



2013

ASME International Mechanical Engineering Congress & Exposition



**November 15–21, 2013
San Diego, California USA**



PROGRAM

Includes Exposition Directory



Join us as we shape the future of engineering

ASME 2013 International Mechanical Engineering Congress & Exposition

November 15-21, 2013 • Manchester Grand Hyatt • San Diego, California, USA

At this year's ASME International Mechanical Engineering Congress; the theme is Advanced Manufacturing. The Congress will focus on today's technical challenges, research updates and breakthrough innovations that are shaping the future of engineering. The Congress convenes nearly 4,000 engineers, scientists and technologists of all disciplines from around the world. In addition to an impressive program which includes: 3,300 technical papers/presentations scheduled among 18 tracks on 245 topics; poster sessions; technical tours and guest tours; student design competition; undergraduate research and design exposition; Honors Assembly; Advanced Manufacturing Impact Forum; and more than 25 exhibitors, you are cordially invited to attend an Opening Keynote on Advanced Manufacturing and three featured presentations with engineering thought leaders.

MONDAY OPENING KEYNOTE: "Advanced Manufacturing: Engaging the Nation and World to Achieve Economic Prosperity."

8:00am – 9:30am (7:30am – 8:00am Continental Breakfast) Manchester Ballroom

Moderator:



Thomas G. Loughlin
CAE, ASME Executive Director

Panelists:



Pradeep K. Khosla
Ph.D., Chancellor, University of California, San Diego



Michael F. Molnar
P.E., Chief Manufacturing Officer, National Institute of Standards & Technology



Greg M. Morris
Strategy & Business Development Lead for Additive Technologies, GE Aviation



Richard Morris
Vice President of Assembly and Logistics at BMW Manufacturing Co., LLC.

MONDAY FEATURED EVENT: Advanced Manufacturing Impact Forum

9:45am – 5:00pm Randle Ballroom AB

This unique one-day event brings together manufacturers, designers, engineers, researchers, and program managers from industry, government, and academia. It focuses on strengthening and shaping the manufacturing community.

Join professionals from NIST, BMW, Northrop Grumman, GE Aviation, UCSD and many more for networking sessions and group town hall discussions. You'll leave with a full understanding of the future of advanced manufacturing.

CONGRESS-WIDE PLENARY SPEAKERS

Tuesday, 11/19 Manchester Ballroom

8:00am – 9:15am (7:30am – 8:00am Continental Breakfast)



"Making Things Matters: The Critical Role of Production Ecosystems to an Innovation Economy"

Martin A. Schmidt
Associate Provost, Professor of Electrical Engineering, MIT

Wednesday, 11/20 Manchester Ballroom

8:00am – 9:15am (7:30am – 8:00am Continental Breakfast)



"The Future of 3D Printing: The Promise and Peril of a Machine That Can Make (Almost) Anything"

Hod Lipson
Professor of Engineering, Cornell University

Thursday, 11/21 Elizabeth Ballroom

12:00pm – 12:45pm (11:30am – 12:00pm Lunch)



"Exploring Mars with Curiosity"

Louise Jandura
Chief Engineer, Jet Propulsion Laboratory, CalTech

WELCOME FROM THE CHAIRS

Welcome to the ASME 2013 International Mechanical Engineering Congress and Exposition (IMECE) at the **Manchester Grand Hyatt San Diego**. Congress offers the unique opportunity to bring together members of academia, industry, and government to discuss a broad range of Mechanical Engineering topics. The 2013 Congress theme is *Advanced Manufacturing* and includes 18 multidisciplinary tracks over 3600 podium and poster presentations. The breadth of the technical tracks that have been organized by our track chairs and topic organizers is truly amazing and shows the dedication of our volunteers.

Congress will kick off with Sunday's Opening Reception in the Exhibit Hall, giving us a chance to refresh our connections and make new ones. Monday's events begin with the keynote panel presentation on *Advanced Manufacturing: Engaging the Nation and the World to Achieve Economic Prosperity*, with Dr. Pradeep Khosla (UCSD), Mr. Michael Molnar (NIST), Mr. Greg Morris (GE Aviation), and Mr. Richard Morris (BMW). Thomas Loughlin, ASME's Executive Director, will moderate the panel. Based on the positive feedback from last year, we have expanded the Congress-wide breakfast and closing lunch sessions with exceptional featured speakers. At Tuesday's breakfast, we will hear from Dr. Martin Schmidt of MIT about *Making Things Matters: The Critical Role of Production Ecosystems to an Innovation Economy*. At Wednesday's breakfast session, we are pleased to host Dr. Hod Lipson of Cornell University on *The Future of 3D Printing: The Promise and Peril of a Machine That Can Make (Almost) Anything*. At Thursday's lunch session, Louise Jandura (JPL, CalTech) will discuss *Exploring Mars With Curiosity*. We are truly honored to have these individuals speak at Congress to give a broader perspective of the challenges and successes that Mechanical Engineering can provide to the industrial and government arenas.

On Monday morning, running in parallel with the technical sessions, the Advanced Manufacturing Impact Forum will showcase luminaries from government, industry, and academia addressing questions of advanced technology and policy, new opportunities created by public and private partnerships, the status of the U.S. Government's initiatives through organizations like the National Additive Manufacturing Innovation Institute and the National Network for Manufacturing Innovation, implications for the future of standards creation, and other topics.

Monday evening's Honors Assembly events spotlight some of the great contributions our society's members have made. Tuesday's featured event is the annual NSF-sponsored Micro/Nano Forum Poster competition, which brings together researchers from across the Mechanical Engineering disciplines to share their findings in this growing area.

Other Congress highlights include Sunday's Student Design Competition, Members and Students Luncheon, as well as an exciting event to help draw and showcase the next generation of engineers to ASME and IMECE: the second annual Undergraduate Expo. This poster session features research performed by undergraduate Mechanical Engineering students from around the world. We encourage everyone to attend and contribute to this wonderful event—you may find the next graduate student or employee among the bright minds participating.

Additional events of interest include the ME Department Heads Forum and the Micro and Nano Forum Poster Session. The National Science Foundation will continue its active support of Congress by holding the CBET/CMMI Info Session, the EEC/Education Session, and the Workshop on Proposal Development. The NSF is funding the CBET/CMMI Student Competition with a selection of 45 nominees among 140 applications from current CBET/CMMI graduate and undergraduate students. The 45 best posters will be showcased during the general Poster Session on Wednesday during lunch time with the latest state-of-the-art research posters on a variety of topics encompassing the essence of all track topics. Use the IMECE itinerary planner to schedule your time for these exciting activities!

There will also be many events hosted by the ASME divisions and committees, including the Heat Transfer Honors and Awards Luncheon and the Applied Mechanics Dinner. Your participation in ASME division and committee meetings is the pathway to helping us continue to improve the Society and future conferences such as IMECE.

An event of this magnitude requires the hard work and dedication of many people, from volunteer organizers to the ASME staff and others too numerous to mention individually here. We want to thank the organizational support of the Congress Steering Committee, our Operations team including our local section representatives, and the dedicated ASME staff with whom we have worked closely. The quality and breadth of the conference program is entirely due to the hard work of our track chairs, topic and symposium organizers, session chairs, reviewers, and judges. These volunteers have put forth an incalculable amount of effort to ensure that this conference has papers and presentations of innovativeness, substance, and quality. Finally, we want to recognize the authors and plenary and keynote speakers whose contributions and insights we have the pleasure of reading and listening to and whose time here is spent generously discussing and exchanging ideas with us.

While attending the Congress, please take the time to thank the ASME staff and volunteers who make IMECE run. We look forward to meeting many of you in the halls of the hotel, at the special events, presentations, and in technical sessions. We hope you enjoy Congress!

Sincerely,



Assimina (Mina) Pelegri
2013 Congress Technical
Program Chair



Aaron Knobloch
2013 Congress
General Chair



George Kardomateas
2013 Congress Technical
Program Vice Chair



Pradeep Lall
2013 Congress Steering
Committee Chair





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SPECIAL EVENTS AND ACTIVITIES DAILY SUMMARY

ACTIVITIES SUMMARY BY DAY

FRIDAY, NOVEMBER 15

Conference Registration/Information Desk Open
12:00pm–5:00pm p. 6

ASME Business Meeting
5:00pm–5:30pm p. 7

SATURDAY, NOVEMBER 16

Conference Registration/Information Desk Open
7:00am–6:00pm p. 6

Old Guard Oral Presentation Competition Finals
9:00am–4:00pm p. 7

History and Heritage Engineer - Historian Award Reception
6:30pm–7:30pm p. 8

Old Guard Oral Presentation Reception
7:00pm–8:30pm p. 8

SUNDAY, NOVEMBER 17

Conference Registration/Information Desk Open
6:30am–7:00pm p. 6

Check-in for 5K Fun Run/Walk
6:30am–7:00am p. 8

5K Fun Run/Walk
7:00am–8:30am p. 8

Guest/Spouse Hospitality
7:30am–10:00am p. 5

Student Design Competition Finals, Awards and Reception
8:00am–5:00pm p. 8

Guest Tour: San Diego by Land and By Sea
10:00pm–3:00pm p. 9

Technical Tour: San Salvador Ship Building Site (Ticket Required)
11:00am–1:00pm p. 9

Members and Students Luncheon (Ticket Required)
12:00pm–1:30pm p. 9

VOLT Workshop: Serving at the ASME Governance Level
2:00pm–3:30pm p. 10

First-Time Attendee Orientation
2:00pm–2:45pm p. 10

Opening Reception/Exhibits
6:00pm–7:30pm p. 10

International Undergraduate Student Exposition
6:00pm–7:30pm p. 10

Social Meet-Up for Early Career Engineers Featuring Mini-Talks
8:00pm–10:00pm p. 10

MONDAY, NOVEMBER 18

Conference Registration/Information Desk Open
7:00am–6:00pm p. 6

Author/Speaker Practice Room
7:00am–5:00pm p. 4

Guest/Spouse Hospitality
7:30am–10:00am p. 5

Keynote Event: Advanced Manufacturing: Engaging the Nation and World
8:00am–9:30am p. 12

Continental Breakfast Served from 7:30am–8:00am

Advanced Manufacturing Impact Forum
9:45am–5:00pm p. 45-46

Technical Sessions
9:45am–11:30am p. 47

Technical Tour: General Atomics DIII-D National Fusion Facilities
9:00am–11:00am p. 13

Robert Henry Thurston Lecture
10:00am–12:00pm p. 13

VOLT Workshop: Serving at the ASME Governance Level
10:00am–11:30am p. 13

Exhibits Open
11:00am–4:00pm p. 5

Lunch in the Exhibit Hall (For Full or Monday-only registrants)
11:30am–12:30pm p. 5

Presidents Luncheon (Ticket Required)
12:00pm–1:30pm p. 12

Technical Sessions
1:00pm–2:45pm p. 47

Department Heads Forum
1:30pm–3:30pm p. 13

Technical Sessions
3:00pm–4:45pm p. 47

Honors Reception (All attendees are invited)
5:15pm–6:00pm p. 13

Honors Assembly (All attendees are invited)
6:00pm–7:30pm p. 13

Honors Dinner (Ticket Required)
7:30pm–10:30pm p. 15

TUESDAY, NOVEMBER 19

Conference Registration/Information Desk Open
7:00am–7:00pm p. 6

Author/Speaker Practice Room
7:00am–5:00pm p. 4

Guest/Spouse Hospitality
7:30am–10:00am p. 5

Congress-Wide Plenary Session
8:00am–9:15am p. 16

Continental Breakfast Served from 7:30am–8:00am

Technical Tour: Solar Turbines
9:00am–11:00am p. 16

ME Department Heads Professional Development Workshop
9:00am–10:30am p. 16

Technical Sessions
9:45am–11:30am p. 47

CMMI and CBET Funding Opportunities: An Overview
9:45am–11:00am p. 18

SPECIAL EVENTS AND ACTIVITIES DAILY SUMMARY

NSF/Federal Agency Discussion
11:00am–12:15pm p. 19

Exhibits Open
11:00am–4:00pm p. 5

Lunch in the Exhibit Hall (For Full or Tuesday-only registrants)
11:30am–12:30pm p. 5

Heat Transfer Division Luncheon (Ticket Required)
11:00am–1:00pm p. 17

Micro and NanoTechnology Society-Wide Forum
12:30pm–4:00pm p. 17

Technical Sessions
1:00pm–2:45pm p. 47

Guest Luncheon (sponsored by the ASME Auxiliary)
(Ticket Required)
1:00pm–3:00pm p. 17

Symposium for New and Prospective Faculty: Tips for Tenure
and Promotion
1:00pm–3:00pm p. 17

Rayleigh Lecture
3:00pm–4:45pm p. 18

Coffee Break
2:45pm–3:00pm p. 6

Technical Sessions
3:00pm–4:45pm p. 47

NSF Proposal Development Workshop
3:15pm–5:45pm p. 18

Strategy Workshop for Women: Get Your Career
Accomplishments Recognized
3:30pm–5:00pm p. 18

Technical Sessions
5:00pm–6:45pm p. 47

ASME Women Engineers Reception
5:00pm–6:00pm p. 18

Koiter Lecture
5:00pm–6:45pm p. 18

Advanced Energy Systems Division Reception and
Frank Kreith Award Lecture
5:30pm–7:30pm p. 19

Fluids Engineering Reception
6:30pm–8:30pm p. 19

Applied Mechanics Division Honors and Awards Banquet
(Ticket Required)
6:30pm–9:30pm p. 19

Electronic and Photonic Packaging Division Reception
6:45pm–8:45pm p. 19

WEDNESDAY, NOVEMBER 20

Conference Registration/Information Desk
7:00am–7:00pm p. 6

Author/Speaker Practice Room
7:00am–5:00pm p. 4

Guest/Spouse Hospitality
7:30am–10:00am p. 5

Congress-Wide Plenary Session
8:00am–9:15am p. 20
Continental Breakfast Served from 7:30am–8:00am

Technical Sessions
9:45am–11:30am p. 47

Exhibits Open
11:00am–3:00pm p. 5

Lunch in the Exhibit Hall (For Full or Wednesday-only registrants)
11:30am–12:30pm p. 5

General Poster Session
11:30am–3:00pm p. 20

Technical Tour: University of California San Diego Shake Table
2:00pm–4:00pm p. 20

Technical Sessions
1:00pm–2:45pm p. 47

Materials Division Awards and Reception:
Orr Lecture; Sia Nemat-Nasser Lecture; Nadai Lecture
2:30pm–7:30pm p. 20-22

Coffee Break
2:45pm–3:00pm p. 6

Technical Sessions
3:00pm–4:45pm p. 47

Technical Sessions
5:00pm–6:45pm p. 47

Fluids Engineering Division Reception
6:30pm–8:30pm p. 22

THURSDAY, NOVEMBER 21

Conference Registration/Information Desk
7:00am–5:00pm p. 6

Author/Speaker Practice Room
7:00am–5:00pm p. 4

Authors' Breakfast (For all Thursday authors and organizers)
7:00am–7:30am p. 4

Guest/Spouse Hospitality
7:30am–10:00am p. 5

Technical Sessions
7:45am–9:15am p. 47

Technical Sessions
9:30am–11:15am p. 47

Lunch/Congress-Wide Plenary Session
(For Full or Thursday-only registrants)
11:30am–12:45pm p. 23

Technical Sessions
1:00pm–2:45pm p. 47

Coffee Break
2:45pm–3:00pm p. 6

Technical Sessions
3:00pm–4:45pm p. 47

GENERAL INFORMATION

AUTHOR/SPEAKER PRACTICE ROOM

Room Annie A on the Hyatt's 3rd Floor will serve as the Authors'/Speakers' Practice Room Monday–Thursday 7:00am–5:00pm. The room is equipped with two (2) LCD projectors and two (2) screens for authors/speakers to practice their presentations.

AUTHORS/PRESENTERS, PLEASE NOTE: EQUIPMENT IN SESSION ROOMS

All technical sessions are equipped with one LCD projector and one screen. Laptops will NOT be provided in the sessions; you MUST bring your own.

AUTHORS' & SESSION CHAIRS' BRIEFING/BREAKFAST FOR THURSDAY SESSIONS

Elizabeth Ballroom ABC, Level Two

Authors, Panelists, Topic Organizers, Chairs, and Vice-Chairs for Thursday's sessions are requested to attend a briefing/breakfast Thursday at 7:00am. Tables will be assigned according to session. Session protocol will be discussed, and the participants will have the opportunity to become better acquainted with one another before their scheduled sessions. Please be sure to come early to load **ALL** presentations onto one laptop. As a reminder, **ALL** session rooms will be equipped with one LCD projector, one screen, and one podium microphone. Laptops are **NOT** provided for this conference.

AWARDS & TICKET SALES

Many division and society awards are given at Congress. Tickets for all functions may be purchased on-site at the ASME Registration Desk. Please purchase tickets as soon as possible after you register. Tickets for all events will be sold up to 24 hours prior to the event or as long as there is flexibility to adjust the guarantee.

BADGES ARE REQUIRED FOR ADMISSION TO ALL EVENTS

All conference attendees must wear their official 2013 ASME Congress badge. No one will be admitted to the technical session area unless he/she has registered and is wearing a badge. The Congress provides an opportunity to meet and exchange experiences with colleagues from around the world. Your badge helps introduce you to the other registrants.

BUSINESS CENTER AT THE MANCHESTER GRAND HYATT

The FedEx Office Business Center is open daily 7am–7pm on the Lobby Level, Harbor Tower. It offers a variety of printing, copying, Internet, and shipping services. In addition, the hotel has an area in the Douglas Pavilion, Lobby Level, where guests can access photocopying and Internet services on a 24-hour basis.

CHILD CARE INFORMATION

Manchester Grand Hyatt San Diego Babysitting Service: Marion's Childcare (<http://www.hotelchildcare.com>)

Since 1981, Marion's Childcare has been providing quality hotel babysitting for hotels across San Diego County. Now with over 30 years of experience, their superior childcare service caters to all of the area's best resorts. They have an experienced and nurturing staff of background-checked, referenced, screened caregivers on hand at all times to provide fun, safe, worry-free care for your children. Sitters come equipped with toys and games appropriate to your children's ages, and they follow your directions carefully to ensure a fun and safe time for everyone.

Rates: \$17* for 1–2 children in the same family; \$18* for 3–4 children in the same family; \$19* for combined families, up to 4 children (age restrictions may apply); *\$1 surcharge for North County locations

Policies: Payment must be made in cash, directly to the care provider. There is a 4-hour minimum, each time of service. The client is responsible for any parking charges. Transportation charges (\$7+) may apply for locations in the extreme North County. Overnight stays must be coordinated in advance. Charges for overnight stays are regular rates, except for 8 sleeping hours, which are billed at 1/2 of the regular rate. We require a three-hour notification for cancellations. Cancellations within three hours of the time of service will be billed \$25.00. Cancellations within 1 hour of the time of service will be billed the full four-hour minimum. We prefer a three-hours notice for time changes. Time changes within one hour of the start time will be billed from the original start time.

To book a Marion's Childcare caregiver, contact Amy Gray at (619) 303-4379 or amy@hotelchildcare.com.

CYBER CAFÉ (Sponsored By Marsh)



ASME members can choose from an array of insurance programs, such as life, long-term care, accident, and disability, along with many other programs administered by Marsh U.S. Consumer, a service of Seabury & Smith, Inc.

Come check your e-mail during the exhibit hall hours at one of our e-mail stations located within the exhibit hall (Douglas Pavilion, Lobby Level).

EMERGENCY INFORMATION

Manchester Grand Hyatt San Diego

If you need medical help or have any kind of emergency in the hotel, dial "55" to be connected directly to 24-hour Hotel Security; or, dial "0" and the hotel operator will connect you. If you are seeking medical assistance for any of the following services, Hospitals, Doctors, Dental or Pharmacy Services, the following information is provided to assist you. Please keep in mind the hotel employees cannot make any specific recommendations.

- Hotel Doctor – (800) 955-8911 or (619) 464-1169
- Travel Med – (800-878-3627)
- Midway Urgent Care – (619) 225-6200, 3434 Midway Drive
- Mercy Hospital – (619) 294-8111, 4077 5th Avenue at Washington Street
- Dental Referrals – (800)-DENTIST
- Ralph's Grocery Store Pharmacy – (619) 237-7660, 1st Avenue at G Street (closest to the Hotel)

What to do in Emergency Situations:

Remember, the hotel has an Emergency Response Team that will guide you through all emergencies. There are also speakers throughout hotel that will advise everyone in the building of an emergency situation and guide you safely. For your safety, please follow these important safety guidelines:

- Never use an elevator during evacuation.
- Evacuate via the emergency exists in an orderly manner to the designated Evacuation Areas.
- Do not leave the Evacuation Areas until you have been accounted for and/or directed by the Emergency
- Never reenter the building until directed by the Emergency Response Team

EXHIBITS

Sunday, November 17	6:00pm–7:30pm
Monday, November 18	11:00am–4:00pm
Tuesday, November 19	11:00am–4:00pm
Wednesday, November 20	11:00am–3:00pm

Exhibits are located in the Douglas Pavilion, Lobby Level

GUEST/SPOUSE HOSPITALITY

Registered guests and spouses are welcome to have Continental breakfast from 7:00am-10:00am Sunday-Thursday in Parlor Suite 477.

ASME Itinerary Planner

Create your own personalized conference itinerary with the new ASME Itinerary Planner Mobile App for the iPhone, iPad, Android, and Blackberry. Add technical sessions, committee meetings, special events, personal appointments, and tours to your schedule. View abstracts, exhibitor information, and more. For information on downloading the Mobile App, please go to: <http://www.asmeconferences.org/Congress2013/>

LUNCH

Lunch will be served Monday–Thursday in the Exhibit Hall (Douglas Pavilion, Lobby Level) 11:30am–12:30pm. All Fully Paid conference attendees are entitled to attend. Guests/Committee Members interested in buying a ticket to the lunch can purchase them at the Registration Desk for \$40 each or \$155 for the entire week.

MEETING INFORMATION/MESSAGE DESKS—HAVE A QUESTION?

Staff at the ASME Meeting Information Desk (in the Elizabeth Ballroom Foyer) will be happy to answer your questions! The desk will follow the Registration Hours of the conference.

MEMBERSHIP TO ASME (One-Year Free)

Non-ASME Members who pay the non-Member conference registration fee, including students who pay the non-Member student fee, will receive a one-year FREE ASME Membership. ASME will automatically activate this complimentary membership for qualified attendees. Please allow approximately four weeks after the conclusion of the conference for your membership to become active. Visit www.asme.org/membership for more information about the benefits of ASME Membership.

PHOTOGRAPHY

ASME has retained the services of a photographer to capture photo images of the events and activities from the conference. The photographer will be taking photos as assigned by the ASME Communications Department. All photographs are the sole

property of ASME, and ASME retains all rights in and to said photographs, which may be used for promotional purposes only, including, but not limited to, the ASME website. If you require more information about the use of Congress photographs, please go to the Press Desk at Conference Registration.

PRESENTER ATTENDANCE POLICY

The compilation presented in the DVD is not the archival version of the Proceedings. Paper information contained therein should not be used for citation purposes. According to ASME's Presenter Attendance Policy, if a paper is not presented at the conference, the paper will not be published in the official Archival Proceedings, which are registered with the Library of Congress and are abstracted and indexed. The paper also will not be published in the ASME Digital Collection and may not be cited as a published paper.

PROFESSIONAL DEVELOPMENT HOURS WHILE AT CONGRESS

In keeping with the ongoing need of engineers to monitor their continuing professional development, Congress attendees can earn PDH credits. Please note: Approval of credits rests with each state's licensing board, and individuals must keep track of their PDH credits. Please go to the ASME Meeting Information Desk for more information.

PUBLICATIONS/ASME MEMBERSHIP

Located within the ASME booth in the Exhibit Hall (Douglas Pavilion, Lobby Level), publications and membership information will be open during exhibit hours.

Information about all ASME publications, such as Proceedings, Transaction Journals, ASME Press, Codes & Standards, Catalogs, and the ASME Digital Library, and other information is available at the ASME Booth. During the conference, all publications are sold at the ASME member price. Prepaid orders will be taken for publications not available at the Congress. You will be billed for shipping and handling charges. Within the U.S. Postal Service, airmail, first class, or any other expedited shipment must be specified, if desired, and charges will be billed to you.

ASME accepts payment in cash, checks, VISA, MasterCard, American Express, and Discover. Conference volumes and technical papers may be ordered after the Congress by contacting the ASME Order Department, 22 Law Drive, PO Box 2300, Fairfield, NJ 07007-2900, or by calling 800-THE-ASME. Payment must accompany order (check or credit card) and California, Georgia, Illinois, and Texas purchasers must add the appropriate state sales tax or furnish an exemption certificate. International and Canadian checks will not be accepted, unless payable through a U.S. Bank.

PUBLICATIONS: IMECE2013 DVD

The collection of technical papers accepted for presentation and publication for IMECE2013 are posted on the Conference DVD and distributed to registered attendees at the Conference. Presentations, such as panels or posters, that do not have an accompanying paper, are considered to be "Oral Presentation Only," and do not appear on the DVD. Please note that the DVD is not the official proceedings of the Conference, which is published in print after the Conference and is also made available online on the ASME Digital Collection at <http://asmedigitalcollection.asme.org>. As such, papers that appear on the DVD may not be cited until after the official Proceedings have been published.

SPECIAL EVENTS FRIDAY / SATURDAY

PUBLICATIONS: Post-Conference Proceedings

Printed volumes of the official Conference Proceedings may be ordered after the Conference by contacting customercare@asme.org or calling 800-THE-ASME. Please check with ASME after the Conference for approximate date of release. The Conference Proceedings will also be available after the Conference via the ASME Digital Collection at <http://asmedigitalcollection.asme.org>.

RECREATION AT THE MANCHESTER GRAND HYATT

Tennis

Tennis/Sports Courts

An inspiring background adds a whole new dimension to your tennis game at our luxury resort in San Diego. Imagine returning a serve while the city spreads out below. Listen for the distinct sound of the ball hitting the sweet spot on your racquet, while the sounds of waves wash over you. San Diego resort tennis facilities let you enjoy the perfect Southern California weather in a memorable setting, ideal whether you are a serious player looking for a challenging game or simply want to hit a few balls for relaxation. Tennis facilities include four hard courts, racquet rental, balls, and lessons from our tennis pro. Reservations for the courts are available through the Kin Spa, located on the 3rd floor of the Harbor Tower.

Equipment rentals are available by touching 6699

Costs:

Court Rental \$15/hour

Racquet Rental \$12/racquet

Balls \$5/can

Tennis Pro \$85/hour, by appointment only

Refreshment Breaks:

Coffee/tea/decaf will be available on Monday, Tuesday, and Wednesday afternoon from 2:45pm-3:00pm in the Exhibit Hall (Douglas Pavilion, Lobby Level.) Thursday's refreshment break will be from 2:45pm-3:00pm in Elizabeth Ballroom Foyer, Level Two.

REGISTRATION DESK/MEETING INFORMATION DESK HOURS

Friday, November 15	12:00pm–5:00pm
Saturday, November 16	7:00am–6:00pm
Sunday, November 17	6:30am–7:00pm
Monday, November 18	7:00am–6:00pm
Tuesday, November 19	7:00am–7:00pm
Wednesday, November 20	7:00am–7:00pm
Thursday, November 21	7:00am–5:00pm

REGISTRANTS WITH DISABILITIES

Whenever possible, we are pleased to accommodate attendees with special needs. Advanced notice may be required for certain requests. For on-site assistance related directly to the conference events and for general conference questions, please visit the ASME Information desk in the Litrenta Lobby, 2nd Floor. For special needs related to your hotel stay, please visit the Manchester Grand Hyatt concierge desk in the main lobby.

TRANSPORTATION AROUND SAN DIEGO/GAS LAMP DISTRICT

Taxis: Available 24 hours right outside the front lobby.

Shuttle service: to the airport must be booked in advance. The Hyatt uses Super Shuttle and the concierge can help with your reservation. Or, if you prefer, you can book your reservation online and save \$2!

Hertz Car Rental: is located in the main lobby of the Hyatt from 8:00am to 6:00pm, Monday–Friday, and Saturday and Sunday from 9:00am to 5:00pm. For reservations, call ext. 6771 within the hotel. The Concierge can assist with other car rental arrangements

Right outside the hotel, there are two unique ways to see more of San Diego:

Red Trolley: The iconic bright red trolley will take you in and around the city. The San Diego Trolley provides convenient services from key locations downtown, including the Santa Fe Depot and the San Diego Convention Center, crisscrossing through downtown and out to various locations like Old Town and Mission Valley. There are three trolley lines (Blue, Orange, and Green) that service the downtown San Diego communities and beyond, covering 51 miles of track and 53 stations. Fares run from \$1.50 to \$3 one way, and trolleys run an average of every 15 minutes, 7 minutes during peak and 30 minutes during off-peak hours.

Water Taxi: San Diego Water Taxi offers on-call transportation services in San Diego Bay. Service runs between Harbor Island, Shelter Island, Downtown, and Coronado, where you can relax and enjoy the scenery and beautiful downtown skylines from the water. Hop serenely from place to place conveniently from your hotel to nearby shopping centers and restaurants.

The Gas Lamp District is a ten-minute walk from the Manchester Grand Hyatt.

Rising from the 16 square blocks are Victorian-era buildings and modern skyscrapers that stand side by side, housing more than 100 of the city's finest restaurants, pubs, nightclubs, and retail shops, as well as offices and residential/work lofts. Downtown San Diego's Gaslamp Quarter is a veritable playground, rich with cultural offerings that include theatres, art galleries, symphony halls, concert venues, and museums. Dining options are plenty with options for al fresco on the sidewalks of this dynamic and cosmopolitan district, sky high at a rooftop lounge, or in an intimate and ornately designed restaurant.

Under the sparkling night sky on a cool California evening, the Gaslamp Quarter transforms into a sophisticated cosmopolitan playground as thousands come out in style for a night of fine dining, craft cocktails, live theatre, music, and dancing. Make a reservation at any of the high-profile restaurants featuring celebrity chefs, enjoy a signature cocktail by a crafty mixologist at a rooftop bar, or groove and sizzle on the dance floor at any of the happening nightclubs.

TWITTER

Join the fun online! Use and follow the hashtag #IMECE2013 to see real-time comments and updates!

Participate and follow the IMECE 2013 Group at ASME.org for conversation during and after the conference.

WIFI

Free Internet access is available for all ASME attendees in the guest rooms.

Free Internet is also provided in all the meeting space courtesy of ASME.org.



Friday, November 15

ASME Business Meeting

5:00pm–5:30pm

Manchester G, Level Two

Call to order by Madiha El Mehelmy Kotb, ASME President, 2013–2014

Report by the Treasurer

Ratification of Auditor

Membership Report

2012–2013 Annual Report of the Executive Director

State of the Society Video Preview

Election of the 2014 Nominating Committee

Report on Proxies Received

President 2014–2015

Board of Governors 2014–2017

Vice Presidents 2014–2017

Other Business

Saturday, November 16

Old Guard Oral Presentation Competition Finals

9:00am–5:00pm

Randle D, Level Four

All are invited to attend the finals of the Society-level Old Guard Oral Presentation Competition. Meet the engineering students who have successfully competed at their local universities, at the ASME Student Professional Development Conferences (SPDCs), and are now vying for the \$2,000 ASME Old Guard Prize for outstanding presentation skills.

Like all effective professionals, engineers must possess a well-developed ability to synthesize issues and communicate both orally and in writing. This competition is designed to emphasize the value of an ability to deliver clear, concise, and effective oral presentations, particularly pertaining to some sphere in which an engineer is or should be involved. Presentation topics must address a technical, economic, or environmental aspect of engineering or other basic engineering theme and often relate to the students' engineering design/analysis projects.

For more information: please visit
<https://www.asme.org/events/competitions/old-guard-competitions/old-guard-prize-oral-presentation-competition/>

Participants:

District B

Zachary Young

Cedarville University

Design of a Macrofluidic Cell Flow Chamber

District D

Harikrishna Patadiya

San Jose State University

Total Knee Replacement (TKR) Testing Device

District G

Manish Pokhrel

UET, Lahore, Pakistan

Ornithopter—Flap and Fly

District F

Mason Chilmonczyk

University of South Florida

Technical Design, Implementation, & Control of an Atomic Layer Deposition (ALD) Reactor into a Pre-Existing UHV Analysis Chamber

District J

Deepan Kishore Kumar

BITS – Pilani

MEMS Technology for the Diagnosis and Treatment of Benign Paroxysmal Positional Vertigo

District A

Matt Wahl

Union College

Technical Swimsuit Design Using Silica Aerogels

District I

Alejandra Castelblanco

Universidad de los Andes

Heat and Mass Transfer Model for Amphibians

District E

Kyle Hampton

University of Tulsa

Design and Analysis of an RC Airplane for the SAE Aero Design Competition

District C

John Cote

Milwaukee School of Engineering

Caterpillar 7495 Electric Rope Shovel—Alternative Boarding System

District E

Pablo Alejandro Rocabado Soria

ITESM Toluca

CFD Analysis for Air Conditioning Ducts

District D

Thomas Larson

University of Washington

Cell Phone Microscopy

District H

Kristian Saull

Loughborough University

Automatic Neurosurgical Drill Unit With Force Control

District A

Jerry Wang

Yale University

Lagrangian Studies on Inertial Particles in Two-Dimensional Flows

District F

Andrew Rydalch

U.S. Naval Academy

Drag Reduction Over SLIP Surfaces

SPECIAL EVENTS SATURDAY**ASME History & Heritage Engineer – Historian Award Reception**

Open to the Public

6:30pm–7:30pm

America's Cup D, Level Four

Sponsored by the ASME History & Heritage Committee

**Gail Marcus**

Please join us for a special reception as the History & Heritage Committee gives its prestigious Engineer-Historian Award to Dr. Gail Marcus for her book *Nuclear Firsts: Milestones on the Road to Nuclear Power Development*. The Engineer-Historian Award is presented for outstanding published work by an engineer on a topic in the history of

mechanical engineering.

Nuclear Firsts chronicles the major technical and institutional steps in the development of nuclear power, in the U.S. and abroad, from the earliest research on the atom.

Dr. Marcus is a consultant on nuclear power technology and policy. She has over 30 years of experience working on nuclear regulation and development for domestic and international agencies. She is also a past president of the American Nuclear Society, and a fellow of both the American Nuclear Society and the American Association for the Advancement of Science.

Dr. Marcus also advises engineering students studying science policy in Washington as part of the Washington Internships for Students of Engineering program (WISE).

Old Guard Young Engineers Reception

7:00pm–8:30pm

America's Cup BC, Level Four

SPECIAL EVENTS SUNDAY**Sunday, November 17****5K Fun Run/Walk**

Sponsored by the ASME Foundation

100% of your entry fee will be donated to Engineers without Borders, USA

7:00am–8:30am (Check-in at 6:30am)

Seaport Courtyard, Lobby Level

Ticket: \$25

Kick up your sneakers for a good cause! The scenic 5K course is right outside the hotel along beautiful Embarcadero Bay.

2013 ASME Student Design Competition Finals, Award Ceremony and Reception

8:00am–5:00pm

Randle ABC, Level Four

Participant Check-In: 9:00am

Participant Setup: 9:00–Noon

Competition: 1:30pm–3:30pm

After the tragedy at the Fukushima nuclear facility following the March 2011 Tohoku earthquake and tsunami, the nuclear industry has issued a Request for Proposal (RFP) to design and build a small, remotely controlled inspection vehicle. The purpose of the vehicle is to determine the level of radioactivity at specified locations and inspect for damage. This vehicle will protect the human operator from absorbing a high dose of radioactive contamination. There is information that could be gained by the inspection vehicle that could inform the plant operators so that they may avert an accident or begin repairs.

Our competitor's task is to design a remotely controlled, proof-of-concept vehicle for inspection purposes. The vehicle must be able to negotiate around obstacles, both in getting to the inspection points and in bringing the sensor back to the designated return area. The vehicle must then return to its starting location, ready for another run.

Participating Teams:

Worcester Polytechnic Institute

New York Institute of Technology

New Jersey Institute of Technology

Ryerson University

Grand Valley State University

University of St. Thomas

South Dakota State University

University of Pacific

University of the Pacific

University of San Diego

University of Arkansas at Little Rock

Instituto Tecnológico de Ciudad Juárez, Mexico

University of Virginia

Western Kentucky University

North Carolina State University

Indian Institute of Technology, Bombay, India

ISAE-SUPAERO, Toulouse, France

Ozyegin University, Istanbul, Turkey

Universidad de los Andes

Universidad Nacional de Ingeniería

Khalifa University, Abu Dhabi, UAE

Notre Dame University, Louaize, Lebanon

British University of Egypt, Egypt, Africa

The Higher Technological Institute, Egypt, Africa

BITS Pilani, India

Hong Kong Polytechnic University, Hong Kong

For more information, visit

<http://www.asme.org/events/competitions/student-design-competition>

Major funding provided by:



Please make plans to attend and support these talented engineering students—you never know, your next grad student or new hire may be a competitor in these finals.

Members and Students Luncheon

12:00pm–1:30pm

*Sponsored by the Committee on Honors
Elizabeth FG, Level Two*

Tickets: \$60 (Members and Non-Members); \$30 (Students)

Edwin F. Church Medal

*William M. Worek, Ph.D., Fellow
Stony Brook University*

William T. Ennor Manufacturing Technology Award

*John W. Sutherland, Ph.D., Fellow
Purdue University*

Gustus L. Larson Memorial Award

*William P. King, Ph.D., Fellow
University of Illinois at Urbana-Champaign*

Charles T. Main Student Section Award – Gold

*Leila C. Aboharb, Member
Drexel University*

Charles T. Main Student Section Award – Silver

*Sarah E. Johnson, Member
The University of Alabama*

McDonald Mentoring Award

*Abel Hernandez-Guerrero, Ph.D., Fellow
Universidad de Guanajuato*

Pi Tau Sigma Gold Medal

*Randy H. Ewoldt, Ph.D., Member
University of Illinois at Urbana-Champaign*

Charles Russ Richards Memorial Award

*A. Galip Ulsoy, Ph.D., Fellow
University of Michigan*

Old Guard Early Career Award

*Jared B. Garrison, Member
The University of Texas at Austin*

Student Section Advisor Award

*Richard A. Merz, Ph.D., Fellow
Lafayette College*

Arthur L. Williston Medal

*Cassandra N. Hawley, Member
United States Coast Guard Academy*

George Westinghouse Gold Medal

*Yiannis A. Levendis, Ph.D., Fellow
Northeastern University*

Ben C. Sparks Medal

*Robert Warrington, Ph.D., Fellow
Michigan Technological University
Scott G. Danielson, Ph.D., Member
Arizona State University
Allan T. Kirkpatrick, Ph.D., Fellow
Colorado State University
Walter W. Laity, Ph.D., Member **(Deceased)**
Pacific Northwest National Laboratory*

SPECIAL EVENTS SUNDAY

VOLT Workshop: Serving at the ASME Governance Level

2:00pm–3:30pm

Cunningham A, Level Four

The Volunteer Orientation and Leadership Training Academy welcomes volunteers interested in serving at ASME's administrative level. We will explore ASME opportunities for fulfilling personal and career goals as well as provide guidance on the important role of ASME's Nominating Committee in electing Society Officers. Panelists will discuss what it takes to serve at the governance level and the different paths they took to become ASME leaders.

First-Time Attendee Orientation

2:00pm–2:45pm

Randle E, Level Four

First time Congress attendees are cordially invited to a relaxing and informative orientation! Join your colleagues for light refreshments as Congress organizers share tips on how best to navigate the conference and to make the most out of your Congress experience.

Exhibit Hall Grand Opening, Ribbon Cutting and Opening Reception

6:00pm–7:30pm

(Open to All Congress Attendees)

Douglas Pavilion, Lobby Level

This event is perfect for mixing and mingling with friends and colleagues: old and new! All registrants are invited; be sure to wear your name badge.

International Undergraduate Research and Design Exposition

6:00pm–7:30pm

Douglas Pavilion, Lobby Level

Poster Set-Up:	3:00pm–5:00pm
Expo (General Viewing)	6:00pm–7:30pm
Winners Announced:	7:30pm–8:00pm

The Student Expo will provide engineering undergraduate students with a professional technical forum for presenting their research, design project, and other engineering solutions and endeavors to top researchers and scientists from academia, industry, government, prospective employers, entrepreneurs, graduate schools, and potential faculty advisors.

Undergraduate Expo Winners

1st Place - Ozyegin University

Umut Yuruker
Enes Tamdogan
Mehmet Arik

2nd Place - University of Kansas

Henry Clever
Henry Evans
Sarah Kieweg

3rd Place - University of Pennsylvania

Lauren Davis
Michael Kofron
Stella Latscha
Gabrielle Merritt
Anthony Stroffolino
Mark Yim

The Undergraduate Expo is sponsored by

Mechanical and Aerospace Engineering Department
Rutgers, The State University of New Jersey

Mechanical Engineering, University of Maryland

Assimina Pelegri, PhD

Mary W. Raisler Distinguished Teaching Chair, MAE Rutgers

Vote for Your Favorite Poster at Sunday's Undergrad Research and Design Expo

Using the Audience Voting feature of your Itinerary Planner Mobile App, you can vote for and rank your favorite top posters at Sunday's *Undergrad Research and Design Expo*. You must first build your conference schedule on the Congress2013 Itinerary Planner Website, and then download the App to your mobile device. You must also be physically present at the session. For further details, refer to Track 17 in your conference program. For information on downloading the Mobile App, please go to: <http://www.asmeconferences.org/Congress2013/>

Social Meet-Up for Early Career Engineers Featuring Mini-Talks

8:00pm–10:00pm

Elizabeth H, Level Two

*Hosted by the Board on Career Development
Supported by the ASME Early Career Connect Affinity Group*

Come meet up with other engineers with similar interests to network professionally and make new connections with ASME leadership and/or renew past friendships. This year's meet up will feature four innovators delivering inspirational mini-talks covering a diverse selection of topics in Leadership, Career Advancement, Negotiations, and Advanced Manufacturing.

Program Host



Rhea Naidoo

Project Engineer at Glencore Alloys

Host Biography: Rhea Naidoo is an active ASME volunteer and currently Chair of the Early Career Connect Affinity Group. Rhea graduated from the University of Cape Town, South Africa, where she was heavily involved in Engineers Without Borders. She has since been working on capital expansion

projects in South Africa for Glencore Alloys, with expertise in the design of processing and smelting plants. Rhea is also a part-time writer with an engineering-related blog and has contributed articles to *ASME News and ME Today*.

Leading Career Enhancement



Jennifer Bell

B.Sc. Eng, MBA, Sustainability Analyst at Elements Offshore, Chair of ASME's Petroleum Division Executive Committee and ASME International IPTI Board Member

Jennifer shares from her own experiences on how leadership roles can enhance your career.

Biography: Jennifer Bell has 20 years'

experience of combined engineering and leadership training. She received her Bachelors of Science in mechanical engineering from Texas Tech University. Jennifer has had roles in downstream, midstream, and upstream oil and gas industry with positions that include Risk and Reliability Consultant, Intervention Engineer, Subsea Systems Reliability Engineer, Subsea Systems Integrity Management Team Lead, and Offshore Interface and Coordination Manager. She left Chevron in early 2012 to pursue both a Master's in engineering and MBA. She completed her MBA with concentrations in finance, environment, and sustainability in June 2013 and working toward her Master's in reliability engineering at Arizona State University. In addition, Jennifer currently serves as the current chairman of the ASME Petroleum Division Executive Committee and the newest Board member to ASME's International Petroleum Technology Institute.

It Depends...In Negotiations



Jeremy Cooper

Marketing Manager at Nucor Steel Arkansas

Jeremy presents the challenges of negotiating and lessons learned from an engineer that has transitioned into sales and marketing.

Biography: Jeremy Cooper is a marketing manager at Nucor Steel Arkansas, a division of Nucor Corporation.

He graduated from the University of Missouri-Rolla with a degree in metallurgical engineering. Jeremy interned at Nucor as an undergraduate student before starting full time as applications engineer/scheduler. Jeremy worked as a process metallurgist with experience in hot rolling, pickling, and automotive OEM accounts before transitioning to sales. Jeremy's roles in sales have included positions with the Nucor Sheet Mill Group as district sales manager in Denver and Houston prior to his current responsibilities.

Taking Risks for Career Advancement



Bethany Johnson

Sr. Account Executive at Complete Office of California

Advancing your career sometimes requires taking risks. Bethany shares from personal examples how taking risks can lead to advances in your career.

Biography: Bethany Johnson is a senior account executive at Complete Office of

California. She graduated from the University of Oklahoma with a degree in business administration in marketing. Bethany has eight years of account management, customer service and marketing experience. Her role involves new client acquisitions and client relationship development. She is also Marketing Chair on the board of the Copley Family YMCA as well as a mentor for the Jenna Druck Foundation Spirit of Leadership Program.

Manufacturing My Career



Jay Beversdorf

Application Engineer at Stratasys, Inc.

Join Jay, as he shares his early career journey in manufacturing in keeping with IMECE 2013's theme of Advanced Manufacturing.

Biography: Jay Beversdorf earned his B.S. in mechanical engineering at the University of Minnesota. He has been working as an application engineer at

Stratasys in Eden Prairie, MN for the past two and a half years. He has been a member of ASME since 2010 and SME since 2011. Jay's primary role as an application engineer has been to help spread the use of 3D printing through both educating current and prospective Stratasys customers, and researching/developing new additive manufacturing applications. He is currently pursuing an MBA through the University of St. Thomas and is expecting to graduate in 2016.

Other meet-up highlights

- Get connected with fellow early career engineers before the conference begins.
- Meet Mechanical Engineering Department Heads from various universities distributing information on graduate education and entry-level faculty openings.
- Enjoy ice cream and refreshments that will be served.

Bring plenty of business cards for networking!

SPECIAL EVENTS MONDAY

Monday, November 18

Keynote Event and Breakfast

Manchester Ballroom, Level Two

7:30am–8:00am Continental Breakfast Served

8:00am–9:30am Opening Session and Keynote Panel Presentation

Advanced Manufacturing: Engaging the Nation and the World to Achieve Economic Prosperity

The Opening Keynote session will focus on the need to provide a fully integrated perspective on manufacturing in the global market. Technological, educational and policy advances necessary to address future manufacturing needs and opportunities for the United States, as well as the world, will be addressed by seasoned executives representing leading industrial, academic and government teams. The session will also address opportunities in manufacturing and barriers that must be overcome to advance manufacturing in a sustainable and strategic fashion.

Moderator



Thomas G. Loughlin
ASME Executive Director

A leader in association management with a strong track record in strategic planning and organizational assessment, Loughlin became executive director of ASME in 2008. A certified association executive and Fellow of ASME, Loughlin received his bachelor's degree in mechanical engineering from Lafayette College in

1983. He was named winner of the Keystone Award for Excellence in Membership from the American Society of Association Executives and was inducted into the Pan American Academy of Engineering in 2012. He holds five patents.

Panelists



Pradeep K. Khosla
Chancellor, University of California,
San Diego

An internationally renowned electrical and computer engineer, Dr. Khosla began his tenure as UC San Diego's eighth Chancellor in August 2012. Chancellor Khosla is an elected member of the National Academy of Engineering and the American Society for Engineering Education. He is a Fellow of ASME, the Institute of Electrical and Electronics Engineers, the American Association for Advancement of Science, the American Association of Artificial Intelligence, and the Indian Academy of Engineering.



Michael F. Molnar
Chief Manufacturing Officer,
National Institute of Standards &
Technology

Molnar has nearly 30 years of experience in advanced manufacturing and leads the NIST Advanced Manufacturing Office for extramural manufacturing programs. He also serves as the director of the interagency Advanced Manufacturing National Program Office. He has served as a Federal Fellow in the White House Office of Science and Technology Policy and is a Fellow of both the ASME and the Society of Manufacturing Engineers. He is a licensed Professional Engineer, a Certified Manufacturing Engineer, and a Certified Energy Manager.



Greg M. Morris
Strategy and Business Development Lead
for Additive Technologies, GE Aviation

Greg Morris was one of three Principals and CEO of Morris Technologies, Inc., a Cincinnati based rapid prototyping, product development, and engineering firm as well as a Principal of Rapid Quality Manufacturing, an additive manufacturing production-oriented company, until both were acquired by GE Aviation in late 2012. In his new role, he serves as strategy and business development lead for Additive Technologies within GE Aviation, as well as working closely with all of GE's businesses to promote and integrate additive manufacturing into a broad array of products and processes.



Richard Morris
Vice President of Assembly and Logistics
at BMW Manufacturing Co., LLC

Richard Morris joined BMW Manufacturing in 1993 as the Assembly Quality Manager for the initial 3 series and the Z3 launches. During the early years of Plant Spartanburg (SC), he served as production leader responsible for launching night-shift operations and as plant manager during the planning phase for the first generation X5. He also managed the Z3/Z4 production line and was Assembly Project Leader for the first generation Z4 among other projects. Morris was named Vice President of Assembly in 2009. He has a bachelor's degree in mechanical engineering and an MBA.

Robert Henry Thurston Lecture**10:00am–12:00pm**

Elizabeth H, Level Two

**John A. Rogers**Swanlund Chair Professor,
*University of Illinois at Urbana-Champaign***Stretchable Electronics: From Bio-Inspired Design to Bio-Integrated Devices**

Recent advances in materials, mechanics designs, and fabrication techniques enable construction of high-performance semiconductor systems that can flex,

bend, fold, and stretch, with ability to accommodate large ($\gg 1\%$) strain deformation, reversibly and in a purely elastic fashion. Such technologies open up new engineering opportunities in bio-inspired device design and in intimate, multifunctional interfaces to biology. This talk summarizes two examples: (1) hemispherical digital imagers that incorporate essential design features found in the arthropod eye and (2) injectable, cellular-scale light-emitting diodes for wireless control of complex behaviors in animal models, via the techniques of optogenetics.

Biography: After receiving his graduate degrees at the Massachusetts Institute of Technology (MIT), Cambridge, Dr. Rogers was a Junior Fellow in the Harvard University Society of Fellows from 1995 to 1997. During this time he initiated programs of research in soft lithography and founded a company that commercialized laser acoustic metrology techniques developed as part of his Ph.D. research. He joined Bell Laboratories (Murray Hill, N.J.) in 1997 as a member of the technical staff in the condensed matter physics research department, and served as director of this department from late 2000 to 2002. His work at Bell yielded commercialized products for fiber optic communications and the first flexible, paperlike displays. Rogers joined the University of Illinois at Urbana-Champaign in 2003 as Founder professor of engineering. He is currently Swanlund chair professor, with appointments in the departments of materials science and engineering, mechanical science and engineering, electrical and computer engineering, bioengineering, and chemistry. He is also director of the Seitz Materials Research Laboratory. From 2009 to 2012, he served as director of a National Science Foundation-funded Nanoscale Science and Engineering Center on nanomanufacturing. During his time at Illinois, he has established foundational knowledge and mechanical engineering capabilities for new classes of semiconductor devices, with applications in photovoltaics, biomedicine, and solid state lighting.

He is author/co-author of more than 400 journal papers and has edited two books. Rogers has more than 80 patents/patent applications in areas ranging from acoustics to nanofabrication to stretchable electronics; more than 50 of these are licensed or in active use.

Rogers received bachelor's degrees in physics and chemistry from the University of Texas at Austin in 1989. He earned master's degrees in physics and chemistry from MIT in 1992. In 1995 he earned his Ph.D. in physical chemistry from MIT. Rogers received a honoris causa doctorate from École Polytechnique Fédérale de Lausanne in 2013.

THE ROBERT HENRY THURSTON LECTURE AWARD was established in 1925 in honor of ASME's first president. It provides an opportunity for a leader in pure and/or applied science or engineering to present to the Society a lecture that encourages stimulating thinking on a subject of broad interest to engineers. The Robert Henry Thurston Lecture Award was elevated to a Society award in 2000.

VOLT Workshop: Serving at the ASME Governance Level**10:00am–11:30am**

Cunningham A, Level Four

The Volunteer Orientation and Leadership Training Academy welcomes volunteers interested in serving at ASME's administrative level. We will explore ASME opportunities for fulfilling personal and career goals as well as provide guidance on the important role of ASME's Nominating Committee in electing Society Officers. Panelists will discuss what it takes to serve at the governance level and the different paths they took to become ASME leaders.

President's Luncheon**12:00pm–1:30pm**

Elizabeth FG, Level Two

Sponsored by the Committee on Honors

Manchester Grand Hyatt

Tickets: \$60

Presidents Luncheon List:**Nancy Deloye Fitzroy And Roland V. Fitzroy Medal**

Andrew J. Viterbi, Ph.D.

*Viterbi Group***Thomas A. Edison Patent Award**

Moshe Shoham, D.Sc., Fellow

*Technion-Israel Institute of Technology***Technical Communities Globalization Medal**

Yogi Goswami, Ph.D., Fellow

*University of South Florida***Frank Kreith Energy Award**

James E. Smith, Ph.D., Fellow

*West Virginia University***M. Eugene Merchant Manufacturing Medal of ASME/SME**

Bryan G. Dods

*General Electric Power & Water***James Harry Potter Gold Medal**

S.A. Klein, Ph.D., Fellow

*University of Wisconsin-Madison***Spirit of St. Louis Medal**

David A. Peters, Ph.D., Fellow

*Washington University-St. Louis***Henry R. Worthington Medal**

Steven M. Tipton, Ph.D., Member

*The University of Tulsa***Worcester Reed Warner Medal**

Singiresu S. Rao, Ph.D., Fellow

*University of Miami***Soichiro Honda Medal**

John C. Wall, Sc.D., Member

Cummins, Inc.

SPECIAL EVENTS MONDAY

Melville Medal

Ashwani K. Gupta, Ph.D., Fellow
University of Maryland

Ahmed E.E. Khalil, Member
University of Maryland

Kenneth M. Bryden, Ph.D., Member
Iowa State University

Sang C. Lee, Ph.D.
Kyungnam University

Department Heads Forum

1:30pm–3:30pm

America's Cup B, Level Four

*Sponsored by Mechanical Engineering and Technology
Department Head Committees*

The Department Heads Forum is an annual event at the ASME Congress for mechanical engineering and mechanical engineering technology department heads. The forum is a chance to learn about some of the latest research funding developments, curricular innovations, accreditation issues, and upcoming ASME Center for Education activities

Honors Reception

5:15pm–6:00pm

Elizabeth Ballroom Foyer, Level Two

*Sponsored by Committee on Honors and The ASME
Foundation*

Attendees are invited to attend this reception, at which time you will have an opportunity to meet our Honors Recipients and other Congress attendees. We hope you will join us at the Honors Assembly, immediately following the reception. No tickets are required for attendance at this reception.

Honors Assembly

6:00pm–7:30pm

Elizabeth Ballroom ABCD, Level Two

All Congress participants are cordially invited to attend the 2013 ASME Honors Assembly. This multimedia program will celebrate some of today's leading engineers, educators, entrepreneurs and innovators. Admission is FREE to all Congress attendees.

This year's Honors Assembly will recognize the achievements of:

ASME Medal



Sia Nemat-Nasser
University of California, San Diego

For creating micro-architected composites to mitigate shock-wave induced traumatic brain injury; metamaterials to redirect, attenuate and manage stress waves; and original comprehensive models of deformation and failure of metallic structures with application to metal forming and failure

prevention; and for excellent contributions in promoting ASME's Materials Division.

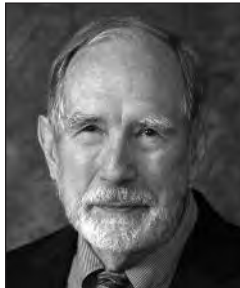
Honorary Member



Ted Belytschko
Northwestern University

For fundamental contributions to computational and applied mechanics, particularly the extended finite element method and its impact on industry.

Honorary Member



John Howell
The University of Texas at Austin

For continuous support of the engineering profession through service to ASME and other societies; and for ongoing contributions to research in heat transfer and to engineering education through technical publications and textbooks.

Honorary Member



Said Jahanmir
MiTiHeart Corporation

For seminal contributions to the advancement of mechanical engineering, particularly the multidisciplinary technologies in tribology, manufacturing, biomedical materials and devices, and in the promotion of standards; and for significant contributions to ASME.

Honorary Member



Sadık Kakaç
*Tobb University of Economics
and Technology*

For seminal and pioneering achievements in transient two-phase flows, fuel cells, and micro/nano heat transfer research and engineering; and for sustained contributions to education as an organizer of conferences and author of well-known textbooks on heat transfer and heat

exchangers.

Honorary Member



Arunava Majumdar
Google, Inc.

For pioneering research in micro-/nanoscale heat transfer; and for distinguished service on the *Journal of Heat Transfer* editorial board, as the founding chair of the ASME Nanotechnology Institute, as founding director of the U.S. Department of Energy's Advanced Research Projects

Agency–Energy, and as acting under secretary of energy.

Kate Gleason Award



Ann Dowling
University of Cambridge

For significant contributions to advance gas turbine engine technology and the engineering science of combustion and acoustics; and for outstanding leadership in industry-university cooperative research and international engineering education.

Ralph Coats Roe Medal



G. Wayne Clough
Smithsonian Institute

For numerous contributions to both higher education policy and U.S. technology policy; and for demonstrating, through distinguished leadership of the Smithsonian Institution, that an accomplished engineer can be the guardian and primary advocate for preserving and promoting our national

cultural heritage.

Melvin R. Green Codes & Standards Medal



Sidney A. Bernsen
ANATECH Corp./Hopper Engineering Associates

For distinguished leadership and professionalism in the development, advancement, promotion, and acceptance of ASME codes and standards; and for pioneering efforts in the development and standardization of quality assurance and nuclear risk management programs for

application in power plants and other facilities.

Honors Dinner

7:30pm–10:30pm

Elizabeth Ballroom FGH, Level Two

Sponsored by the Committee on Honors

The Honors Dinner celebrates the achievements of our 2013 Honors Awardees.

Tickets: \$85

Dixy Lee Ray Award



Anibal L. Taboas
ASPIRA Inc. of Illinois

For advancing closure of the nuclear fuel cycle and for internationally recognized leadership in regulatory engineering and sustainable environmental management.

SPECIAL EVENTS TUESDAY

Congress-Wide Plenary

Manchester Ballroom, Level Two

7:30am–8:00am Continental Breakfast Served

8:00am–9:15am Plenary Presentation

Making Things Matters: The Critical Role of Production Ecosystems to an Innovation Economy



Martin A. Schmidt

Associate Provost; Professor of Electrical Engineering at MIT

The topic of advanced manufacturing is enjoying a robust discussion in the U.S., and around the world. Large-scale trends such as rising wages in China and the shale gas boom are leading to predictions of “re-shoring” of manufacturing to the US. In addition, while a subject of debate

in policy circles, many believe that domestic manufacturing is important for jobs, national security, and innovation. The White House has aggressively pursued the topic through its sponsorship of the Advanced Manufacturing Partnership (AMP), and subsequent implementation of the AMP recommendations. At MIT, we have just concluded a two-year study of the linkage of production to innovation. This talk will explore the current state of manufacturing, particularly in the US. We will review the AMP findings and recommendations, as well as the results of the MIT study. Lastly, we will look to the future of manufacturing, and discuss policy and R&D issues that will be important in the future.

Schmidt is a Professor of Electrical Engineering and Associate Provost at MIT. As a faculty member at MIT, his research and teaching are in the area of micro-/nanotechnology. He serves as a member of the Production in the Innovation Economy (PIE) project at MIT; a multiyear study conducted by a team of MIT faculty to understand how innovation is linked to production activities. He also served as the faculty lead for the Advanced Manufacturing Partnership, a White House initiative co-chaired by MIT President-emeritus Susan Hockfield and Dow CEO Andrew Liveris. As Associate Provost, Schmidt is the senior officer responsible for MIT’s Industrial engagements, and he manages the Institute’s space. He received his BS degree from Rensselaer Polytechnic Institute and his SM and PhD from MIT.

ME Department Heads Professional Development Workshop: Modern Approaches to ME Education - MODCS, Flipped Classroom and Engagement

9:00am–10:30am

Technical Tour: Solar Turbines Company

(Ticket Required)

9:00am–11:00am

NSF (CMMI & CBET) Information Session

9:45am–11:00am

Gibbons, Level Four

This session will present an opportunity for NSF stakeholders to learn about the Foundation and interactively discuss pressing issues with senior leaders from the NSF Directorate for Engineering (NSF/ENG). The Division Directors will present a brief overview of NSF and highlight ongoing initiatives within the NSF Directorate for Engineering and their respective divisions. Following their short presentation, they will lead an extended discussion with session attendees on a wide array of topics presently facing NSF/ENG. Topics for discussion may include managing the number of proposal submissions, the NSF Innovation Ecosystem initiative, assessment and evaluation of NSF funded research programs, and methods to support small-team and interdisciplinary research. An overarching goal of the session will be to discuss ways in which the ASME community and NSF/ENG can work together to strengthen the broader mechanical engineering community.



Steven H. McKnight

Division Director for Civil, Mechanical and Manufacturing Innovation at NSF

Steven H. McKnight is the director of the Civil, Mechanical, and Manufacturing Innovation Division (CMMI) of the Directorate for Engineering. McKnight, served as Chief of the Army Research Laboratory (ARL) Materials Division prior to 2006.

At ARL, McKnight directed a comprehensive interdisciplinary materials research program that encompasses materials science and engineering, chemistry, applied physics, process and manufacturing technology, and engineering mechanics. He oversaw both in-house research and an extramural collaborative research program with 42 academic and 38 industrial partners.

CMMI supports fundamental research and education directed at advances in civil, mechanical, industrial, and manufacturing engineering and materials design, with an additional focus on reducing risks and damage from earthquakes and other natural and technological hazards. These investments are leading to advances that promote the global competitiveness of the nation’s manufacturing sector; enhance the sustainability and resiliency of the nation’s civil infrastructure; and improve the economics of the nation’s health care system.

Sumanta Acharya

Program Director, CBET Thermal Transport Program

Sumanta Acharya is the Program Director for Thermal Transport Processes in the Chemical, Bioengineering, Environment, and Transport Systems (CBET) Division at NSF. He is the L. R. Daniel Professor, and Director of the Turbine Innovation and Energy Research Center at Louisiana State University.

Cross-Disciplinary and Collaborative Research Funding Opportunities at the NSF

11:00am-12:15pm

Gibbons, Level Four

Eduardo Misawa

Program Director, and Other NSF Program Managers

The opportunities to develop exciting research activities often involve grand challenges that cuts across multiple traditional science and engineering disciplines. The National Science Foundation (NSF) supports cross-disciplinary research and education in all areas of science and engineering through several programs and funding mechanisms. Some special programs that will be discussed in this session will include collaborative research, Computational and Data-enabled Science and Engineering (CDS&E), other cyber-related programs, and mid-scale and larger scale research (including ERC and STC) that are of particular interest to IMECE attendees.

Eduardo Misawa has a B.Sc. and M.Sc. degrees from University of Sao Paulo (1979 and 1983) and Ph.D. degree from the Massachusetts Institute of Technology (MIT, 1988), all in Mechanical Engineering with concentration in Dynamics and Control. He is currently a Program Director in the Directorate for Engineering at the National Science Foundation. His research experience includes Nonlinear Dynamics, Nonlinear Control, Robust Control, Vibrations, Mechatronics, Nanotechnology, Precision Engineering, Vehicle Dynamics, Fluid Power Control, Bioinformatics, Biotechnology and Biomedical Engineering.

Heat Transfer Division Luncheon

11:00am-1:00pm

Elizabeth F, Level Two

Tickets: \$40

Sponsored by ASME Heat Transfer Division

Micro- & Nanotechnology Society-Wide Forum

12:30pm-4:00pm

Douglas Pavilion, Lobby Level

Poster Setup	11:00am-12:30pm
General Viewing/Judging	12:30pm-3:00pm
Awards	3:00pm-4:00pm

Sponsored by the ASME Nanotechnology Institute and the ASME NanoEngineering Council

Micro- and nanoscale phenomena and processes are widely explored across many ASME divisions to create new applications and to improve existing engineering systems. This forum seeks to bring together ASME members and researchers from academia and industry with a common focus on micro- and nanotechnology. Please join us in discovering small-scale innovation making a large impact.

Best Poster Awards to be presented.

Micro and Nano Forum Student Poster Awardees

Chenbo Dong
Jongho Lee
Ashkan Aryaei
Liang Chen
Yue Yang
Xiaokun Gu
Woochul Lee

Banafsheh Barabadi
Songbo Xu
Marie Pinti
Man Prakash Gupta
Qian Li
Xianglei Liu
Weian Sheng
Jianlong Gao
Raghu Pulavarthy
Shinnosuke Inoue
Ali Hashmi
Jun Xu
Hao Wang
Yi Zheng
Seid Sadat
Susmita Dash
Scott N. Schiffres

Forum Organizing Leadership

Stuart Williams, University of Louisville

Ronggui Yang, University of Colorado

Umut Gurkan, Case Western Reserve University

Additional Sponsors:

National Science Foundation

ASME Nanotechnology Institute

ASME NanoEngineering Council: NanoEngineering for Energy and Sustainability (NEES) and NanoEngineering for Medicine and Biology (NEMB) Steering Committees

ASME Applied Mechanics Division

ASME Electronic and Photonic Packaging Division

ASME Heat Transfer Division

ASME Microelectromechanical Systems Division

Guest Luncheon (Auxiliary)

1:00pm-3:00pm

America's Cup D, Level Four

The ASME Auxiliary welcomes ASME members to an afternoon of great food and refreshments at its semi-annual Guest Luncheon.

Tickets: \$37

Sponsored by ASME Auxiliary

Symposium for New and Prospective Faculty "Tips for Tenure and Promotion"

1:00pm-3:00pm

Cunningham A, Level Four

Sponsored by Mechanical Engineering Department Heads Committee

The target audience is new and prospective faculty, including graduate students and those from research labs and industry. Department heads and early career faculty will discuss tips for tenure and promotion in teaching, service/outreach, and scholarship at institutions that focus on both research and teaching. Department heads, deans, and faculty will also provide tips on obtaining research funding and securing a faculty position. Each talk has been scheduled with sufficient time for Q&A and discussion.

SPECIAL EVENTS TUESDAY

Rayleigh Lecture

3:00pm-4:45pm

Madeleine D, Level Three

Research Program Development Workshop

See description on page 35.

3:15pm-5:45pm

Gibbons, Level Four



George Hazelrigg

This workshop will cover the fundamentals of formulating and funding an academic research program. It will focus largely on proposal writing as a means of funding the program and provide guidelines for effective proposal writing. The workshop will also touch upon such important topics as ethics and mechanisms for getting involved in your research community.

The workshop presenter is Dr. George A. Hazelrigg. George has been a program manager and deputy division director at NSF for over 30 years, he has administered to the review of over 5,000 proposals and has run several hundred panels. He has provided numerous such workshops over the past 15 years and is known for his practical advice on proposal writing.

Strategy Workshop for Women: Get Your Career Accomplishments Recognized

3:30pm-5:00pm

Elizabeth G, Level Two

This workshop is intended to communicate strategies for women seeking to be recognized for their many career accomplishments. The workshop will include both overall strategies as well as individual discussions, provided time permits. We ask that the participants prepare for the workshop by bringing an updated curriculum vitae and descriptions of relevant awards.

ASME Women Engineers Reception

5:00pm-6:00pm

America's Cup D, Level Four

Sponsored by the Committee on Diversity and Inclusion Strategy and the Women in Engineering Affinity Group

In its fifth year, the reception provides a focal point at the conference for a gathering of women from the wide range of ASME activity for networking and a bit of casual relaxation at the end of a conference day. The event is open to all ASME women engineers/engineering students.

Koiter Lecture

5:00pm-6:45m

Elizabeth H, Level Two



Norman A. Fleck

University of Cambridge, UK

Recent Advances in Lattice Materials

This talk reviews recent advances in the mechanics of lattice materials. This class of materials gives the possibility of new combinations of material property, thereby filling gaps in material property space. The overall goal is to combine material, topology, and length scale in new ways in

order to develop new combinations of thermal-mechanical properties, such as high strength and low thermal conductivity at low density. The bounds on some properties (such as strength) are much closer together than those for other properties (such as fracture toughness); in fact, to the author's knowledge, no satisfactory bounds have been obtained on toughness. Lattice materials have found most application in the cores of sandwich panels, due to the fact that they can be designed to be stiff and strong in shear, and also under normal through-thickness compressive loadings, as encountered in blast loading. Under such dynamic loadings, the compressive, buckling response of the lattice is influenced by material inertia and strain rate sensitivity. The sensitivity of buckling strength to dynamic effects has been explored theoretically and experimentally, and used to determine the resistance of the lattice-cored sandwich to blast loading (water blast and sand blast).

Biography: Dr. Fleck is professor of mechanics of materials in the engineering department at the University of Cambridge, U.K. He is also the founder/director of the Cambridge Centre. He received his Ph.D. on the subject of metal fatigue from Cambridge in 1984 and spent a postdoctoral year at Harvard University (Cambridge, Mass.) as Lindemann Trust Fellow, working with Dr. John W. Hutchinson on creep fracture. Fleck returned to Cambridge as a lecturer in 1986 and was subsequently promoted to a readership and then to a professorship. He was head of the Mechanics, Materials and Design Division for 11 years (until 2009).

Fleck combines experiments and theory to develop mesoscale and macroscale constitutive models of engineering materials (e.g., compressive failure of composites, strain gradient plasticity theory, and mechanics of foams and lattice materials). He has close collaborations with many U.S. and European groups, having held visiting positions at Harvard University and NASA's Langley Research Center (Hampton, Va.).

He has done much of the important research on the topic of blast-resistant panels to protect structures, vehicles, and sea vessels. Fleck has developed breakthrough experiments to identify panel behavior in response to blast impacts. He has dramatically advanced the theories and models used in this area to predict the response of sandwich panels and to design them so that they are robust against such impacts.

Fleck is an ISI highly cited author with more than 300 journal publications in the field of experimental and theoretical mechanics of materials, including ceramics, polymers, and metals. He serves on the editorial board of several composites and mechanics journals.

He is a Fellow of the Royal Society, the Royal Academy of Engineering, Academia Europaea, the European Academy of Sciences, the European Mechanics Society, and the Institute of Materials, Minerals and Mining.

Fleck's honors included a Humboldt Research Award from the Alexander von Humboldt Foundation (2012). He is a chartered engineer in the U.K.

THE WARNER T. KOITER MEDAL was established in 1996 to recognize distinguished contributions to the field of solid mechanics with special emphasis on the effective blending of theoretical and applied elements, and on a high degree of leadership in the international solid mechanics community. The medal honors the late Dr. Warner T. Koiter (1914–1997), world-renowned authority in the field of solid mechanics, and it commemorates his vast contributions as research engineer and teacher. The medal was funded by the Delft University of Technology, Netherlands.

Advanced Energy Systems Division Reception and Lecture

5:30pm–7:30pm

Molly A, Level Two

Sponsored by the Advanced Energy Systems Division



James E. Smith
West Virginia University

James E. Smith, CEng, Ph.D. Professor and Director, Center for Industrial Research Applications, West Virginia University, Morgantown has received this award for more than 30 years of significant contributions through the creation of energy-related innovative technologies; the transfer of those

technologies into the marketplace; and the use of that developmental process for the advanced training of students, staff, and colleagues.

Dr. Smith is currently the director of the Center for Industrial Research Applications at West Virginia University (WVU), Morgantown, where he is a professor in the mechanical and aerospace engineering department. Prior to joining the faculty at WVU in 1976, he was a research engineer for the U.S. Department of Energy.

He has been the principal/co-principal investigator for more than 100 research contracts for various projects funded by federal agencies (TACOM, DOD, HEW, DOT, U.S. Navy, DARPA, and DOE), international corporations, U.S. corporations, and many West Virginia companies. In his role, Smith has been actively involved in providing and/or enhancing technology solutions for the industrial marketplace. Several of these solutions have resulted in proprietary technologies that have been instrumental in the continued success of these business efforts while others have resulted in the creation of 10 new business entities. He has been granted 32 U.S. patents, with 26 pending, and numerous foreign patents on aerospace, mechanical, medical, and energy-related devices.

Smith has published more than 250 refereed conference papers and journal/bound transaction papers, as well as many final project reports and other publications. He has published on various technology topics, including engine design; engine emissions, alternate fuels use, and renewable energy production; flight vehicle development; radio frequency power processing; antenna development; and machine vision for medical related applications. He has also, most recently, published on innovation and leadership development and the use of current global research and development capabilities and infrastructure for the furthering of the same.

An ASME Fellow, Smith has authored articles for various Society publications, and he is a former member of the Internal Combustion Engine Division. He is also a Fellow of the Institution of Mechanical Engineers and SAE International. He served on the SAE board of directors, and was president and chairman of the board (2009). He is a member of the American Institute of Aeronautics and Astronautics; the American Society for Engineering Education; Tau Beta Pi, the Engineering Honor Society; Sigma Xi, the Scientific Research Society; and Sigma Gamma Tau, the National Aerospace Engineering Honor Society.

He has received several awards for teaching, research, and service, including SAE's Ralph R. Teeter Educational Award (1988) and Forest R. McFarland Award for service (1992 and 2010); the WVU Academies of Distinguished Alumni Teaching Award (2004); and Outstanding Research awards (1989, 1995, 1997, and 2009) from WVU's Statler College of Engineering and Mineral Resources.

Smith earned three degrees from WVU: his bachelor's and master's in aerospace engineering in 1972 and 1974, respectively; and his Ph.D. in mechanical engineering in 1984. He is a chartered engineer in the U.K.

THE FRANK KREITH ENERGY AWARD was established in 2005 to honor an individual for significant contributions to a secure energy future with particular emphasis on innovations in conservation and/or renewable energy. Contributions may be through research, education, practice, or significant service to society that will lead to a sustainable energy future. The award was established by the Solar Energy and Advanced Energy Divisions to honor Dr. Frank Kreith's contributions to solar energy and heat transfer, and was funded by Holocaust Settlement Claim No. 4931 for Nazi victims and by the Kreith family.

Fluids Engineering Division Reception

6:30pm–8:30pm

Elizabeth F, Level Two

Sponsored by the Fluids Engineering Executive Committee

Applied Mechanics Division Honors & Awards Banquet

6:30pm–9:30pm

Elizabeth A, Level Two

Tickets: \$90

Sponsored by Applied Mechanics Division

The evening's events will include honoring:

Richard M. Christensen, Recipient of the Timoshenko Medal
Younggang Huang, Recipient of the Daniel C. Drucker Medal
Norman Fleck, Recipient of the Walter T. Koiter Medal

Electronic and Photonic Packaging Division Reception

6:45pm–8:45pm

America's Cup C, Level Four

Sponsored by the Electronics and Photonics Packaging Division

SPECIAL EVENTS WEDNESDAY

Congress-Wide Plenary

Manchester Ballroom, Level Two

7:30am–8:00am Continental Breakfast Served

8:00am–9:15am Plenary Presentation

The Future of 3D Printing: The Promise and Peril of a Machine That Can Make (Almost) Anything



Hod Lipson

Professor of Engineering at Cornell University

3D Printers—machines that can automatically fabricate arbitrarily shaped parts, layer by layer, from almost any material—have evolved over the last three decades from limited and expensive prototyping equipment in the hands of few, to small-scale commodity production

tools available to almost anyone. It's been broadly recognized that this burgeoning industrial revolution will transform almost every aspect of our lives. But where will this technology go next? We will look at the evolution of additive manufacturing technologies' past, present, and future as a series of milestone in humans' increasing control over physical matter. First, the unprecedented control over the shape of objects, where manufacturing complexity is free. Second, the control over new multimaterial composition of matter with unprecedented fidelity, creating new kinds of materials. The third episode of this journey will be the control over active behavior, where we move from fabricating passive parts to printing active, integrated systems. Our ultimate test is to print a robot that will walk off the printer, batteries included.

Biography: Lipson is a professor of engineering at Cornell University in Ithaca, New York, and a co-author of the recent book "Fabricated: The New World of 3D Printing." His work on self-aware and self-replicating robots, food printing, and bio-printing has received widespread media coverage, including *The New York Times*, *The Wall Street Journal*, *Newsweek*, *Time*, CNN, and the National Public Radio. Lipson has co-authored over 200 technical papers and speaks frequently at high-profile venues such as TED and the U.S. National Academies. Hod directs the Creative Machines Lab, which pioneers new ways to make machines that create, and machines that are creative.

General Posters Session:

11:30am–3:00pm

Douglas Pavilion, Lobby Level

Advances in Aerospace; Advanced Manufacturing; Biomedical & Biotechnology Engineering; Dynamics, Vibration, and Control; Education and Globalization; Emerging Technologies; Energy; Fluid Engineering and Technologies; Heat Transfer; Mechanics of Solids, Structures, and Fluids; Safety, Reliability, and Risk; Systems and Design; Transportation Systems; Vibration, Acoustics, and Wave Propagation; and Dewitt Session for Undergraduate Research in Thermal/Fluid Sciences

Poster Setup	9:30am–10:30am
Judging	10:30am–11:30am
General Viewing	11:30pm–2:30pm
Awards	2:30pm–3:00pm

Materials Division Lecture and Reception

2:30pm–7:30pm

Cunningham ABC, Level Four

Sponsored by the Materials Division and Featuring the Lectures Below:

Orr Early Career Awards Lectures

2:30pm–3:15pm

This year, there are two recipients of the award:



Thao (Vicky) Nguyen

Assistant Professor, The Johns Hopkins University, Baltimore

Dr. Nguyen received her award for outstanding contributions in both theoretical and experimental biomechanics, particularly work on the complex mechanics of the eye with applications to several conditions, including glaucoma.

Dr. Nguyen received her bachelor's degree in mechanical engineering from the Massachusetts Institute of Technology, Cambridge, in 1998. She earned her master's degree and Ph.D., also in mechanical engineering, from Stanford University, California, in 2001 and 2004, respectively. She was a research scientist at Sandia National Laboratories (Livermore, Calif.) for three years before joining the Mechanical Engineering Department at The Johns Hopkins University, Baltimore, as an assistant professor in 2007.

The broad theme of Nguyen's research is the mechanics of soft adaptive materials and includes the remodeling of soft tissues and the stimuli-responsive behavior of polymers. Her work in biomechanics integrates the development of novel experimental methods and microstructure-based theoretical and computational models to study the structure, property, and function of soft collagenous tissues and their alteration with age and disease, providing insights for new diagnostic and treatment strategies. In the area of stimuli-responsive polymers, her research develops models to investigate the physical mechanisms underlying shape memory behavior in polymers and provides mechanistic understanding for improving the material response.

Particularly noteworthy is her work on the mechanics of the eye. Nguyen has worked collaboratively to investigate the role of the sclera and cornea in the development of glaucoma and to develop a biomechanical model of the sclera and its effects on glaucoma.

She has published nearly 40 journal papers and three peer-reviewed papers in conference proceedings, and she has given nearly 30 invited presentations.

An ASME member, Nguyen has served the Applied Mechanics Division as recording secretary of the Executive Committee (2005–2007), and secretary/vice chair (2009–2010) and chair (2010–2011) of the Committee on Soft Materials. She is currently theme co-organizer, Solid Mechanics–Other for the Society's Bioengineering Division.

Nguyen is also a member of the Society of Engineering Science, the Materials Research Society, the Association for Research in Vision and Ophthalmology, and the Society of Experimental Mechanics.

Her honors include a Presidential Early Career Award for Scientists and Engineers (2008) for work on modeling the thermomechanical behavior of shape memory polymers, a National Science Foundation CAREER Award (2013) to investigate the micromechanisms of

growth and remodeling of collagenous tissues, and the inaugural Eshelby Mechanics Award for Young Faculty (2013) from the University of Houston.



K.N. Solanki
School for Engineering of Matter,
Transport, and Energy, Arizona State
University

On Stress Corrosion Cracking Mechanisms in Iron: A Multiscale Perspective

Material strengthening and embrittlement are controlled by intrinsic interactions between dislocations and hydrogen (H) that alter the observed deformation mechanisms of the material. In this work, we used an energy-based approach to differentiate two fundamental stress–corrosion mechanisms for hydrogen embrittlement (HE) in iron, namely, hydrogen-enhanced localized plasticity (HELP) and hydrogen enhanced decohesion (HED). In HELP, dislocation mobility increases significantly with an increase in H concentration. In HED, it is widely believed that an increase in H concentration results in cleavage-type decohesion. In the present study, we used density functional theory, atomistic simulations, and discrete dislocation modeling to quantify changes in energy due to (i) H on the generalized stacking fault energy (i.e., related to Peierls stress), (ii) dislocation interactions with H (mobility), (iii) the effect of H on cleavage and slip, and (iv) the effect of H on the grain boundary plastic deformation and fracture process. At lower H concentrations, alternating cleavage and slip deformation mechanisms were energetically favorable. However, as the H concentration increased above a critical value, HE mechanisms of cleavage-based decohesion (HED) became energetically favorable. Moreover, this type of cleavage-based embrittlement behavior was the result of the inhibition of dislocation nucleation near the crack tip in iron. Finally, our simulation of dislocation interactions with H showed resistance to dislocation motion due to solute drag as the dislocation moved through the H Cottrell atmospheres.

Biography: K.N. Solanki is an Assistant Professor of Mechanical Engineering in the School of Materials at Arizona State University. Prior to coming to ASU, he was an Associate Director for the Center for Advanced Vehicular Systems at Mississippi State University. Dr. Solanki received his Ph.D. from Mississippi State University in December 2008. Dr. Solanki's research interest is at the interface of solid mechanics and material science, with a focus on characterizing and developing microstructure-based structure–property relationships across multiple length and time scales. To date, he has coauthored 40 journal articles, four book chapters, and 35 conference proceedings with faculty and students at ASU and MSU. In addition, his paper published in *Engineering Fracture Mechanics* was recognized as one of the most highly cited papers from year 2002 to 2005. For his efforts to promote the education of engineering students in the area of fatigue technology, he was awarded the SAE Henry O. Fuch Award by the SAE Fatigue Design & Evaluation Committee. In 2011, Dr. Solanki received TMS Light Metals Magnesium Best Fundamental Research Paper Award for his work on predicting deformation and failure behavior in magnesium alloys using a multiscale modeling approach. Recently, he received the 2013 TMS Light Metals Division Young Leader Professional Development Award and the 2013 Air Force Office of Scientific Research Young Investigator Research Award.

Sia Nemat-Nasser Lecture

3:15pm–4:00pm

THE SIA NEMAT-NASSER EARLY CAREER AWARD recognizes research excellence in experimental, computational, or theoretical aspects of mechanics of materials by a young investigator within 10 years following receipt of their Ph.D. degree. Established by the Materials Division in 2008, it was elevated to a Society award in 2012.



Ting Zhu
Associate Professor, Georgia Institute of
Technology, Atlanta

Dr. Zhu received his award for outstanding research contributions to the nanomechanics of advanced engineering and energy materials through the synergistic application of fundamental theory, mechanics, materials physics, and multiscale modeling.

Dr. Zhu joined the Georgia Institute of Technology, Atlanta, as an assistant professor in the George W. Woodruff School of Mechanical Engineering in 2005, following his postdoctoral fellowship at Harvard University (Cambridge, Mass.). He is currently an associate professor in the Woodruff School and holds a joint appointment in the School of Materials Science and Engineering at Georgia Tech.

Zhu's research is focused on the nanomechanics of engineering and energy materials, and encompasses the fundamental theory, modeling, and application to advanced materials and nanotechnology. He has published more than 50 peer-reviewed journal papers in these areas. Among his notable contributions, Zhu has developed a nanomechanics theory that is synergistically integrated with the novel atomistic reaction pathway modeling for elucidating the ultra-high strength behavior in metallic nanomaterials. He also developed a multiscale model to elucidate the controlling deformation mechanism that governs the unusual combination of ultra-high strength and high ductility in nanotwinned metals. Recently he and his collaborators established a multiscale chemomechanics framework for simulating the electrochemically induced mechanical degradation in high-capacity electrodes for lithium-ion batteries, which are crucially important to the mass market of electric vehicles; this research provides novel mechanistic insights and design guidelines for the development of durable energy storage materials.

An ASME member, Zhu has served on the Applied Mechanics Division's committees on Computing in Applied Mechanics and on Fracture and Failure Mechanics. He has co-organized ASME minisymposia on Small-Scale Fracture; Multiphysics Simulations and Experiments for Solids; and Mechanics of Electrochemical Energy Storage Materials.

Zhu is also a member of the Materials Research Society; The Minerals, Metals and Materials Society; the Society of Engineering Science; and the United States Association for Computational Mechanics.

Among his honors, Zhu was ranked among the Top 10 Outstanding Students (1998) at Tsinghua University, China. He received a Presidential Fellowship (1999) from the Massachusetts Institute of Technology (MIT), Cambridge; and was named a Woodruff Faculty Fellow (2010) at Georgia Tech.

Zhu earned his bachelor's degree in engineering mechanics and a Ph.D. in solid mechanics from Tsinghua University in 1995 and 1999, respectively. He earned a Ph.D. in mechanical engineering from MIT in 2004.

SPECIAL EVENTS WEDNESDAY

Nadai Medal Lecture



Tsu-Wei Chou

THE NADAI MEDAL was established in 1975 to recognize significant contributions and outstanding achievements which broaden the field of materials engineering.

Tsu-Wei Chou, Ph.D., Pierre S. du Pont chair of engineering, University of Delaware, Newark, for seminal contributions to fundamental studies of

anisotropic, heterogeneous material systems and nanocomposites; and for the combination of theoretical and experimental work that has enabled unique insights essential to the engineering of ceramic-, metal- and polymer-based advanced composite materials.

Dr. Chou joined the faculty of the University of Delaware (UD), Newark, in 1969, and is currently the Pierre S. du Pont chair of engineering.

Chou has served as a visiting professor at the Argonne National Laboratory, Illinois; the British Science Research Council, U.K.; the University of the Witwatersrand, South Africa; the National Commission for the Investigation of Space, Argentina; the German Aerospace Research Establishment, Cologne; the London branch office of the U.S. Office of Naval Research; Tongji University, Shanghai; and the Tokyo University of Science. He is an honorary research professor of the Beijing University of Aeronautics and Astronautics and the Northwestern Polytechnical University in China; and an advisory professor of Tongji University. He has performed composites technology assessments in Europe and Asia for the U.S. Army Research Office and the Office of Naval Research.

Chou's research interests are in materials science, applied mechanics, fiber composite materials, piezoelectric materials and nanocomposites. He has made notable contributions in the application of analytical techniques to the study of a broad range of material problems; and has been a central figure in bringing composite materials, particularly fiber reinforced composites, from the laboratory into engineering practice.

He has authored more than 335 archival journal papers and book chapters. He is the author of the book *Microstructural Design of Fiber Composites* (Cambridge University Press, U.K., 1992), the co-author of the book *Composite Materials and Their Use in Structures* (Elsevier Applied Science, London, 1975) and the editor of several books. Chou is the editor-in-chief of the international journal *Composites Science and Technology* (Elsevier).

An ASME Fellow, Chou was a member of the first ASME delegation to visit the former Soviet Union in 1989. He served on the Applied Mechanics Division's Composite Materials Committee, Materials Processing and Manufacturing Committee and Nadai Award Committee; and was the organizer of several ASME symposia. Chou received the Society's Charles Russ Richards Memorial Award in 1996 and Worcester Reed Warner Medal in 2002.

He is also a Fellow of the American Institute of Aeronautics and Astronautics, The Minerals, Metals and Materials Society, the American Society for Composites, the American Ceramic Society and ASM International.

Among his honors, Chou was ranked No. 34 among the Top 100 Materials Scientists of the Decade (2000-10) by Times Higher Education/Thomson Reuters in 2011, and was named a highly cited researcher by ISI in 2002. He received a Distinguished Research Award (1998) from the American Society for Composites; and the Francis Alison Medal (2002) and the Medal of Excellence in Composite Materials (2009) from UD. He was honored as a World Fellow by the International Committee on Composite Materials in 2011.

Chou received his bachelor's degree in civil engineering from the National Taiwan University, Taipei, in 1963. He earned his master's degree in materials science at Northwestern University (Evanston, Ill.) in 1966; and his Ph.D. in materials science at Stanford University, California, in 1969.

Fluids Engineering Division Reception

6:30pm–8:30pm

Elizabeth F, Level Two

Sponsored by the Fluids Engineering Executive Committee

Congress Wide Plenary

Elizabeth D-H, Level Two

11:30am–12:00pm

Lunch Served

12:00pm–12:45pm

Plenary Presentation

Exploring Mars With Curiosity



Louise Jandura

Chief Engineer for Curiosity's Sampling System, Jet Propulsion Laboratory; California Institute of Technology

In August 2012, NASA's Curiosity Rover arrived on Mars using a novel sky crane landing. Since landing, the car-sized Curiosity Rover has been exploring Gale Crater using her suite of ten science instruments. Curiosity is a mobile geologist and chemistry lab with a

capable sampling system that can scoop soil or drill rocks and provide the resultant processed powder to instruments inside the rover for analysis. In a recent first, Curiosity used a drill carried at the end of its robotic arm to bore into a rock and collect a sample from its interior. This is the first time any robot has drilled into a rock to collect a sample on Mars. Analysis of this sample shows ancient Mars had conditions that could have supported living microbes. Curiosity's mission of discovery and exploration has been underway for more than a year. This talk will describe some of the challenges of robotic exploration on Mars and some of the highlights from Curiosity's first year+ on the planet, with a particular focus on sampling.

Biography: Louise Jandura is a mechanical engineer at NASA's Jet Propulsion Laboratory (JPL) in Pasadena, Ca. She started at JPL in 1989 after receiving both a SB and SM in Mechanical Engineering from the Massachusetts Institute of Technology. Her expertise is in space mechanisms and sampling systems. She serves on the Organizing Committee of the Aerospace Mechanisms Symposium. During her career at JPL, she has worked on many flight projects, including Shuttle Radar Topography Mission, Genesis, Mars Exploration Rovers, Aquarius, and Mars Science Laboratory Curiosity Rover. Louise has worked on Curiosity's Sampling System through its entire lifecycle from initial design concepts through operation on Mars. She is the Chief Engineer for Curiosity's Sampling System.

TOURS

Sunday, November 17

Scenic San Diego by Land and By Sea (Guest Tour)

Location/Time: Meet in hotel lobby at 9:45am, depart 10:00am

Cost: \$75.00 Per Person

City Tour: 10:00am–11:00am

Stop at Balboa Park: 11:00am–12:00pm

City Tour: 12:00pm–1:00pm

Board Harbor Tour: 1:00pm

Harbor Tour: 1:30pm–2:30pm

(Box lunch served on board harbor cruise.)

City Tour: 2:30pm–3:00pm

Return to Hotel: 3:00pm

San Diego is a beautiful city full of history, culture, and attractions. During the tour, you will have the opportunity to photograph many points of interest, such as Balboa Park, one of the most beautiful, diversified and culturally enriching parks in North America; the historic Gaslamp Quarter; Seaport Village; and scenic Coronado Island. After exploring the city by land, you will be welcomed aboard a public harbor tour boat, which will take you through the calm waters of San Diego Bay, where you can enjoy a panoramic view of the city and the bustling harbor from a completely different viewpoint. Professional guides will narrate the points of interest that give San Diego its unique maritime flavor.

San Salvador Ship Building Site (Technical Tour)

Time: 11:00am–1:00pm (Meet in hotel lobby at 10:30am.)

Cost: \$30

Location: 4216 N. Harbor Drive, San Diego, CA 92101

San Salvador, Juan Rodriguez Cabrillo's Capitana, or flagship of the Spanish expedition that first explored what is now the West Coast of the United States, is being constructed in full public view at Spanish Landing, giving you the opportunity to watch from a close perspective as an example of the first modern industrial activity in the Americas comes to life before your eyes.

Building *San Salvador* at the prominent waterfront Spanish Landing village, some of what you will find will be demonstrations on shipbuilding, blacksmith, sail making, and Native American Kumeyaay demonstrations such as tulle boats, baskets, and pottery making. Ship models will be on display for your viewing enjoyment. Costumed docents from Cabrillo National Monument will be giving tours on select days. Gift shop available on site.

After construction, *San Salvador* will remain on exhibit as part of the Museum's fleet of historic and replica ships and will travel along the California coast as an ambassador for San Diego.

Monday, November 18

General Atomics DIII-D National Fusion Facilities (Technical Tour)

Time: 9:00am–11:00am

(attendees to meet in hotel lobby at 8:30am)

Cost: \$25

Location: DIII-D National Fusion Facility, 3483 Dunhill St., San Diego, CA 92121

(about 15 minutes from the Manchester Grand Hyatt)

Special Instructions: For safety reasons, attendees MUST wear closed-toe shoes.

General Atomics operates the DIII-D Tokamak, the nation's largest magnetic confinement device used in the study of high temperature plasma discharges, for the Department of Energy as part of a continuing effort into nuclear fusion research. Inside DIII-D, high temperature (excess of 100M K) deuterium plasma discharges are magnetically confined while the nuclei fuse to form helium, energetic neutrons, and other by-products of the reaction. From a technical point of view, a visit to the DIII-D Facility offers a unique opportunity to gain an overview of today's forefront in fusion research—work that will help provide the world's populations with electricity for generations to come. During the tour, we will present an overview of fusion, discuss some of the more than 70 sophisticated diagnostics with which we probe the plasma, and see some of the electromagnetic and particle heating systems and main control room. We will visit the main machine hall and discuss some of the ME-applicable aspects of DIII-D's design. Hope to see you here.

Tuesday, November 19

Solar Turbines Company (Technical Tour)

Time: 9:00am–11:00am

(attendees to meet in hotel lobby at 8:30am)

Cost: \$25

Location: 2200 Pacific Hwy Drive, San Diego, CA 92101

Special Instructions: For safety reasons, proper shoes and clothing (closed-toe shoes preferably leather, no loose clothing, and long pants) are REQUIRED due to heavy manufacturing. NO cameras are allowed!

Safety is our NUMBER ONE concern! We want everyone to enjoy the tour and leave the way they arrived, happy and safe!

Headquartered in San Diego, California, Solar Turbines Inc., a subsidiary of Caterpillar Inc., is one of the world's leading manufacturers of industrial gas turbines, with more than 13,900 units and over 1.7 billion operating hours in 98 countries. Products from Solar Turbines play an important role in the development of oil, natural gas, and power generation projects around the world. Solar Turbines' products include gas turbine engines (rated from 1,590 to 30,000 horsepower), gas compressors, and gas turbine-powered compressor sets, mechanical-drive packages, and generator sets (ranging from 1.1 to 22 megawatts). Solar's customers put the company's products to work in many areas, including production, processing, and pipeline transmission of natural gas and crude oil and generation of electricity and thermal energy for processing applications, such as manufacturing chemicals, pharmaceuticals, and food products. Solar's foundation is people, and Solar's culture is one where individual contributions are valued, diversity in the workplace is encouraged, and safety is emphasized in all aspects of the business. Solar Turbines is comprised of a dedicated and multitalented workforce of more than 7,000 employees with decades of experience working as a global team.

Wednesday, November 20

University of California San Diego Shake Table (Technical Tour)

Time: 2:00pm–4:00pm

(attendees to meet in hotel lobby at 1:30pm)

Cost: \$25

Location: 10201 Pomerado Rd, San Diego, CA 92131

Upon arrival at the site, attendees will receive a briefing of the tour that will be given by the professors and designated graduate students involved with the projects. Afterward, attendees will be divided into three groups. Each group will visit three testing facilities on a rotating basis. The testing facilities are the Soil Pit, the Shake Table, and the Blast Simulator. Each visit is led by the professors on that project. In addition to the tour, the professors will talk about the purpose of their research and discuss any test results that they may have. At the end of the tour, attendees will be asked to take an informal survey on the strengths and weaknesses of the program in terms of content, logistics, and delivery.

TRACK PLENARY SPEAKERS

Session: 1.11.1 (Track 1 – Advance in Aerospace Technology)

Wednesday, November 20
5:00pm–6:45pm
Betsy C, Level Two

Peridynamics for Failure Prediction in Fiber-Reinforced Laminates

IMECE2013-67393



Erdogan Madenci
*Department of Aerospace and
Mechanical Engineering,
University of Arizona*

Description: Damage initiation and its subsequent propagation in fiber-reinforced composites are not understood as clearly as they are, for example, for metals because of the presence of stiff fibers embedded into a soft matrix

material, causing inhomogeneity. Under the assumption of homogeneity, a lamina has orthotropic elastic properties. Even though this assumption is suitable for stress analysis, it becomes questionable when predicting failure. Most composite structures include notches and cutouts, reducing not only the strength of composites but also serving as potential failure sites for damage initiation. They also promote common failure modes of delamination, matrix cracking, and fiber breakage. These failure modes are inherent to the inhomogeneous nature of the composite; thus, the homogeneous material assumption taints failure analyses.

Peridynamic (PD) theory removes these obstacles present in the classical laminate theory. This study presents analytical relations between the PD material parameters necessary for modeling fiber-reinforced laminates in terms of ply properties. The predictive capability of PD theory is demonstrated by considering a laminate with a hole under tension and a laminate under compression after experiencing impact loading (CAI).

Biography: Erdogan Madenci is a professor in the Department of Aerospace and Mechanical Engineering at the University of Arizona. He received his B.S. degrees in both mechanical and industrial engineering, and his M.S. degree in applied mechanics from Lehigh University, Bethlehem, Pa. in 1980, 1981, and 1982, respectively. He received his Ph.D. degree in engineering mechanics from the University of California, Los Angeles, in 1987. Madenci worked as a research engineer at Northrop Corporation (1983–1985) and as a member of technical staff at The Aerospace Corporation (1985–1988). He has spent one year at The Fraunhofer Institute (1989), Freiburg, Germany, as a visiting scientist and another year at The Royal Institute of Technology (1996), Stockholm, Sweden, as a visiting professor. He is the lead author of three books: (i) *Peridynamic Theory and Its Applications*, (ii) *The Finite Element Method and Applications in Engineering Using ANSYS*, and (iii) *Fatigue Life Prediction of Solder Joints in Electronic Packages with ANSYS*. Madenci has authored more than 100 peer-reviewed journal articles and numerous conference papers on structural dynamics, fracture mechanics, failure analysis, finite and boundary element methods, plates and shells, buckling/post-buckling of aerospace structures, and peridynamic theory.

Session: 2-22-1 (Track 2 – Plenary Talks in Advanced Manufacturing)

Tuesday, November 19
9:45am–11:30am
Edward A, Level Two

Energy Efficiency for Global Competitiveness of U.S. Manufacturers



Jamal Yagoobi
Worcester Polytechnic Institute

Description: The efficiency of energy use, as well as its cost and availability, have a substantial direct impact on the global competitiveness and economic health of U.S. manufacturers. Energy efficient operation in various industry sectors lowers production costs, conserves limited energy resources, and increases

productivity. Efficient use of energy via better understanding of the corresponding manufacturing processes could also result in improved product quality. In addition, more efficient energy use improves the environment by reducing emissions of greenhouse gases and air pollutants. Thus, improving energy consumption in industry, especially in energy-intensive manufacturing processes, can significantly reduce the U.S. energy needs. This presentation will focus on the importance of the energy efficiency for global competitiveness of U.S. manufacturers.

Biography: Jamal Yagoobi is the head of the Department of Mechanical Engineering at Worcester Polytechnic Institute (WPI). He also holds the George I. Alden Professorship at WPI. Yagoobi received his PhD degree from the University of Illinois at Urbana-Champaign in mechanical engineering in 1984. After receiving his PhD, he worked for Westvaco Corporation as a research engineer before joining Texas A&M University (TAMU) in 1987. At TAMU, he was the Paul John Faculty Fellow as well as the TEES Senior Fellow. At TAMU, he established the Drying Research Center and the Electrohydrodynamics Laboratory. Yagoobi joined the Illinois Institute of Technology (IIT) in 2002 as the Chair of the Mechanical, Materials and Aerospace Engineering Department until 2011. At IIT, he established the Illinois Coalition for Manufacturing Innovation, a partnership with Argonne National Laboratory, Chicagoland Chamber of Commerce Foundation, and Chicago Manufacturing Center. In 2012, he joined WPI.

Yagoobi's research specialties are in enhancement of heat and mass transfer with electrohydrodynamics in small and large scales in the presence and absence of gravity, heat and mass transfer in porous media, and enhancement of heat transfer with phase-change materials. He has over 115 journal publications and eight licensed patents. Yagoobi is a fellow ASME, a senior member of IEEE, and has received a number of national and international awards in research and teaching. Yagoobi is currently the associate editor of IEEE-IAS Transactions and was the associate editor for ASME Journal of Heat Transfer.

Yagoobi has been on a number of boards and panels including the Review Panel of Innovations in Remanufacturing Program of Science & Engineering Research Council of Singapore and the Advisory Board, Energy Engineering and Systems Analysis Directorate of Argonne National Laboratory.

Advanced Manufacturing in the US: Challenges and Opportunities



Michael F. Molnar
Director of the National Institute of Standards and Technology

Michael F. Molnar is the Director of the National Institute of Standards and Technology (NIST) Advanced Manufacturing Office and the Director of the Advanced Manufacturing National Program Office (AMNPO). Mr. Molnar is an expert on the Manufacturing Extension Partnership (MEP) which works with small and mid-sized U.S. manufacturers to help them create and retain jobs, increase profits, and save time and money. The nationwide network provides a variety of services, from innovation strategies to process improvements to green manufacturing. MEP also works with partners at the state and federal levels on programs that put manufacturers in position to develop new customers, expand into new markets and create new products. Additionally, Mr. Molnar has worked to advance the creation of the National Network for Manufacturing Innovation (NNMI). The proposed NNMI would consist of regional hubs that will accelerate development and adoption of cutting-edge manufacturing technologies for making new, globally competitive products.

Session: 3.1.1

(Track 3 – Biomedical and Biotechnology Engineering)

Wednesday, November 20

9:45am–11:30am

Madeleine A, Level Three

Mechanics of the Heart: Disease and Devices

IMECE2013-66879



Kendall Waters

Chair, IEEE Consultants' Network of Silicon Valley, Silicon Valley, CA, United States

Description: Cardiovascular diseases impact the mechanical performance of the cardiovascular system. Coronary heart disease leads to cardiac tissue remodeling that can affect physiologic performance. Valvular heart disease can impact

cardiovascular circulation. For over 30 years, the interventional cardiology community has developed and used an armamentarium of mechanical-based devices that aim to better understand, better diagnose, and better treat cardiovascular disease. These devices include guide wires, guide catheters, balloon catheters, bare-metal and drug-eluting stents, valve replacement and repair devices, and imaging catheters. This talk will review the role of mechanics in the progression, diagnosis, and treatment of cardiovascular diseases and close with a peek at current clinical challenges.

Biography: Kendall is an IEEE Senior Member. He is also active in the IEEE Ultrasonics, Ferroelectrics, and Frequency Control (UFFC) Society, where he is currently a member of the Medical Ultrasound Technical Program Committee. Previously he served as Associate Editor of the Transactions of the UFFC, Web Editor-in-Chief, and Proceedings Chair of the 2008 IEEE International Ultrasonics Symposium.

Outside of the IEEE, Kendall is manager of intellectual property (IP) and technology development at Silicon Valley Medical Instruments, a development-stage medical device start-up. He manages in-house IP activities, strategic research collaborations, and licensing activities related to minimally invasive image guidance for cardiovascular interventions. Kendall holds a Ph.D. in Physics from Washington University in St. Louis and a BS Physics/BA Mathematics from the University of Texas at Austin.

TRACK PLENARY SPEAKERS

Session: 3.1.1 (Track 3 – Biomedical and Biotechnology Engineering)

Wednesday, November 20
9:45am–11:30am
Madeleine A, Level Three

Modeling Wave Phenomena in the Arterial Network

IMECE2013-66841



Nikos Stergiopoulos
EPFL, Lausanne, Vaud, Switzerland

Description: Wave phenomena, such as wave propagation, wave reflections, and pulse amplification, are of importance for understanding the physiology and certain pathologies of the arterial system. The aim of this study is to validate a person-specific distributed model of the main systemic arterial tree, coupled to a model

of the left ventricle of the heart. This model is built and validated with noninvasive measurements on the same person, leading therefore to a coherent set of physiological data. Although previous studies have been done on a 1D model of arterial trees, demonstrating their aptitude of modeling wave propagation, they were mainly based on generic disparate arterial trees and were not able to provide for both a qualitative and quantitative validation. The 1D form of the fluid equations is applied over each large arterial segment. The systemic arterial tree geometric dimensions are deduced from angio MR, performed with a contrast agent injection. A nonlinear viscoelastic constitutive law for the arterial wall is considered. Arterial wall distensibility is based on literature data and adapted to match the specific subject, using the traveling time of the waves by ECG referenced tonometry measurements. The intimal shear stress is modeled using the Witzig-Womersley theory. The arterial tree is coupled to the heart, which is modeled using the time-varying elastance model. To validate model predictions, we performed noninvasive measurements of pressure and flow waveforms. Pressure was measured using applanation tonometry and flow rate using transcranial ultrasound and PC-MRI. The model predicts pressure and flow waveforms shape and wave features with high qualitative agreement compared to in vivo measurements. The quantitative aspect of pressure and flow waveforms is also well reproduced. The results obtained let us conclude that a 1D model based on a specific geometric arterial tree is able to predict qualitative and quantitative pressure and flow waveforms in the main systemic circulation. Applications of the 1D model to arterial grafts, aging, cardiac output monitoring, and diagnostics are presented and discussed.

Biography: Nikos Stergiopoulos is a professor and director of the Laboratory of Hemodynamics and Cardiovascular Technology (LHCT). The goal of the LHCT is to become a leading laboratory in the study of blood flow in relation to cardiovascular disease and to contribute to the advancement of cardiovascular technology through active transfer of our know-how to the clinic and to the medical technology sector.

Nikos's experience includes: 2002–present: Professor and director of LHCT; 2010–present: Founder and director of Rheon Medical SA, Prévèrènges, Switzerland; 2008–present: Founder and director of Antlia S.A., PSE-C, EPFL campus, Switzerland; 1998–2007: Founder and scientific director of EndoArt S.A., Lausanne, Switzerland; 1996–2002: Assistant professor at the Biomedical Engineering Laboratory, Swiss Federal Institute of Technology, Lausanne, Switzerland; 1991–1996: Research associate at Swiss Federal Institute of Technology–Lausanne; and 1990–1991: Lecturer at Iowa State University.

Session 3.9.6 (Track 3 – Biomedical and Biotechnology Engineering)

Thursday, November 21
9:30am–11:15am
Edward B, Level Two

A New Method for the Estimation of Total Arterial Compliance From Aortic Pulse Wave Velocity

IMECE2013-62271



Orestis Vardoulis and Nikos Stergiopoulos
EPFL, Lausanne, Vaud, Switzerland

Description: Total arterial compliance (CT) is a main determinant of cardiac afterload and arterioventricular coupling. Direct, in vivo, noninvasive, measurement of CT is not possible. Indirect CT estimation requires simultaneous recording of aortic flow and pressure waves, which is difficult

in current clinical practice. In contrast, aortic pulse wave velocity (aPWV), which is considered as the best parameter to assess arterial stiffness, is easy to measure noninvasively. The goal of this project was to establish the relation between aPWV and CT using a validated one-dimensional model of the human arterial tree. One-thousand different hemodynamic cases were simulated, by altering heart rate, compliance, resistance, and geometry. Based on Bramwell–Hill theory, we derived the formula $CT = k/aPWV^2$, which was found to accurately estimate CT from aPWV. Coefficient k was determined both analytically and by fitting CT vs. aPWV data. CT estimation may serve as a relevant parameter for cardiovascular risk (CV) assessment. CT could have greater impact in assessing elderly population or subjects with elevated arterial stiffness, where aPWV seems to have limited prognostic value. Further clinical studies should be performed to validate the formula in vivo.

Biography: Orestis Vardoulis is a second-year Ph.D. candidate at Ecole Polytechnique Federal de Lausanne in Switzerland. In 2010, he received his Diploma in Mechanical Engineering at the Department of Mechanical Engineering, Aristotle University of Thessaloniki, Greece. His thesis research project focuses on arterial aging and the evolution of the wave reflection profile along the aorta. Furthermore, his research topics include a study on the impact of: (1) reduced aortic compliance and (2) aortic graft implantation on global hemodynamics. He has published three papers in international journals including the *American Journal of Physiology* and the *European Journal of Vascular and Endovascular Surgery*.

Session: 4.10.2
(Track 4 – Dynamics, Vibration, and Control)

Thursday, November 21
3:00pm–4:45pm
 Mohsen, Level Three

**Recent Advances in Dynamic System Research:
 From Vibration of Distributed Structural Systems to
 Vibration-Based Damage Detection and Infinitely
 Variable Transmission**

IMECE2013-66865



Weidong Zhu,
*University of Maryland, Baltimore County,
 Baltimore, MD, United States*

Description: Some interesting results on the vibration and stability of distributed structural systems, vibration-based damage detection, and infinitely variable transmission will be reviewed. The vibration and stability of translating media with time-varying lengths and/or velocities

will be addressed. Two types of dynamic stability problems are considered: dynamic stability of translating media during extension and retraction, and parametric instabilities in distributed structural systems with sinusoidally or periodically varying velocities. A new spatial discretization and substructure method, which ensures that all the matching conditions of distributed components are satisfied, and hence uniform convergence of the solutions, will be discussed. The method overcomes the drawbacks of the classical assumed modes and component mode synthesis methods. A new nonlinear model of a slack cable with bending stiffness and arbitrarily moving ends is developed. Only one-tenth of elements are needed to achieve the same accuracy as that of the finite element method. The new methodologies will be applied to elevator systems. The vibration-based damage detection will address two major challenges in model-based damage detection: accurate modeling of structures and the development of a robustness algorithm for identifying the locations and extent of damage. Finally, design, analysis, and control of a novel infinitely variable transmission will be discussed. Experimental results will be presented to validate the theoretical predictions.

Biography: Weidong Zhu is a Professor in the Department of Mechanical Engineering at the University of Maryland, Baltimore County, and the founder and director of its Dynamic Systems and Vibrations Laboratory and Laser Vibrometry Laboratory. He received his double major BS degree in Mechanical Engineering and Computational Science from Shanghai Jiao Tong University in 1986, and his MS and PhD degrees in Mechanical Engineering from Arizona State University and the University of California at Berkeley in 1988 and 1994, respectively. He is a recipient of the 2003 National Science Foundation CAREER Award, the 2007 American Society for Nondestructive Testing Fellowship Award, the 2008 ChangJiang Scholar Chair Professorship in General Mechanics from the Ministry of Education of China, and the 2009 Daily Record's Maryland Innovator of the Year Award. He is a Fellow of ASME and an Associate Editor of the *ASME Journal of Vibration and Acoustics*. His research spans the fields of dynamics, vibration, control, applied mechanics, structural health monitoring, and wind energy, and involves analytical development, numerical simulation, experimental validation, and industrial application.

Session: 4.12.4
(Track 4 – Dynamics, Vibration and Control)

Wednesday, November 20
1:00pm–2:45pm
 Ford A, Level Three

**Multi-Objective Optimization With the Simple Cell
 Mapping Method**

IMECE2013-66866



Jian-Qiao Sun
*University California, Merced,
 Merced, CA, United States*

Description: Engineering system design must often meet different and conflicting goals. Consider the design of a jumbo jet. Common goals in the design include the payload, engine size, structure weight, fuel efficiency, manufacturability, and total cost. Several of these goals are conflicting

to each other. Proper combinations of the conflicting objective functions have led to single objective optimization problems. However, such a single-objective optimization is dependent on the combination algorithm, only provides a narrow window of all possible optimal solutions and, most importantly, is valid for convex objective functions only. Multi-objective optimization provides a set of optimal solutions, known as Pareto set. There have been many studies of search algorithms for Pareto sets of multi-objective optimization problems for complex dynamical systems. Recently, the simple cell mapping (SCM) method due to C.S. Hsu has been found to be a highly effective tool to compute Pareto sets. This paper discusses the SCM method and its application to global multi-objective optimization problems. We use several control design problems of linear and nonlinear dynamical systems. The results of the work indicate that the SCM method is very promising to solve for multi-objective optimization problems in high dimensional design space.

Biography: Jian-Qiao Sun earned his PhD from University of California at Berkeley in 1988. He worked for Lord Corporation at the Corporate R&D Center in Cary, North Carolina, and since has engaged in smart materials research and applications, and acoustic-structural controls. In 1994, he joined the faculty of the Department of Mechanical Engineering at the University of Delaware as an Assistant Professor, was promoted to Associate Professor in 1998 and to Professor in 2003. He is currently a professor in School of Engineering at University of California, Merced. He was an Associated Editor of the *ASME Journal of Vibration and Acoustics* from 1994 to 2000, an Associate Editor of *Communications in Nonlinear Science and Numerical Simulations* from 2001 to 2012, and an Editorial Board Member of *Acta Mechanica Solida Sinica* from 2003 to 2012. He has been an Editorial Board Member of the *Journal of Vibration and Control* since 2005 and *Journal of Sound and Vibration* since 2006. From October 2012, he began serving as the founding Editor-in-Chief of *International Journal of Dynamics and Control* published by Springer. His research interests include cell mapping methods, multi-objective optimization, nonlinear random vibrations, nonlinear controls, active structural-acoustic control, stochastic systems, modeling and physical therapy applications of smart materials, time-delayed dynamical systems, and optimal HVAC control and fault detection of energy efficiency of office buildings.

TRACK PLENARY SPEAKERS

Session 6.2.1

(Track 6 – Emerging Technologies)

Wednesday, November 20

1:00pm–2:45pm

Connaught, Level Three

Automotive Safety—Past, Present, and the Future

IMECE2013-67387



Priyaranjan Prasad

Prasad Consulting, LLC, Plymouth, MI, United States

Description: Historical accident data in terms of fatality rates in the U.S. from 1966 to 2012 will be discussed to show trends. The current environment and expected future trends as a result of fleet downsizing or mass reduction will also be discussed, as will the effect of the aging

population on fatality rates. For further improvement in automotive safety, a combination of active and passive safety will be required with technologies that will reduce accidents, mitigate the effect of the accident if it occurs, and provide urgent postcrash transportation of injured occupants to trauma centers.

Biography: Dr. Priyaranjan Prasad worked for Ford Motor Company for 35 years (1973–2008) in product development, advanced engineering, and research. During this period, he conducted basic and applied biomechanics research to determine the impact responses and impact tolerance of the human body; he applied the knowledge gained to the design of vehicle structures and restraint systems for various crash modes to protect occupants involved in crashes. He also pioneered the development and application of modeling techniques for human surrogates, vehicle structures, and restraint systems (e.g., seatbelts, airbags, side curtains, etc.). He was elected as a Henry Ford technical fellow, reporting directly to the chief technical officer of the company, in 1994. From 1994 to 2008, he was responsible for directing the research, development, and implementation of active and passive safety technologies worldwide. His safety research work has had a major influence on safety regulations worldwide, particularly in the U.S. He has led several voluntary industry activities that have resulted in the adoption of conformance standards for vehicles sold in the U.S. (compatibility between light vehicles, airbag out-of-position testing). He also led an International Organization for Standardization working group charged with the development of airbag out-of-position test procedures that were subsequently adopted in Federal Motor Vehicle Safety Standard No. 208—Occupant Crash Protection, to which all airbags have to be designed.

Currently, as president of Prasad Consulting, LLC (Plymouth, Mich.), he is a consultant to universities, governments, and automotive original equipment manufacturers. Prasad has written more than 110 technical peer-reviewed papers and has received seven patents in active/passive safety technologies.

His most recent honors include the Automotive Occupant Restraints Council's (now the Automotive Safety Council) Pathfinder Award (2010), the Insurance Institute of Highway Safety's Top Safety Pick Award (2010) and SAE International's Arnold W. Siegel Transportation Safety Award (2011). Earlier honors include Ford Motor Co.'s Henry Ford Technology Award (1990 and 1995), the National Highway Traffic Safety Administration's Engineering Excellence Award for Safety (1991 and 2009), the U.S. Department of Transportation's National Award for the Advancement of Motor Vehicle Research and Development (1994), the International Research Council on the Biomechanics of Injury's Bertil Aldman Award (1999), the John Paul Stapp Award (2003) for the best paper at the Stapp Car Crash Conference®, SAE International's Ralph H. Isbrandt Automotive Safety Engineering Award (2005), Wayne State University's Distinguished Engineering Alumni Award (2005), and the Association for the Advancement of Automotive Medicine's Award of Merit (2006).

Prasad is a member of the National Academy of Engineering; and a Fellow of SAE International and the American Institute for Medical and Biological Engineering. He earned his bachelor's degree in mechanical engineering at Bihar College of Engineering (Patna, India) in 1965. He earned his master's degree in mechanical engineering and his Ph.D. in biomechanics at Wayne State University, Detroit, in 1968 and 1973, respectively.

Session 6.13.1

(Track 6 – Emerging Technologies)

Wednesday, November 20

5:00pm–6:45pm

Oxford, Level Three

How Technology and Innovation are Enhancing Oilfield Well Performance

IMECE2013-67388



Rustom Mody

Baker Hughes, Houston, TX, United States

Description: The overall performance of oil and gas wells are characterized by a variety of metrics including non-productive time, gross output, intervention costs, reduced lifting costs, ultimate recovery factor, etc. Innovative technologies and methods are enabling

ever-increasing levels of well performance, across all metrics. Collaboration among operators and service companies, a steady investment in technology and an unwavering commitment to innovation has enabled the rapid development of new solutions which a consistently increasing levels of well performance.

Biography: Rustom Mody holds Bachelor of Science and Master of Science degrees in Mechanical Engineering and a Master of Business Administration in Finance, and he is a Registered Professional Engineer in the State of Texas. The author of numerous technical publications, he holds 15 patents and has won numerous Meritorious Awards for Engineering Innovation. In all, he has more than 30 years of experience in drilling and completion. Rustom is an active member of the Society of Petroleum Engineers, American Association of Drilling Engineers, and International Association of Drilling Engineers serving on sub-committees of all three organizations.

Session 7.16.1
(Track 7 – Energy)

Monday, November 18
9:45am–11:30am
Madeleine A, Level Three

Final Report and Proposal by JSME on Damages of Machines and Structures Caused the Great East Japan Earthquake and Following Tsunami

IMECE2013-67390



Shigehiko Kaneko
University of Tokyo, Tokyo, Japan

Description: The Japan Society of Mechanical Engineers (JSME) has settled the following two committees just after the earthquake: The Committee on emergent damage analyses, surveys and proposals and the Committee on long range proposals. The members of both committees have been working

aggressively from the viewpoint of the following: What the engineers and researchers, who are engaged in the mechanical engineering, have to reconsider and learn from the disaster and what they can do towards the future. There are many items to be surveyed and many subjects to be investigated. In order to do this task effectively, JSME settled seven WG's in the first committee and four in the second. JSME has constituted an investigation committee on emergent damage analyses, surveys and proposals. The committee consists of the following seven working groups: WG1–Damages of machines and devices, and effectiveness of the earthquake-proof technologies; WG2–Mechanism of damages of machines and structures due to tsunami; WG3–Applications of robots at the disaster area WG4–Analysis of transportation and logistics in disaster-hit and surrounding areas; WG5–Damages of energy infrastructure; WG6–Review of codes and standards in connection with Nuclear Power Plant; and WG7–Crisis management for catastrophic events, earthquakes, and nuclear power plants. In addition, JSME started another working group for longer term actions consisting of the following four working groups: WG8–Quantitative assessment and proposals regarding future energy sources and energy utilization; WG9–Establishment of reliability and robustness of man-made structures and crisis management control methods; WG10–Proper way to explain engineering to the public, and the human resource development of mechanical engineers for that purpose; and WG11–Learning social mission of engineering from Fukushima-accident—Toward reliable and safety society. In this presentation, overview of the JSME activities, the results of analyses, and proposals will be provided

Biography: Shigehiko Kaneko is professor at the University of Tokyo, Tokyo, Japan, where he earned his B.E., M.E., and D.E. in Mechanical Engineering in 1976, 1978, and 1981, respectively. His professional experience includes serving as lecturer (1981-1982) and associate professor (1982-1985) at the University of Tokyo; visiting associate professor at McGill University, Japan (1985-1986); and associate professor (1986-2002) at the University of Tokyo, prior to becoming professor there in 2003. Kaneko's areas of interest include, small-size distributed energy systems, biomass gas turbine and engines, dynamics and control of energy systems, flow induced vibration, and noise and vibration control.

Serving currently as president of the Japan Society of Mechanical Engineers (2012-13), Kaneko is also a trustee of Gas Turbine Society of Japan (2008–2009), Japan Federation of Engineering Societies (2005–2006), and Society of Automotive Engineers of Japan (2001–2007); chairman of the International Steering Committee of Asia Pacific Vibration Conference (2007–2013); and member of Central Environmental Council of Japan (2005–2013).

Session 8.1.2
(Track 8 – Fluids Engineering Systems & Technologies)

Tuesday, November 19
1:00pm–2:45pm
Betsey A, Level Two

On the Development of a Thermodynamic Framework for Developing Implicit Constitutive Relations

IMECE2013-65574

Kumbakonam Rajagopal



Texas A&M University, College Station, TX, United States

Description: This talk will cover a systematic thermodynamic framework for the development of implicit constitutive relations to describe the complex response of nonlinear bodies. In addition, we will also discuss an approximation procedure of a very general class of implicit constitutive relations that leads to fluids of both the differential and rate type.

Biography: Professor Rajagopal holds a B. Tech. from the Indian Institute of Technology, Madras (1973), a M.S. from the Illinois Institute of Technology (1974), and a Ph.D. from the University of Minnesota, where his PhD advisor was Roger Fosdick. At the present K. R. Rajagopal is a Distinguished Professor at the Department of Mechanical Engineering of the University of Texas, where he also holds appointments in other departments such as the Department of Mathematics, and the Department of Civil Engineering. His research interests focus on Continuum Mechanics and its applications to Non-linear materials. Among his different honors and distinctions we can mention the Eringen Medal, which he received from the Society of Engineering Science in 2004 and the Bush Excellence Award received also in 2004. Professor Rajagopal has been editor and has been in the editorial board of many journals, such as the Archive for Rational Mechanics and Analysis, the International Journal of Engineering Science, the International Journal of Nonlinear Mechanics, Meccanica, Journal of Elasticity, Continuum Mechanics and Thermodynamics, International Journal of Plasticity, and Theoretical and Computational Fluid Mechanics.

TRACK PLENARY SPEAKERS

Session 8.3.1 (Track 8 – Fluids Engineering Systems & Technologies)

Monday, November 18

9:45am–11:30am

Betsy A, Level Two

The Nanoaquarium—A Tool for Visualizing Processes in Liquid Media with Nanometer Resolution

IMECE2013-62431

Haim Bau



University of Pennsylvania, Philadelphia, PA, United States

Description: Since its invention, the electron microscope has facilitated numerous advances in a plethora of disciplines ranging from materials science, physics, and chemistry to biology.

Traditional electron microscopy must be carried out, however, in a high vacuum environment that does not allow for real

time imaging of processes in liquid media. Consequently, traditional electron microscopy has been restricted to painstaking, “postmortem,” after-the-fact investigations of dry or frozen samples without any guarantee that an image is captured at the “right” moment. Static images also do not provide information on process dynamics, and the sample preparation may adversely impact the structure of the object to be imaged. The ability to image dynamic processes in liquid media is certain to be transformative, lead to new discoveries, and provide a better understanding of many important processes at the nanoscale. To overcome the limitations of traditional electron microscopy, there has been a growing interest in recent years in developing means for wet electron microscopy that will allow one to image samples in real time in their native environment and observe processes in situ as they take place. We briefly survey recent efforts pertaining to wet electron microscopy and then describe in greater detail the work of our group with a custom-made, microfabricated liquid cell dubbed the nanoaquarium. The nanoaquarium sandwiches a thin liquid layer, ranging in thickness from tens of nanometers to a few microns, between two thin, electron-transparent, silicon nitride membranes. The liquid cell is hermetically sealed from the vacuum environment of the electron microscope. The thin liquid layer scatters only a small fraction of the electrons and allows one to image objects suspended in the liquid with high resolution. We describe briefly the imaging of oriented assembly of colloidal crystals, diffusion limited aggregation of nanoparticles, interactions of the electron beam with the imaged medium, bubble nucleation and growth, crystallization processes, and electrochemical processes relevant to batteries and manufacturing.

Biography: Haim Bau is a Professor of Mechanical Engineering and Applied Mechanics at the University of Pennsylvania. His research expertise is in computational mechanics, fluid mechanics, and mechanics of materials. Bau’s current research interests are in nano- and macrofluidics, with applications in biology and medicine. His lab has developed means for the directed positioning of individual molecules and the study of their mechanical and electrical properties. They have also developed methods to transport liquids and particles through nanopipes. They are working on carbon nanopipe-based devices for cell

surgery and are constructing laboratories on chips for disease detection at the point of care.

He is a member of the and the . His education includes earning a Ph.D. from Cornell University in 1980, an M.S. from Technion in Haifa, Israel, in 1973; and a BS in mechanical engineering from Technion in 1969. His is a Fellow of the ASME and was awarded the ASME Presidential Young Investigator Award – 1984 and the ASME-Heat Transfer Division Best Paper Award – 1982.

Sean Anderson

University of Pennsylvania, Philadelphia, PA, United States

Sean Anderson, Ph.D. Candidate, University of Pennsylvania, received his BS in mechanical engineering from The College of New Jersey in 2009, and is currently a PhD candidate in mechanical engineering and applied mechanics at the University of Pennsylvania. Thesis work is being performed in a micro- and nanofluidics laboratory under the advisement of Professor Haim H. Bau. The focus of this work is the development of applications for carbon nanopipettes (CNPs), which combine traditional pulled-glass micropipettes with a conductive carbon microelectrode for advanced cellular probing and microinjection techniques.

Session 8.9.4

(Track 8 – Fluids Engineering Systems & Technologies)

Tuesday, November 19

9:45am–11:30am

Betsy A, Level Two

Free-Surface Microfluidics and SERS for High Performance Sample Capture and Analysis

IMECE2013-67406

Carl Meinhart



University of California, Santa Barbara, CA, United States

Description: Nearly all microfluidic devices to date consist of some type of fully enclosed microfluidic channel. The concept of “free-surface” microfluidics has been pioneered at UCSB during the past several years, where at least one surface of the microchannel is exposed to the surrounding air. Surface tension is a dominating force at the micron scale,

which can be used to control effectively fluid motion. There are a number of distinct advantages to the free surface microfluidic architecture. For example, the free surface provides a highly effective mechanism for capturing certain low-density vapor molecules. This mechanism is a key component (in combination with surface-enhanced Raman spectroscopy, i.e., SERS) of a novel explosives vapor detection platform, which is capable of subpart-per-billion sensitivity with high specificity. This platform is currently being commercialized for homeland security applications by SpectraFluidics, Inc.

Biography: Professor Meinhart completed his Ph.D and Postdoctoral work at the University of Illinois in June of 1995. Since coming to UCSB in 1996, his research has focused on developing and applying PIV to study transport phenomena in microfluidic devices. His research group is involved in the development and analysis of BioMEMS, and SERS-based ultra sensitive chemical detectors.

Session 8.9.8 (Track 8 – Fluids Engineering Systems & Technologies)

Wednesday, November 20

9:45am–11:30am

Maggie, Level Three

Description: High Fidelity Simulation of Multiscale Turbulent Flows in the Environment

IMECE2013-67396



Sutanu Sarkar

University of California, La Jolla, CA,
United States

Description: The high fidelity simulation of flows around engineered devices that operate in the natural environment presents a tremendous challenge owing to the large range of length scales (millimeters to tens of meters) and time scales (seconds to hours) in the flow variability. We will discuss two examples

concerning flows in a stratified environment. The first concerns the stratified wake of a body. A large eddy simulation (LES) with an immersed boundary method is employed to simulate the near wake and the results coupled with another domain in which the simulation is continued into the far wake. This technique enables a realistic picture of the wave field associated with the intermediate wake and the coherent vortices of the far field. The second example concerns flow on the slopes of steep topographic features on the ocean floor. Here, topographically generated waves that are tens of meters tall evolve into overturns that eventually dissipate through turbulence. The sequence of instabilities leading to turbulence is described using LES.

Biography: Sutanu Sarkar received his B.Tech. from IIT Bombay, M.S. from Ohio State University, and Ph.D. from Cornell University. After four years as a staff scientist at ICASE, NASA Langley Research Center, he joined UCSD, where he is currently the Blasker Professor of Engineering and the Chair of the Department of Mechanical and Aerospace Engineering. His current research interests are in the areas of simulation and modeling of turbulent flows, transport and mixing in the environment, and energy. He has received a NASA group achievement award (1994), the Bessel Award from the Humboldt Foundation (2001), and was elected Fellow, American Physical Society (2006), Associate Fellow, AIAA (2009), and Fellow, ASME (2010).

Session 10.2.1 (Track 10 – Mechanics of Solids, Structures, and Fluids)

Monday, November 18

9:45am–11:30am

Mohsen A, Level Three

Mechanics of Stretchable Electronics

IMECE2013-67392



Yonggang Huang

Northwestern University, Evanston, IL,
United States

Description: Recent advances in mechanics and materials provide routes to integrated circuits that can offer the electrical properties of conventional, rigid wafer-based technologies but with the ability to be stretched, compressed, twisted, bent, and deformed into arbitrary

shapes. Inorganic electronic materials in micro-/nanostructured forms, intimately integrated with elastomeric substrates offer particularly attractive characteristics in such systems, with realistic pathways to sophisticated embodiments. Mechanics plays a key role in this development by identifying the underlying mechanism and providing analytical solutions to guide design and fabrication. This talk presents the mechanics theory for the enabling technology (transfer printing) and materials (stretchable silicon, interconnect), and their applications to stretchable and foldable circuits, electronic-eye camera, solar cell, semi-transparent and flexible LED display, neural and cardiac sensors, cardiac ablation therapy, epidermal electronics, flexible electrode array for mapping brain activity in vivo, dissolvable electronics, stretchable battery, pressure sensor, injectable, cellular-scale optoelectronics, and digital camera inspired by the arthropod eye.

Biography: Young Huang joined the faculty at Northwestern University (Evanston, Ill.) as Joseph Cummings professor in 2007. Previously he was a faculty member at the University of Illinois at Urbana-Champaign; and, earlier, he was at Michigan Technological University, Houghton, and the University of Arizona, Tucson. Huang has made seminal contributions to mechanics theory and applications, and is recognized as a leader in the research areas of mechanics of materials and mechanics of stretchable electronics. During the early years of his career, he focused on the advancement of mechanics theory and research in key areas across multiple scales. He was looking to integrate the disciplinary fields of mechanics and materials science by developing a clear understanding of the hierarchy of size scales that govern the material behavior. His work on the mechanism-based strain gradient plasticity theory represents a major advance in scale-dependent plasticity of metals.

Since 2005, Huang has moved to a new research area: mechanics of stretchable and curvilinear electronics. Using mechanics principles, he and his collaborators have developed electronics with performance equal to established technologies—those using flat and rigid semiconductor wafers—but in lightweight, curvilinear, foldable, and stretchable formats that enable many new application possibilities. This represents the future electronics technology that overcomes the fundamental mismatch in mechanics and form between biology (soft, elastic, and curved) and silicon wafer (hard, rigid, and flat). It enables applications that are impossible to achieve with hard, planar integrated circuits that exist today, such as the seamless integration of stretchable electronics with the human body for health monitoring and certain therapeutic functions.

An ASME member, Huang is editor of the *Journal of Applied Mechanics*. He received the Society's Gustus L. Larson Memorial Award in 2003, the Melville Medal in 2004, and the Charles Russ Richards Memorial Award in 2010. His honors include the Society of Engineering Science's Young Investigator Medal (2006), the *International Journal of Plasticity* Medal (2007), and a fellowship from the John Simon Guggenheim Memorial Foundation (2008). In 2009, he was identified by ISI as a Highly Cited Researcher in Engineering.

Huang received his bachelor's degree in mechanics from Peking University, Beijing, in 1984. He earned his master's degree and Ph.D. in engineering science from Harvard University (Cambridge, Mass.) in 1987 and 1990, respectively.

TRACK PLENARY SPEAKERS

Session 11.8.1 (Track 11 – Micro- and Nanosystems Engineering and Packaging)

Tuesday, November 19

9:45am–11:30am

Randle A, Level Four

Challenges and Opportunities in Gen-3 Embedded Cooling of Microsystems

IMECE2013-67389



Avram Bar-Cohen

Defense Advanced Research Projects Agency, Arlington, VA, United States

Description: From the dawn of the Information Age, thermal management technology has played a key role in the continuing miniaturization, performance improvements, and higher reliability of microsystems. Following the initial focus on computer room ventilation and air-conditioning (Gen 1), much of thermal

packaging history since the 1960s has dealt with heat sinks and coldplates and their attachment to microelectronic chips (Gen 2). However, we have reached the limits of Gen 2 cooling technology, with many of today's high-performance microsystems unable to fully exploit the inherent capability of the cutting-edge electrical, optical, and microwave devices, due to excessive heat generation. An embedded, Gen 3, cooling paradigm, combining intrachip microfluidics with high conductivity thermal interconnects, promises to overcome these limitations and enable compact microsystems with unprecedented performance. The motivation, opportunities, current state-of-the-art, and research challenges associated with this embedded cooling thermal management paradigm are the focus of this plenary lecture.

Biography: Dr. Avram Bar-Cohen is a Program Manager in the Microsystems Technology Office of the Defense Advanced Research Projects Agency (DARPA), Arlington, VA; he is serving in this capacity while on leave from his position as a Distinguished University Professor at the University of Maryland, where he most recently also served as the Chair of the Mechanical Engineering Department (2001–2010). Bar-Cohen earned a PhD in mechanical engineering from the Massachusetts Institute of Technology, and prior to joining Maryland, he directed the University of Minnesota's Center for the Development of Technological Leadership and held the Sweatt Chair in Technological Leadership. His publications, lectures, short courses, and research, as well as professional service in ASME and IEEE, have helped to create the scientific foundation for the thermal management of electronic components and systems and pioneered techniques for energy-efficient sustainable design of manufactured products.

Bar-Cohen has received numerous awards, including the prestigious International Centre for Heat and Mass Transfer's 2008 Luikov Medal, ASME's Heat Transfer Memorial Award (1999), and the IEEE CPMT Society's Outstanding Sustained Technical Contributions Award (2002). He is among a very select number of ASME Honorary Members and is a Fellow of IEEE.

Session 11.8.1 (Track 11 – Micro- and Nanosystems Engineering and Packaging)

Tuesday, November 19

9:45am–11:30am

Randle A, Level Four

When Engineering Meets Medicine

IMECE2013-67394



Chih-Ming Ho

University of California, Los Angeles, Los Angeles, CA, United States

Description: During the last two decades, the manufacturing techniques of microfluidics-based devices have been phenomenally advanced, offering tremendous potential for biomedical technologies. However, the direct applications of these technologies toward

diagnostics and therapeutics are still far from maturity. The present challenges lay at the interfaces between the engineering systems and the biocomplex systems. A precisely designed engineering system with narrow dynamic range is hard to seamlessly integrate with the adaptive biological system in order to achieve the design goals. These differences remain as the roadblock between two fundamentally noncompatible systems. This presentation will not extensively review the existing microfluidic sensors and actuators; rather, we will discuss the sources of the gaps for integration. We will also introduce system interface technologies for bridging the differences to lead toward paradigm shifts in diagnostics and therapeutics.

Biography: Dr. Chih-Ming Ho holds the Ben Rich-Lockheed Martin Chair Professor in School of Engineering. He is the Director of the Institute for Cell Mimetic Space Exploration (CMISE) with a goal of fusing bio-nano-information technologies. After receiving his Ph.D. from The Johns Hopkins University, Ho started his career at the University of Southern California and rose to the rank of full professor. In 1991, he moved to the University of California, Los Angeles to lead the establishment of the micro-electro-mechanical-system (MEMS) field in UCLA and served as the founding Director of the Center for Micro Systems. To this day, the UCLA MEMS research has been recognized as one of the top three programs in the world. He served as UCLA Associate Vice Chancellor for Research from 2001 to 2005.

Ho is known for his contributions in bio-nano technology, micro/nano fluidics, and turbulence. He was ranked by ISI as one of the top 250 most cited researchers in the whole engineering category around the world. In 1997, he was inducted as a member of the National Academy of Engineering. In the following year, he was elected as an Academician of Academia Sinica, which honors scholars of Chinese origin with exceptional achievements in liberal arts and sciences. He holds five honorary professorships and has published 260 papers and 10 patents. He presented over 100 keynote talks at international conferences. Ho was elected Fellow of the American Physical Society as well as the American Institute of Aeronautics and Astronautics for his contributions in a wide spectrum of technical areas.

In addition to his academic accomplishments, Ho has made extensive contributions to the professional societies around the world. He has chaired the Division of Fluid Dynamics (DFD) in American Physical Society, which is the leading platform in the United States for scientists interested in fundamental fluid dynamics. He is on the advisory board for AIAA Journal.

He is a member of the IEEE/ASME JMEMS Coordinating Committee. He was an associate editor of the ASME Journal of Fluids Engineering and the AIAA Journal. He received his B.S. from the National Taiwan University in 1967 and his Ph.D. from Johns Hopkins University in 1974.

Ho is a member of the National Academy of Engineering, fellow of the American Institute of Aeronautics and Astronautics, a member of the Academia Sinica, and fellow of the American Physical Society.

**Session 15.14.1 Rayleigh Lecture
(Track 15 – Vibration, Acoustics, & Wave Propagation)**

Tuesday, November 19

3:00pm–4:45pm

Madeleine D, Level Three

Walking-Induced Vibrations in Buildings; Evaluation, and Prediction

Eric Ungar



Acentech, Cambridge, MA, United States

Description: Standard criteria for human vibration perception and comfort are reviewed, and their limitations and practical applicability to footfall-generated vibrations are discussed. Similarly, widely used generic vibration criteria for sensitive equipment are summarized and critiqued. Vibration criteria for some items of sensitive equipment, as set forth by their

suppliers, are illustrated and assessed. The characteristics of the force pulses produced by walking persons are described, as are their analytical representations. Widely used tools and methods for predicting vibrations induced in the floors of buildings due to walking are summarized, and their limitations are pointed out. Comments are presented concerning the current state of the art.

Biography: Eric E. Ungar received his early education in Vienna, Austria, and in St. Louis, Mo. After service in the U.S. Army in World War II, he obtained his BSME degree from Washington University in St. Louis. He then worked on atomic weapons at Sandia Corporation in Albuquerque, N.M., and earned his MS at the University of New Mexico. Subsequently, he taught and studied at New York University, receiving his Doctor of Engineering Science degree in 1957. In 1958, he joined the research and consulting firm of Bolt Beranek and Newman, Inc., in Cambridge, Ma., from where he retired in 1996 as Chief Consulting Engineer. Since then he has been serving as Chief Engineering Scientist at Acentech Inc. in Cambridge, Ma.

Dr. Ungar is a Life Fellow of ASME and held the chairmanship of its Design Engineering Division in 1978-1979. He is a Fellow of the Acoustical Society of America (ASA) and served as its President in 1992-93. He is a board-certified member of the Institute of Noise Control Engineering (INCE), whose presidency he held in 1985, and he is an Associate Fellow of the American Institute for Aeronautics and Astronautics. His awards include ASME's Per Bruel Gold Medal for Noise Control and Acoustics, ASA's Gold Medal, and INCE's Distinguished Engineer Award. He has published widely and has presented lectures and seminars on four continents.

THE NCAD RAYLEIGH LECTURE is an ASME division level award given by the Noise Control and Acoustics Division in recognition of the selected lecturer's pioneering contributions to the fields of noise control and acoustics.

**Session 15.15.1
(Track 15 – Vibration, Acoustics, & Wave Propagation)**

Wednesday, November 20

9:45am–11:30am

Mohsen A, Level Three

Tutorial on Dynamometry

IMECE2013-62800

Michael Jonson



Pennsylvania State University, University Park, PA, United States

Description: Most users of dynamometry are interested in steady operations such as torque as a function of RPM from a motor or automobile engine. This tutorial will discuss methods for measurements where steady and time-varying forces and moments are needed. The main need for these loads is for steady performance fatigue, vibration, and acoustic noise

reduction. The tutorial will discuss how lumped parameter and finite element models can be used to design and provide methods for calibration, expected sensor levels, and for data reduction. This tutorial will discuss how sensors placed in rotating coordinate systems may provide advantageous, inferring subtle details for loads associated with time varying vectors. Finally, processing methods will be provided for broadband and periodic forcing functions.

Biography: Dr. Michael Jonson is a Research Associate at The Pennsylvania State University Applied Research Laboratory where he has worked since 1985. He obtained his BS in Aeronautical Engineering from The California Polytechnic State University, San Luis Obispo in 1984. He received his MS and Ph.D. in Mechanical Engineering from Penn State in 1988 and 1998, respectively. He currently is the head of the Flow Acoustics Department consisting of seven faculty and staff engineers. For ASME he has served on the Technical and Executive Committees within the Noise Control and Acoustics Division.

Dr. Jonson has extensive experience in the acoustics of underwater turbomachinery. This includes structural acoustics, leading and trailing edge flow excitation models, and the application of smart materials for acoustic and vibration control. He is particularly expert in the prediction and measurement of the response of turbomachinery to non-uniform and turbulent inflows through the use of dynamometry. He has applied this knowledge mainly to marine turbomachinery for government and industrial sponsors.

SCHEDULE AT-A-GLANCE / MONDAY, NOVEMBER 18

Monday November 18	9:45–11:30am	1:00–2:45pm	3:00–4:45pm	5:00–6:45pm
Betsy A	8-3-1: Electric, Magnetic, and Thermal Phenomena in Micro- and Nanoscale Systems – I	8-3-2: Electric, Magnetic and Thermal Phenomena in Micro- and Nanoscale Systems: What Can We Do with Electric and Magnetic Fields? - Panel Discussion	8-3-3: Electric, Magnetic and Thermal Phenomena in Micro- and Nanoscale Systems – II	
Betsy B	8-4-2: Forum on Recent Developments in Multiphase Flow – I	8-4-3: Forum on Recent Developments in Multiphase Flow – II	8-4-4: Forum on Recent Developments in Multiphase Flow – III	
Betsy C	8-5-1: Turbulence Modeling and Applications	8-5-2: Fluid Flow Theory and Applications	8-5-3: Fluid Flow Separation and Transport	
Connaught	9-3-4: Nanomaterials in Energy Systems	9-3-5: Multiscale Simulation and Modeling – I	11-10-3: Nanoengineering for Energy Storage	
Cunningham C	10-29-2: Instability in Solids and Structures – II	10-29-3: Instability in Solids and Structures – III	10-29-4: Instability in Solids and Structures – IV	
Del Mar A	10-10-1: Degradation and Environmental Effects	10-10-2: Micromechanics and Multiscale Studies		
Del Mar B	10-8-1: Composite Materials for Renewable Energy Systems	10-9-1: Mechanics and Design of Cellular Materials – I	10-9-2: Mechanics and Design of Cellular Materials – II	
Edward A	8-6-1: CFD Applications for Optimization and Controls – I	8-6-2: CFD Applications for Optimization and Controls – II	8-6-3: CFD Applications for Optimization and Controls – III	
Edward B	8-8-1: Industrial Applications 1: Turbulent Flows – I	8-8-2: Industrial Applications 2: Turbulent Flows – II	8-8-3: Industrial Applications 3: Heat Transfer	
Edward C	8-9-1: Microscale Multiphase Flow and Surface Interactions – I	8-9-2: Droplet/Particle/Bubble Dynamics and Capillary Flow – I	8-9-3: Devices, Experimental Investigation of Micro/Nanofluidics – I	
Edward D	8-10-1: Fluid Measurements and Instrumentation – 1	8-10-2: Fluid Measurements and Instrumentation – 2	8-11-1: CFD / EFD (Experimental Fluid Dynamics) Choice, A Dilemma for Industries!	
Emma A	9-16-1: Environmental Heat Transfer	12-1-2: Safety Engineering & Management, Transportation Safety, and Risk Analysis	12-4-2: Reliability Methods – II	
Emma B	12-1-1: Safety Engineering & Management, Process Safety, and Risk Analysis	12-7-1: Forensic Applications in Failure Analysis	12-8-1: Product Safety	
Emma C	12-4-1: Reliability Methods – I	7-6-1: Biofuels for Internal Combustion Engines – I	7-6-2: Biofuels for Internal Combustion Engines – II	
Ford A	7-4-2: Advanced Electrochemical Storage Concepts – I	7-4-3: Advanced Electrochemical Storage Concepts – II	7-5-1: High Temperature Fuel Cells	
Ford B	7-8-1: Wind and Other Alternative Power Source Turbines for Energy Generation	7-9-1: Concentrating Solar Power and Thermal Applications	7-9-2: Solar Thermochemistry and Related Themes	

MONDAY, NOVEMBER 18 / SCHEDULE AT-A-GLANCE

Monday November 18	9:45–11:30am	1:00–2:45pm	3:00–4:45pm	5:00–6:45pm
Ford C	7-2-1: Fundamentals of Thermodynamics – I	7-8-2: Waste Heat, Energy Storage, and Energy Recovery	7-8-3: Advanced Alternative Energy Cycles, Systems, and Fuels I	
Gibbons	10-11-1: Materials & Meta-Materials at Varying Length Scales & Frequency Ranges	10-21-1: Applications and Challenges in Full-Field Experimental Mechanics	10-1-1: Engineering Problems in Mechanics	
Gregory A	9-21-1: Thermophysical Properties - I	9-21-2: Thermophysical Properties - II	9-14-1: Bioheat and Mass Transfer	
Gregory B	9-15-1: Heat and Mass Transfer under Extreme Conditions	9-18-1: Future Directions for Heat Transfer Engineering, Research and Education - A Perspective on the 75th Anniversary of the Heat Transfer Division	9-11-2: Gas Turbine Heat Transfer	
Madeleine A	7-16-1: ASME NED – Plenary Session	7-16-2: Operations, Safety and Security	7-16-3: Materials and Structures	
Madeleine B	7-12-6: Materials Challenges for Energy	7-12-1: Energy Storage and Applications	7-12-2: Energy Conversion	
Madeleine C	7-13-2: Applications in Heating and Cooling Systems	7-13-3: Applications of Solar Energy	7-17-1: Symposium on Energy-Water Nexus – I	
Madeleine D	7-7-1: Combined Heat and Power (CHP)	7-7-2: Waste Heat Recovery and Hybrid Cycles	9-19-1: Photogallery - Heat and Mass Transfer Visualization	
Maggie	9-4-1: Heat Exchangers Performance, Microchannels and Nanofluids	9-4-3: Heat Pumps, Cooling, Refrigeration and HVAC Systems	9-4-4: Heat Pipes and Thermosyphons	
Mohsen A	10-2-1: Medalist Symposium	10-4-1: Drucker Medalist Symposium	10-27-1: Gels	
Mohsen B	10-6-1: Mechanics and Materials in Flexible/Stretchable Electronics	10-6-2: Mechanics in Lithium Ion Batteries	10-6-3: Nanomaterials in Li-ion Batteries and Flexible Electronics	
Molly A	9-10-1: Boiling Heat Transfer	9-10-2: Condensation Heat Transfer and Two Phase Flows	9-10-3: Microchannel Phase Change Heat Transfer	
Molly B	9-13-1: Liquid and Phase Change Cooling – I	9-13-2: Advances in Heat Sink Technology	9-13-3: Thermal Transport in Materials, Devices, and Systems	
Oxford	9-6-1: Combustion and Fire - Experimental & Modeling Techniques – I	9-6-3: Modeling and Simulation of Combustion, Fire and Reactive Flow	9-6-2: Combustion and Fire - Experimental & Modeling Techniques – II	
Windsor B	9-2-1: Fundamentals of Natural and Mixed Convection – I	9-2-2: Fundamentals of Boiling/Phase Change	9-2-3: Fundamentals of Multiscale Modeling	
Windsor C	9-3-1: Thermal Transport Through Interfaces	9-3-2: Near-Field Thermal Radiation and Metamaterials	9-3-3: Engineered Surfaces of Phase-Change Heat Transfer	

SCHEDULE AT-A-GLANCE / TUESDAY, NOVEMBER 19

Tuesday November 19	9:45–11:30am	1:00–2:45pm	3:00–4:45pm	5:00–6:45pm
Betsy A	8-1-1: Fluid Mechanics and Rheology of Nonlinear Materials and Complex Fluids – I	8-1-2: Fluid Mechanics and Rheology of Nonlinear Materials and Complex Fluids – Plenary	8-1-3: Fluid Mechanics and Rheology of Nonlinear Materials and Complex Fluids – II	5-4-1: Curriculum Innovations, Pedagogy and Learning Methodologies – I
Betsy B	8-8-4: Industrial Applications 4: Turbulent Flows – III	8-8-5: Industrial Applications 5: Multiphase Flows	8-6-4: CFD Applications for Optimization and Controls – IV	8-6-5: CFD Applications for Optimization and Controls – V
Betsy C	8-9-4: Plenary (Topic 8-9)	8-9-5: Microscale Multiphase Flow and Surface Interactions – II	8-9-6: Droplet/Particle/Bubble Dynamics and Capillary Flow – II	8-9-7: Devices, Experimental Investigation of Micro/Nanofluidics – II
Connaught	7-5-3: Low Temperature Fuel Cells	11-7-1: MEMS and MEMS Packaging	7-16-4: Neutronics, Fluid, Thermal	7-17-2: Symposium on Energy-Water Nexus II
Del Mar A	10-14-1: Hierarchical Nanocomposites – I	10-14-2: Hierarchical Nanocomposites – II	10-43-2: Modeling and Simulation of Failure Mechanics – I	10-43-3: Failure of Composites and Heterogeneous Materials – I
Del Mar B	10-18-1: Durability and Life Prediction of Advanced Composite Materials – I	10-18-2: Durability and Life Prediction of Advanced Composite Materials – II	10-36-1: Fatigue Failure – I	10-36-2: Fracture Mechanics
Edward A	2-22-1: Plenary Talks in Advanced Manufacturing	2-10-1: Manufacturing and Processing of Nanostructured Materials Session – I	2-10-2: Manufacturing and Processing of Nanostructured Materials Session – II	2-21-1: Relevance of Material Characterization to Manufacturing Processes
Edward B	2-3-1: Advanced Materials Design, Synthesis, and Processing Session – I	2-3-2: Advanced Materials Design, Synthesis, and Processing Session – II	2-3-3: Advanced Materials Design, Synthesis, and Processing Session – III	2-3-4: Advanced Materials Design, Synthesis, and Processing Session – IV
Edward C	2-9-1: Lean and Sustainable Processes and Methodologies	2-17-2: Studies in Tool Wear and Surface Roughness/Integrity	2-17-3: Numerical Analyses and Simulations	2-17-4: Advances in Drilling and Machining Processes
Edward D	2-20-1: Computational Modeling of Microstructural Evolution	2-6-1: Computational Modeling and Simulation for Advanced Manufacturing Session I	2-6-2: Computational Modeling and Simulation for Advanced Manufacturing Session II	2-6-3: Computational Modeling and Simulation for Advanced Manufacturing Session III
Emma A	7-12-3: Energy Conversion and Storage	7-12-4: Nanomaterial Fibers	7-18-1: Symposium on Thermal Energy Storage – I	7-18-2: Symposium on Thermal Energy Storage – II
Emma B	7-8-4: Advanced Alternative Energy Cycles, Systems, and Fuels – II	7-11-2: Wave Energy	7-11-3: Geothermal and Tidal Energy	7-11-4: Wind Energy – II
Emma C	7-3-1: Solar Thermal and Cooling Systems	7-3-2: Exergy Analysis and Thermoconomics	7-3-3: Low-Grade Heat Recovery Systems	7-3-4: Design and Analysis of Energy Systems – I
Ford A	10-27-2: Bio Polymers	9-17-1: Industrial Applications of Computational Heat Transfer	9-17-2: Emerging Techniques in Computational Heat Transfer	9-17-3: Applications of Computational Heat Transfer
Ford B	10-43-1: Dynamic Failure Mechanics – I	9-2-4: Fundamentals of Nanoscale Heat Transfer	9-2-6: Interfacial Thermal Transport: Resolving the Roles of Temperature, Anharmonicity, Specularity, and Coherence	9-2-7: Fundamentals of Natural and Mixed Convection – II
Ford C	10-22-1: Modeling and Experiments in Nanomechanics and Nanomaterials – 1	10-22-2: Modeling and Experiments in Nanomechanics and Nanomaterials – 2	10-22-3: Modeling and Experiments in Nanomechanics and Nanomaterials – 3	10-29-1: Instability in Solids and Structures – I
Gregory A	2-17-1: Drilling and Electrical Discharge Machining	2-14-1: Bolted Joints Technology	2-14-2: Welding Joints Technology	2-14-3: Bonding Joints Technology

TUESDAY, NOVEMBER 19 / SCHEDULE AT-A-GLANCE

Tuesday November 19	9:45–11:30am	1:00–2:45pm	3:00–4:45pm	5:00–6:45pm
Gregory B	2-4-1: Advancing Sensing, Measurement, & Process Control in Manufacturing Session I	2-4-2: Advancing Sensing, Measurement, & Process Control in Manufacturing Session II	2-4-3: Advancing Sensing, Measurement, & Process Control in Manufacturing Session III	2-4-4: Advancing Sensing, Measurement, & Process Control in Manufacturing Session IV
Madeleine A	10-6-4: Mechanics and Materials in the Oilfield	10-6-5: Mechanics in Microelectronics and MEMS	10-27-3: Active Soft Materials	10-27-4: Shape Memory Polymers
Madeleine B	10-12-1: Multifunctional and Micro/Nano-structured Materials – I	10-12-2: Multifunctional and Micro/Nano-structured Materials – II	10-12-3: Multifunctional and Micro/Nano-structured Materials – III	10-12-4: Multifunctional and Micro/Nano-structured Materials – IV
Madeleine C	10-20-4: Mechanics of adhesion and friction – IV	15-5-1: Noise and Vibration Control – I	10-13-1: Nanocomposites Synthesis and Performance – I	10-3-1: Koiter Lecture (will be held in Elizabeth H on 2nd floor)
Madeleine D	10-25-1: Nanoengineered, Hierarchical, and Multi-Scale Materials	15-1-1: Acoustic and Elastic Wave Propagation – I	15-14-1: NCAD Rayleigh Lecture	10-39-1: Multiscale Modeling of Fatigue Damage and Failure Mechanics – I
Maggie	8-12-1: Young Engineer Paper (YEP) Contest Fluids Engineering Division	9-5-1: Utilization and Combustion of Biomass and Biofuels	9-5-2: Production and Utilization of Biomass and Biofuels	9-12-1: Transport Phenomena in Manufacturing and Materials Processing
Mohsen A		10-23-2: Mechanics of Electrochemical Energy Storage Materials – II	10-23-3: Mechanics of Electrochemical Energy Storage Materials – III	10-33-1: Multi-Physics Experiments and Associated Modeling Approach
Mohsen B	10-30-1: Membrane Mechanics	10-30-2: Subcellular and Cellular Mechanics	10-30-4: Cell Nanomaterial Interactions	10-30-5: Mechanotransduction
Oxford	5-7-1: Pre-College (K-12) STEM - University, School and Industry Alliance	8-7-1: Wind Turbines: Aerodynamics and Control	11-7-2: Experimental Methods and Characterization	11-7-3: Nanomaterials
Randle A	11-8-1: Plenary Presentations in MEMS/NEMS and Packaging	11-12-1: Droplet/Particle/Bubble Manipulation	11-12-2: Flows in Microfluidic Systems	11-5-1: Biosensing
Randle B	10-32-1: Hybrid Multifunctional Composite Materials	11-13-1: Quality and Reliability in Electronics and Photonics Packaging	11-14-1: Modeling and Simulation in Electronics and Photonics Packaging	11-15-1: Manufacturing, Materials and Processes in Electronics and Photonics Packaging
Randle D	10-40-1: Modeling of Multifunctional Materials	11-1-1: Computational Studies on MEMS and Nanostructures – I	11-1-2: Computational Studies on MEMS and Nanostructures – II	11-10-1: NanoEngineering for Energy and Sustainability: Energy Production & Storage
Randle E	7-11-1: Wind Energy I	11-2-1: Analysis, Processes, and Technology – 1	11-2-2: Analysis, Processes, and Technology – 2	11-2-3: Analysis, Processes, and Technology – 3
Windsor B	9-3-6: Nanoscale Thermal Metrology – I	9-3-7: Nanostructured Carbon and Related Materials – I	9-3-8: Nanoscale Thermal Metrology - II	9-3-9: Nanoparticles and Nanofluids
Windsor C	9-4-6: Thermal Management Challenges in Energy Conversion and Conservation	9-1-1: Radiation in Energy Systems	9-1-2: Heat and Mass Transfer in Heating, Refrigeration and Air Conditioning Systems	9-1-6: Heat and Mass Transfer in Energy Systems: Applications
Douglas Pavilion		16-16-1: Society-Wide Micro and Nantechnology Forum (12:30–4:00pm)		

SCHEDULE AT-A-GLANCE / WEDNESDAY, NOVEMBER 20

Wednesday November 20	9:45–11:30am	1:00–2:45pm	3:00–4:45pm	5:00–6:45pm
Betsy A	9-3-10: Thermal Transport in Nanoscale Devices	9-3-11: Nanostructured Carbon and Related Materials – II	9-3-13: Multiscale Simulation and Modeling – II	9-3-14: Nanoscale Phase-Change and Near-Field Heat Transfer
Betsy B	9-1-3: Waste Heat Recovery and Thermal Storage	9-1-8: Clean Energy as the Building Mark of This Millennium	9-1-4: Numerical Analysis and Performance Assessment of Energy Systems	9-1-7: Heat and Mass Transfer in Energy Systems Fundamentals
Betsy C	9-17-5: Inverse Problems and Optimization in Computational Heat Transfer	9-17-6: Computational Heat Transfer in Multiphase Systems	9-3-15: Coherent Phonons and Localization	1-11-1: Plenary Session
Connaught	6-1-1: Innovations in Processing, Characterization and Applications of Bioengineered, Composite, Genome, and Nano-Materials	6-2-1: Emerging Technologies in Transportation Industry	6-7-1: Emerging Technologies in Energy Sector	9-3-12: Thin Films and Superlattices
Del Mar A	10-20-1: Mechanics of Adhesion and Friction – I	10-20-2: Mechanics of Adhesion and Friction – II	10-20-3: Mechanics of Adhesion and Friction – III	10-23-1: Mechanics of Electrochemical Energy Storage Materials – IV
Del Mar B	10-24-1: Chudnovsky Symposium – 1	10-24-2: Chudnovsky Symposium – 2	10-24-3: Chudnovsky Symposium – 3	10-24-4: Chudnovsky Symposium – 4
Douglas Pavilion		*All poster sessions are scheduled from 11:30am–3:00pm 18-1-1: NSF Student Competition 16-1-1: Advances in Aerospace Technology 16-4-1: Dynamics, Vibration and Control 16-7-1: Energy 16-10-1: Mechanics of Solids, Structures and Fluids 16-13-1: Systems and Design 16-17-1: Dewitt Poster Session for Undergraduate Research in Thermal/Fluid Sciences 16-2-1: Advanced Manufacturing 16-5-1: Education and Globalization 16-8-1: Fluids Engineering and Technologies 16-11-1: Micro and Nano Systems Engineering and Packaging 16-14-1: Transportation Systems 16-18-1: The Graduate Student Poster Session in Heat Transfer and Fluid Sciences 16-3-1: Biomedical and Biotechnology Engineering 16-6-1: Emerging Technologies 16-9-1: Applications of Heat and Mass Transfer 16-12-1: Safety, Reliability and Risk 16-15-1: Vibration, Acoustics and Wave Propagation		

WEDNESDAY, NOVEMBER 20 / SCHEDULE AT-A-GLANCE

Wednesday November 20	9:45–11:30am	1:00–2:45pm	3:00–4:45pm	5:00–6:45pm
Edward A	2-1-1: Modeling and Simulation	2-1-2: Materials and Evaluation	2-1-3: Process Development – I	2-1-4: Process Development – II
Edward B	2-3-5: Advanced Materials Design, Synthesis, and Processing Session – V	2-11-1: Process Modeling in Advanced Manufacturing Session – I	2-11-2: Process Modeling in Advanced Manufacturing Session – II	2-11-3: Process Modeling in Advanced Manufacturing Session – III
Edward C		2-2-1: Advanced Forming and Flexible Electronic Manufacturing	2-2-2: Advanced Forming Session I	2-2-3: Advanced Forming Session II
Edward D	2-6-4: Computational Modeling and Simulation for Advanced Manufacturing Session IV	2-6-5: Computational Modeling and Simulation for Advanced Manufacturing Session V	2-6-6: Computational Modeling and Simulation for Advanced Manufacturing Session VI	13-3-1: Collaborative Design
Emma A	1-1-1: Advances in Gas Turbine Technology – I	1-1-2: Advances in Gas Turbine Technology – II	1-1-3: Advances in Gas Turbine Technology – III	1-3-1: Advances in Propulsion Systems
Emma B	1-2-1: Advances in Aerodynamics I	1-2-2: Advances in Aerodynamics II	1-10-1: Lightweight Sandwich Composites and Layered Structures	
Emma C	1-5-1: Materials for High Temperature Applications	1-5-2: Lifing and Prognosis of Aerospace Structures and Materials	1-5-3: Multiscale Structural Mechanics	1-5-4: Aeromechanical Analysis
Ford A	10-35-1: Wave Tailoring Materials and Acoustic Meta-Materials	4-12-4: Nonlinear Dynamics, Control, and Stochastic Mechanics – IV	4-13-1: General Dynamics Topics	4-12-5: Nonlinear Dynamics, Control, and Stochastic Mechanics – V
Ford B	10-36-3: Fatigue Failure – II	4-15-1: Rotor Dynamics – I	4-15-2: Rotor Dynamics – II	4-16-1: Optimal Approaches in Nonlinear Dynamics and Acoustics
Ford C	10-33-2: Multi-Physics Coupling with Diffusion and Transport	4-18-1: Mechanical and Structural Design	4-10-3: Structural Health Monitoring	4-2-3: Controls Theory and Application – III
Gregory A	11-5-2: Cell and Tissue Analysis	11-6-1: Sensors and Actuators	11-6-2: Bio-Application	11-6-3: Fabrication and Structure
Gregory B	11-2-4: Analysis, Processess, and Technology 4	11-3-1: Fundamentals of Carbon Nanomaterials	11-9-1: Dynamics and Control of Micro and Nano Systems	11-11-1: Micro/NanoScale Phononic Crystals and Acoustic Metamaterials: Fundamentals, Devices, and Applications
Madeleine A	3-1-1: Plenary Session	3-2-1: Experimental Analysis and Computational Modeling of TBI	3-2-2: Injuries due to Blast Loading	3-4-1: Processing, Characterization and Applications of Bioengineered Materials
Madeleine B	3-7-1: Clinical Applications of Bioengineering – I	3-3-1: Vibration and Acoustics in Biomedical Applications – I	3-3-2: Vibration and Acoustics in Biomedical Applications – II	3-6-1: Viscoelasticity – I
Madeleine C	3-8-1: Transport Phenomena In Biomedical Applications – I	3-7-2: Clinical Applications of Bioengineering – II	3-8-2: Transport Phenomena In Biomedical Applications – II	3-10-1: Characterization and Technical Application of Biological and Bioinspired Materials
Madeleine D	3-9-1: Computational Modeling & Device Design – I	3-9-2: Computational Modeling & Device Design – II	3-9-3: Computational Modeling & Device Design – III	3-9-4: Computational Modeling & Device Design – IV

SCHEDULE AT-A-GLANCE / WEDNESDAY, NOVEMBER 20

Wednesday November 20	9:45–11:30am	1:00–2:45pm	3:00–4:45pm	5:00–6:45pm
Maggie	8-9-8: Droplet/Particle/Bubble Dynamics and Capillary Flow – III	9-20-1: Symposium to Celebrate the Life and Legacy of Novak Zuber – I	9-20-2: Symposium to Celebrate the Life and Legacy of Novak Zuber – II	9-20-3: Symposium to Celebrate the Life and Legacy of Novak Zuber – III
Mohsen A	15-15-1: Noise Control and Acoustics Tutorial on Dynamometry	15-4-1: Flow Induced Noise and Vibration – I	15-4-2: Flow Induced Noise and Vibration – II	10-43-5: Fatigue and Time-Dependent Failure
Mohsen B	15-5-2: Noise and Vibration Control II	15-1-2: Acoustic and Elastic Wave Propagation – II	15-9-1: Phononic Crystals/Metamaterials 1: Theoretical Advances	15-9-2: Phononic Crystals/Metamaterials 2: Damping and Nonlinearity
Oxford	10-26-1: High Strain Rate Phenomena and Durability and Lifetime Prediction – I	8-9-9: Novel Applications of Micro/Nanofluidics	10-26-2: High Strain Rate Phenomena and Durability and Lifetime Prediction – II	6-13-1: Emerging Modeling and Simulation Capabilities for Digital Manufacturing and Manufacturing Systems Automation
Randle A	10-17-1: Effects of Defects, Damage Tolerance and Repair of Composites	10-33-3: Soft Materials	10-33-4: Multiscale Mechanics of Material	10-33-5: Multiscale and Multi-Physics Modeling and Simulation (I)
Randle B	10-27-5: Instability of Soft Materials – I	10-27-6: Instability of Soft Materials – II	10-27-7: Fracture of Soft Materials	10-27-8: Tunable Soft Materials
Randle D	10-27-9: Polymers – I	10-27-10: Polymers – II	10-39-2: Multiscale Modeling of Fatigue Damage and Failure Mechanics – II	10-39-3: Multiscale Modeling of Fatigue Damage and Failure Mechanics – III
Randle E	10-28-1: Size Scale Effects in Fracture Process	10-34-1: Multi-Scale Computations in Fluids, Structures, and Materials – 1	10-34-2: Multi-Scale Computations in Fluids, Structures, and Materials – 2	10-34-3: Multi-Scale Computations in Fluids, Structures, and Materials – 3
Windsor B	13-2-3: Product and Process Design – 3	13-2-5: Product and Process Design – 2	13-2-6: Product and Process Design – 1	13-4-1: Analysis and Simulation
Windsor C	5-4-2: Curriculum Innovations, Pedagogy and Learning Methodologies – II	11-17-1: Advanced Packaging and Power Electronics	11-18-1: Thermal Transport in Electronic Devices and Packaging Materials	11-18-2: Thermoelectric Devices

THURSDAY, NOVEMBER 21 / SCHEDULE AT-A-GLANCE

Thursday November 21	7:45–9:15am	9:30–11:15am	1:00–2:45pm	3:00–4:45pm
Betsy A	6-14-1: Energy Modelling – 1	2-19-1: Innovations in Processing, Characterization, and Applications of Bioengineered Materials	2-16-1: Management of Dynamic Manufacturing Networks	5-6-1: Globalization of Engineering
Betsy B	5-2-1: Emerging and Sustainable Trends in Engineering	5-3-1: Societal and Ethical Dimensions of Engineering, Assessment and Safety Issues	5-9-2: Teaching Laboratories, Machine Shop Experience, and Technology-Aided Lecturing – II	5-8-1: Problem Solving in Engineering Education, Research and Practice
Betsy C	5-9-1: Teaching Laboratories, Machine Shop Experience, and Technology-Aided Lecturing – I	5-5-1: Distance/Online Engineering Education, Models and Enabling Technologies	14-2-1: Railroad Vehicle and Bicycle Dynamics	14-4-7: Advanced Subsystems Development
Connaught	4-4-3: Automotive Applications	4-4-4: Other Applications	10-43-6: Failure of Composites and Heterogeneous Materials-II	7-21-1: Energy Systems Components - General
Edward A	3-2-3: Injuries due to Blast, Blunt and Ballistic Impact - 1	3-2-4: Injuries due to Blast, Blunt and Ballistic Impact – 2	3-2-5: Experimental Analysis and Computational Modeling of Injuries	3-9-8: Computational Modeling & Device Design – VIII
Edward B	3-9-5: Computational Modeling & Device Design – V	3-9-6: Computational Modeling & Device Design – VI	3-9-7: Computational Modeling & Device Design – VII	
Edward C	3-8-3: Transport Phenomena In Biomedical Applications – III	3-12-1: Dynamics, and Control in Biomechanical Systems – I	3-12-2: Dynamics, and Control in Biomechanical Systems – II	3-12-3: Dynamics, and Control in Biomechanical Systems – III
Edward D	3-7-3: Clinical Applications of Bioengineering – III	3-7-4: Clinical Applications of Bioengineering – IV	4-11-1: Dynamics & Control in Micro/Nano Engineering – I	10-43-7: Experimental Studies and Failure Property Measurement
Emma A		1-7-1: Advances in Aerospace Design and Optimization – I	1-7-2: Advances in Aerospace Design and Optimization – II	1-7-3: Advances in Aerospace Design and Optimization – III
Emma B		3-12-4: Dynamics, and Control in Biomechanical Systems – IV	7-14-3: Solar Energy and Heat Transfer for Sustainability	11-19-2: Nanostructured Materials – II
Emma C	7-14-1: Renewable Energy Systems Analyses	7-14-2: Combustion, Gasification, Generation, and Efficiency	7-20-1: Energy in Buildings	7-20-2: Environmental Emissions and Solar Resource Assessments
Ford A	4-1-1: VCMS-I: Vibration and Control of Mechanical Systems	4-1-2: VCMS-II: Vibration and Control of Mechanical Systems	4-1-3: DCMS-III: Vibration and Control of Mechanical Systems	4-1-4: DCMS-IV: Vibration and Control of Mechanical Systems
Ford B	4-2-1: Controls Theory and Application – I	4-2-2: Controls Theory and Application – II	4-4-1: Multibody Dynamic Systems and Applications – I	4-4-2: Multibody Dynamic Systems and Applications – II
Ford C	4-3-1: Dynamics Modeling, Theory and Application – I	4-3-2: Dynamics Modeling, Theory and Application – II	4-3-3: Dynamics Modeling, Theory and Application – III	4-6-1: Smart Structures, Structronic Systems

SCHEDULE AT-A-GLANCE / THURSDAY, NOVEMBER 21

Thursday November 21	7:45–9:15am	9:30–11:15am	1:00–2:45pm	3:00–4:45pm
Gregory A	14-3-1: Vehicle Crashworthiness Methods	14-3-2: Occupant Protection & Biomechanics	14-3-3: Systems & Components Crashworthiness	
Gregory B	14-4-6: Automotive Control Systems Design and Development	13-3-4: Innovative Design – I	13-3-5: Innovative Design – II	13-3-6: Quality and Innovation – II
Maggie	14-4-1: Electric and Hybrid Systems	14-4-3: Modeling, Simulation, and Analysis Technologies	5-11-1: Applied Mechanics, Dynamic Systems and Control Engineering	5-10-1: Fluid Mechanics, Heat Transfer, Experiments and Energy Systems
Mohsen A	4-5-1: Robotic Dynamics and Control	4-5-2: Mechanical Dynamics and Control	4-5-3: Mechanism Analysis and Design	4-8-1: Novel Control of Dynamic System and Design
Mohsen B	4-7-1: Vibration & Noise Control and Damping Technologies – I	4-7-2: Vibration & Noise Control and Damping Technologies – II	4-10-1: Renewable Energy	4-10-2: Distributed Structural Systems, Structural Health Monitoring, and Wind Energy
Molly A	13-3-2: Quality and Innovation – I	13-4-5: Interaction in Design	13-6-1: Complex Systems – 1	13-6-2: Complex Systems – 2
Molly B	13-4-2: Computer Aided Design Studies	13-5-1: Optimization – I	14-4-4: Engine and Power-Train Technologies	14-4-5: Systems and Performance Optimization
Oxford	4-12-1: Nonlinear Dynamics, Control, and Stochastic Mechanics – I	4-12-2: Nonlinear Dynamics, Control, and Stochastic Mechanics – II	4-12-3: Nonlinear Dynamics, Control, and Stochastic Mechanics – III	3-5-1: Nanomaterials for Biomedical Applications – I
Randle A	11-19-1: Nanostructured Materials I	11-20-1: Nanoporous Materials		10-19-1: Nanoscale Mechanics of Polymer Nanocomposites and Nanostructured Materials
Randle B	11-6-4: Power and Thermal Application	2-15-1: Nanomanufacturing – Self-Assembly and Material Properties	6-14-2: Energy Modelling – 2	10-43-10: Multi-Scale Characterization and Size Effects – II
Randle D	10-33-6: Multiscale and Multi-Physics Modeling and Simulation – II	10-33-7: Multi-Physics Topics in Applications	10-43-8: Modeling and Simulation of Failure Mechanics – II	10-43-9: Multi-Scale Characterization and Size Effects
Randle E	10-24-5: Chudnovsky Symposium - 5	10-24-6: Chudnovsky Symposium - 6	10-39-4: Multiscale Modeling of Fatigue Damage and Failure Mechanics – IV	
Windsor B	15-11-1: Vibration and Acoustic Measurement Techniques and Facilities	15-8-1: Numerical Methods in Vibration and Acoustics – I	15-8-2: Numerical Methods in Vibration and Acoustics – II	7-15-1: Compressor Technologies
Windsor C	15-9-3: Phononic Crystals/Metamaterials 3: Local Resonance	15-9-4: Phononic Crystals/Metamaterials 4: Design and Experiments	15-9-5: Phononic Crystals/Metamaterials 5: Tunability and Coupled Phenomena	7-3-5: Design and Analysis of Energy Systems II

ASME ADVANCED MANUFACTURING IMPACT FORUM

During the course of the one-day Forum, luminaries from government, industry, and academia will address questions of advanced technology and policy; new opportunities created by public and private partnerships, the status of the U.S. Government’s initiatives through organizations like the National Additive Manufacturing Innovation Institute and the National Network for Manufacturing Innovation, and exploration of future standards development.

Randle Ballroom, Level Four

Monday, November 18			
8:00am	9:30am	Congress Keynote Manchester Ballroom, Level Two	Technology Leadership Forum Moderated by <i>Thomas G. Loughlin</i> , ASME Executive Director
		Advanced Technology & Policy Sessions	Panelists include: <ul style="list-style-type: none"> • <i>Pradeep Khosla</i>—Chancellor, University of California, San Diego • <i>Michael Molnar</i>—Chief Manufacturing Officer, National Institute of Standards & Technology • <i>Greg M. Morris</i>—Strategy and Business Development Lead for Additive Technologies, GE Aviation • <i>Richard Morris</i>, Vice President of Assembly and Logistics, BMW Manufacturing Co., LLC
9:45am	10:00am	Impact Forum Welcome, Goals, and Agenda	Professor <i>Tom Kurfess</i> (formerly White House Office of Science Technology & Policy) Georgia Institute of Technology
10:00am	11:00am	Future Standards Needs— Process vs. Product Certification	<p>Session Leader: <i>Tim Shinbara</i>, Technical Director, Association for Manufacturing Technology</p> <p>In a future that continues to require lower cost and increased speed to market, how does industry optimally certify their goods or services? In a panel discussion, this session looks to industry representatives to discuss the pros and cons of “process” versus “product” certification. The round table of experts will provide some background as to why things are done the way they are today and provide insight into what types of standards could be applied in the future to better enable optimal certification solutions. Join us as we hear from the Composite, Additive, and Robotic manufacturing industries.</p> <ul style="list-style-type: none"> • <i>Doug Decker</i>, Composite Manufacturing Technical Fellow at Northrop Grumman Corporation <ul style="list-style-type: none"> – “Composite Manufacturing” • <i>Dave Ciscel</i>, Vice President, CalRAM <ul style="list-style-type: none"> – “Additive Manufacturing” • <i>Fred Proctor</i>, Lead for Smart Manufacturing and Construction Control Systems Program (NIST) <ul style="list-style-type: none"> – “Standards for Robot Performance (repeatability vs. accuracy)” • <i>Clay Flannigan</i>, Manager of Robotics and Automation Engineering (Southwest Research Institute) <ul style="list-style-type: none"> – “Standards in Robot Language (lowering the barrier to entry for industry)”
11:00am	12:00pm	NNMI Status Update	<p>Session Leader: Steve Schmid, former ASME Federal Fellow at NIST and Professor at University of Notre Dame</p> <p>From Discovery to Scale-Up: The National Network for Manufacturing Innovation. Learn about current NNMI activities, funding, processes, and the creation of regional Institutes for Manufacturing Innovation (IMIs).</p> <p>Speakers:</p> <ul style="list-style-type: none"> • <i>Robert Ivester</i>, Deputy Director, Advanced Manufacturing Office, U.S. Department of Energy
12:00pm	12:45pm	Lunch (available in Exhibit Hall, Douglas Pavillion, Lobby Level 11:30am–12:30pm)	

ASME ADVANCED MANUFACTURING IMPACT FORUM

Monday, November 18			
12:45pm	1:45pm	Case Study : From Kitchen to Adaptive Manufacturing	<p>Session Leader: <i>Tim Wei</i>, Professor and Dean, University of Nebraska–Lincoln, College of Engineering</p> <p>Speakers:</p> <ul style="list-style-type: none"> • <i>Jeff Korengel</i>, VP Process Engineering, ConAgra Foods Research, Quality & Innovation (RQI); <ul style="list-style-type: none"> – “Perspectives on the challenge of transforming food processing into an automated state-of-the-art manufacturing industry” • <i>Daniel J. Duncan</i>, Executive Director, Nebraska Innovation Campus Development Corporation; <ul style="list-style-type: none"> – “Role(s) that the university can play in this enterprise” • <i>Prem Paul</i>, Vice Chancellor for Research & Economic Development, University of Nebraska-Lincoln. <ul style="list-style-type: none"> – “Overview of the Innovation Campus and how it will be uniquely structured to support the university-industry collaborations”
1:45pm	2:45pm	Public/Private Partnerships - NNMI : Impact & Opportunities	<p>Session Leader: <i>Ralph Resnick</i>, President and Executive Director, National Center for Defense Manufacturing and Machining (NCDMM); Founding Director, National Additive Manufacturing Innovation Institute (NAMII)</p> <p>The NNMI is a priority of President Obama’s administration and the president announced the creation of three new Institutes for Manufacturing Innovation (IMIs) during his 2013 State of the Union Address to Congress and the Nation. This session will focus on the National Additive Manufacturing Innovation Institute (NAMII), which is the pilot IMI in the National Network for Manufacturing Innovation (NNMI). Lessons learned from starting up this new public private partnership will be presented. Furthermore, as these centers target applied research and scaling of that research toward production capabilities, a wide variety of operational and functional insights that differ significantly from classical research and development centers will be discussed.</p> <p>Speakers:</p> <ul style="list-style-type: none"> • <i>Scott Leonard</i>, Government Strategic Advisor, NAMII • <i>Darrell Wallace</i>, Deputy Director for Workforce and Educational Outreach NAMII
2:45pm	3:00pm	Break	
3:00pm	4:00pm	Town Hall – Future Directions	<p>Help set the road map for ASME in the area of advanced manufacturing. Participate in an interactive closing session, featuring our Forum speakers, focusing on identifying challenges and opportunities in the commercialization of advanced manufacturing.</p> <ul style="list-style-type: none"> • Moderated by <i>Mechanical Engineering</i> Editor-in-Chief <i>John G. Falcioni</i> and Associate Editor <i>Alan Brown</i>
4:00pm	5:00pm	Networking Reception – <i>sponsored by the ASME Manufacturing Engineering Division</i>	

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ADVANCES IN AEROSPACE TECHNOLOGY

WEDNESDAY, NOVEMBER 20

1-1 ADVANCES IN GAS TURBINE TECHNOLOGY

1-1-1 Advances in Gas Turbine Technology I

3rd Floor, Manchester Grand Hyatt, Emma A 9:45am–11:30am

Session Organizer: **Gang Liu**, GE, Greenville, SC, United States
 Session Co-Organizer: **Xionghua Wu**, F.tech R&D North America, Troy, OH, United States

9:45am The Effect of Heat Transfer Coefficient Increase on Tip Clearance Control in Gas Turbine Engine H.P. Compressors

Technical Paper Publication. IMECE2013-64958
 Godwin I. Ekong, C.A. Long, University of Sussex, Brighton, United Kingdom, P.R.N. Childs, Imperial College London, London, United Kingdom

10:02am Experimental Flow Field Investigations Downstream a Film Cooling Scheme Over a Flat Plate Using the PIV Technique

Technical Paper Publication. IMECE2013-65650
 Othman Hassan, Ibrahim Hassan, Concordia University, Montreal, QC, Canada

10:19am Highly Accurate Simulation of Flow Past Turbine Blade

Technical Paper Publication. IMECE2013-66139
 Rajesh Ranjan, S.M. Deshpande, Roddam Narasimha, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, India

10:36am Investigations on Aerodynamic Loading Limits of Subsonic Compressor Tandem Cascades: Midspan Flow

Technical Paper Publication. IMECE2013-64488
 Charlotte Hertel, Christoph Bode, Dragan Kozulovic, Technische Universitaet Braunschweig, Braunschweig, Niedersachsen, Germany, Tim Schneider, MTU Aero Engines AG, Munich, Germany

10:53am Numerical Investigation of Heat Transfer Enhancement in Gas Turbine Blade by Air Film Cooling and Different Types of Ribs

Technical Paper Publication. IMECE2013-66300
 Maximiliano Pourhasanzadeh, Power and Water University of Technology, Tehran, Tehran, Iran

11:10am Effects of Wake and Shock Wave on Film Cooling Performance in a 3-D Rotating Transonic Turbine Stage

Technical Paper Publication. IMECE2013-66784
 Huazhao Xu, Jianhua Wang, University of Science and Technology, Hefei, China, Ting Wang, University of New Orleans, New Orleans, LA, United States

1-2 ADVANCES IN AERODYNAMICS

1-2-1 Advances in Aerodynamics I

3rd Floor, Manchester Grand Hyatt, Emma B 9:45am–11:30am

Session Organizer: **Erol Ulucakli**, Lafayette College, Easton, PA, United States

Session Co-Organizer: **Steven Cai**, University of the Pacific, Stockton, CA, United States

9:45am Numerical Investigation of Flow over an Airfoil by the Lattice Boltzmann Method

Technical Paper Publication. IMECE2013-62386
 Felipe A. Valenzuela, Universidad de Santiago de Chile, Santiago, Región Metropolitana, Santiago, Chile, Amador M. Guzmán, Pontificia Universidad Católica de Chile, Santiago, Región Metropolitana, Santiago, Chile, Andres J. Diaz, Universidad Diego Portales, Santiago, Región Metropolitana, Santiago, Chile

10:02am RANS Modeling of Accelerating Boundary Layers

Technical Paper Publication. IMECE2013-63467
 Ugochukwu Oriji, Paul G. Tucker, University of Cambridge, Cambridge, United Kingdom

10:19am Suppression of Vortex Shedding Downstream of a Circular Cylinder Using Permeable Cylinders in Shallow Water

Technical Paper Publication. IMECE2013-64698
 Gokturk M. Ozkan, Huseyin Akilli, Cukurova University, Adana, Turkey

10:36am The Passive Control of Unsteady Flow Structure Downstream of a Circular Cylinder in Shallow Water

Technical Paper Publication. IMECE2013-65924
 Tahir Durhasan, Engin Pinar, Muhammed M. Aksoy, Gokturk M. Ozkan, Huseyin Akilli, Besir Sahin, Cukurova University, Adana, Turkey

10:53am Rotation Effects on Hub Drag

Technical Paper Publication. IMECE2013-63547
 Alexander Forbes, Vrishank Raghav, Michael Mayo, Narayanan Komerath, Georgia Institute of Technology, Atlanta, GA, United States

11:10am Modeling Multi-Operator-Multi-UAV (MOMU) Operator Attention Allocation Problem

Technical Paper Publication. IMECE2013-63810
 Anoop Verma, Rahul Rai, University at Buffalo, State University of New York, Buffalo, NY, United States

TRACK 1 ADVANCES IN AEROSPACE TECHNOLOGY / WEDNESDAY, NOVEMBER 20**1-5 ADVANCES IN AEROSPACE MATERIALS AND STRUCTURES****1-5-1 Materials for High-Temperature Applications****3rd Floor, Manchester Grand Hyatt, Emma C 9:45am–11:30am**Session Organizer: **John D. Whitcomb**, *Texas A&M University, College Station, TX, United States*Session Co-Organizer: **Gary Seidel**, *Virginia Technology, Blacksburg, VA, United States***9:45am Design and Testing of Mixed Mode SMA/MAX Phase Fracture Specimens****Technical Presentation.** IMECE2013-62624W. Ross McLendon, Ankush D. Kothalkar, John D. Whitcomb, Ibrahim Karaman, *Texas A&M University, College Station, TX, United States***10:02am Micromechanical Modeling of the Thermomechanical Response of Shape Memory Alloy - MAX Phase Composites****Technical Presentation.** IMECE2013-63293Brian T. Lester, Dimitris C. Lagoudas, *Texas A&M University, College Station, TX, United States***10:19am Effective Thermal Mechanical Properties of the Silicon Carbide Foam****Technical Presentation.** IMECE2013-65476Zheng Ye, *Utah State University, Logan, UT, United States*, Wenbin Yu, *Purdue University, West Lafayette, IN, United States*, Charles Tseng, Ming-Yung Chen, *Air Force Research Laboratory, AFRL/RXBC, Wright-Patterson AFB, OH, United States***10:36am Thermomechanical Sizing of Various Core Options for a Structural Thermal Protection System****Technical Presentation.** IMECE2013-65497Zheng Ye, Fang Jiang, *Utah State University, Logan, UT, United States*, Wenbin Yu, *Purdue University, West Lafayette, IN, United States***10:53am Determining Composite Ply Orientations Using Ultrasonic Measurements****Technical Presentation.** IMECE2013-65093Sarah Stair, *Baylor University, Arlington, TX, United States*, David Jack, *Baylor University, Waco, TX, United States*, John Fitch, *Birkeland Current, Waco, TX, United States***11:10am Electro-Thermo-Mechanical Response of Polymer Matrix Composites to a High-Intensity Pulsed Electric Current****Technical Presentation.** IMECE2013-65594Yeqing Wang, Olesya Zhupanska, *University of Iowa, Iowa City, IA, United States***1-1 ADVANCES IN GAS TURBINE TECHNOLOGY****1-1-2 Advances in Gas Turbine Technology II****3rd Floor, Manchester Grand Hyatt, Emma A 1:00pm–2:45pm**Session Organizer: **Gang Liu**, *GE, Greenville, SC, United States*Session Co-Organizer: **Farong Zhu**, *Ohio State University, Columbus, OH, United States***1:00pm Surge Characteristics and Range Extension With Steam Injection in a Centrifugal Compressor With Vaned Diffuser****Technical Paper Publication.** IMECE2013-62380Chuang Gao, Weiguang Huang, Weijia Yao, *Shanghai Advanced Research Institute, Chinese Academy of Sciences, Shanghai, China*, Jicheng Duan, *Xi'an ShaanGu Power Co., Ltd., Xi'an, China***1:17pm The Blade Releasing Method for Test of Engine Casing Containment****Poster Paper Publication.** IMECE2013-63749Alexander Lepeshkin, Nikolai Bychkov, Peter Vaganov, Yuri Nozhnitsky, Boris Baluev, *Central Institute of Aviation Motors, Moscow, Russia***1:34pm Semi-Empirical Correlation to Predict the Sauter Mean Diameter of the Pressure-Swirl Atomizer****Technical Paper Publication.** IMECE2013-62907Wei Xiao, Yong Huang, *Beihang University (Beijing University of Aeronautics and Astronautics), Beijing, China***1:51pm Thermodynamic Analysis of the Atkinson Cycle****Technical Paper Publication.** IMECE2013-63057Pejman Akbari, Iain Crosby, *Columbia University, New York, NY, United States***2:08pm Computational Analysis of Recess Vane Geometry Modifications in the Casing Treatment Approach for Stall Margin Enhancement in Axial Flow Fans****Technical Paper Publication.** IMECE2013-63096Viswanath K, Kiran Yelmar, *Indian Institute of Technology, Madras, Chennai, Madras, India***2:25pm Phase Transformation Stress Field Due to Hot Corrosion in the Top Coat of TBC****Technical Paper Publication.** IMECE2013-63138Abba A. Abubakar, Syed Sohail Akhtar, Abul Fazal M. Arif, *King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia*

1-2 ADVANCES IN AERODYNAMICS**1-2-2 Advances in Aerodynamics II****3rd Floor, Manchester Grand Hyatt, Emma B 1:00pm–2:45pm**Session Organizer: **Erol Ulucakli**, *Lafayette College, Easton, PA, United States*Session Co-Organizer: **Quinjun Cai****1:00pm Vortex Flow Hypothesis for Rotor Blades in Reverse-Flow****Technical Paper Publication.** IMECE2013-63957
Michael Mayo, Nicholas Motahari, Vrishank Raghav, Narayanan Komerath, *Georgia Institute of Technology, Atlanta, GA, United States***1:17pm Analysis of Vapor Blanket Formation in the Porous Wick of a LHP With High Heat Load****Technical Paper Publication.** IMECE2013-62360
Xiaoming Huang, Xin Jin, Bin B. Chen, Wei Liu, *Huazhong University of Science and Technology, Wuhan, HuBei, China***1:34pm Thermostructural Design of the Hyprob Methane Cooling Channel Breadboard****Technical Paper Publication.** IMECE2013-62966
Michele Ferraiuolo, Adolfo Martucci, *CIRA, Capua, Italy***1:51pm Thermal Design and Analysis of Spacecraft During Flight Missions****Technical Paper Publication.** IMECE2013-63143
Ahmed Farag, *Cairo University, Cairo, Egypt*, Essam E. Khalil, *Cairo University, Dokki, Egypt***2:08pm Sensitivity Analysis of the Factors Affecting Force Generation by Wing Flapping Motion****Technical Paper Publication.** IMECE2013-65472
Alok Rege, Brian H. Dennis, Kamesh Subbarao, *University of Texas at Arlington, Arlington, TX, United States***2:25pm Grasping Analysis of a Bio-Inspired UAV/MAV Perching Mechanism****Technical Paper Publication.** IMECE2013-66526
Pu Xie, Ou Ma, *New Mexico State University, Las Cruces, NM, United States***1-5 ADVANCES IN AEROSPACE MATERIALS AND STRUCTURES****1-5-2 Lifting and Prognosis of Aerospace Structures and Materials****3rd Floor, Manchester Grand Hyatt, Emma C 1:00pm–2:45pm**Session Organizer: **Yingtao Liu**, *Arizona State University, Tempe, AZ, United States*Session Co-Organizer: **Yongming Liu**, *Arizona State University, Tempe, AZ, United States***1:00pm Numerical and Experimental Investigation of Delamination Detection Based on Lamb Wave Propagation****Technical Presentation.** IMECE2013-63790
Tishun Peng, Yongming Liu, *Arizona State University, Tempe, AZ, United States*, Abhinav Saxena, Kai Goebel, *NASA, Moffett Field, CA, United States***1:17pm Fracture Mechanics Based Total Fatigue Life Behavior for Stitch-Bonded Polymer Matrix Composites****Technical Paper Publication.** IMECE2013-64045
Masoud Yekani Fard, Aditi Chattopadhyay, *Arizona State University, Tempe, AZ, United States*, Brian Raji, *Pipe Reconstruction Inc, Phoenix, AZ, United States***1:34pm A Variational Asymptotic Method for Unit Cell Homogenization of Interface Debonding in Heterogeneous Materials****Technical Presentation.** IMECE2013-65303
Liang Zhang, *Utah State University, Logan, UT, United States*, Wenbin Yu, *Purdue University, West Lafayette, IN, United States***1:51pm Non-Destructive Evaluation of Composite Adhesive Kissing Bond****Technical Paper Publication.** IMECE2013-65767
Yingtao Liu, Joel Johnston, Aditi Chattopadhyay, *Arizona State University, Tempe, AZ, United States***2:08pm An Investigation of Prognosis and Remaining Useful Life Prediction for Composites With Impact and Fatigue Damage****Technical Presentation.** IMECE2013-65768
Yingtao Liu, Aditi Chattopadhyay, *Arizona State University, Tempe, AZ, United States***2:25pm Connecting Microscale and Macroscale Damage Models in a Bayesian Framework for Fatigue Damage Prognostics of CFRP Composites****Technical Presentation.** IMECE2013-66361
Juan Chiachio-Ruano, Manuel Chiachio-Ruano, *NASA Ames Research Center/ University of Granada (Spain), Moffett Field, CA, United States*, Guillermo Rus, *University of Granada, Granada, Spain*, Abhinav Saxena, Kai Goebel, *NASA, Moffett Field, CA, United States*

TRACK 1 ADVANCES IN AEROSPACE TECHNOLOGY / WEDNESDAY, NOVEMBER 20

1-1 ADVANCES IN GAS TURBINE TECHNOLOGY

1-1-3 Advances in Gas Turbine Technology III

3rd Floor, Manchester Grand Hyatt, Emma A 3:00pm–4:45pm

Session Organizer: **Gang Liu**, *GE, Greenville, SC, United States*

Session Co-Organizers: **Farong Zhu**, *Ohio State University, Columbus, OH, United States*, **Tobias Rossmann**, *Lafayette College, Easton, PA, United States*

3:00pm Scale Factor of Gas Turbines Design by Meridian Flow Analysis

Technical Presentation. IMECE2013-62934

Bendjaima Belkacem, *University of Batna, M'sila, Algeria*

3:26pm Control Algorithm for Anti-Lock Braking System (ABS)

Technical Paper Publication. IMECE2013-64640

Devesh Sahu, Rishi Sharma, Devesh Bharti, *IIT Bombay, Mumbai, India*, Utkarsh Narain, *Mahatma Gandhi Mission's College of Engineering and Technology, Noida, India*

3:52pm Helicopter Fuselage Drag Amelioration Using CFD and Experiments

Technical Paper Publication. IMECE2013-64727

Alexander Kusyumov, Andrey Batrakov, Sergey Mikhailov, Vladimir Pakhov, Artur Sungatullin, Vladimir Zherekhov, *KNRTU-KAI, Kazan, Russia*, George Barakos, *Liverpool University, Liverpool, United Kingdom*

4:18pm Numerical Simulation of a Hydrogen Fueled Scramjet Combustor at Mach 1.5 Using Strut Injectors Mach 2.47 Air Speed

Technical Paper Publication. IMECE2013-66036

Krishna Pandey, Binita Nath, *National Institute of Technology, Silchar, Assam, India*

1-5 ADVANCES IN AEROSPACE MATERIALS AND STRUCTURES

1-5-3 Multiscale Structural Mechanics

3rd Floor, Manchester Grand Hyatt, Emma C 3:00pm–4:45pm

Session Organizer: **Wenbin Yu**, *Purdue University, West Lafayette, IN, United States*

3:00pm Static and Dynamic Analysis of Aircraft Structures by Component-Wise Approach

Technical Paper Publication. IMECE2013-63600

Erasmus Carrera, Alfonso Pagani, Marco Petrolo, *Politecnico di Torino, Torino, TO, Italy*

3:17pm Hygrothermally Induced Postbuckling Response of Laminated Composite Plates With Temperature Independent Random System Properties: Micro Mechanical Model

Technical Presentation. IMECE2013-64754

Aman Malik, *R.T.U., Kota, Rajasthan, Delhi, India*, Rajesh Kumar Tripathi, *HCE, Sonapat, Haryana, Delhi, India*

3:34pm Representative Structural Element: A New Paradigm for Multiscale Structural Modeling

Technical Presentation. IMECE2013-64775

Wenbin Yu, *Purdue University, West Lafayette, IN, United States*

3:51pm A Variational Asymptotic Method for Unit Cell Homogenization of Hyperelastic Heterogeneous Materials

Technical Presentation. IMECE2013-65298

Liang Zhang, *Utah State University, Logan, UT, United States*, Wenbin Yu, *Purdue University, West Lafayette, IN, United States*

4:08pm A Critical Assessment of MOC/GMC/HFGMC and VAMUCH

Technical Presentation. IMECE2013-66594

Hamsasew Moges, *Utah State University, Logan, UT, United States*, Wenbin Yu, *Purdue University, West Lafayette, IN, United States*

4:25pm Effect of Meso to Micro Transition and Effect of Grain Boundary Property Manipulation in Morphology Dependent Fracture of SiC and W

Technical Presentation. IMECE2013-64818

Hongsuk Lee, Vikas Tomar, *Purdue University, West Lafayette, IN, United States*

1-10 LIGHTWEIGHT SANDWICH COMPOSITES AND LAYERED STRUCTURES

1-10-1 Lightweight Sandwich Composites and Layered Structures

3rd Floor, Manchester Grand Hyatt, Emma B 3:00pm–4:45pm

Session Organizer: **George Kardomateas**, *Georgia Institute of Technology, Atlanta, GA, United States*

Session Co-Organizer: **Yeoshua Frostig**, *Technion-Israel Institute of Technology, Haifa, Israel*

3:00pm Sandwich Beams With Truss-Folded Core Filled With Polyurethane Foam

Technical Presentation. IMECE2013-62123

Victor Birman, *Missouri University of Science and Technology, Saint Louis, MO, United States*, K. Chandrashekhara, Jeffery S. Volz, Zhen Huo, *Missouri University of Science and Technology, Rolla, MO, United States*

3:17pm On the Twist Effect in Lightweight Sandwich Plates

Technical Presentation. IMECE2013-62616

Dvir Elmalich, Oded Rabinovitch, *Technion-Israel Institute of Technology, Haifa, Israel*

3:34pm High-Order Buckling of Annular Sandwich Plates

Technical Presentation. IMECE2013-62673

Yeoshua Frostig, *Technion-Israel Institute of Technology, Haifa, Israel*, George Kardomateas, *Georgia Institute of Technology, Atlanta, GA, United States*

3:51pm Curvature Mode Shape-Based Stiffness Identification in Composite Plates

Technical Presentation. IMECE2013-63012

Yiska Goldfeld, *Technion-Israel Institute of Technology, Haifa, Israel*

4:08pm Thermal-Structural Design of Active-Cooling Panels Reinforced by Lightweight Truss Cores

Technical Paper Publication. IMECE2013-63352

Hongwei Song, Mingjun Li, Chenguang Huang, Xi Wang, *Institute of Mechanics, Chinese Academy of Sciences, Beijing, China*

4:25pm Transient Blast Response of Sandwich Plates via Dynamic Elasticity

Technical Presentation. IMECE2013-66006

George Kardomateas, Nunthadech Rodcheuy, *Georgia Institute of Technology, Atlanta, GA, United States*, Yeoshua Frostig, *Technion-Israel Institute of Technology, Haifa, Israel*

1-3 ADVANCES IN PROPULSION SYSTEMS

1-3-1 Advances in Propulsion Systems

3rd Floor, Manchester Grand Hyatt, Emma A 5:00pm–6:45pm

Session Organizer: **Jose Pascoa Marques**, *Universidade Da Beira Interior, Covilha, Portugal*

Session Co-Organizer: **Michele Trancossi**, *Università Modena Reggione Emilia, Reggio Emilia, Italy*

5:00pm Robust and Adaptive Power Generation, Control and Actuation System for Air Flow Control of Jet Engines

Technical Paper Publication. IMECE2013-62055

Giovanni Jacazio, Massimo Sorli, Andrea Mornacchi, *Politecnico Di Torino, Torino, Italy*

5:17pm Dynamic Analysis for Cryogenic and High-Pressure Fueling Valve of Combustion Light Gas Gun System

Technical Paper Publication. IMECE2013-62942

Yang Liu, Xiao-Xian Yao, Xiao-Dong Song, *Beijing Institute of Technology, Beijing, China*, Kun Li, *Beijing Electro-Mechanical Engineering Institute, Beijing, China*

5:34pm Mathematical Modeling of a Two Streams Coanda Effect Nozzle

Technical Paper Publication. IMECE2013-63459

Michele Trancossi, Subhash Maharshi, Diego Angeli, *University of Modena and Reggio Emilia, Reggio Emilia, Italy*

5:51pm Analytic Model Able to Assist in Parametric Design of Cycloidal Rotor Thrusters

Technical Paper Publication. IMECE2013-65238

Jakson A. Leger, Jose Pascoa Marques, *Universidade Da Beira Interior, Covilha, Portugal*, Carlos Xisto, *Dep. De Eng. Electromecânica, Covilhã, Portugal*

6:08pm Prediction of Ablation Rates From Solid Surfaces Exposed to High-Temperatures Gas Flow

Technical Paper Publication. IMECE2013-65417

Kazim Akyuzlu, *University of New Orleans, New Orleans, LA, United States*, David Coote, *NASA, Stennis Space Center, MS, United States*

6:25pm Numerical Modeling of Electrode Geometry Effects in a 2D Self-Field MPD Thruster

Technical Paper Publication. IMECE2013-63144

Carlos Xisto, *Dep. De Eng. Electromecânica, Covilhã, Portugal*, Jose Pascoa Marques, Paulo Jorge Oliveira, *Universidade Da Beira Interior, Covilha, Portugal*

TRACK 1 ADVANCES IN AEROSPACE TECHNOLOGY / WEDNESDAY, NOVEMBER 20

1-5 ADVANCES IN AEROSPACE MATERIALS AND STRUCTURES

1-5-4 Aeromechanical Analysis

3rd Floor, Manchester Grand Hyatt, Emma C 5:00pm–6:45pm

Session Organizer: **Weihua Su**, *University of Alabama, Tuscaloosa, AL, United States*

Session Co-Organizer: **Luciano Demasi**, *San Diego State University, San Diego, CA, United States*

5:00pm **Research on Sealing Structure and Ground Test of Lunar Sample Return Devices**

Technical Paper Publication. IMECE2013-62747
Bin Zhang, Min Yu, Huayong Yang, Haocen Hong, Zhejiang University, Hangzhou, Zhejiang, China

5:21pm **Aeroelastic Response of an Aircraft Wing Modeled as a Thin-Walled Composite Beam**

Technical Paper Publication. IMECE2013-64261
Seher Durmaz, Metin Orhan Kaya, *Istanbul Technical University, Istanbul, Turkey*

5:42pm **On Comparing Nonlinear Aeroelastic Formulations for Very Flexible HALE Aircraft**

Technical Presentation. IMECE2013-66587
Weihua Su, *University of Alabama, Tuscaloosa, AL, United States*

6:03pm **Estimation of the True Interfacial Shear Strength for Composite Materials With the Microbond Test**

Technical Paper Publication. IMECE2013-62981
Jason T. Ash, William M. Cross, Jon J. Kellar, Lidvin Kjerengtroen, *South Dakota School of Mines and Technology, Rapid City, SD, United States*

6:24pm **Fatigue and Fracture Mechanics Analysis of Friction Stir Welded Joints of Aerospace Aluminum Alloys Al-2195**

Technical Paper Publication. IMECE2013-63285
Muhammad Wahab, Vinay Rahguram, *Louisiana State University, Baton Rouge, LA, United States*

1-11 PLENARY LECTURE

1-11-1 Plenary Session

2nd Floor, Manchester Grand Hyatt, Betsy C 5:00pm–6:45pm

Session Organizer: **Erol Ulucakli**, *Lafayette College, Easton, PA, United States*

5:00pm **Peridynamics for Failure Prediction in Fiber-Reinforced Laminates**

Plenary Presentation. IMECE2013-67393
Erdogan Madenci, *University of Arizona, Tucson, AZ, United States*

THURSDAY, NOVEMBER 21

1-7 ADVANCES IN AEROSPACE DESIGN AND OPTIMIZATION

1-7-1 Advances in Aerospace Design and Optimization—I

3rd Floor, Manchester Grand Hyatt, Emma A 9:30am–11:15am

Session Organizer: **Ramazan Asmatulu**, *Wichita State University, Wichita, KS, United States*

Session Co-Organizers: **Erol Ulucakli**, *Lafayette College, Easton, PA, United States*, **Erdogan Madenci**, *University of Arizona, AZ, Tucson, United States*

9:30am Optimization of Air Plane Wing Rib Using Finite Element Analysis

Technical Paper Publication. IMECE2013-62192

G.V. Naveen Prakash, *Vidyavardhaka College of Engineering, Mysore, Mysore, Karnataka, India, India*, K.S. Anoop Kumar, *EASI -Allegis Group, Bangalore, Karnataka, India, V. Doddabasappa, CMAXX Technologies, Bangalore, Karnataka, India*

9:45am An Effective Methodology for Drop Test Analysis and Optimization of Aerospace Composite Structures

Technical Presentation. IMECE2013-63074

Pham Dinh Chi, Sridhar Narayanaswamy, *Institute of High Performance Computing, Singapore, Singapore*

10:00am Acoustic Emission and Ultrasound Phased Array Technique for Composite Material Evaluation

Technical Paper Publication. IMECE2013-62447

Hosseini Taheri, Fereidoon Delfanian, Jikai Du, *South Dakota State University, Brookings, SD, United States*

10:15am Modeling Heat Flow Interaction With Defects in Composite Materials Using Virtual Heat Sources in Pulsed Thermography

Technical Paper Publication. IMECE2013-62568

Arun Manohar, Francesco Lanza di Scalea, *University of California, San Diego, La Jolla, CA, United States*

10:30am Comparison of Signal Filtering Techniques for Ultrasonic Waves Used in Inspection of Composite Materials

Technical Paper Publication. IMECE2013-62601

Paulo Pereira Jr., Tainá G. Rodovalho, Leandro B. Ambiel, Rafael H. Garcia, *University of Campinas, Campinas, Brazil*, Rodrigo J. Leão, *Institute for Technological Research, São Paulo, SP, Brazil*, Auteliano A. dos Santos Jr., *University of Campinas, Campinas, SP, Brazil*

10:45am Fracture Mechanics Analysis of Aero-Engine Compressor Disk

Technical Paper Publication. IMECE2013-62978

K.M. Sathish Kumar, *BMS Institute of Technology, Bangalore, Bangalore, Karnataka, India, India*, G.V. Naveen Prakash, *Vidyavardhaka College of Engineering, Mysore, Karnataka, India, K.K. Pavan Kumar, Rajeev Institute of Technology, Hassan, Hassan, Karnataka, India, H.V. Lakshminarayana, Bangalore/Visvesvaraya Technological University, Belgaum, Bangalore, Karnataka, India*

11:00am Characterization of Graphene Composites for Lightning Strike Protection

Technical Presentation. IMECE2013-66799

Max Tenorio, Bernard Kear, Stephen Tse, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*, Assimina Pelegri, *Rutgers University, East Brunswick, NJ, United States*

TRACK 1 ADVANCES IN AEROSPACE TECHNOLOGY / THURSDAY, NOVEMBER 21

1-7 ADVANCES IN AEROSPACE DESIGN AND OPTIMIZATION

1-7-2 Advances in Aerospace Design and Optimization—II

3rd Floor, Manchester Grand Hyatt, Emma A 1:00pm–2:45pm

Session Organizer: **Ramazan Asmatulu**, *Wichita State University, Wichita, KS, United States*

Session Co-Organizer: **Erdogan Madenci**, *University of Arizona, AZ, Tucson, United States*

1:00pm Researching on Finding Form and Instability of the Radial String-Net Structure on Deployable Antenna

Technical Paper Publication. IMECE2013-62434

Luo Ani, Liu Heping, Yongfan Wang, Jianhua Song, Wentao Ma, *Harbin Engineering University, Harbin, Heilongjiang, China*

1:17pm Performance Comparison for Aeroengine-Type Sump Geometries

Technical Paper Publication. IMECE2013-62836

Budi Chandra, Kathy Simmons, *University of Nottingham, Nottingham, United Kingdom*, Benjamin Keeler, *Rolls Royce plc, Derby, United Kingdom*

1:34pm Impact of Bolt-Nut Interface Modeling Assumptions on the Calculated Low-Cycle Fatigue Life of Aircraft Engine Turbine Rotor Bolted Joints

Technical Paper Publication. IMECE2013-63706

Anil Saigal, Luke Jensen, Thomas James, *Tufts University, Medford, MA, United States*

1:51pm Magnetic Non-Contact Harmonic Drive

Technical Paper Publication. IMECE2013-63718

Jose L. Perez-Diaz, Efen Diez-Jimenez, Cristian Cristache, Ignacio Valiente, Marco Antonio Alvarez-Valenzuela, Juan Sanchez-Garcia-Casarrubios, Elisa Maria Ruiz-Navas, Victor Castro-Fernandez, *Universidad Carlos III, Leganes, Spain*, Carlo Ferdeghini, *CNR-SPIN, Genova, Italy*, Fabio Canepa, *CNR-IMEM and Università degli studi di Genova, Genova, Italy*, Wolfgang Hornig, *BPE e.K., Eckental, Germany*, Giuseppe Carbone, *Università degli studi di Cassino e del Lazio Meridionale, Cassino, Italy*, Jan Plechacek, *Can Superconductors SRO, Kamenice Stirin, Czech Republic*, Javier Serrano, *LIDAX, Torrejon de Ardoz, Spain*, Antonio Amorim, *Universidade de Lisboa, Lisboa, Portugal*, Violeta Sanz, *Lidax Ingenieria, Torrejon de Ardoz, Spain*

2:08pm Design Concept of a CFRP External Trailing Edge for Ailerons

Technical Paper Publication. IMECE2013-66066

Burak Gozluclu, Gulsen Oncul, Ugur Koseoglu, *Turkish Aerospace Industries, Ankara, Turkey*

2:25pm Effect of Cohesive Zone Models on the Dynamic Delamination of Highly Curved Thick Unidirectional Composite Laminates

Technical Presentation. IMECE2013-66411

Burak Gozluclu, *Turkish Aerospace Industries, Ankara, Turkey*, Denizhan Yavas, Demirkan Coker, *Middle East Technical University, Ankara, Turkey*

1-7 ADVANCES IN AEROSPACE DESIGN AND OPTIMIZATION

1-7-3 Advances in Aerospace Design and Optimization—III

3rd Floor, Manchester Grand Hyatt, Emma A 3:00pm–4:45pm

Session Organizer: **Ramazan Asmatulu**, *Wichita State University, Wichita, KS, United States*

Session Co-Organizer: **Erdogan Madenci**, *University of Arizona, Tucson, AZ, United States*

3:00pm Analysis of Self-Pressurization Phenomenon in a Cryogenic Fluid Storage Tank With VOF Method

Technical Paper Publication. IMECE2013-63209

Bengt Sunden, Juan Fu, *Lund University, Lund, Sweden*, Xiaoqian Chen, *National University of Defense Technology, Changsha, China*

3:17pm Constructal Design for Efficiency: The Case of Airship Design

Technical Paper Publication. IMECE2013-63448

Michele Trancossi, *Università Modena Reggio Emilia, Reggio Emilia, Italy*, Antonio Dumas, *Università di Modena e Reggio Emilia, Reggio Emilia, RE, Italy*, Mauro Madonia, *University of Modena and Reggio Emilia, DISMI, Reggio Emilia, RE, Italy*

3:34pm 3-Dimensional Characterizations of the Impact Damaged Fiber-Reinforced Composites

Technical Paper Publication. IMECE2013-64717

Raghavendra Salagame, Ramazan Asmatulu, Vamsi Patlolla, *Wichita State University, Wichita, KS, United States*

3:51pm Decomposition of High-Dimensional Shape Optimization Problems Using Quantifying Design Variables' Correlation

Technical Paper Publication. IMECE2013-64792

Amir Safari, *UiS, Stavanger, Norway*, Kambiz Haji Hajikolaie, Gary Wang, *Simon Fraser University, Surrey, BC, Canada*, Hirpa G. Lemu, Mohsen Assadi, *University of Stavanger, Stavanger, Norway*

4:08pm Aircraft Fleet Maintenance Planning Using Combined Cost Benefit Model and Branch and Bound

Technical Paper Publication. IMECE2013-64799

Behnam Razavi, Farrokh Sassani, *University of British Columbia, Vancouver, BC, Canada*

4:25pm A Study on the Effect of Bird Hit Damage on the Dynamic Response of Aero-Engine Fan Blade

Technical Paper Publication. IMECE2013-65494

Hithesh Channegowda, *Infotech, Bangalore, India*, Raghu V. Prakash, *Indian Institute of Technology Madras, Chennai, India*, Anandavel Kaliyaperumal, *InfoTech Enterprises Limited, Bangalore, Karnataka, India*

ADVANCED MANUFACTURING

TUESDAY, NOVEMBER 19

2-3 ADVANCED MATERIALS DESIGN, SYNTHESIS,
AND PROCESSING2-3-1 Advanced Materials Design, Synthesis, and
Processing Session I

2nd Floor, Manchester Grand Hyatt, Edward B 9:45am–11:30am

Session Organizer: **Shreyes Melkote**, *Georgia Institute of Technology, Atlanta, GA, United States*9:45am Precipitation of Nano-Sized Z-Phase in HR3C
Austenitic Heat-Resistant Steel**Technical Paper Publication.** IMECE2013-62075
Fengshi Yin, Zhen Xu, Bing Xue, Li Zhou, Xuebo Jiang,
*Shandong University of Technology, Zibo, Shandong, China*10:02am Production of Ultra-Fine-Grained Aluminum Plates by
Constrained Groove Pressing Technique**Technical Paper Publication.** IMECE2013-62201
Hadi Miyanaji, Ali Keshavarz Panahi, *Southern Illinois University Edwardsville, Edwardsville, IL, United States*, Ramin Hajavifard, *Ruhr University, Bochum, Germany*10:19am Properties Development of IF Steel Sheets During
Constrained Groove Pressing Technique**Technical Paper Publication.** IMECE2013-62202
Hadi Miyanaji, Ali Keshavarz Panahi, *Southern Illinois University Edwardsville, Edwardsville, IL, United States*, Ramin Hajavifard, *Ruhr University, Bochum, Germany*, Mehdi Motahari, *Tabriz Azad University, Tabriz, Iran*10:36am Carbon Composite Materials in Modern Day
Automotive Production Line—A Case Study**Technical Paper Publication.** IMECE2013-62272
Hakan Petersson, *Halmstad University, Halmstad, Sweden*, Damien Motte, Robert Bjarnemo, *Lund University, Lund, Sweden*10:53am Development of Magnetic Polishing for Microchannel
With a Ball-Nose-Shaped Tool**Technical Paper Publication.** IMECE2013-64163
Yusuke Takebayashi, Toshiki Hirogaki, Eiichi Aoyama, *Doshisha University, Kyotanabe, Kyoto, Japan*, Keiji Ogawa, *University of Shiga Prefecture, Hikone, Shiga, Japan*, Shreyes Melkote, *Georgia Institute of Technology, Atlanta, GA, United States*11:10am Modeling of Tribological Properties of Near Beta
Titanium Alloy Using Artificial Neural Network in
Solution Treated Condition**Technical Presentation.** IMECE2013-64315
Srinivasu Gangi Setti, *Sri Lakshmi Srinivasa Enterprises, Nidadavole, Andhra Pradesh, India*, R. Narasimha Rao, *National Institute of Technology Warangal, Warangal, Andhra Pradesh, India*2-4 ADVANCING SENSING, MEASUREMENT, AND
PROCESS CONTROL IN MANUFACTURING2-4-1 Advancing Sensing, Measurement, & Process
Control in Manufacturing Session I

2nd Floor, Manchester Grand Hyatt, Gregory B 9:45am–11:30am

Session Organizer: **Siddharthsinh Jadeja**, *B. H. Gardi College of Engineering, & Technology, India*9:45am A Framework for In-Line Milling Process Optimization
Technical Paper Publication. IMECE2013-62240Paolo Bosetti, Carlos Maximiliano Giorgio Bort, *University of Trento, Trento, Italy*10:02am A Study on 3D Micro-Topographical Measurement of
FRCMC Grinding Surface**Technical Paper Publication.** IMECE2013-62366
Xiaoyan Cao, Bin Lin, Yan Wang, Shaolei Wang, *Tianjin University, Tianjin, China*10:19am Optimization of Nd:YAG Laser Parameters for Cutting
of Thick Steel Sheet Using Taguchis Design of
Experiments**Technical Paper Publication.** IMECE2013-62456
Amit J. Banerjee, Manoj K. Biswal, Ashok Kumar Prasad, Sankar Karmakar, *CSIR-Central Mechanical Engineering Research Institute, Durgapur, India*, Angela Msipha, *Scientific and Industrial Research and Development Centre, Production Engineering Institute, Harare, Zimbabwe*, Palash Kumar Maji, *CSIR-Central Mechanical Engineering Research Institute, MTG, West Bengal, India*10:36am Application of Optical Scanning and Photogrammetry
for Evaluation of Geometrical Tolerance Values**Technical Paper Publication.** IMECE2013-62543
Andrzej Gessner, Roman Staniek, Jakub Michalek, *Poznan University of Technology, Poznan, Poland*10:53am Optimizing Machining of Machine Tool Casting
Bodies by Means of Optical Scanning**Technical Paper Publication.** IMECE2013-62841
Andrzej Gessner, Roman Staniek, *Poznan University of Technology, Poznan, Poland*11:10am 5-Axis In-line Measurement System for Laser
Materials Processing**Technical Paper Publication.** IMECE2013-62932
Yangsheng Li, Lijue Xue, Shaodong Wang, *National Research Council, London, ON, Canada*

TRACK 2 ADVANCED MANUFACTURING / TUESDAY, NOVEMBER 19**2-9 LEAN AND SUSTAINABLE PROCESSES AND METHODOLOGIES****2-9-1 Lean and Sustainable Processes and Methodologies****2nd Floor, Manchester Grand Hyatt, Edward C 9:45am–11:30am**Session Organizer: **Rama K. Koganti**, *JPS Health Network, Fort Worth, TX, United States***9:45am A Manufacturing Failure Mode Avoidance Framework for Aerospace Manufacturing****Technical Paper Publication.** IMECE2013-64606J. Goodland, I. Felician Campean, J.L. Victory, M.L. Jupp, *University of Bradford, Bradford, United Kingdom*, A. Caunce, *BAE Systems, Preston, United Kingdom***10:02am Definition of a Protocol for Implementing Lean Production Methodology in Textile and Clothing Case Studies****Technical Paper Publication.** IMECE2013-64739Laura Costa Maia, Anabela Alves, Celina P. Leão, *University of Minho, Guimarães, Portugal***10:19am Near Minimum Material Zone—A New Concept to Reduce the Weight of the Aircraft Components in Machining Using Lean Six Sigma Methodology****Technical Paper Publication.** IMECE2013-65555Ganesh Kumar Nithyanandam, *PSG College of Technology, Coimbatore, Tamil Nadu, India*, P. Radhakrishnan, *PSG Institute of Advanced Studies, Coimbatore, Tamil Nadu, India*, Matthew Franchetti, *University of Toledo, Toledo, OH, United States***10:36am Optimization of Cutting Parameters in Turning of AISI 1018 Steel With Constant Material Removal Rate Using Robust Design for Minimizing Cutting Power****Technical Paper Publication.** IMECE2013-62520Carmita Camposeco Negrete, Juan de Dios Calderon, Jose Carlos Miranda-Valenzuela, *ITESM Campus Toluca, Toluca, Mexico***10:53am Low Cycle Fatigue Property of Injection Molded Jute/PP Composites****Technical Paper Publication.** IMECE2013-63356Xiahui Liu, Jian Wang, Yuqiu Yang, *Donghua University, Shanghai, China*, Weiguang Song, *Shanghai Yinai New Material Technology Co., Ltd., Shanghai, China*, Cuntao Wang, *Kyoto Institute of Technology, Kyoto, Japan***11:10am Biologically Inspired Design of Closed Loop Manufacturing Networks****Technical Paper Publication.** IMECE2013-63958Astrid Layton, Bert Bras, Marc Weissburg, *Georgia Institute of Technology, Atlanta, GA, United States*, John Reap, *Quinnipiac University, Hamden, CT, United States***2-17 TRADITIONAL MACHINING PROCESSES****2-17-1 Drilling and Electrical Discharge Machining****2nd Floor, Manchester Grand Hyatt, Gregory A 9:45am–11:30am**Session Chair: **Pulak M. Pandey**, *Indian Institute of Technology Delhi, New Delhi, India*Session Co-Organizer: **Manoj Satyarthi**, *Indian Institute of Technology Delhi, New Delhi, India***9:45am Surface and Subsurface Study of Advanced Ceramic Composite While Machining by EDG and EDM Process****Extended Abstract Publication.** IMECE2013-62045Manoj Satyarthi, Pulak M. Pandey, *Indian Institute of Technology Delhi, New Delhi, India***10:02am Comparative Study of Electrode Wear Estimation in Wire Cut Electric Discharge Machining of Different Materials Using Multiple Regression Analysis****Technical Presentation.** IMECE2013-64274G. Ugrasen, *Central Manufacturing Technology Institute, Bangalore, India*, Holalu Venkatadas Ravindra, *P E S College of Engrg, Mandya, Karnataka, India*, G.V. Naveen Prakash, *Vidyavardhaka College of Engineering, Mysore, Mysore, Karnataka, India***10:19am Fabrication of Complex Microchannels by Microelectric Discharge Milling (μ -ED Milling)****Technical Paper Publication.** IMECE2013-64031Vaibhav Shukla, Syed Nadeem Akhtar, S. Kanmani Subbu, J. Ramkumar, *Indian Institute of Technology Kanpur, Kanpur, Uttar Pradesh, India***10:36am Performance Evaluation on Cryogenic Cooling of Electrode in Electrical Discharge Machining of AISI D2 Steel****Technical Paper Publication.** IMECE2013-64133Pradeep Kumar, Vinoth Kumar, *Anna University, Chennai, Tamil Nadu, India***10:53am Effect of EDM Process Parameters on Burr Removal in Drilled Holes of Inconel 718****Technical Paper Publication.** IMECE2013-65854Uday Dabade, *Walchand College of Engineering, Sangli, Maharashtra, India***11:10am Drilling Performance of Carbon Fiber Reinforced Epoxy Composite When Machined Dry, With Conventional Cutting Fluid and With a Cryogenically Cooled Tool****Technical Paper Publication.** IMECE2013-62246Stuart Barnes, Pipat Bhudwannachai, Aishah Najiah Dahnel, *University of Warwick, Coventry, United Kingdom*

2-20 COMPUTATIONAL MODELING OF MICROSTRUCTURAL EVOLUTION

2-20-1 Computational Modeling of Microstructural Evolution

2nd Floor, Manchester Grand Hyatt, Edward D 9:45am–11:30am

Session Organizer: **Mohsen Asle Zaeem**, *Missouri University of Science and Technology, Rolla, MO, United States*

Session Co-Organizer: **Ravindra Duddu**, *Vanderbilt University, Nashville, TN, United States*

9:45am Phase-Field Modeling of Complex Polycrystalline Morphologies: From Needle Crystals to Spherulites
Invited Presentation. IMECE2013-66862
Laszlo Granasy, *Hungarian Academy of Sciences, Budapest, Hungary*

10:02am Modeling the Solidification, Growth, and Properties of Multiferroic Polycrystalline Materials
Invited Presentation. IMECE2013-66849
Ken Elder, *Oakland University, Rochester, MI, United States*

10:19am Simulations of the Effects of Mold Properties on Directional Solidification
Technical Paper Publication. IMECE2013-66830
Mark A. Lauer, David R. Poirier, Robert G. Erdmann, *University of Arizona, Tucson, AZ, United States*, **Luke Johnson, Surendra N. Tewari**, *Cleveland State University, Cleveland, OH, United States*

10:36am Phase Field Modeling of Transformation Toughening in Zirconia
Invited Presentation. IMECE2013-67270
Mohsen Asle Zaeem, *Missouri University of Science and Technology, Rolla, MO, United States*

10:53am Multiphase-Field Modeling of Micropore Formation in Metallic Alloys
Extended Abstract Publication. IMECE2013-66827
Hossein Meidani, *EPFL, Lausanne, Switzerland*, **Alain Jacot, Michel Rappaz**, *EPFL - STI - IMX - LSMX, Lausanne, Switzerland*

11:10am Phase Transitions in Metallic Grain Boundaries
Invited Presentation. IMECE2013-66871
Timofey Frolov, *University of California, Berkeley, Berkeley, CA, United States*

2-22 PLENARIES IN ADVANCED MANUFACTURING

2-22-1 Plenary Talks in Advanced Manufacturing

2nd Floor, Manchester Grand Hyatt, Edward A 9:45am–11:30am

Session Organizer: **Alberto Cuitino**, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*

9:45am Energy Efficiency for Global Competitiveness of U.S. Manufacturers
Plenary Presentation. IMECE2013-67433
Jamal Yagoobi, *Worcester Polytechnic Institute, Worcester, MA, United States*

10:30am "Special Invited Presentation."

Michael Molnar, *Chief Manufacturing Officer, National Institute of Standards and Technology, Gaithersburg, MD, USA*

2-3 ADVANCED MATERIALS DESIGN, SYNTHESIS, AND PROCESSING

2-3-2 Advanced Materials Design, Synthesis, and Processing Session II

2nd Floor, Manchester Grand Hyatt, Edward B 1:00pm–2:45pm

Session Organizer: **Devaraju Aruri**, *National Institute of Technology Warangal, Warangal, Andhrapradesh, India*
Session Co-Organizer: **Devdas Pai**, *North Carolina A&T State University, Greensboro, NC, United States*

1:00pm Structure and Property of Sub-Zero Processed Cold Work Die Steel
Technical Paper Publication. IMECE2013-63102
Apurba Kishore Dutta, Debdulal Das, *Bengal Engineering & Science University, Howrah, West Bengal, India*, **Kalyan Kumar Ray**, *Indian Institute of Technology, Kharagpur, West Bengal, India*

1:17pm Slurry Erosive Wear Behavior of Forged Al-6061-CeO₂-TiO₂ Hybrid Composites
Technical Paper Publication. IMECE2013-64402
Ramesh Chinnakurli Suryanarayana, Ummar Khan, Kumar Saheb, Apoorva Kumar, Manoj Kumar Rajput, *PES Institute of Technology, Bangalore, Karnataka, India*

1:34pm Dimensional and Internal Structural Design for Braided Fabric Reinforced Thermoplastic Composite
Technical Paper Publication. IMECE2013-64416
Takeshi Saito, *Mizuno Technics Corporation, Gifu, Japan*, **Akio Ohtani, Asami Nakai**, *Gifu University, Gifu, Japan*, **Masaru Imamura, Ryo Morinaga**, *Kyoto Institute of Technology, Kyoto, Japan*

1:51pm Tribological Behavior of Hot Extruded Al6061-Si₃N₄ Composite
Technical Paper Publication. IMECE2013-64459
Ramesh Chinnakurli Suryanarayana, Praveennath G. Koppad, *PES Institute of Technology, Bangalore, Karnataka, India*, **Saleem Khan**, *GSSIT, Bangalore, Karnataka, India*, **Zulfiqar Khan**, *Bournemouth University, Poole, Dorset, United Kingdom*

2:08pm Wear and Mechanical Properties of Aluminum Alloy Based Hybrid Composites [(SiC+Gr) & (SiC+Al₂O₃)] Fabricated by Friction Stir Processing
Technical Paper Publication. IMECE2013-64734
Kumar Adepu, Devaraju Aruri, Bazavada Kotiveerachari, *National Institute of Technology Warangal, Warangal, India*

2:25pm Electrical Discharge Machining of SiC & Gr Particles Reinforced 6061-T6 Aluminum Alloy Hybrid Composites Fabricated by Friction Stir Processing
Technical Paper Publication. IMECE2013-64161
Kumar Adepu, Devaraju Aruri, Kolli Murahari, *National Institute of Technology Warangal, Warangal, India*

TRACK 2 ADVANCED MANUFACTURING / TUESDAY, NOVEMBER 19

2-4 ADVANCING SENSING, MEASUREMENT, AND PROCESS CONTROL IN MANUFACTURING

2-4-2 Advancing Sensing, Measurement, & Process Control in Manufacturing Session II

2nd Floor, Manchester Grand Hyatt, Gregory B 1:00pm–2:45pm

Session Organizer: **Shiv Kapoor**, *University of Illinois, Urbana, IL, United States*

1:00pm Investigation of Motion Control of Liner Axes and a Rotary Axis Under Constant Feed Speed Vector at Milling Point With a Five-Axis Machining Center

Technical Paper Publication. IMECE2013-63461
Yuma Maruyama, Toshiki Hirogaki, Eiichi Aoyama, *Doshisha University, Kyoto, Japan*, Takayuki Akai, *Mori Seiki Co., Ltd., Nara, Japan*, Keiji Ogawa, *University of Shiga Prefecture, Hikone, Shiga, Japan*

1:17pm Finite State Machine Assisted Automatic Tonnage Signal Clustering for Multiple-Operation Forging Processes

Technical Paper Publication. IMECE2013-63493
Yong Lei, Haibo Xie, *Zhejiang University, Hangzhou, China*

1:34pm Cutting Temperature Measurement During Titanium Machining With an Atomization-Based Cutting Fluid (ACF) Spray System

Technical Paper Publication. IMECE2013-63898
Alexander C. Hoyne, Chandra Nath, Shiv Kapoor, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

1:51pm Measurement and Process Control in Precision Hot Embossing

Technical Paper Publication. IMECE2013-65788
Maia Bageant, David Hardt, *Massachusetts Institute of Technology, Cambridge, MA, United States*

2:08pm Monitoring of I-V Characteristics of Cu Electrochemical Mechanical Polishing (ECMP) With H₃PO₄ Electrolyte Using Current Sensors

Technical Paper Publication. IMECE2013-65802
Anant Kandasamy Arulmozhi, Sakthi Jaya Rahul Ravichandran, Satish Bukkapatnam, Zhenyu Kong, Ranga Komunduri, *Oklahoma State University, Stillwater, OK, United States*

2:25pm Process Capability Analysis With GD&T Specifications

Technical Presentation. IMECE2013-62940
Jinya Liu, Wenzhen Huang, *University of Massachusetts Dartmouth, North Dartmouth, MA, United States*, Zhenyu Kong, *Oklahoma State University, Stillwater, OK, United States*, Yingqing Zhou, *Dimensional Control Systems Inc., Troy, MI, United States*

2-6 COMPUTATIONAL MODELING AND SIMULATION FOR ADVANCED MANUFACTURING

2-6-1 Computational Modeling and Simulation for Advanced Manufacturing Session I

2nd Floor, Manchester Grand Hyatt, Edward D 1:00pm–2:45pm

Session Organizer: **Stephen Recchia**, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*

Session Co-Organizer: **Jing Shi**, *North Dakota State University, Fargo, ND, United States*

1:00pm Investigation of Thermal Cycle and Hardness Distribution in the Laser Cladding of AISI H13 Tool Steel Produced by High-Power Diode Laser

Technical Paper Publication. IMECE2013-62193
Parisa Farahmand, Prabu Balu, Fanrong Kong, Radovan Kovacevic, *Southern Methodist University, Dallas, TX, United States*

1:17pm On Finite Element Simulation of Chip Formation During Cyclic Machining Operations

Technical Presentation. IMECE2013-62267
Sven Eck, Werner Ecker, Reinhold Ebner, *Materials Center Leoben Forschung GmbH, Leoben, Austria*

1:34pm FEM Optimization of Process Parameters and In-Process Cooling in the Friction Stir Processing of Magnesium Alloy AZ31b

Technical Paper Publication. IMECE2013-62468
Ali Ammouri, Ali Kheireddine, Ramsey Hamade, *American University of Beirut, Beirut, Riad El Solh, Lebanon*, Ghassan T. Kridli, *Texas A&M University at Qatar, Doha, Qatar*

1:51pm The Design and Finite Element Analyses of the Super-Long Ultrasonic Amplitude Transformer

Technical Paper Publication. IMECE2013-62484
Yan Wang, Bin Lin, Xiaoyan Cao, Shaolei Wang, *Tianjin University, Tianjin, China*

2:08pm Formability Prediction for Thermal Stamping of Magnesium Alloy Sheet Based on M-K Model

Technical Paper Publication. IMECE2013-62539
Zhanghua Chen, Yue Wen, Chenhui Sun, *University of Science and Technology Beijing, Beijing, China*

2:25pm An Analysis on Friction Behavior of Metal Material Under Ultrasonic Vibration

Technical Paper Publication. IMECE2013-62588
Dalong Yi, *Tsinghua University, Beijing, China*

2-10 MANUFACTURING AND PROCESSING OF NANOSTRUCTURED MATERIALS

2-10-1 Manufacturing and Processing of Nanostructured Materials Session I

2nd Floor, Manchester Grand Hyatt, Edward A 1:00pm–2:45pm

Session Organizer: **Cary Pint**, *Vanderbilt University, Nashville, TN, United States*

Session Chair: **Stephen Tse**, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*

1:00pm Laser-Based Integration of Carbon Nanotube Arrays on Flexible Substrates

Technical Presentation. IMECE2013-65325

Jung-Bin In, Daeho Lee, Jae-Hyuck Yoo, Costas Grigoropoulos, *University of California, Berkeley, Berkeley, CA, United States*, Julian Marschewski, Dimos Poulikakos, *ETH Zurich, Zurich, Switzerland*

1:17pm Graphene Device Fabrication via Ultrafast Laser Processing

Technical Presentation. IMECE2013-65372

Jae-Hyuck Yoo, Jung-Bin In, Costas Grigoropoulos, *University of California, Berkeley, Berkeley, CA, United States*

1:34pm Nonvacuum, Maskless Laser Direct Patterning of Solution-Deposited Nanomaterials

Technical Presentation. IMECE2013-65421

Daeho Lee, Sangmo Koo, Dongwoo Paeng, Costas Grigoropoulos, *University of California, Berkeley, Berkeley, CA, United States*

1:51pm Multiple Scribing Method via Diffusion-Assisted Direct Laser Writing

Technical Presentation. IMECE2013-65424

Ioanna Sakellari, Jae-Hyuck Yoo, Costas Grigoropoulos, *University of California, Berkeley, Berkeley, CA, United States*, David Gray, Maria Vamvakaki, Costas Fotakis, Maria Farsari, *Institute of Electronic Structure and Laser-FORTH, Heraklion, Crete, Greece*, Alexander Pikulin, Nikita Bityurin, *Institute of Applied Physics, Russian Academy of Sciences, Nizhni Novgorod, Russia*

2:08pm Laser-Assisted on Demand Growth of Semiconducting Nanowires

Technical Paper Publication. IMECE2013-65696

Sang-gil Ryu, Eunpa Kim, Jae-Hyuck Yoo, Costas Grigoropoulos, *University of California, Berkeley, Berkeley, CA, United States*, David J. Hwang, *State University of New York at Stony Brook, Stony Brook, NY, United States*

2:25pm Pulsed Laser Deposition of Carbon Nanomaterials

Technical Presentation. IMECE2013-66826

Billy Mozet, Stephen Tse, Bernard Kear, Sang-Wook Cheong, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*

2-14 JOINING TECHNOLOGIES

2-14-1 Bolted Joints Technology

2nd Floor, Manchester Grand Hyatt, Gregory A 1:00pm–2:45pm

Session Organizer: **Yosef Amir**, *GE Healthcare, Milwaukee, WI, United States*

Session Co-Organizer: **Thomas Whitney**, *University of Dayton, Dayton, OH, United States*

Session Chair: **Christoph Friedrich**, *University of Siegen, Siegen, Germany*

1:00pm Improving Tightening Reliability on Bolted Joints for Calibrated Wrench Method (An Analysis on Optimum Tightening Torque by Confidence Limit Ellipse)

Technical Paper Publication. IMECE2013-63387

Soichi Hareyama, *Tokyo Metropolitan University, Chiba, Japan*, Ken-ichi Manabe, *Tokyo Metropolitan University, Hachioji-City Tokyo, Japan*, Makoto Nakashima, *TCM Corporation, Omihachiman-City Shiga Pref., Japan*

1:17pm New Design Formula for Bolted Joints Under Tensile Loads

Technical Paper Publication. IMECE2013-65150

Toshiyuki Sawa, Yuya Omiya, *Hiroshima University, Higashi-Hiroshima, Japan*

1:34pm Product Innovation Needs Improved Design Process of Screw Joints

Technical Paper Publication. IMECE2013-62927

Christoph Friedrich, Hendrik Hubbertz, *University of Siegen, Siegen, Germany*

1:51pm Bending Effect in Concentric Bolted Joints Under Transverse Load

Technical Paper Publication. IMECE2013-63201

Yosef Amir, *GE Healthcare, Milwaukee, WI, United States*, Saravanakumar Iyyanar, M. Kumar, Aravind Devali, *GE Healthcare, Bangalore, India*

2:08pm Elastoplastic Stress Analysis of the Characteristics for T-Flange Bolted Joints Under External Loading

Technical Paper Publication. IMECE2013-65148

Yuya Omiya, Toshiyuki Sawa, *Hiroshima University, Higashi-Hiroshima City, Japan*

2:25pm Torque Vibrations in Automatized Screw Assembly—Reasons, Elimination, and Virtual Testing

Technical Paper Publication. IMECE2013-62347

Tobias Hoernig, Heiko Kopfer, Christoph Friedrich, *University of Siegen, Siegen, NRW, Germany*

TRACK 2 ADVANCED MANUFACTURING / TUESDAY, NOVEMBER 19**2-17 TRADITIONAL MACHINING PROCESSES****2-17-2 Studies in Tool Wear and Surface Roughness/Integrity****2nd Floor, Manchester Grand Hyatt, Edward C 1:00pm–2:45pm**

Session Organizer: **Marcel Henerichs**, *Institute of Machine Tools and Manufacturing, ETH Zurich, Zurich, Switzerland*
 Session Co-Organizer: **Qiang Wu**, *Kennametal Inc., Latrobe, PA, United States*

1:00pm Microscopic Tool Wear in Machining Aluminum 6061 T6 (Cold Compressed Air, Nitrogen, and Dry Environments)

Technical Paper Publication. IMECE2013-63731
 Vishnu Vardhan Chandrasekaran, Lewis Payton, Auburn University, Auburn, AL, United States

1:17pm Evaluation of Forces, Tool Wear, and Surface Finish During Orthogonal Machining AISI 1020 Steel in Three Cutting Environments

Technical Paper Publication. IMECE2013-63777
 Vishnu Vardhan Chandrasekaran, Lewis Payton, Auburn University, Auburn, AL, United States

1:34pm Acoustic Emission Based Tool Wear Condition Monitoring While Turning Nimonic C-263 Alloy Using PVD-Coated Carbide Insert

Technical Presentation. IMECE2013-64246
 V.S. Senthil Kumar, C. Ezilarasan, Anna University, Chennai, India, A. Velayudham, Compact Vehicle Research Development Establishment, Avadi, Tamilnadu, India

1:51pm Comparitive Study of Surface Roughness and Cylindricity of Aluminium Silicon Nitride Material Using MRA GMDH & Pattern Recognition Technique in Drilling

Technical Presentation. IMECE2013-64283
 B.M. Umesh Gowda, P E S College of Engineering, Mandya, Mandya, India, Holalu Venkatadas Ravindra, P E S College of Engineering, Mandya, Karnataka, India, Naveen Prakash G V, Vidyavardhaka College of Engineering, Mysore, Mysore, Karnataka, India

2:08pm In Situ Work Piece Surface Roughness Estimation in Turning

Technical Presentation. IMECE2013-65304
 Ibrahim Zeid, Sagar Kamarthi, Northeastern University, Boston, MA, United States, Sivarit Sultornsanee, University of the Thai Chamber of Commerce, Bangkok, Thailand

2:25pm Performance of Lasered PCD- and CVD-Diamond Cutting Inserts for Machining Carbon Fiber-Reinforced Plastics (CFRP)

Technical Paper Publication. IMECE2013-62675
 Marcel Henerichs, *Institute of Machine Tools and Manufacturing, ETH Zurich, Zurich, Switzerland*, Claus Dold, *Inspire AG, ETH Zurich, Zurich, Switzerland*, Robert Voß, *Konrad Wegener, Institute of Machine Tools and Manufacturing, ETH Zurich, Zurich, Switzerland*

2-3 ADVANCED MATERIALS DESIGN, SYNTHESIS, AND PROCESSING**2-3-3 Advanced Materials Design, Synthesis, and Processing Session III****2nd Floor, Manchester Grand Hyatt, Edward B 3:00pm–4:45pm**

Session Organizer: **Ram V. Mohan**, *Joint School of Nanoscience and Nanoengineering, Greensboro, NC, United States*
 Session Co-Organizer: **Raghu V. Prakash**, *Indian Institute of Technology Madras, Chennai, India*

3:00pm Evaluation of Metal Wire Network Kana-ami Structure Between Expert and Nonexpert

Technical Paper Publication. IMECE2013-63456
 Wang Zelong, Atsushi Endo, Tetsushi Koshino, *Kyoto Institute of Technology, Kyoto, Japan*, Toru Tsuji, Ken-ichi Tsuji, *Kanaami Tsuji, Kyoto, Japan*

3:17pm Effect of Laser Peening on Fatigue Life of Steel and Titanium Alloy for Power Applications

Technical Paper Publication. IMECE2013-63589
 Bharat Pant, *Bharat Heavy Electricals Ltd., Hyderabad, Andhra Pradesh, India*, Raghu V. Prakash, M. Kamaraj, *Indian Institute of Technology Madras, Chennai, India*

3:34pm Microstructural Response of High Aluminum Steels to Quenching and Partitioning Treatment

Technical Paper Publication. IMECE2013-63735
 Tuomo Nyyssönen, Veli-Tapani Kuokkala, *Tampere University of Technology, Tampere, Finland*, Mahesh Somani, *University of Oulu, Oulu, Finland*, Pasi Peura, *Ruukki Metals Oy, Hämeenlinna, Finland*

3:51pm Processing and Analysis of Ceramic Mesoscale Combustors Fabricated by Co-Extrusion

Technical Paper Publication. IMECE2013-64866
 Khurshida Sharmin, Ingmar Schoegl, *Louisiana State University, Baton Rouge, LA, United States*

4:08pm Centrifugal Coating of Films

Technical Presentation. IMECE2013-64936
 Chen Yang, Saugata Dutt, Koundinya Kuppa, Aaron Mazzeo, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*, Wonjae Choi, *University of Texas at Dallas, Richardson, TX, United States*

4:25pm Design and Construction of a Membrane Analysis System for Fuel Cell Humidification Applications

Technical Paper Publication. IMECE2013-65233
 Russell Borduin, Wei Li, *University of Texas at Austin, Austin, TX, United States*

2-4 ADVANCING SENSING, MEASUREMENT, AND PROCESS CONTROL IN MANUFACTURING

2-4-3 Advancing Sensing, Measurement, & Process Control in Manufacturing Session III

2nd Floor, Manchester Grand Hyatt, Gregory B 3:00pm–4:45pm

Session Organizer: **Shiv Kapoor**, *University of Illinois, Urbana, IL, United States*

3:00pm Fracture Prediction for Sheet Metals Subjected to Draw-Bending Using Forming Limit Stress Criterion

Technical Paper Publication. IMECE2013-64296

Masazumi Saito, Toshihiko Kuwabara, *Tokyo University of Agriculture and Technology, Koganei-shi, Japan*

3:17pm Integration of Fiber Optic Sensors in Measuring Machines

Technical Paper Publication. IMECE2013-65057

Ashkan Davanlou, *University of Central Florida, Orlando, FL, United States*

3:34pm Investigation of New Generation of Ceramic and Single Crystalline Piezo Materials for Helicopter Blade and UAV Actuation

Technical Paper Publication. IMECE2013-66649

Devdas Shetty, *University of District of Columbia, Washington, DC, United States*, Claudio Campana, *University of Hartford, Suffield, CT, United States*, Nikolay Nazaryan, Lou Manzione, *University of Hartford, West Hartford, CT, United States*

3:51pm Development of a Smart Computer Numerical Controller

Technical Paper Publication. IMECE2013-65984

Zhiqian Sang, Xun Xu, *University of Auckland, Auckland, New Zealand*

4:08pm Sustainable Reverse Engineering Methodology Assisting 3D Modeling of Footwear Safety Metallic Components

Technical Paper Publication. IMECE2013-65190

Joel Silva, Sergio Costa, Hélder Puga, Nuno Peixinho, João P. Mendonça, *Universidade do Minho, Guimarães, Portugal*

4:25pm Paper-Based Touch Pads With a Reduced Number of Multiplexed Wires

Technical Presentation. IMECE2013-64944

H. Sinan Bank, Enes Yigit, Mahmut Bicer, Aaron Mazzeo, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*

2-6 COMPUTATIONAL MODELING AND SIMULATION FOR ADVANCED MANUFACTURING

2-6-2 Computational Modeling and Simulation for Advanced Manufacturing Session II

2nd Floor, Manchester Grand Hyatt, Edward D 3:00pm–4:45pm

Session Organizer: **Tran Hoang Quan**, *Ecole de Technologie Supérieure, Montreal, QC, Canada*

Session Co-Organizer: **Satyanarayana Kosaraju**, *National Institute of Technology Warangal, Warangal, Andhra Pradesh, India*

3:00pm The Influence of the Yield Function on Shear Fracture Prediction

Technical Presentation. IMECE2013-62852

Myoung-Gyu Lee, F. Barlat, Jinwoo Lee, *Pohang University of Science and Technology, Pohang, Korea (Republic)*, R.H. Wagoner, *Ohio State University, Columbus, OH, United States*

3:17pm Finite Element Simulation of Cutting Forces in Turning Ti6Al4V Using DEFORM 3D

Technical Paper Publication. IMECE2013-62868

Satyanarayana Kosaraju, Venu Gopal Anne, Bangaru Babu Popuri, *National Institute of Technology Warangal, Warangal, Andhra Pradesh, India*

3:34pm Estimation and Control of the Geometric Error in a Linear Interpolator With Parabola Blending

Technical Paper Publication. IMECE2013-62877

Hongbo Li, *Academy of Mathematics and Systems Science, Beijing, China*

3:51pm Validation of Electrostatic Rotary Spray Simulation on Vehicle Bodies

Technical Presentation. IMECE2013-62999

Hua-Tzu Fan, *General Motors LLC, Troy, MI, United States*, Joseph Simmer, Robert Tilove, *General Motors Company, Warren, MI, United States*, Andreas Mark, Bjorn Andersson, *Fraunhofer Chalmers Research Centre, Goteborg, Sweden*

4:08pm Effects of Initial Rolling Temperature on Rolling Deformation and Microstructure Evolution of 42CrMo Casting Ring Blank

Technical Paper Publication. IMECE2013-63055

Li Ju, Yongtang Li, Huiping Qi, Huiqin Chen, *Taiyuan University of Science and Technology, Taiyuan, Shanxi, China*

4:25pm Dynamic FE Analysis for Reducing the Flat Areas of Formed Shapes Obtained by Roll Bending Process

Technical Paper Publication. IMECE2013-63302

Tran Hoang Quan, Henri Champlaud, Zhengkun Feng, Dao Thien-My, *Ecole de Technologie Supérieure, Montreal, QC, Canada*

TRACK 2 ADVANCED MANUFACTURING / TUESDAY, NOVEMBER 19

2-10 MANUFACTURING AND PROCESSING OF NANOSTRUCTURED MATERIALS

2-10-2 Manufacturing and Processing of Nanostructured Materials Session II

2nd Floor, Manchester Grand Hyatt, Edward A 3:00pm–4:45pm

Session Organizer: **Stephen Tse**, Rutgers, The State University of New Jersey, Piscataway, NJ, United States

Session Chair: **Cary Pint**, Vanderbilt University, Nashville, TN, United States

3:00pm Fabrication of Energetic MoO₂/Al Core/Shell Nanoplates

Technical Presentation. IMECE2013-66828

Zhizhong Dong, Bernard Kear, Stephen Tse, Rutgers, The State University of New Jersey, Piscataway, NJ, United States

3:17pm Low-Pressure Flame-Synthesized Carbon-Doped TiO₂ Nanoparticles

Technical Presentation. IMECE2013-66829

Hadi Halim, Bernard Kear, Stephen Tse, Rutgers, The State University of New Jersey, Piscataway, NJ, United States

3:34pm Scalable Assembly of Carbon Nanomaterials Into Three-Dimensional Structures Using Electrophoresis

Technical Presentation. IMECE2013-66839

Landon Oakes, Shahana Chatterjee, Cary Pint, Vanderbilt University, Nashville, TN, United States

3:51pm Nanoparticle Reinforced Metal Composites Prepared by Electrocodeposition

Technical Paper Publication. IMECE2013-62300

Michael Koludrovich, University of Toledo, Toledo, OH, United States, Yong X. Gan, California State Polytechnic University, Pomona, Pomona, CA, United States

4:08pm Fabrication of Graphene Reinforced Aluminum Composite by Semi-Solid Processing

Technical Paper Publication. IMECE2013-63715

Mina Bastwros, Gap-Yong Kim, Iowa State University, Ames, IA, United States, Kun Zhang, Shiren Wang, Texas Tech University, Lubbock, TX, United States

4:25pm Bottom-Up Fabrication of Hierarchical Structure for Energy Storage

Technical Presentation. IMECE2013-64400

Shiren Wang, Jenny Qiu, Texas Tech University, Lubbock, TX, United States

2-14 JOINING TECHNOLOGIES

2-14-2 Welding Joints Technology

2nd Floor, Manchester Grand Hyatt, Gregory A 3:00pm–4:45pm

Session Organizer: **Christoph Friedrich**, University of Siegen, Siegen, Germany

Session Co-Organizer: **Yosef Amir**, GE Healthcare, Milwaukee, WI, United States

Session Chair: **Thomas Whitney**, University of Dayton, Dayton, OH, United States

3:00pm Measurements and Models for the Thermal Conductance Through Surfaces Joined by Screws

Technical Paper Publication. IMECE2013-63009

Nicholas Konkle, Adam Pautsch, Yosef Amir, GE Healthcare, Waukesha, WI, United States

3:17pm Friction Self-Piercing Riveting (F-SPR) of AA6061-T6 to AZ31B

Technical Paper Publication. IMECE2013-64212

Yongbing Li, Zeyu Wei, Yating Li, Zhaozhao Wang, Xiaobo Zhu, Shanghai Jiao Tong University, Shanghai, China

3:34pm Fatigue Life Characterization of Interference Fitted Joints

Technical Paper Publication. IMECE2013-63515

Dario Croccolo, Massimiliano De Agostinis, Giorgio Olmi, University of Bologna, Bologna, Italy

3:51pm Effect of Postweld Heat Treatment and Electrolytic Plasma Treatment on TIG Welded 4140 Steel Joints

Technical Presentation. IMECE2013-62973

Jiandong Liang, Mohammad W. Dewan, Muhammad Wahab, Louisiana State University, Baton Rouge, LA, United States

4:08pm Experimentally Validated Thermo-Mechanically Coupled FE Simulations of Al/Mg Friction Stir Welded Joints

Technical Paper Publication. IMECE2013-62691

Ali Kheireddine, Ali Ammouri, Ramsey Hamade, American University of Beirut, Beirut, Riad El Solh, Lebanon, Ghassan T. Kridli, Texas A&M University at Qatar, Doha, Qatar

4:25pm Characterization and Optimization of Rotational Friction Welding for Small Stainless Steel Tubes

Technical Paper Publication. IMECE2013-66094

Alex J. Adams, David Miller, Montana State University, Bozeman, MT, United States

2-17 TRADITIONAL MACHINING PROCESSES**2-17-3 Numerical Analyses and Simulations****2nd Floor, Manchester Grand Hyatt, Edward C 3:00pm–4:45pm**Session Organizer: **Jianfeng Ma**, *Saint Louis University, St. Louis, MO, United States*Session Co-Organizer: **Lewis Payton**, *Auburn University, Auburn, AL, United States***3:00pm Comparison Orthogonal Tube Turning Data Versus Finite Element Simulation Using LS Dyna****Technical Paper Publication.** IMECE2013-63803Vishnu Vardhan Chandrasekaran, Lewis Payton, *Auburn University, Auburn, AL, United States***3:17pm 3D Numerical Investigation of Thermally Assisted High-Efficiency Ductile Machining of Brittle Materials****Technical Paper Publication.** IMECE2013-63827Jianfeng Ma, Nate Pelate, *Saint Louis University, St. Louis, MO, United States*, Shuting Lei, *Kansas State University, Manhattan, KS, United States***3:34pm Finite Element Analysis and Study of Tool Wear in Machining With Coated Tools****Technical Paper Publication.** IMECE2013-64342Umamaheshwera Reddy Paturi, Suresh Kumar Reddy Narala, *BITS-Pilani, Hyderabad, Hyderabad, Andhra Pradesh, India***3:51pm Model-Based Simulation and Optimization of Cutting Operations in Sheet Metal Working****Technical Paper Publication.** IMECE2013-64493Girish Dhote, *Dr. Babasaheb Ambedkar College of Engineering & Research, Nagpur, Maharashtra, India*, Anil Kale, *Yeshwantrao Chavan College of Engineering, Nagpur, Maharashtra, India***4:08pm Assessment of Microgrooved Cutting Tool in Dry Machining of AISI 1045 Steel: A Numerical Study****Technical Paper Publication.** IMECE2013-63842Jianfeng Ma, Hung Duong, *Saint Louis University, Saint Louis, MO, United States*, Shuting Lei, *Kansas State University, Manhattan, KS, United States*, Yunsong Lian, *Shandong University, Jinan, China***4:25pm Machining of Nonaxisymmetric Curved Surface by Lathe Turning****Technical Paper Publication.** IMECE2013-63317Yoshitaka Morimoto, Hideharu Kato, *Kanazawa Institute of Technology, Hakusan, Japan*, Katsuhiro Nakagaki, *Takamatsu Machinery Co., Ltd., Hakusan, Japan***2-3 ADVANCED MATERIALS DESIGN, SYNTHESIS, AND PROCESSING****2-3-4 Advanced Materials Design, Synthesis, and Processing Session IV****2nd Floor, Manchester Grand Hyatt, Edward B 5:00pm–6:45pm**Session Organizer: **Ryosuke Suzuki**, *Japan/Gunma University, Kiryu, Japan***5:00pm Formation and Characterization of Co-Continuous Shear Thickening Fluid/Polymer Blends****Technical Paper Publication.** IMECE2013-63828Yifeng Hong, Donggang Yao, *Georgia Institute of Technology, Atlanta, GA, United States***5:17pm Influence of Refiner Aluminum Titanium Boride on the ZA Alloys Processed Through Centrifugal Casting****Technical Paper Publication.** IMECE2013-64141P.N. Jyothi, A. Shailesh Rao, *K.S. School of Engineering and Management, Bangalore, India*, M.C. Jagath, *B.I.T, Bangalore, India*, K. Channakeshavalu, *East West Institute of Technology, Bangalore, India***5:34pm Mechanical Property of CFRP by Carbon Spray-Up Method****Technical Paper Publication.** IMECE2013-64144Tetsuo Kikuchi, *Toyugiken Co., Ltd., Kanagawa, Japan*, Akira Fudauchi, *Tetsushi Koshino, Chieko Narita, Atsushi Endo, Hiroyuki Hamada, Kyoto Institute of Technology, Kyoto, Japan*, Yuka Takai, *Akihiko Goto, Osaka Sangyo University, Daito, Japan*, Akio Ohtani, *Asami Nakai, Gifu University, Gifu, Japan***5:51pm Modeling and Fabrication of Heterogeneous Three-Dimensional Objects Based on Additive Manufacturing****Technical Paper Publication.** IMECE2013-65724Pu Huang, Dongping Deng, Yong Chen, *University of Southern California, Los Angeles, CA, United States***6:08pm Experimental Investigation of Manufacturing Possibility of Multilayered Ni-ZrO₂ System Functionally Graded Material by Powder Injection Molding****Technical Paper Publication.** IMECE2013-66233Ryosuke Suzuki, Masaaki Matsubara, Takumi Maruyama, Kenji Sakamoto, Kazuyuki Arakawa, *Gunma University, Kiryû, Gunma, Japan***6:25pm Adhesion Behavior of and Dry Machining Performance of Interface Modified Diamond-Coated Tools****Technical Presentation.** IMECE2013-66635Humberto Gomez, *Universidad del Norte, Barranquilla, Colombia*, Delcie Durham, Ashok Kumar, *University of South Florida, Tampa, FL, United States*, Michael Lukitsch, *General Motors Corporation, Warren, MI, United States*, Y. Kevin Chou, *University of Alabama, Tuscaloosa, AL, United States*

TRACK 2 ADVANCED MANUFACTURING / TUESDAY, NOVEMBER 19

2-4 ADVANCING SENSING, MEASUREMENT, AND PROCESS CONTROL IN MANUFACTURING

2-4-4 Advancing Sensing, Measurement, & Process Control in Manufacturing Session IV

2nd Floor, Manchester Grand Hyatt, Gregory B 5:00pm–6:45pm

Session Organizer: **Slawomir (Swavik) Spiewak**, *University of Calgary, Calgary, AB, Canada*

5:00pm Innovative Geometric Redesign of Safety Footwear Components Using a Reverse Engineering Approach

Technical Paper Publication. IMECE2013-65226

Sergio Costa, João P. Mendonça, Nuno Peixinho, Joel Silva, *Universidade do Minho, Guimarães, Portugal*

5:17pm Table Based Volumetric Error Compensation of Five-Axis Machine Tools Using a Joint Perturbation Error Model

Technical Paper Publication. IMECE2013-65381

Jennifer Creamer, *Missouri University of Science and Technology, Newburg, MO, United States*, Patrick Sammons, Douglas Bristow, Robert Landers, *Missouri University of Science and Technology, Rolla, MO, United States*, Philip Freeman, Samuel J. Easley, *The Boeing Company, Berkeley, MO, United States*

5:34pm Computer-Aided Manufacturing (CAM) Software Package for Laser Micromachining

Poster Paper Publication. IMECE2013-65423

Abdolreza Bayesteh, Farid Ahmed, Martin Jun, *University of Victoria, Victoria, BC, Canada*

5:51pm Sustaining Competitive Advantage Through Total Quality Management in Pump Manufacturing Industry

Technical Paper Publication. IMECE2013-65460

Ganesh Kumar Nithyanandam, *PSG College of Technology, Coimbatore, TN, Tamil Nadu, India*, Ranjith Suresh, Matthew Franchetti, *University of Toledo, Toledo, OH, United States*

6:08pm Experimental Investigation of the Tool Wear and Tool Life in Micro Hard Milling

Technical Paper Publication. IMECE2013-65607

Shreyas Shashidhara, Xinyu Liu, Weihang Zhu, James Curry, Victor Zaloom, *Lamar University, Beaumont, TX, United States*

6:25pm High-Accuracy, Low-Invasive Displacement Sensor (HALIDS)

Technical Paper Publication. IMECE2013-66767

Slawomir (Swavik) Spiewak, *University of Calgary, Calgary, AB, Canada*, Curtis Zaiss, *Special Projects, Inc., Calgary, AB, Canada*, Stephen J. Ludwick, *Aerotech, Inc., Pittsburgh, PA, United States*

2-6 COMPUTATIONAL MODELING AND SIMULATION FOR ADVANCED MANUFACTURING

2-6-3 Computational Modeling and Simulation for Advanced Manufacturing Session III

2nd Floor, Manchester Grand Hyatt, Edward D 5:00pm–6:45pm

Session Organizer: **John Michaloski**, *National Institute of Standards and Technology, Gaithersburg, MD, United States*

Session Co-Organizer: **Hua-Tzu Fan**, *General Motors LLC, Troy, MI, United States*

5:00pm Measurement and Simulation of Electric Power Consumption of Feed Drive Systems

Technical Paper Publication. IMECE2013-63518

Akio Hayashi, Masayuki Hashimoto, Ryoma Iwase, Keiichi Shirase, Ryuta Sato, *Kobe University, Kobe, Hyogo, Japan*

5:17pm Towards Automating Production Optimization—Combining Automated Data Acquisition, Automated Model Generation, and Automated Analysis

Technical Paper Publication. IMECE2013-63546

John Michaloski, Fred Proctor, *National Institute of Standards and Technology, Gaithersburg, MD, United States*, Jorge Arinez, *General Motors, Warren, MI, United States*, Jonatan Berglund, *Chalmers University of Technology, Chalmers, Sweden*

5:34pm Computational Optimization of Arc Welding Parameters Using Coupled Genetic Algorithms and Finite Element Method

Technical Paper Publication. IMECE2013-63628

Mohammad R. Islam, Keiichi Motoyama, *Center for Advanced Vehicular Systems, Mississippi State University, Starkville, MS, United States*, Jens Rohbrecht, *Simufact Engineering GmbH, Hamburg, Germany*, Arjaan Buijk, *Simufact-Americas LLC, Plymouth, MI, United States*, Ehsan Namazi, *University of Windsor, Windsor, ON, Canada*, Bing Liu, *F.tech R&D North America Inc., Troy, OH, United States*

5:51pm Comparative Study Between FEA-Based Sequentially Coupled and Fully Coupled Thermal Stress Models in a Laser Hardening Process

Technical Paper Publication. IMECE2013-63745

Suhash Ghosh, Chittaranjan Sahay, Joseph Connors, *University of Hartford, West Hartford, CT, United States*

6:08pm The Modeling and Prediction of Gravity Deformation in Precision Machine Tool Assembly

Technical Paper Publication. IMECE2013-63441

Junkang Guo, Jun Hong, Xiaopan Wu, Mengxi Wang, Yan Feng, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*

6:25pm Development of a Swirl Nozzle for Powder Technology

Technical Paper Publication. IMECE2013-66777

Mehmet Alper Sofuoglu, Murat Erbas, Ibrahim Uslan, Atilla Biyikoglu, *Gazi University, Ankara, Turkey*

2-14 JOINING TECHNOLOGIES

2-14-3 Bonding Joints Technology

2nd Floor, Manchester Grand Hyatt, Gregory A 5:00pm–6:45pm

Session Organizer: **Thomas Whitney**, *University of Dayton, Dayton, OH, United States*Session Co-Organizer: **Christoph Friedrich**, *University of Siegen, Siegen, Germany*Session Chair: **Yosef Amir**, *GE Healthcare, Waukesha, WI, United States*5:00pm **Analysis on Failure Mechanism of Scarf Joints With Brittle-Ductile Adhesives Subjected to Uniaxial Tensile Loads****Technical Paper Publication.** IMECE2013-62854
Lijuan Liao, Chenguang Huang, *Institute of Mechanics, Chinese Academy of Sciences, Beijing, China*, Toshiyuki Sawa, *Hiroshima University, Higashihiroshima, Japan*5:21pm **An Analysis of an Impact of the Background Atmosphere on Aluminum Brazing Joint Formation****Technical Paper Publication.** IMECE2013-64776
Cheng-Nien Yu, Dusan P. Sekulic, *University of Kentucky, Lexington, KY, United States*, Doug K. Hawksworth, *SAPA, Mississauga, ON, Canada*5:42pm **Effect of Bonding Pressure on Joint Formation by Diffusion Bonding of Ti-6Al-4V and Mg-AZ31****Technical Presentation.** IMECE2013-65131
Anas M. Atieh, Tahir I. Khan, *University of Calgary, Calgary, AB, Canada*6:03pm **Numerical Analysis of Self-Pierce Riveting of Magnesium Alloys****Technical Paper Publication.** IMECE2013-66668
Joao Moraes, J. Brian Jordon, *University of Alabama, Tuscaloosa, AL, United States*6:24pm **Numerical Analysis of Residual Stresses in V-Butt Welded Joint of Two Dissimilar Pipes****Technical Paper Publication.** IMECE2013-62873
Gurinder Singh Brar, *Guru Nanak Dev Engineering College, Ludhiana, Punjab, India*, Gurdeep Singh, *Sant Longowal Institute of Engineering and Technology, Sangrur, Punjab, India*

2-17 TRADITIONAL MACHINING PROCESSES

2-17-4 Advances in Drilling and Machining Processes

2nd Floor, Manchester Grand Hyatt, Edward C 5:00pm–6:45pm

Session Organizer: **Stuart Barnes**, *University of Warwick, Coventry, United Kingdom*Session Co-Organizer: **Yoshitaka Morimoto**, *Kanazawa Institute of Technology, Hakusanshi, Japan*5:00pm **Experimental Characterization and Multiobjective Optimization of the Orbital Drilling Process of CFRP****Technical Paper Publication.** IMECE2013-65311
Ahmad Sadek, *McGill University, Montreal, QC, Canada*, Ashraf Nassef, *American University in Cairo, Cairo, Egypt*, Mouhab Meshreki, *National Research Council Canada, Montreal, QC, Canada*, Helmi Attia, *National Research Council Canada/McGill University, Montreal, QC, Canada*5:17pm **A Preliminary Study on Machinability Assessment of Nanobainite Steel****Technical Paper Publication.** IMECE2013-64004
Ashwin Polishetty, *Deakin University, Geelong, Victoria, Australia*, Guy Littlefair, *Thomas Musselwhite, Deakin University, Waurn Ponds, Victoria, Australia*, Chinmay Sonavane, *Indian Institute of Technology Madras, Chennai, Tamilnadu, India*5:34pm **On Sustainability Assessment of Machining Processes****Technical Paper Publication.** IMECE2013-65710
Ibrahim Deiab, Syed Waqar Raza, *American University of Sharjah, Sharjah, United Arab Emir.*5:51pm **New Kinematic in Dressing of Grinding Wheels****Technical Paper Publication.** IMECE2013-64362
Taghi Tawakoli, Amir Daneshi, *Institute of Grinding and Precision Technology, KSF, Hochschule Furtwangen University, Villingen-Schwenningen, Baden-Württemberg, Germany*6:08pm **The Design and Fabrication of an Electrochemical Machining Test Apparatus****Technical Paper Publication.** IMECE2013-66299
Bruce Bingham, Atanas Atanasov, John Parmigiani, *Oregon State University, Corvallis, OR, United States*6:25pm **On Surface Integrity of EN8 Steel Finished by Ultrasonic Assisted Abrasive Flow Machining****Technical Paper Publication.** IMECE2013-63636
Venkatesh Gudipadu, Apurbba Kumar Sharma, Pradeep Kumar, *Indian Institute of Technology Roorkee, Roorkee, Uttarakhand, India*

TRACK 2 ADVANCED MANUFACTURING / TUESDAY, NOVEMBER 19 / WEDNESDAY, NOVEMBER 20

2-21 RELEVANCE OF MATERIAL CHARACTERIZATION TO MANUFACTURING PROCESSES

2-21-1 Relevance of Material Characterization to Manufacturing Processes

2nd Floor, Manchester Grand Hyatt, Edward A 5:00pm–6:45pm

Session Organizer: **Stephen Tse**, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*

Session Chair: **Cary Pint**, *Vanderbilt University, Nashville, TN, United States*

5:00pm Effect of Extrusion Parameters on Mechanical Properties of Al6061-Ni-P Coated SiC Composites

Technical Paper Publication. IMECE2013-63490
Ramesh Chinnakurli Suryanarayana, Sikhakolli Ramakrishna, Ummar Khan, Smitha Badnur, Kumar Saheb, *PES Institute of Technology, Bangalore, Karnataka, India*

5:17pm The Effect of Building up Edge Formation on the Machining Characteristics in Austempered Ferritic Ductile

Technical Paper Publication. IMECE2013-63764
Sakir Yazman, Ahmet Akdemir, Mesut Uyaner, Baris Bakircioglu, *Selçuk Üniversitesi, Konya, Turkey*

5:34pm Mechanical & Tribological Behavior of Alumina Nano Filler Reinforced Epoxy Hybrid Composites

Technical Paper Publication. IMECE2013-64159
Gujjala Raghavendra, S.K. Acharya, S.K. Pal, Shakuntala Ojha, *National Institute of Technology, Rourkela, Rourkela, Orissa, India*

5:51pm Low-Cost Chemical Sensors Based on Shrink Polymer Microfluidics

Technical Paper Publication. IMECE2013-62634
Bo Zhang, *University of Minnesota, St. Paul, MN, United States*, Tianhong Cui, *University of Minnesota, Minneapolis, MN, United States*

6:08pm Investigating the Effect of Machining Parameters on Microdrilling of Titanium Grade 19 Alloy

Technical Paper Publication. IMECE2013-65921
Shivraj Yeole, *Vallurupalli Nageswara Rao Vignana Jyothi Institute of Engineering & Technology, Hyderabad, India*, Nagabhushana Ramesh Nunna, *CMR Engineering College, Hyderabad, India*, Balu Naik Banoth, *JNTU College of Engineering, Karimnagar, India*

6:25pm Relationship Between Surface Roughness and Corrosion Resistance

Technical Paper Publication. IMECE2013-65498
Alisina Toloei, Vesselin Stoilov, Derek Northwood, *University of Windsor, Windsor, ON, Canada*

WEDNESDAY, NOVEMBER 20

2-1 ADDITIVE MANUFACTURING

2-1-1 Modeling and Simulation

2nd Floor, Manchester Grand Hyatt, Edward A 9:45am–11:30am

Session Organizer: **Jaehyung Ju**, *University of North Texas, Denton, TX, United States*

9:45am A Numerical Study of a Molten Aluminum for Investment Casting of 3D Cellular Metals

Technical Paper Publication. IMECE2013-62847
Jiwon Mun, Jaehyung Ju, *University of North Texas, Denton, TX, United States*, Byoung-Gwan Yun, Byung-Moon Chang, *Korea Lost-Wax Co., Ltd., Shiheung, Gyeonggi, Korea (Republic)*, Doo-Man Kim, *Korea Aerospace University, Goyang-City, Gyeonggi-Do, Gyeonggi, Korea (Republic)*

10:06am A Design of Experiments Approach to Study Thermal Property Effects on Melt Pool Geometry in Powder-Based EBAM

Technical Paper Publication. IMECE2013-66009
Bo Cheng, Y. Kevin Chou, *University of Alabama, Tuscaloosa, AL, United States*

10:27am Build Direction for 3D Heterogeneous Object in Layer Manufacturing

Technical Paper Publication. IMECE2013-65253
AKM Khoda, *North Dakota State University, Fargo, ND, United States*

10:48am Shape Deviation Modeling for Dimensional Quality Control in Additive Manufacturing

Technical Paper Publication. IMECE2013-66329
Lijuan Xu, Qiang Huang, *University of Southern California, Los Angeles, CA, United States*, Arman Sabbaghi, Tirthankar Dasgupta, *Harvard University, Cambridge, MA, United States*

11:09am Precision and Energy Usage in Additive Manufacturing

Technical Paper Publication. IMECE2013-65688
Lee Clemon, Anton Sudradjat, Maribel Jaquez, Aditya Krishna, David Dornfeld, *University of California, Berkeley, Berkeley, CA, United States*, Marwan Rammah, *University of California, Berkeley, East Palo Alto, CA, United States*

2-3 ADVANCED MATERIALS DESIGN, SYNTHESIS, AND PROCESSING

2-3-5 Advanced Materials Design, Synthesis, and Processing Session V

2nd Floor, Manchester Grand Hyatt, Edward B 9:45am–11:30am

Session Organizer: **Devdas Pai**, *North Carolina A&T State University, Greensboro, NC, United States*

Session Co-Organizer: **Raghu V. Prakash**, *Indian Institute of Technology Madras, Chennai, India*

9:45am Growth and Characterization of Titanium Nitride Nanowires on Silicon Substrate Using Pulsed Laser Deposition Method for Biological Applications

Technical Paper Publication. IMECE2013-64883
Seyram Gbordzoe, Dhananjay Kumar, Kwadwo Mensah-Darkwa, *North Carolina A&T State University, Greensboro, NC, United States*, Ram Gupta, *Pittsburg State University, Pittsburg, KS, United States*

10:02am Enhancement of Mechanical Properties of PTFE Masterbatch Composites Using Al₂O₃ Nano Filler

Technical Presentation. IMECE2013-66779
Vasu Velagapudi, G. Suresh, *National Institute of Technology Warangal, Warangal, Andhra Pradesh, India*

10:19am Creation and Characterization of Doped Hydroxyapatite With Strontium Carbonate Thin-Film Coating on Titanium Substrates Using Pulse Laser Deposition for Biological Applications

Technical Paper Publication. IMECE2013-64924
Cindy Waters, Stephen Ajinola, Kwadwo Mensah-Darkwa, Dhananjay Kumar, Ahmadreza Sedighi, *North Carolina A&T State University, Greensboro, NC, United States*

10:36am Effect of Severe Hot Forging and Rolling on Microstructure, Texture, and Tensile Properties of Titanium Metastable Beta-Alloys

Technical Paper Publication. IMECE2013-63767
Orest Ivasishin, Pavlo Markovsky, *Institute for Metal Physics, NAS of Ukraine Kiev, Ukraine*, Marta Pozuelo, Sergey Prikhodko, *University of California, Los Angeles, Los Angeles, CA, United States*

10:53am Fabrication of Aluminum Laminate Nanocomposite by Spray-Deposited Sheet Bonding

Technical Presentation. IMECE2013-63794
Jie Wang, Mina Bastwos, Gap-Yong Kim, *Iowa State University, Ames, IA, United States*

11:10am Mechanical Behavior of Green Ceramic Tapes Used in a Viscoelastic Shaping Process

Technical Presentation. IMECE2013-63237
Ming-Jen Pan, *U.S. Naval Research Laboratory, Springfield, VA, United States*, Stephanie Wimmer, *Virginia Degiorgi, U.S. Naval Research Laboratory, Washington, DC, United States*

2-6 COMPUTATIONAL MODELING AND SIMULATION FOR ADVANCED MANUFACTURING

2-6-4 Computational Modeling and Simulation for Advanced Manufacturing Session IV

2nd Floor, Manchester Grand Hyatt, Edward D 9:45am–11:30am

Session Organizer: **Aditya Das**, *University of Texas at Arlington Research Institute, Fort Worth, TX, United States*

Session Co-Organizer: **John Wentz**, *University of St. Thomas, Saint Paul, MN, United States*

9:45am Quantitative Optimization of a Custom Flexible Manufacturing Platform for Assembly and Packaging of Heterogeneous Microsystems

Technical Paper Publication. IMECE2013-63800
Aditya Das, *University of Texas at Arlington Research Institute, Fort Worth, TX, United States*

10:02am Computational Fluid Dynamic Analysis of Atomization Spray Cooling Nozzle Designs for Micromachining

Technical Paper Publication. IMECE2013-63982
Andressa Lunardelli, John Wentz, *University of St. Thomas, Saint Paul, MN, United States*

10:19am Method on Tolerance Stack Analysis Involving Geometric Characteristics in Precision Machinery Design

Technical Presentation. IMECE2013-64303
Lianshui Guo, Yuanjing Ye, Jiayin Feng, *Beihang University (Beijing University of Aeronautics and Astronautics), HaiDian, Beijing, China*

10:36am A New Method for the Generation of Tool Paths for Finishing Near Net Shape Components

Technical Paper Publication. IMECE2013-65483
Hugo Ivan Medellin Castillo, Edgar Mendoza-Lopez, Dirk F. de Lange, *Universidad Autónoma de San Luis Potosí, San Luis Potosí, San Luis Potosí, Mexico*, Theo Lim, *Heriot-Watt University, Edinburgh, Scotland*

10:53am Effect of Lubrication in Nanoindentation Process—A Molecular Dynamics Simulation Study

Technical Paper Publication. IMECE2013-65651
Yachao Wang, Jing Shi, *North Dakota State University, Fargo, ND, United States*

11:10am Ultrasonic-Assisted Cylindrical Grinding of Alumina-Zirconia Ceramics

Technical Paper Publication. IMECE2013-65811
Taghi Tawakoli, *Institute of Grinding and Precision Technology, KSF, Hochschule Furtwangen University, Villingen-Schwenningen, Baden-Württemberg, Germany*, Javad Akbari, Ali Zahedi, *Sharif University of Technology, Tehran, Tehran, Iran*

TRACK 2 ADVANCED MANUFACTURING / WEDNESDAY, NOVEMBER 20**2-1 ADDITIVE MANUFACTURING****2-1-2 Materials and Evaluation****2nd Floor, Manchester Grand Hyatt, Edward A 1:00pm–2:45pm**Session Organizer: **Ilya Avdeev**, *University of Wisconsin–Milwaukee, Milwaukee, WI, United States***1:00pm Sensitivity of Mechanical Properties to Print Parameters in FDM Fabricated Parts****Technical Presentation.** IMECE2013-64995Alex Francis, Ilya Avdeev, *University of Wisconsin–Milwaukee, Milwaukee, WI, United States***1:17pm Flexural Modulus of Lasersintered PA 2200****Technical Paper Publication.** IMECE2013-64696Johannes A. Coy, Clara-Maria Kuball, *Technische Universität München, Garching, Germany*, Daniel B. Roppenecker, *Technische Universität Muenchen, Garching Bavaria, Bavaria, Germany*, Tim C. Lueth, *Technische Universität München, Institute of Micro Technology and Medical Device Technology, Garching, Germany***1:34pm Friction Coefficients and Surface Properties for Laser Sintered Parts****Technical Paper Publication.** IMECE2013-64549Daniel B. Roppenecker, *Technische Universität Muenchen, Garching Bavaria, Bavaria, Germany*, Rebecca Grazek, *Technische Universität Muenchen, Institute of Micro Technology and Medical Device Technology, Garching, Germany*, Johannes A. Coy, *Technische Universität München, Garching, Germany*, Franz Irlinger, Tim C. Lueth, *Technische Universität München, Institute of Micro Technology and Medical Device Technology, Garching, Germany***1:51pm Electrically Conductive Polymer Nanocomposites of Polyamide-12 Filled With Exfoliated Graphite Nanoplatelets Manufactured by Selective Laser Sintering****Technical Presentation.** IMECE2013-64707Shaun Eshraghi, Mehdi Karevan, Kyriaki Kalaitzidou, Suman Das, *Georgia Institute of Technology, Atlanta, GA, United States***2:08pm Evaluation of Mechanical Properties of Printed Polymeric Materials From an ObjJet 3D Printer****Technical Presentation.** IMECE2013-65135Qi Ge, Martin Dunn, Hang Qi, *University of Colorado Boulder, Boulder, CO, United States***2:25pm Complex Sparse-Filled Mechanical Property Prediction Methods for Direct Digital Manufacturing****Technical Paper Publication.** IMECE2013-65426David Kordonowy, Sydney Giblin, *Aurora Flight Sciences, Cambridge, MA, United States***2-2 ADVANCED FORMING****2-2-1 Advanced Forming and Flexible Electronic Manufacturing****2nd Floor, Manchester Grand Hyatt, Edward C 1:00pm–2:45pm**Session Organizer: **Devdas Pai**, *North Carolina A&T State University, Greensboro, NC, United States***1:00pm A Control System Design for Efficiently Operating Free-Motion of Servo Mechanical Press****Technical Paper Publication.** IMECE2013-62582Pin-Jyun Chen, Pi-Ying Cheng, *National Chiao Tung University, Hsinchu, Taiwan*, Yu-Ting Lin, Tseng-Jen Cheng, *Metal Industries Research & Development Centre, Kaohsiung, Taiwan***1:17pm Precision Measurement and Control of Synchronization Errors in a Contact-Type Printing Machine for Fine Pattern Printing and Overlay Improvement****Extended Abstract Publication.** IMECE2013-64408Dongwoo Kang, Taikmin Lee, Youngman Choi, Seunghyun Lee, Dukkyun Yoon, Inyoung Kim, Jeongdai Jo, *KIMM, Daejeon, Korea (Republic)***1:34pm Characterization of Delamination in Laser Micro Transfer Printing****Technical Paper Publication.** IMECE2013-64668Ala'a Al-okaily, Placid Ferreira, *University of Illinois at Urbana-Champaign, Urbana, IL, United States***1:51pm Bio-Inspired Artificial Apposition Compound Eye****Technical Presentation.** IMECE2013-65896Jianliang Xiao, *University of Colorado Boulder, Boulder, United States*, Young Huang, *Northwestern University, Evanston, IL, United States*, John Rogers, *University of Illinois at Urbana-Champaign, Urbana, IL, United States***2:08pm Additive Manufacturing of Conformable Electronics on Complex Objects Through Combined use of Liquid Metal Ink and Packaging Material****Technical Paper Publication.** IMECE2013-66607Qin Zhang, *Technical Institute of Physics and Chemistry, Beijing, China*, Jing Liu, *Chinese Academy of Sciences, Beijing, China***2:25pm Arithmetic and Experimental Study of Fixed-Length Compensation Based on Conical Bottom Shape of Electrode in Micro-EDM****Technical Paper Publication.** IMECE2013-62458Jingyu Pei, Bowen Zheng, Lei He, *Shanghai Jiao Tong University, Shanghai, Shanghai, China*, Fangjin Jin, *Shanghai Volkswagen, Shanghai, China*

2-6 COMPUTATIONAL MODELING AND SIMULATION FOR ADVANCED MANUFACTURING

2-6-5 Computational Modeling and Simulation for Advanced Manufacturing Session V

2nd Floor, Manchester Grand Hyatt, Edward D 1:00pm–2:45pm

Session Organizer: **Ranadip Acharya**, *Georgia Institute of Technology, Atlanta, GA, United States*

1:00pm Method on Analysis Pre-Tighten Moments Using Failure Criteria of Composite Material in Precision Instruments

Technical Presentation. IMECE2013-64377
Lianshui Guo, Jiayin Feng, *Beihang University (Beijing University of Aeronautics and Astronautics), Haidian, Beijing, China*

1:17pm Modeling of Solidification and Microstructure Evolution in the Scanning Laser Epitaxy (SLE) Process for Additive Manufacturing With Nickel-Base Superalloy Powders

Technical Paper Publication. IMECE2013-66807
Ranadip Acharya, Rohan Bansal, Justin J. Gambone, Suman Das, *Georgia Institute of Technology, Atlanta, GA, United States*

1:34pm Simplified Thermoelastoplastic Numerical Modeling Techniques Applied to Friction Stir Welding of Mild Steel

Technical Paper Publication. IMECE2013-64387
Daniel Micallef, Duncan Camilleri, Pierluigi Mollicone, *University of Malta, Msida, Malta*

1:51pm Numerical and Experimental Analysis of Droplet Impact, Deformation, and Formation of Droplet Train in Direct Print Technology

Technical Paper Publication. IMECE2013-64801
Muhammad Noman Hasan, Morteza Vatani, Yanfeng Lu, Jae-Won Choi, *University of Akron, Akron, OH, United States*,
Hochan Kim, *Andong National University, Andong, Korea (Republic)*

2:08pm Variation Simulation of Welded Assemblies Using a Thermoelastic Finite Element Model

Technical Paper Publication. IMECE2013-64512
Samuel Lorin, Lars Lindkvist, Rikard Soderberg, *Chalmers University of Technology, Goteborg, Sweden*,
Christoffer Cromvik, *Fraunhofer-Chalmers Research Centre for Industrial Mathematics, Gothenburg, Sweden*,
Fredrik Edelvik, *Fraunhofer-Chalmers Centre, Gothenburg, Sweden*

2:25pm Prediction, Design and Optimization of Microstructure Evolution in Powder Compaction Processes

Technical Presentation. IMECE2013-66445
Marcial Gonzalez, Alberto Cuitino, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*

2-11 PROCESS MODELING IN ADVANCED MANUFACTURING

2-11-1 Process Modeling in Advanced Manufacturing Session I

2nd Floor, Manchester Grand Hyatt, Edward B 1:00pm–2:45pm

Session Organizer: **Nand Jha**, *Manhattan College, Riverdale, NY, United States*

Session Co-Organizer: **Björn Lindau**, *Chalmers University of Technology, Göteborg, Sweden*

1:00pm Experimental Investigations Into the Finishing Force and Torque in Magnetic Abrasive Finishing Process

Technical Paper Publication. IMECE2013-62365
Rahul Mulik, *Indian Institute of Technology Roorkee, Roorkee, Uttarakhand, India*,
Pulak M. Pandey, *Indian Institute of Technology Delhi, New Delhi, India*

1:17pm Productivity Theory for Industrial Automated Lines

Technical Paper Publication. IMECE2013-62722
Ryspek Usubamatov, Fidzwan Hamzas, Tan Chan Sin, *University Malaysia Perlis, Arau, Perlis, Malaysia*

1:34pm Automation in Manufacturing Operation of Crankshaft

Technical Paper Publication. IMECE2013-62855
Nand Jha, *Manhattan College, Riverdale, NY, United States*

1:51pm Investigation of the Scaling Effects in Meso-Micro EDM

Technical Paper Publication. IMECE2013-63160
Umang Maradia, *ETH Zurich, Zurich, Switzerland*,
Konrad Wegener, *Institute of Machine Tools and Manufacturing, ETH Zurich, Switzerland*,
Josef Stirnimann, *Inspire AG (ETH Zurich), Zurich, Switzerland*,
Reto Knaak, *Marco Boccadoro, Agie Charmilles SA, Losone, Switzerland*

2:08pm Chip Breaking Parameter Selection for Constant Surface Speed Machining

Technical Paper Publication. IMECE2013-63531
Luke A. Berglind, John Ziegert, *University of North Carolina at Charlotte, Charlotte, NC, United States*

2:25pm Aspects of Fixture Clamp Modeling in Nonrigid Variation Simulation of Sheet Metal Assemblies

Technical Paper Publication. IMECE2013-63622
Björn Lindau, Kristina Warmefjord, Lars Lindkvist, Rikard Soderberg, *Chalmers University of Technology, Goteborg, Sweden*

TRACK 2 ADVANCED MANUFACTURING / WEDNESDAY, NOVEMBER 20**2-1 ADDITIVE MANUFACTURING****2-1-3 Process Development I****2nd Floor, Manchester Grand Hyatt, Edward A 3:00pm–4:45pm**Session Organizer: **Yong Chen**, *University of Southern California, Los Angeles, CA, United States***3:00pm An Origami-Inspired Additive Manufacturing Process for Building Thin-Shell Structures****Technical Paper Publication.** IMECE2013-65720Dongping Deng, Yong Chen, *University of Southern California, Los Angeles, CA, United States***3:17pm Hybrid Additive Manufacturing of 3D Compliant Tactile Sensors****Technical Paper Publication.** IMECE2013-63064Morteza Vatani, Jae-Won Choi, *University of Akron, Akron, OH, United States*, Erik Engeberg, *University of Akron, Cuyahoga Falls, OH, United States***3:34pm Development of Direct Printing/Curing Process for 3D Structural Electronics****Technical Paper Publication.** IMECE2013-63068Yanfeng Lu, Morteza Vatani, Jae-Won Choi, *University of Akron, Akron, OH, United States*, Hohan Kim, *Andong National University, Andong, Korea (Republic)*, Rae-Chan Lee, *Daekwang Technology, Busan, Korea (Republic)***3:51pm G-Code Generation for a New Printing Process Based on 3D Plastic Polymer Droplet Generation****Technical Paper Publication.** IMECE2013-63152Johannes Schwaiger, Tim C. Lueth, Franz Irlinger, *Technische Universität München, Institute of Micro Technology and Medical Device Technology, Garching, Germany***4:08pm A Novel Additive Manufacturing File Format for Printed Electronics****Technical Paper Publication.** IMECE2013-64678Neeraj Panhalkar, Ratnadeep Paul, Sam Anand, *University of Cincinnati, Cincinnati, OH, United States***4:25pm From Multiring and Radial Spoke to Spider Net and Foam: Pattern Formation From Inkjet-Printed Colloidal Drop****Technical Presentation.** IMECE2013-65069Xin Yang, Ying Sun, *Drexel University, Philadelphia, PA, United States***2-2 ADVANCED FORMING****2-2-2 Advanced Forming Session I****2nd Floor, Manchester Grand Hyatt, Edward C 3:00pm–4:45pm**Session Organizer: **Sanjeev Khanna**, *University of Missouri–Columbia, Columbia, MO, United States***3:00pm Effect of Process Parameters on the Microstructure Homogeneity of AA6082 Aluminum Alloy Deformed by Twist Extrusion****Technical Paper Publication.** IMECE2013-63075V.S. Senthil Kumar, U. Mohammed Iqbal, *Anna University, Chennai, India***3:17pm Temperature-Supported Forming of Automobile Related Magnesium Components****Technical Paper Publication.** IMECE2013-63175Frank Schieck, Welf-Guntram Drossel, Hans Bräunlich, Sören Scheffler, *Fraunhofer Institute for Machine Tools and Forming Technology IWU, Chemnitz, Saxony, Germany*, Norbert Pierschel, *Chemnitz University of Technology, Chemnitz, Saxony, Germany***3:34pm The Evaluation of Friction Behavior Between EG and EGA Coated Automotive Steels****Technical Paper Publication.** IMECE2013-63213Hua-chu Shih, *United States Steel Corporation, Rochester Hills, MI, United States*, Michele L. Vanfleteren, *United States Steel Corporation, Troy, MI, United States***3:51pm Measurements of Wall Formation Forces in an Acoustic Resonator****Technical Paper Publication.** IMECE2013-63307Natasha Barbely, Sorin Pirau, Narayanan Komerath, *Georgia Institute of Technology, Atlanta, GA, United States***4:08pm The Experimental Study on Forming Accuracy for Water Jet Incremental Sheet Metal Forming****Technical Paper Publication.** IMECE2013-62892Kai He, Shuguo Wei, *Shenzhen Key Laboratory of Precision Engineering, Shenzhen Institutes of Advanced Technology, Shenzhen, Guangdong, China*, Jiuhua Li, *Graduate University, Chinese Academy of Sciences, Shenzhen Institutes of Advanced Technology, Shenzhen, Guangdong, China*, Ruxu Du, *Chinese University of Hong Kong, Shenzhen Institutes of Advanced Technology, Hong Kong, China***4:25pm Investigations on the Effect of Coating Material and Method on Die Wear in Stamping of Advanced High-Strength Steels****Technical Paper Publication.** IMECE2013-62043Muammer Koc, *Istanbul Sehir University, Istanbul, Istanbul, Turkey*, Omer N. Cora, *KTU, Trabzon, TR, Turkey*, Peter Blau, *Oak Ridge National Laboratory, Oak Ridge, TN, United States*, Kunio Namiki, *Daido Steel Co., Ltd., Tokyo, Japan*

2-6 COMPUTATIONAL MODELING AND SIMULATION FOR ADVANCED MANUFACTURING

2-6-6 Computational Modeling and Simulation for Advanced Manufacturing Session VI

2nd Floor, Manchester Grand Hyatt, Edward D 3:00pm–4:45pm

Session Organizer: **Dominique Knittel**, *University of Strasbourg, Strasbourg, France*

Session Co-Organizer: **Jing Shi**, *North Dakota State University, Fargo, ND, United States*

3:00pm Computer Modeling and Simulation Framework for Particulate Spray-Based Manufacturing Processes

Technical Paper Publication. IMECE2013-64933
Debanjan Mukherjee, Tarek Zohdi, *University of California, Berkeley, Berkeley, CA, United States*

3:17pm Tunable and Transferrable Bar Feeder Damping Design for Advanced Manufacturing

Technical Paper Publication. IMECE2013-64970
Harry Pierson, Kumar Singh, *Miami University, Oxford, OH, United States*

3:34pm Using Simulation Technology in Manufacturing—Engagement With Products and Processes

Technical Presentation. IMECE2013-65053
Melanie N. Ambrose, James F. Mahoney, *Honeywell Federal Manufacturing & Technologies, Kansas City, MO, United States*

3:51pm Simulation of Expanding Foam Encapsulation During Fill

Technical Presentation. IMECE2013-65066
James Tinsley, *Honeywell Federal Manufacturing & Technologies, Kansas City, MO, United States*

4:08pm A Comparison of Continuum, DSMC and Free Molecular Modeling Techniques for Physical Vapor Deposition

Technical Paper Publication. IMECE2013-66433
Kevin Gott, *Pennsylvania State University, Lusby, MD, United States*, Anil Kulkarni, Jogender Singh, *Pennsylvania State University, University Park, PA, United States*

4:25pm Design of a Nozzle for the Production of Metal Powder via Gas Atomization

Technical Paper Publication. IMECE2013-66761
Mehmet Alper Sofuoglu, Murat Erbas, Ibrahim Uslan, Atila Biyikoglu, *Gazi University, Ankara, Turkey*

2-11 PROCESS MODELING IN ADVANCED MANUFACTURING

2-11-2 Process Modeling in Advanced Manufacturing Session II

2nd Floor, Manchester Grand Hyatt, Edward B 3:00pm–4:45pm

Session Organizer: **Hongtao Ding**, *University of Iowa, Iowa City, IA, United States*

Session Co-Organizer: **Anil Saigal**, *Tufts University, Medford, MA, United States*

3:00pm Numerical and Experimental Measurements of Die Swell for a LCP and an Amorphous Polymer

Technical Paper Publication. IMECE2013-63723
Arash Ahmadzadegan, Anil Saigal, Michael Zimmerman, *Tufts University, Medford, MA, United States*

3:17pm Influence of Process Parameters on the Dimensions of the Channels Prepared Using Abrasive Water Jet Machining

Technical Paper Publication. IMECE2013-64063
V.K. Gupta T, Puneet Tandon, *PDPM Indian Institute of Information Technology, Design & Manufacturing Jabalpur, Jabalpur, M.P., India*, J. Ramkumar, Nalinaksh S. Vyas, *Indian Institute of Technology Kanpur, Kanpur, Uttar Pradesh, India*

3:34pm Fabrication and Study of Mechanical and Tribological Properties of Wood Apple Particulate Composite

Technical Paper Publication. IMECE2013-64176
Shakuntala Ojha, S.K. Acharya, Gujjala Raghavendra, *National Institute of Rourkela, Rourkela, Orissa, India*

3:51pm Optimization of Kerf Surface and Material Removal Rate Using Abrasive Water-Slurry Jet Machining Setup

Technical Paper Publication. IMECE2013-64245
Divyansh Patel, Puneet Tandon, *PDPM Indian Institute of Information Technology, Design & Manufacturing Jabalpur, Jabalpur, Madhya Pradesh, India*

4:08pm Predictive Modeling of Surface Microstructure of Hardened Steel Subject to Drilling

Technical Paper Publication. IMECE2013-64499
Ninggang Shen, Hongtao Ding, Wei Li, *University of Iowa, Iowa City, IA, United States*

4:25pm Modeling Solidification and Grain Boundary of FCC and BCC Metals by Phase-Field Crystal

Technical Presentation. IMECE2013-66247
Ebrahim Asadi, Mohsen Asle Zaeem, *Missouri University of Science and Technology, Rolla, MO, United States*

TRACK 2 ADVANCED MANUFACTURING / WEDNESDAY, NOVEMBER 20

2-1 ADDITIVE MANUFACTURING

2-1-4 Process Development II

2nd Floor, Manchester Grand Hyatt, Edward A 5:00pm–6:45pm

Session Organizer: **Andreas Gebhardt**, *FH Aachen, Aachen, Germany*

5:00pm Experimental Investigation of Selective Laser Melting of Lunar Regolith for In Situ Applications

Technical Paper Publication. IMECE2013-64334
Miranda Fateri, Andreas Gebhardt, *FH Aachen, Aachen, Germany*, Maziar Khosravi, *RWTH Aachen, Aachen, Germany*

5:21pm Advances in Direct Metal Deposition

Technical Paper Publication. IMECE2013-65042
Jyotirmoy Mazumder, *University of Michigan, Ann Arbor, MI, United States*, Lijun Song, *Hunan University, Changsha, China*

5:42pm Radiometric and Metallurgical Analysis of Zone Formation in Elementary Laser Deposited Thin-Wall Structures

Technical Paper Publication. IMECE2013-62142
Joshua Hammell, *South Dakota School of Mines and Technology, Evansville, SD, United States*, Michael Langerman, Nathan Saunders, *South Dakota School Mines & Technology, Rapid City, SD, United States*

6:03pm Experimental Investigation on Electro Discharge Deposition Process

Technical Paper Publication. IMECE2013-62866
Muralidharan Balakrishnan, H. Chelladurai, *PDPM Indian Institute of Information Technology Design and Manufacturing Jabalpur, Jabalpur, India*, J. Ramkumar, *IIT Kanpur, Kanpur (U.P.), India*

6:24pm Manufacturing Additively, With Fresh Concrete

Technical Paper Publication. IMECE2013-63996
Tony Di Carlo, *Boeing, Long Beach, CA, United States*, Behrokh Khoshnevis, Yong Chen, *University of Southern California, Los Angeles, CA, United States*

2-2 ADVANCED FORMING

2-2-3 Advanced Forming Session II

2nd Floor, Manchester Grand Hyatt, Edward C 5:00pm–6:45pm

Session Organizer: **Sanjeev Khanna**, *University of Missouri–Columbia, Columbia, MO, United States*

5:00pm Using a Pyramidal Three-Roll Bending Process to Improve the Quality of Seemed Cylinders

Technical Paper Publication. IMECE2013-63294
Zhengkun Feng, Henri Champlaud, *École de Technologie Supérieure, Université du Québec, Montreal, QC, Canada*

5:17pm Experimental Study on Electromagnetic Forming of Copper Sheets

Technical Paper Publication. IMECE2013-63433
K. Shanmuga Sundaram, Rajiv Selvam, *Anna University, Chennai, Tamilnadu, India*

5:34pm Optimization of Process Parameters in Profile Forming of Al 3003(O) Aluminum Alloy

Technical Paper Publication. IMECE2013-63435
V.S. Senthil Kumar, S.P. Shanmuganathan, *Anna University, Chennai, India*

5:51pm Centrifugal Forming of Soft Robotic Components

Technical Presentation. IMECE2013-64913
Parth Kulkarni, Darshil Bhavsar, John D. Popivchak, Koundinya Kuppa, Aaron Mazzeo, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*

6:08pm Experimental Validation of Analytical Model for Electromagnetic Forming Using a Uniform Pressure Actuator

Technical Paper Publication. IMECE2013-65903
Ethan Thibaudeau, Brad Kinsey, *University of New Hampshire, Durham, NH, United States*

6:25pm An Interferometer-Based Experimental Technique to Evaluate Large Strains and Springback on Sheet Metal

Technical Paper Publication. IMECE2013-66373
Luis R. Sanchez, Carl G. Simonsen, Shannon K. Peterson, Abrar Satar, *University of Colorado Denver, Denver, CO, United States*

2-11 PROCESS MODELING IN ADVANCED MANUFACTURING

2-11-3 Process Modeling in Advanced Manufacturing Session III

2nd Floor, Manchester Grand Hyatt, Edward B 5:00pm–6:45pm

Session Organizer: **Mouhab Meshreki**, *National Research Council Canada, Montreal, QC, Canada*

Session Co-Organizer: **Jose Carballo**, *University of South Florida, Riverview, FL, United States*

5:00pm Multicriteria Optimization of Process Plans for Reconfigurable Manufacturing Systems: An Evolutionary Approach

Technical Paper Publication. IMECE2013-64560
Taiba Zahid, Aamer Ahmed Baqai, *National University of Sciences & Technology, Rawalpindi, Punjab, Pakistan*

5:17pm Flow through Multigate Gating System: Experimental and Simulation Studies

Technical Paper Publication. IMECE2013-64732
K.H. Renukananda, Udit Chheda, B. Ravi, *IIT Bombay, Mumbai, Maharashtra, India*

5:34pm Comparison of Cartesian and Polar Kinematic Arrangements for Compensation of Scale Effects in Micromilling

Technical Paper Publication. IMECE2013-65002
Angela Sodemann, Yogesh Chukewad, *Arizona State University at the Polytechnic Campus, Mesa, AZ, United States*

5:51pm Study of Part-Site Interactions in Microscale Capillary Self Assembly

Extended Abstract Publication. IMECE2013-65177
Jose Carballo, *University of South Florida, Riverview, FL, United States*, Nathan Crane, *University of South Florida, Tampa, FL, United States*

6:08pm Dynamic Modeling of the Force Measurement System of Low-Frequency Vibration-Assisted Drilling

Technical Paper Publication. IMECE2013-65307
Ahmad Sadek, *McGill University, Montreal, QC, Canada*, Mouhab Meshreki, *National Research Council Canada, Montreal, QC, Canada*, Helmi Attia, *National Research Council Canada/McGill University, Montreal, QC, Canada*

6:25pm Comparison of Cellular Automaton and Phase Field Models to Simulate Dendritic Growth

Technical Presentation. IMECE2013-66801
Mohsen Asle Zaeem, *Missouri University of Science and Technology, Rolla, MO, United States*, Hebi Yin, *Oak Ridge National Laboratory, Oak Ridge, TN, United States*, Sergio Felicelli, *Mississippi State University, Mississippi State, MS, United States*

THURSDAY, NOVEMBER 21

2-15 NANOMANUFACTURING

2-15-1 Nanomanufacturing—Self-Assembly and Material Properties

4th Floor, Manchester Grand Hyatt, Randle B 9:30am–11:15am

Session Organizer: **Aaron Mazzeo**, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*

Session Co-Organizer: **Ram V. Mohan**, *Joint School of Nanoscience and Nanoengineering, Greensboro, NC, United States*

9:30am Laser Diagnostics of Plasma in Synthesis of Graphene-Based Materials

Technical Paper Publication. IMECE2013-63823
Alfredo Tuesta, Aizaz Bhuiyan, Robert Lucht, Timothy Fisher, *Purdue University, West Lafayette, IN, United States*

9:47am Laser Direct Synthesis of Graphene for Chemical Sensing Applications

Technical Presentation. IMECE2013-64580
Woongsik Nam, James I. Mitchell, Xianfan Xu, *Purdue University, West Lafayette, IN, United States*

10:04am Guided Self-Assembly of Nanomaterials Using Nanoporous Membrane and Detachment Lithography

Technical Presentation. IMECE2013-65669
Junghoon Yeom, *Michigan State University, East Lansing, MI, United States*

10:21am Graphene Growth Process Modeling for Nanomanufacturing

Technical Presentation. IMECE2013-66337
Jian Wu, Qiang Huang, *University of Southern California, Los Angeles, CA, United States*

10:38am Influences of Silicon Crystal Anisotropy in Nanomachining Processes Using AFM

Technical Paper Publication. IMECE2013-65674
Yachao Wang, Jing Shi, Xinnan Wang, *North Dakota State University, Fargo, ND, United States*

10:55am A Coupled Electromagnetic and Thermal Model for Picosecond and Nanometer-Scale Plasmonic Lithography Process

Technical Paper Publication. IMECE2013-66413
Ion-Hong Chao, Adrienne Lavine, *University of California, Los Angeles, Los Angeles, CA, United States*, Liang Pan, *Purdue University, West Lafayette, IN, United States*, Cheng Sun, *Northwestern University, Evanston, IL, United States*, Xiang Zhang, *University of California, Berkeley, Berkeley, CA, United States*

TRACK 2 ADVANCED MANUFACTURING / THURSDAY, NOVEMBER 21

2-19 INNOVATIONS IN PROCESSING, CHARACTERIZATION, AND APPLICATIONS OF BIOENGINEERED MATERIALS

2-19-1 Innovations in Processing, Characterization, and Applications of Bioengineered Materials

2nd Floor, Manchester Grand Hyatt, Betsy A 9:30am–11:15am

Session Organizer: **Devdas Pai**, *North Carolina A&T State University, Greensboro, NC, United States*

Session Co-Organizer: **Yeoheung Yun**, *Jagannathan Sankar, North Carolina A&T State University, Greensboro, NC, United States*

9:30am Extraction and Synthesis of Keratin-Based Nanofibers by Electrospinning for Biomedical Applications

Technical Paper Publication. IMECE2013-64501
Narayan Bhattarai, Angela Edwards, David Jarvis, *North Carolina A&T State University, Greensboro, NC, United States*

9:47am Mechanical Characteristics of Anodized Magnesium Alloy for Biodegradable Implants

Technical Paper Publication. IMECE2013-63929
Leon White, Ruben Kotoka, Yongseok Jang, Yeoheung Yun, Jagannathan Sankar, *North Carolina A&T State University, Greensboro, NC, United States*, Sudheer Neralla, *Jet-Hot LLC, Burlington, NC, United States*

10:04am Additive Fabrication of 3D Functional Organs: Promises and Future Challenges

Technical Presentation. IMECE2013-62492
Ibrahim Ozbolat, *University of Iowa, Iowa City, IA, United States*

10:21am Bioprinting of Vascular Constructs for Tissue Engineering

Technical Presentation. IMECE2013-62524
Yahui Zhang, Yin Yu, Farzaneh Dolati, Ibrahim Ozbolat, *University of Iowa, Iowa City, IA, United States*

10:38am Fabrication of Three-Dimensional Tissue Scaffold Arrays Using Laser Foaming

Technical Paper Publication. IMECE2013-65195
Jingyu Ock, Bryan T. Philpott, Wei Li, *University of Texas at Austin, Austin, TX, United States*

10:55am Structural and Mechanical Properties of Mg/MgO and Mg/Al₂O₃ Nanolaminate Coating for Implant Applications

Technical Paper Publication. IMECE2013-65410
Ruben Kotoka, Sergey Yarmolenko, Devdas Pai, Jagannathan Sankar, *North Carolina A&T State University, Greensboro, NC, United States*, Sudheer Neralla, *Jet-Hot LLC, Burlington, NC, United States*

2-16 ROBOTIC MACHINING PROCESSES

2-16-1 Management of Dynamic Manufacturing Networks

2nd Floor, Manchester Grand Hyatt, Betsy A 1:00pm–2:45pm

Session Organizer: **Sotirios Kousouris**, *National Technical University of Athens, Zografou, Greece*

Session Co-Organizer: **Elisabeth Zudor**, *Computer and Automation Research Institute, Budapest, Hungary*

Session Chair: **João P Mendonça**, *Universidade do Minho, Guimaraes, Portugal*

1:00pm Practical Identifiability of the Manipulator Link Stiffness Parameters

Technical Paper Publication. IMECE2013-63123
Alexandr Klimchik, Anatol Pashkevich, *École des Mines de Nantes, Nantes, France*, Stéphane Caro, *Centre National de la Recherche Scientifique, Nantes, France*

1:17pm Skillful Operating of Working Plate to Control of Ball Rolling Motion With a Dual Arm Robot

Technical Paper Publication. IMECE2013-64084
Shun Kinoshita, Wei Wu, Toshiki Hirogaki, Eiichi Aoyama, *Doshisha University, Kyoto, Japan*

1:34pm MSIRP—Methodology for the Economic Viability of Semantic Interoperability Resolution Projects

Technical Paper Publication. IMECE2013-64868
Elsa Marcelino Jesus, Mario Antao, *Universidade Lusitana de Lisboa, Lisboa, Portugal*, João Sarraipa, Ricardo Goncalves, *UNINOVA, Caparica, Portugal*, Elisabeth Zudor, *Computer and Automation Research Institute, Budapest, Hungary*

1:51pm Sustainable Interoperability of Negotiation of Manufacturing Robotic Machining Processes

Technical Paper Publication. IMECE2013-64891
Carlos Coutinho, *CaixaMagica, Lisboa, Portugal*, Ricardo Goncalves, *UNINOVA, Caparica, Portugal*, Adina Cretan, *Nicolae Titulescu University of Bucharest, Bucharest, Romania*

2:08pm Influences of Grit's Shape and Cutting Edge on Material Removal Mechanism of a Single Abrasive in Flexible Robotic Grinding

Technical Paper Publication. IMECE2013-64985
AmirMasoud Tahvilian, Henri Champlaud, Zhaoheng Liu, *École de Technologie Supérieure, Université du Québec, Montreal, QC, Canada*, Bruce Hazel, *IREQ, Varennes, QC, Canada*

2:25pm Event-Driven CNC Modularized Sewing Platform

Technical Paper Publication. IMECE2013-63533
Xiaohui Xie, *Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, Shenzhen, Guangdong, China*, Cui Ma, Bingzhe Han, *Shenzhen Institutes of Advanced Technology, Shenzhen, China*, Ruxu Du, *Chinese University of Hong Kong, Shenzhen Institutes of Advanced Technology, Hong Kong, China*

BIOMEDICAL AND BIOTECHNOLOGY ENGINEERING

WEDNESDAY, NOVEMBER 20

3-1 BIOMEDICAL AND BIOTECHNOLOGY PLENARY PRESENTATION

3-1-1 Plenary Session

3rd Floor, Manchester Grand Hyatt, Madeleine A 9:45am–11:30am

Session Organizer: **Ahmed Al-Jumaily**, *Auckland University of Technology, Auckland, New Zealand*

9:45am Modeling Wave Phenomena in the Arterial Network Plenary Presentation. IMECE2013-66841
Nikos Stergiopoulos, *EPFL, Lausanne, Vaud, Switzerland*

10:35am Mechanics of the Heart: Disease and Devices Plenary Presentation. IMECE2013-66879
Kendall Waters, *IEEE Consultants' Network of Silicon Valley, Silicon Valley, CA, United States*

3-7 CLINICAL APPLICATIONS OF BIOENGINEERING

3-7-1 Clinical Applications of Bioengineering I

3rd Floor, Manchester Grand Hyatt, Madeleine B 9:45am–11:30am

Session Organizer: **Karen C. Yan**, *The College of New Jersey, Ewing, NJ, United States*

Session Co-Organizer: **Thomas James**, *Tufts University, Medford, MA, United States*

9:45am Measurement of Electrical Impedance and Eddy Currents in Tissue Phantoms Extended Abstract Publication. IMECE2013-65112
Emily Sequin, Karen Bellman, Scott Koch, Joseph West, Shaurya Prakash, *Ohio State University, Columbus, OH, United States*, Vish Subramaniam, *Ohio State University, Westerville, OH, United States*

10:00am Articular Soft Tissues Affect Hip Kinematics: A Cadaver Study Technical Presentation. IMECE2013-63297
Sima Zakani, John Rudan, Randy Ellis, *Queen's University, Kingston, ON, Canada*

10:15am Effect of Sagittal Sawing Parameters on Histopathology of Bone Technical Paper Publication. IMECE2013-62557
Gerard Chang, Tobi Quinto, *Tufts University, Boston, MA, United States*, Steven Micucci, Charles Cassidy, Eric Smith, *Tufts Medical Center, Boston, MA, United States*, Amrit Sagar, Thomas James, *Tufts University, Medford, MA, United States*

10:30am The Effects of Retesting on the Mechanical Properties of Brain Tissue Technical Paper Publication. IMECE2013-65149
Asghar Rezaei, Mehdi Salimi Jazi, Ghodratollah Karami, Mariusz Ziejewski, *North Dakota State University, Fargo, ND, United States*

10:45am Effects of Process Parameters on Formation of Hybrid Tissue Constructs

Extended Abstract Publication. IMECE2013-66430
Karen C. Yan, Pamela Hitscherich, James Ferrie, *The College of New Jersey, Ewing, NJ, United States*

11:00am Objective Assessment of Minimally Invasive Surgical Skills Technical Paper Publication. IMECE2013-63739
Ali Keshavarz Panahi, Sohyung Cho, *Southern Illinois University Edwardsville, Edwardsville, IL, United States*

11:15am The Effect of Oscillation Speed and Thrust Force on Cortical Bone Temperature During Sagittal Sawing Technical Paper Publication. IMECE2013-62556
Steven Micucci, Charles Cassidy, Eric Smith, *Tufts Medical Center, Boston, MA, United States*, Gerard Chang, *Tufts University, Boston, MA, United States*, Amrit Sagar, Thomas James, *Tufts University, Medford, MA, United States*

3-8 TRANSPORT PHENOMENA IN BIOMEDICAL APPLICATIONS

3-8-1 Transport Phenomena in Biomedical Applications—I

3rd Floor, Manchester Grand Hyatt, Madeleine C 9:45am–11:30am

Session Organizer: **Erol Ulucakli**, *Lafayette College, Easton, PA, United States*

Session Co-Organizer: **Linxia Gu**, *University of Nebraska-Lincoln, Lincoln, NE, United States*

9:45am DDPM-DEM Simulations of Particulate Flows in Human Tracheobronchial Airways Extended Abstract Publication. IMECE2013-62307
Yu Feng, Clement Kleinstreuer, *North Carolina State University, Raleigh, NC, United States*

10:02am The Impact of Hemorheology on Wall Shear Stress in a Separated and Reattached Flow Region Technical Paper Publication. IMECE2013-62549
Khaled Hammad, *Central Connecticut State University, Simsbury, CT, United States*

10:19am A Numerical Investigation of the Fluid Flow in a Chandler Loop for Thrombus Studies Technical Paper Publication. IMECE2013-63916
Hisham Touma, Iskender Sahin, *Polytechnic Institute of New York University, Brooklyn, NY, United States*, Tidimogo Gaamangwe, Maud B. Gorbet, Sean D. Peterson, *University of Waterloo, Waterloo, ON, Canada*

10:36am Analysis of Thrombus Formation Process by Flow-Induced High Shear Rate Using Optical Observation Method Technical Paper Publication. IMECE2013-63940
Masaaki Tamagawa, *Kyushu Institute of Technology, Kitakyushu, Japan*

TRACK 3 BIOMEDICAL AND BIOTECHNOLOGY ENGINEERING / WEDNESDAY, NOVEMBER 20

10:53am Mathematical Model on Magnetic Drug Targeting a Permeable Microvessel

Technical Paper Publication. IMECE2013-66606
Sachin Shaw, Precious Sibanda, *University of Kwazulu-Natal, Pietermaritzburg, KwaZulu-Natal, South Africa*, P.V.S.N. Murthy, *Indian Institute of Technology, Kharagpur, India*

11:10am A Multiscale CFD Analysis of the Hybrid Norwood Palliative Treatment for Hypoplastic Left Heart Syndrome: Effect of Reverse Blalock-Taussing Shunt Diameter

Technical Paper Publication. IMECE2013-66856
Andres Ceballos, Alain Kassab, *University of Central Florida, Orlando, FL, United States*, Eduardo Divo, *Embry-Riddle Aeronautical University, Daytona Beach, FL, United States*, I. Ricardo Argueta-Morales, William DeCampi, Arnold Palmer, *Hospital for Children, Orlando, FL, United States*, Christopher A. Caldarone, *University of Toronto/The Hospital for Sick Children, Toronto, ON, Canada*

3-9 COMPUTATIONAL MODELING AND DEVICE DESIGN

3-9-1 Computational Modeling & Device Design I

3rd Floor, Manchester Grand Hyatt, Madeleine D 9:45am–11:30am

Session Organizer: **Marwan El-Rich**, *University of Alberta, Edmonton, Canada*

9:45am Integrated Computer-Aided Approach for Supporting Development of Biomedical Devices

Technical Paper Publication. IMECE2013-62832
Ahmed Sherif El-Gizawy, *University of Missouri, Columbia, MO, United States*

10:00am A New Anchorage Device for Orthodontic Applications

Technical Paper Publication. IMECE2013-63973
Mohamad Najari, Marwan El-Rich, Samer Adeeb, *University of Alberta, Edmonton, AB, Canada*, Bachar Taha, *Orthodontic Dentist, Private Practice, Verneuil sur Seine, IDF, France*

10:15am Development of Bio-MEMS Device for Cell Cluster Patterning by Using Dielectrophoresis Method

Technical Paper Publication. IMECE2013-64295
Shinya Murakami, Yusuke Morita, Eiji Nakamachi, *Doshisha University, Kyotanabe, Kyoto, Japan*

10:30am Study on the Effects of Femoral Muscle Forces on Performance of Internal Fixation Devices Utilizing a Simulation-Based Approach

Technical Paper Publication. IMECE2013-64926
Laurent Eap, A. Sherif El-Gizawy, *University of Missouri, Columbia, MO, United States*

10:45am An Experimental Setup for API Assessment of a Valved Holding Chamber Device

Technical Paper Publication. IMECE2013-65111
Ricardo F. Oliveira, Senhorinha Teixeira, José Carlos Teixeira, *University of Minho, Guimarães, Portugal*, Helena Marques, *University of Lisbon, Lisbon, Portugal*

11:00am Phase Field Modeling of Active Stress Generation in Spreading Cells During Actin Polymerization

Technical Presentation. IMECE2013-65299
Mahdi Golkaram, Sulin Zhang, *Pennsylvania State University, University Park, PA, United States*

11:15am Simulation of Pulmonary Return to the Left Atrium With a Numerical Model Governed Hydraulic System

Technical Presentation. IMECE2013-63653
Charles E. Taylor, Stephen J. Warren, Gerald E. Miller, *Virginia Commonwealth University, Richmond, VA, United States*

3-2 BIOMECHANICS OF TRAUMA DUE TO ACCIDENTS, SURGERY, OR WEAPONS

3-2-1 Experimental Analysis and Computational Modeling of TBI

3rd Floor, Manchester Grand Hyatt, Madeleine A 1:00pm–2:45pm

Session Organizer: **Amit Bagchi**, *U.S. Naval Research Laboratory, Washington, DC, United States*

Session Chair: **Jack Roberts**, *Johns Hopkins University, Laurel, MD, United States*

Session Co-Chair: **Karim Muci-Kuchler**, *South Dakota School of Mines and Technology, Rapid City, SD, United States*

1:00pm Correlation of Simulation With Clinical Assessment of Blast-Induced Traumatic Brain Injury

Invited Presentation. IMECE2013-66314
Paul Taylor, *Sandia National Laboratories, Albuquerque, NM, United States*, Corey Ford, Andrei Vakhtin, *University of New Mexico, Albuquerque, NM, United States*

1:30pm Validation of Human Head Model

Technical Presentation. IMECE2013-64636
Nithyanand Kota, *SAIC, La Plata, MD, United States*, Alan Leung, Siddiq Qidwai, Amit Bagchi, *U.S. Naval Research Laboratory, Washington, DC, United States*

1:45pm Modelling and Analysis of the Effect of Angular Velocity and Acceleration on Brain Strain Field in Traumatic Brain Injury

Technical Paper Publication. IMECE2013-63053
Hesam Hoursan, M.T. Ahmadian, Hamid Naghibi Beidokhti, *Sharif University of Technology, Tehran, Iran*, Ahmad Barari, *University of Ontario, Oshawa, ON, Canada*

2:00pm Lateral Impact Validation of a Probabilistic Statistical Shape Finite Element Model of the Head and Neck

Technical Paper Publication. IMECE2013-65154
Travis Eliason, Daniel Nicolella, Todd Bredbenner, Loren Francis, *Southwest Research Institute, San Antonio, TX, United States*, Brian Stemper, *Medical College of Wisconsin, Milwaukee, WI, United States*, Barry Shender, *Naval Air Warfare Center Aircraft Division, Patuxnet River, MD, United States*, Glenn Paskoff, *Naval Air Systems Command, Patuxnet River, MD, United States*

2:15pm A Micromechanical Model for Shear-Induced Platelet Damage in Capillaries Within Gray Matter

Technical Paper Publication. IMECE2013-66794

Daniel Sullivan, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*, Assimina Pelegri, *Rutgers, The State University of New Jersey, East Brunswick, NJ, United States*, Paul Taylor, *Sandia National Laboratories, Albuquerque, NM, United States*

3-3 VIBRATION AND ACOUSTICS IN BIOMEDICAL APPLICATIONS

3-3-1 Vibration and Acoustics in Biomedical Applications I

3rd Floor, Manchester Grand Hyatt, Madeleine B 1:00pm–2:45pm

Session Organizer: **Lijie G. Zhang**, *George Washington University, Washington, DC, United States*

Session Co-Organizer: **Maruti Gudavalli**, *Palmer Center for Chiropractic Research, Davenport, IA, United States*

1:00pm Sound Transmission in a Lung Phantom Model

Technical Paper Publication. IMECE2013-63766

Zoujun Dai, Ying Peng, Thomas J. Royston, *University of Illinois at Chicago, Chicago, IL, United States*, Hansen A. Mansy, *Rush University Medical Center, Chicago, IL, United States*

1:17pm Localized Elastography Map of Human Cornea Through Surface Vibrations

Technical Paper Publication. IMECE2013-64016

Altaf Khan, Zoujun Dai, Soledad Cortina, Thomas J. Royston, *University of Illinois at Chicago, Chicago, IL, United States*, Wallace Chamon, *Universidade Federal de São Paulo, São Paulo, Brazil*

1:34pm Study of the Combined Effect of Isoproterenol and Mechanical Oscillation on the Contractile Response of Mice Airways From Healthy and Asthmatic Subjects (In Vivo)

Technical Paper Publication. IMECE2013-65028

Miguel Jo-Avila, Ahmed Al-Jumaily, Jun Lu, *Auckland University of Technology, Auckland, New Zealand*, Luis Sobrevia, *Pontificia Universidad Católica de Chile, Santiago, Chile*

1:51pm Acoustics and Computational Models for Diagnosing Arterial Blockages

Technical Paper Publication. IMECE2013-63316

Mohammad Al-Rawi, *Manukau Institute of Technology, Auckland, New Zealand*, Ahmed Al-Jumaily, *Auckland University of Technology, Auckland, New Zealand*

2:08pm A Method for Applying High Cyclic Strain to Focal Adhesions and Measuring the Cell Response

Extended Abstract Publication. IMECE2013-64681

Toshihiko Shiraiishi, Takuya Ohara, Shin Morishita, *Yokohama National University, Yokohama, Japan*

2:25pm Oscillatory Flow Between Two Hemispheres for Shearing Protein Solutions

Technical Paper Publication. IMECE2013-65663

Dejuan Kong, Anita Penkova, Satwindar Sadhal, *University of Southern California, Los Angeles, CA, United States*

3-7 CLINICAL APPLICATIONS OF BIOENGINEERING

3-7-2 Clinical Applications of Bioengineering II

3rd Floor, Manchester Grand Hyatt, Madeleine C 1:00pm–2:45pm

Session Organizer: **Karen C. Yan**, *The College of New Jersey, Ewing, NJ, United States*

Session Co-Organizer: **Thomas James**, *Tufts University, Medford, MA, United States*

1:00pm Three-Dimensional Holographic Microwave Imaging Array: Experimental Investigation of Tumour Detection in Breast Phantom

Extended Abstract Publication. IMECE2013-63132

Lulu Wang, Ahmed M. Al-Jumaily, *Auckland University of Technology, Auckland, New Zealand*, Ray Simpkin, *Callaghan Innovation, Auckland, New Zealand*

1:15pm Interpreting Microscopic Magnetic Resonance Elastography Measurements Using Finite Element Analysis

Technical Paper Publication. IMECE2013-63355

Yifei Liu, Temel Yasar, Thomas J. Royston, *University of Illinois at Chicago, Chicago, IL, United States*

1:30pm Improved Image Registration Technique Using Demons and B-Spline

Technical Paper Publication. IMECE2013-65830

Chao Tang, Xiaohui Xie, *Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, Shenzhen, Guangdong, China*, Ruxu Du, *Chinese University of Hong Kong; Shenzhen Institutes of Advanced Technology, Hong Kong, China*

1:45pm Evidence-Based Best Practices: Wound Healing Tracking and Assessment

Technical Paper Publication. IMECE2013-62844

Jessica Chin, Ibrahim Zeid, Sagar Kamarthi, *Northeastern University, Boston, MA, United States*

2:00pm Low-Cost Near Real-Time Displacement-Gradient Elastography for the Diagnosis of Breast Cancer

Extended Abstract Publication. IMECE2013-65418

H.J. Kwon, Jiwon Lee, Sara Molladavoodi, *University of Waterloo, Waterloo, Canada*

2:15pm Stress Analysis of Hip Implant in Dynamic Condition

Technical Presentation. IMECE2013-62301

Abhaykumar Kuthe, Sandeep Dahake, Gaurav Burele, *Visvesvaraya National Institute of Technology, Nagpur, India*

2:30pm Biophysical Determinants of Ventilation Associated Cell Injury

Invited Presentation. IMECE2013-64721

Rolf Hubmayr, *Mayo Clinic, Rochester, MN, United States*

TRACK 3 BIOMEDICAL AND BIOTECHNOLOGY ENGINEERING / WEDNESDAY, NOVEMBER 20

3-9 COMPUTATIONAL MODELING AND DEVICE DESIGN

3-9-2 Computational Modeling & Device Design II

3rd Floor, Manchester Grand Hyatt, Madeleine D 1:00pm–2:45pm

Session Organizer: **Mohammad Poursina**, *University of Arizona, Tucson, AZ, United States*

Session Co-Organizer: **Duan Shanzhong**, *South Dakota State University, Brookings, SD, United States*

1:00pm Studying the Intact, ACL-Deficient, and Reconstructed Human Knee Joint Using a Finite Element Model

Technical Paper Publication. IMECE2013-63795

Achilles Vairis, Markos Petousis, Nectarios Vidakis, Andreas-Marios Tsainis, *Technological Education Institute of Crete, Heraklion, Greece*, George Stefanoudakis, *Creta Interclinic Hospital, Heraklion, Greece*, Betina Kandyla, *Private Practice, Athens, Greece*

1:17pm A New Look Into the Interlock Mechanism in the Tibiofemoral Joint: A Finite Element and Experimental Study

Technical Presentation. IMECE2013-64087

Ariful Bhuyitan, Stephen Ekwaro-Osire, *Texas Tech University, Lubbock, TX, United States*, Naveen Chandrashekar, *University of Waterloo, Waterloo, ON, Canada*, Javad Hashemi, *Florida Atlantic University, Boca Raton, FL, United States*

1:34pm Design of a New Knee Orthosis Locking System

Technical Paper Publication. IMECE2013-64276

Pedro Moreira, Pedro Ramôa, Joao Paulo Flores Fernandes, *University of Minho, Guimarães, Portugal*

1:51pm Swing Phase Lubrication Analysis of a Novel Artificial Hip Joint

Technical Paper Publication. IMECE2013-64356

Stephen Boedo, Sean A. Coots, *Rochester Institute of Technology, Rochester, NY, United States*, John F. Booker, *Cornell University, Ithaca, NY, United States*

2:08pm Numerical Analysis on Stress-Induced Corrosion With Emphasis on Ti-Alloy Total Hip Arthroplasty Stem Failure

Technical Paper Publication. IMECE2013-63689

Manish Paliwal, *The College of New Jersey, Ewing, NJ, United States*

2:25pm Modeling and Simulation of Shoulder-Humerus Complex via Multibody Dynamics

Technical Paper Publication. IMECE2013-63789

Nicholas Harrington, Duan Shanzhong, *South Dakota State University, Brookings, SD, United States*

3-2 BIOMECHANICS OF TRAUMA DUE TO ACCIDENTS, SURGERY, OR WEAPONS

3-2-2 Injuries due to Blast Loading

3rd Floor, Manchester Grand Hyatt, Madeleine A 3:00pm–4:45pm

Session Organizer: **Amit Bagchi**, *U.S. Naval Research Laboratory, Washington, DC, United States*

Session Chair: **Weinong W. Chen**, *Purdue University, West Lafayette, IN, United States*

Session Co-Chair: **Siddiq Qidwai**, *U.S. Naval Research Laboratory, Washington, DC, United States*

3:00pm Validations of Virtual Animal Model for Investigation of Shock/Blast Wave TBI

Technical Paper Publication. IMECE2013-64587

Xiangguang Tan, Andrzej Przekwas, *CFD Research Corporation, Huntsville, AL, United States*, Joseph Long, *WRAIR, Silver Spring, MD, United States*

3:17pm The Influence of Neck Kinematics on Brain Pressures and Strains Under Blast Loading

Technical Paper Publication. IMECE2013-64821

Jack Roberts, Tim Harrigan, Emily Ward, Andrew Merkle, *Johns Hopkins University Applied Physics Laboratory, Laurel, MD, United States*, Dan Nicolella, Daniel Nicolella, Travis Eliason, *Southwest Research Institute, San Antonio, TX, United States*

3:34pm Influence of Brain Topography Under Blasts

Technical Presentation. IMECE2013-65755

Alan Leung, Amit Bagchi, Siddiq Qidwai, *U.S. Naval Research Laboratory, Washington, DC, United States*, Nithyanand Kota, *SAIC, La Plata, MD, United States*

3:51pm Response of Postmortem Human Head Under Primary Blast Loading Conditions—Effect of Blast Overpressures

Technical Paper Publication. IMECE2013-63910

Shailesh Ganpule, Namas Chandra, *University of Nebraska Lincoln, Lincoln, NE, United States*, Robert Salzar, *University of Virginia, Charlottesville, VA, United States*

4:08pm Numerical Study of Head/Helmet Interaction Due to Blast Loading

Technical Paper Publication. IMECE2013-63015

Timothy Zhang, *Bowhead Science and Technology, LLC, Belcamp, MD, United States*, Sikhanda Satapathy, Amy Dagro, *U.S. Army Research Laboratory, Aberdeen Proving Ground, MD, United States*, Philip Mckee, *Dynamic Science, Inc., Aberdeen Proving Ground, MD, United States*

4:25pm Reducing the Effects of Blast to the Head Through Load Partitioning

Technical Paper Publication. IMECE2013-63257

Mark Rapo, *L-3 Applied Technologies, Inc., San Diego, CA, United States*, Tim Baumer, *L-3 Communications, San Diego, CA, United States*, Philemon Chan, *L-3/Jaycor, San Diego, CA, United States*, James MacKiewicz, *U.S. Naval Health Research Center, Natick, MA, United States*

3-3 VIBRATION AND ACOUSTICS IN BIOMEDICAL APPLICATIONS

3-3-2 Vibration and Acoustics in Biomedical Applications II

3rd Floor, Manchester Grand Hyatt, Madeleine B 3:00pm–4:45pm

Session Organizer: **Zoujun Dai**, *University of Illinois at Chicago, Chicago, IL, United States*

Session Co-Organizers: **Guangsheng Gu**, *Rice University, Houston, TX, United States*, **Ting Xia**, *Toshiba Medical Research Institute USA, Inc., Vernon Hills, IL, United States*

3:00pm Vibration Analysis and Measurement in Knee Ankle-Foot Orthosis for Both Metal and Plastic KAFO Type

Technical Paper Publication. IMECE2013-64641

Ayad Takhakh, Fahad Kadhim, *Al-Nahrain University, Baghdad, Iraq*, Jumaa Chiad, *Al-Mustansiriya University, Baghdad, Baghdad, Iraq*

3:17pm Do American Football Helmets Protect Players Against Concussions?

Technical Paper Publication. IMECE2013-64893

Peyman Honarmandi, *City College of New York, New York, NY, United States*, Ali Sadegh, *City University of New York, New York, NY, United States*, Paul Cavallaro, *City College of City University of New York, New York, NY, United States*

3:34pm Analyzing of Impact, Vibration Response, and Stability of Artificial Upper Limb

Technical Paper Publication. IMECE2013-65827

Bashar Bedaiwi, *Al-Mustansiriya University, Baghdad, Iraq*

3:51pm Design and Evaluation of a Multi-Sensor Unit for Measuring Physiological Stressors of Medical Transport

Technical Paper Publication. IMECE2013-65435

Georgios Kaloutsakis, *Medotics AG, Basel, Switzerland*, Andrew Reimer, Donghwa Jeong, Kiju Lee, *Case Western Reserve University, Cleveland, OH, United States*

4:08pm Novel Acoustic Wave Tactile Sensor Array for Biomedical Application

Technical Paper Publication. IMECE2013-66098

Kyungrim Kim, Xiaoning Jiang, *State North Carolina University, Raleigh, NC, United States*

4:25pm An Investigation Into Acoustics and Vibration of CPAP Devices

Technical Paper Publication. IMECE2013-62845

Xuan-Tung Vuong, Ahmed Al-Jumaily, Robert Paxton, *Auckland University of Technology, Auckland, New Zealand*

3-8 TRANSPORT PHENOMENA IN BIOMEDICAL APPLICATIONS

3-8-2 Transport Phenomena in Biomedical Applications—II

3rd Floor, Manchester Grand Hyatt, Madeleine C 3:00pm–4:45pm

Session Organizer: **Erol Ulucakli**, *Lafayette College, Easton, PA, United States*

Session Co-Organizer: **Linxia Gu**, *University of Nebraska-Lincoln, Lincoln, NE, United States*

3:00pm Modeling of Tau Protein Transport in Axons

Technical Paper Publication. IMECE2013-62430

Ivan A. Kuznetsov, *Johns Hopkins University, Baltimore, MD, United States*, Andrey Kuznetsov, *North Carolina State University, Raleigh, NC, United States*

3:17pm Treatment of Arrhythmias by Radiofrequency Ablation

Technical Paper Publication. IMECE2013-63360

Erol Ulucakli, Evan P. Sheehan, *Lafayette College, Easton, PA, United States*

3:34pm A Novel Approach for Compensating the Significance of Tubules Architecture in Urine Concentrating Mechanism of Renal Medulla

Technical Paper Publication. IMECE2013-63747

Salman Sohrabi, Seyyed Mahdi Nemati Mehr, Pedram Falsafi, *Sharif University of Technology, Tehran, Tehran, Iran*

3:51pm Simulation of Discrete Blood Vessel Effects on Thermal Signature of a Melanoma Lesion

Technical Paper Publication. IMECE2013-64451

Sri Kamal Kandala, Daxiang Deng, Cila Herman, *Johns Hopkins University, Baltimore, MD, United States*

4:08pm The Effect of Perfusion Rate on the Radiofrequency Ablation of Liver Tissue

Technical Paper Publication. IMECE2013-64631

Erol Ulucakli, Christopher S. Lavery, *Lafayette College, Easton, PA, United States*

4:25pm Beyond Liquid Nitrogen Coolant: Extreme Freezing to Maximize Cryosurgical Ablation of Tumor

Technical Paper Publication. IMECE2013-66605

Zhizhu He, Xu Xue, Zhong-Shan Deng, *Technical Institute of Physics and Chemistry, Beijing, China*, Jing Liu, *Chinese Academy of Sciences, Beijing, China*

TRACK 3 BIOMEDICAL AND BIOTECHNOLOGY ENGINEERING / WEDNESDAY, NOVEMBER 20

3-9 COMPUTATIONAL MODELING AND DEVICE DESIGN

3-9-3 Computational Modeling & Device Design III

3rd Floor, Manchester Grand Hyatt, Madeleine D 3:00pm–4:45pm

Session Organizer: Peter Gustafson, *Western Michigan University, Kalamazoo, MI, United States*

3:00pm Micro FEM Simulations of Single-Cutting-Edge Sawing of Cortical Bone

Technical Paper Publication. IMECE2013-62589
Ilige S. Hage, *American University of Beirut, Beirut, Lebanon*, Ramsey Hamade, *American University of Beirut, Beirut, Riad El Solh, Lebanon*

3:17pm Effect of the Number of Dental Implant Neck Threads in Contact With the Cortical Bone on Interface Stresses Using Finite Element Method

Technical Paper Publication. IMECE2013-63822
Mohammed Moustafa Hassan, Moahmed-Tarek El-Wakad, E.M. Bakr, *Helwan University, Cairo, Egypt*

3:34pm Errors and Artifacts Associated With the Calculation of the Intrinsic Properties of Trabecular Bone

Technical Presentation. IMECE2013-63926
Ramin Oftadeh, Ashkan Vaziri, *Northeastern University, Boston, MA, United States*, Peter Mcguirk, Cory Haselmayer, Ara Nazarian, *Beth Israel Deaconess Medical Center, Boston, MA, United States*

3:51pm A Study of the Planar Serial-Parallel Mechanism With Various Stiffness for a Biotic Compliant Fish

Technical Paper Publication. IMECE2013-62305
Cui Zuo, Jiang Hong-Zhou, *Haerbin Institute of Technology, Haerbin, HeiLongjiang, China*

4:08pm Design Principles for the Conceptual Design of Low-Cost Prosthetic Knee

Technical Paper Publication. IMECE2013-65358
Victor Duenas, Noe Vargas-Hernandez, *University of Texas at El Paso, El Paso, TX, United States*

4:25pm Simulation of the High Strain Rate Deformation Behavior of Titanium Based Alloy for Biomedical Applications

Technical Paper Publication. IMECE2013-63046
Emmanuel K. Ocran, Johnson O. Aina, *University of Manitoba, Winnipeg, MB, Canada*, Daniel O. Odoh, *Howard University, Washington, DC, United States*

3-4 INNOVATIONS IN PROCESSING, CHARACTERIZATION, AND APPLICATIONS OF BIOENGINEERED MATERIALS

3-4-1 Processing, Characterization, and Applications of Bioengineered Materials

3rd Floor, Manchester Grand Hyatt, Madeleine A 5:00pm–6:45pm

Session Organizer: Anil Saigal, *Tufts University, Medford, MA, United States*

5:00pm Feature-attribute-based Segmentation of Optical Images of Bone Slices Using Optimized Pulse Coupled Neural Networks (PCNN)

Technical Paper Publication. IMECE2013-62265
Ilige S. Hage, Ramsey Hamade, *American University of Beirut, Beirut, Riad El Solh, Lebanon*

5:15pm A Comparative Study of Mechanical Properties of Tooth Reconstruction Materials

Technical Paper Publication. IMECE2013-63106
Keyoung Jin Chun, Hyun Ho Choi, *Korea Institute of Industrial Technology, Cheonan, Chungnam, Korea (Republic)*, Jong Yeop Lee, *Samsung Medical Center, Seoul, Korea (Republic)*

5:30pm Improving the Properties of Cornstarch-Based Green Composites Reinforced With Banana Fibers by Incorporating Polycaprolactone for Maxillofacial Bone Plates Fabrication

Technical Paper Publication. IMECE2013-63705
Lamis Darwish, Moahmed-Tarek El-Wakad, *Helwan University, Cairo, Cairo, Egypt*, Mahmoud Farag, *American University in Cairo, Cairo, Egypt*, Mohamed Emara, *The Canadian International College, Cairo, Egypt*

5:45pm Mechanical Effectiveness of Polyvinyl Alcohol/Polyvinyl Pyrrolidone (PVA/PVP) as an Intervertebral Disc Polymer

Technical Paper Publication. IMECE2013-64767
Morshed Khandaker, Ashton Williams, Koroush Azartash, Zheila Azartash, Khiet Tran, *University of Central Oklahoma, Edmond, OK, United States*

6:00pm Structural Performance Analysis of Hydroxyapatite Scaffolds for Tissue Engineering

Technical Paper Publication. IMECE2013-65580
Hugo Ivan Medellin Castillo, Enrique Gallegos-Nieto, Dirk F. de Lange, Gilberto Mejia-Rodriguez, *Universidad Autónoma de San Luis Potosí, San Luis Potosí, Mexico*

6:15pm Modeling of Elastic and Fracture Behavior of the Queen Conch Mollusk Shell

Technical Presentation. IMECE2013-66319
Sridhar Santhanam

6:30pm Preparation and Characterization of Drug-Loaded Thermosensitive Hydrogels

Technical Paper Publication. IMECE2013-66489
Ramazan Asmatulu, Leyla Saeednia, Aybala Usta, *Wichita State University, Wichita, KA, United States*

3-6 VISCOELASTICITY OF BIOLOGICAL TISSUES AND ULTRASOUND APPLICATIONS DYNAMICS, AND CONTROL IN BIOMECHANICAL SYSTEMS

3-6-1 Viscoelasticity I

3rd Floor, Manchester Grand Hyatt, Madeleine B 5:00pm–6:45pm

Session Organizer: **Mostafa Fatemi**, *Mayo Clinic College of Medicine, Rochester, MN, United States*

Session Co-Organizer: **Sam Mukdadi**, *Morgantown, WV, United States*

5:00pm **Dissipation Can Act as a Mechanobiological Signal in Cartilage Differentiation**

Technical Paper Publication. IMECE2013-62268
Philippe Abdel-sayed, Arne Vogel, Dominique Pioletti, *Laboratory of Biomechanical Orthopedics/EPFL, Lausanne, Switzerland*

5:17pm **Viscoelastic Strain Response (ViSR) Ultrasound in Pre-Clinical and Clinical Application**

Invited Paper Publication. IMECE2013-65596
Mallory R. Scola, James F. Howard, Jr., Timothy C. Nichols, Caterina M. Gallippi, *University of North Carolina at Chapel Hill, Chapel Hill, NC, United States*, Joe N. Kornegay, *Texas A&M University, College Station, TX, United States*

5:34pm **Modeling Dynamic Responses of Viscoelastic Heterogeneous Soft Tissues to Step Acoustic Radiation Force**

Technical Paper Publication. IMECE2013-66109
Xiaodong Zhao, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*, Assimina Pelegri, *Rutgers, The State University of New Jersey, East Brunswick, NJ, United States*

5:51pm **Softness Measurement Technics of Human Skin by Indentation Devices Imitating Palpation**

Technical Paper Publication. IMECE2013-66258
Atsushi Sakuma, *Tokyo University of Agriculture and Technology, Koganei, Japan*

6:08pm **Studying Mechanical Properties of Bladder Wall Using Lamb Waves**

Invited Presentation. IMECE2013-66868
Mostafa Fatemi, *Mayo Clinic College of Medicine, Rochester, MN, United States*

6:25pm **A Constitutive Model for Soft Tissue and Its Application to a Boundary Value Problem**

Technical Paper Publication. IMECE2013-64210
Mythravaran Pullela, Parag Ravindran, *Indian Institute of Technology Madras, Chennai, Tamil Nadu, India*

3-9 COMPUTATIONAL MODELING AND DEVICE DESIGN

3-9-4 Computational Modeling & Device Design IV

3rd Floor, Manchester Grand Hyatt, Madeleine D 5:00pm–6:45pm

Session Organizer: **Peter Gustafson**, *Western Michigan University, Kalamazoo, MI, United States*

5:00pm **Computational Fluid Dynamics Analysis of Blood Flow Through Stented Arteries**

Technical Paper Publication. IMECE2013-62407
Pradip Majumdar, *Shafiullah Mohammad, Northern Illinois University, DeKalb, IL, United States*

5:21pm **Numerical Modeling of Pulsating Inflow to the Pulmonary Arteries in TCPC Morphology Using FSI Approach**

Technical Paper Publication. IMECE2013-63776
Hamid Reza Rajabzadeh, Bahar Firoozabadi, Mohammad Said Saidi, Salman Sohrabi, Seyyed Mahdi Nemati Mehr, *Sharif University of Technology, Tehran, Tehran, Iran*

5:42pm **Effects of Turbulent Blood Flow on Abdominal Aortic Aneurysms: A Fluid-Structure Interaction Study**

Technical Paper Publication. IMECE2013-63879
Shengmao Lin, Linxia Gu, *University of Nebraska–Lincoln, Lincoln, NE, United States*

6:03pm **Three-Dimensional Fluid-Structure-Interaction Simulation of Tilting Disk Mechanical Heart Valve**

Technical Paper Publication. IMECE2013-65335
Ardavan Aliabadi, Klaus A. Hoffmann, *Wichita State University, Wichita, KS, United States*

6:24pm **A Review of Computer Simulation of Spine Biomechanics for the Treatment of Scoliosis**

Technical Paper Publication. IMECE2013-64231
Athena Jalalian, Ian Gibson, Eng Hock Tay, *National University of Singapore, Singapore, Singapore*

TRACK 3 BIOMEDICAL AND BIOTECHNOLOGY ENGINEERING / WEDNESDAY, NOVEMBER 20 / THURSDAY, NOVEMBER 21

3-10 BIOINSPIRED MATERIALS AND STRUCTURES

3-10-1 Characterization and Technical Application of Biological and Bioinspired Materials

3rd Floor, Manchester Grand Hyatt, Madeleine C 5:00pm–6:45pm

Session Organizer: **Seyed Allameh**, *Northern Kentucky University, Highland Heights, KY, United States*

Session Co-Organizer: **Zhenhai Xia**, *University of North Texas, Denton, TX, United States*

5:00pm Interdigitation of Materials and Its Implication for Engineering and Biological Attachments

Technical Presentation. IMECE2013-62618

Victor Birman, *Missouri University of Science and Technology, Saint Louis, MO, United States*, Stavros Thomopoulos, Jenny Y. Hu, Guy Genin, *Washington University in St. Louis, St. Louis, MO, United States*

5:17pm Bioinspired Composites for Direct Writing of Tough Structures

Technical Presentation. IMECE2013-63047

Seyed Allameh, *Northern Kentucky University, Highland Heights, KY, United States*

5:34pm Effect of Valproic Acid on Cell Proliferation of Whartons Jelly MSC in PCL Nanofiber Scaffolds

Technical Paper Publication. IMECE2013-65041

Jack Dougherty, Emily Schaefer, Ryan Niemeier, Erin Koch, Craig Cady, Kalyani Nair, *Bradley University, Peoria, IL, United States*

5:51pm Bioresorbable Shape Memory Thiolen/Polycarbonate Hybrids Built From Natural Products

Technical Presentation. IMECE2013-65402

Keith Hearon, Alexander T. Lonneck, Lauren A. Link, Jeffery E. Raymond, Karen L. Wooley, Duncan J. Maitland, *Texas A&M University, College Station, TX, United States*

6:08pm Enhanced Human Bone Marrow Mesenchymal Stem Cell Functions in 3D Bioprinted Biologically Inspired Osteochondral Construct

Technical Paper Publication. IMECE2013-66118

Benjamin Holmes, Lijie G. Zhang, *George Washington University, Washington, DC, United States*

6:25pm Self-Cleaning Mechanisms of Gecko Setae at Microscale

Technical Presentation. IMECE2013-66465

Quan Xu, Zhenhai Xia, *University of North Texas, Denton, TX, United States*, Shihao Hu, *Case Western Reserve University, Cleveland, OH, United States*

THURSDAY, NOVEMBER 21

3-2 BIOMECHANICS OF TRAUMA DUE TO ACCIDENTS, SURGERY, OR WEAPONS

3-2-3 Injuries Due to Blast, Blunt, and Ballistic Impact—I

2nd Floor, Manchester Grand Hyatt, Edward A 7:45am–9:15am

Session Organizer: **Karim Muci-Kuchler**, *South Dakota School of Mines and Technology, Rapid City, SD, United States*

Session Chair: **Paul Taylor**, *Sandia National Laboratories, Albuquerque, NM, United States*

Session Co-Chair: **Brandon Hinz**, *South Dakota School of Mines and Technology, Rapid City, SD, United States*

7:45am The Blast Gauge System as a Research Tool to Quantify Blast Overpressure in Complex Environments

Extended Abstract Publication. IMECE2013-65138

Michael Ostertag, David Borkholder, Matthew Kenyon, *BlackBox Biometrics, Inc., Rochester, NY, United States*, Gary H. Kamimori, General Lee, *Walter Reed Army Institute of Research, Silver Spring, MD, United States*, Uade Da Silva, *Naval Medical Research Center, Silver Spring, MD, United States*

8:00am Comparative Modeling of Brain Injury Based on Four Benchmark Studies

Technical Presentation. IMECE2013-64996

Siddiq Qidwai, Amit Bagchi, Alan Leung, *U.S. Naval Research Laboratory, Washington, DC, United States*, Nithyanand Kota, *SAIC, La Plata, MD, United States*

8:15am Comparing the Behavior of Homogeneous vs. Fluid-Filled Solid Head Forms Under Impact Loading Conditions

Technical Paper Publication. IMECE2013-64971

Veera Selvan, Namas Chandra, *University of Nebraska Lincoln, Lincoln, NE, United States*, Virginia Halls, James Zheng, *Program Executive Office–Soldier, U.S. Army, Fort Belvoir, VA, United States*

8:30am Effects of Height and Head Protector on Injury and Mortality of Elderly in Accidental Collision and Fall for Developing Daily Life Supporting Mobile

Technical Presentation. IMECE2013-66718

Masaaki Tamagawa, *Kyushu Institute of Technology, Kitakyushu, Japan*, Hiroyuki Matsuura, *National Center for Geriatrics and Gerontology, Obu, Japan*, Masahiro Nakano, *Makoto Yamanaka, Junshin Gakuen University, Fukuoka, Japan*, Toru Yukimasa, *University of Occupational and Environmental Health, Kitakyushu, Japan*, Masami Kubota, *Japan Automobile Research Institute, Tsukuba, Japan*

8:45am Validating the Critical Areal Density for a New Ballistic Armor Exhibiting Blunt Trauma Reduction

Technical Paper Publication. IMECE2013-63023

Jay Hanan, *Oklahoma State University, Tulsa, OK, United States*, Advait Bhat, *Balaji Jayakumar, Oklahoma State University, Stillwater, OK, United States*

9:00am Computational Analysis of Blast Induced Vascular Mechanisms of TBI**Technical Presentation.** IMECE2013-64546

Andrzej Przekwas, Xiangguang Tan, Zhijian Chen, *CFD Research Corp., Huntsville, AL, United States*, Tim Harrigan, Jack Roberts, Andrew Merkle, *Johns Hopkins University, Laurel, MD, United States*

3-7 CLINICAL APPLICATIONS OF BIOENGINEERING**3-7-3 Clinical Applications of Bioengineering III****2nd Floor, Manchester Grand Hyatt, Edward D 7:45am–9:15am**

Session Organizer: **Thomas James**, *Tufts University, Medford, MA, United States*

Session Co-Organizer: **Karen C. Yan**, *The College of New Jersey, Ewing, NJ, United States*

7:45am Deflection of Cancellous Bone Screws Under a Cantilever Bending Load**Technical Paper Publication.** IMECE2013-62554

Thomas James, Maria Arshanskiy, Amrit Sagar, Anil Saigal, *Tufts University, Medford, MA, United States*, Carolina Vega, *Tufts University, Boston, MA, United States*, Eric Smith, Charles Cassidy, *Tufts Medical Center, Boston, MA, United States*

7:57am Developing a 3D Multibody Model of a Scoliotic Spine During Lateral Bending for Comparison of Ribcage Flexibility and Lumbar Joint Loading to the Normal Model**Technical Paper Publication.** IMECE2013-62899

Khatereh Hajizadeh, Huang Mengjie, Ian Gibson, Gabriel Liu, *National University of Singapore, Singapore, Singapore*

8:09am Systems in Prosthetic Hands and the Relationship With Their Performance**Technical Paper Publication.** IMECE2013-63179

Julio C. Diaz, J.M. Dorador, *Universidad Nacional Autónoma de México, Mexico, Mexico*

8:21am Effect of Operating Parameters on the Removal of Bone Cement by a Sawing Process**Technical Paper Publication.** IMECE2013-62553

Brian Sheehan, *Tufts University, Boston, MA, United States*, Amrit Sagar, Thomas James, *Tufts University, Medford, MA, United States*

8:33am Hip Impingement Patterns During Passive Range of Motion of Fresh Frozen Cadaveric Hips**Technical Presentation.** IMECE2013-63692

Brian J. Rasquinha, Manuela Kunz, John Rudan, Randy Ellis, *Queen's University, Kingston, ON, Canada*

8:45am Cancellation of Physiological Hand Tremors Using Compliant Robotic Assist**Technical Paper Publication.** IMECE2013-65737

Rupesh Bobade, Prasanna Gandhi, *IIT Bombay, Mumbai, India*, Chao Chen, *Monash University, Monash University, Australia*, Nikunj Bhagat, *University of Houston, Houston, TX, United States*

8:57am Current Situation of Design Criteria for Intervertebral Disc Prosthesis**Technical Paper Publication.** IMECE2013-65499

Epifanio Vargas-Alcaraz, Adri-n Espinosa, Marcelo Lopez-Parra, *Universidad Nacional Autónoma de México, Queretaro, Queretaro, México*

3-8 TRANSPORT PHENOMENA IN BIOMEDICAL APPLICATIONS**3-8-3 Transport Phenomena in Biomedical Applications—III****2nd Floor, Manchester Grand Hyatt, Edward C 7:45am–9:15am**

Session Organizer: **Erol Ulucakli**, *Lafayette College, Easton, PA, United States*

7:45am Modeling Prion Transport in a Tunneling Nanotube**Technical Paper Publication.** IMECE2013-62461

Ivan A. Kuznetsov, *Johns Hopkins University, Baltimore, MD, United States*, Andrey Kuznetsov, *North Carolina State University, Raleigh, NC, United States*

7:56am Development of a Dynamic Testing Device for Predicting the Enhanced Permeation and Retention (EPR) Effect of Different Nanoparticles in Tumor Vessels**Technical Paper Publication.** IMECE2013-62869

Sungchul Baek, Robert Taylor, Tracie Barber, *University of New South Wales, Sydney, NSW, Australia*

8:07am Simultaneous Tracking of Vocal Fold Superior Surface Motion and Glottal Jet Dynamics**Technical Paper Publication.** IMECE2013-64574

Joseph Nielson, David Daily, Tadd T. Truscott, *Brigham Young University, Provo, UT, United States*, Georg Luegmair, Michael D'Iltinger, *University Hospital Erlangen, Medical School, Erlangen, Germany*, Scott Thomson, *Brigham Young University, Springville, UT, United States*

8:18am Mechanotransduction in Corneal Epithelial Cells**Technical Paper Publication.** IMECE2013-65406

Sara Molladavoodi, John Medley, Maud B. Gorbet, H.J. Kwon, *University of Waterloo, Waterloo, ON, Canada*

8:29am Effects of Surface Roughness on Flows Through Nano/Micro Channel Based Biomedical Devices—A Study by Lattice Boltzmann Method**Technical Presentation.** IMECE2013-65814

Mohammed Mayeed, *Southern Polytechnic State University, Marietta, GA, United States*

8:40am Solvent Penetration Rate in Tablets: Measurement and Inertial Effects on Macro and Micro Scales**Technical Presentation.** IMECE2013-66288

Yuriy Gulak, Alberto Cuitino, Daniel Braido, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*

8:51am Poly-Disperse Droplet Evaporation Model Comparison With Experimental Results**Extended Abstract Publication.** IMECE2013-65347

Michael D. Protheroe, Ahmed M. Al-Jumaily, Roy J. Nates, *Auckland University of Technology, Auckland, Auckland, New Zealand*

TRACK 3 BIOMEDICAL AND BIOTECHNOLOGY ENGINEERING / THURSDAY, NOVEMBER 21

9:02am Motility of Keratinocytes Under the Non-Contact Application of Electric Fields

Technical Presentation. IMECE2013-65144

Emily Sequin, Joseph West, *Ohio State University, Columbus, OH, United States*, Vish Subramaniam, *Ohio State University, Westerville, OH, United States*

3-9 COMPUTATIONAL MODELING AND DEVICE DESIGN

3-9-5 Computational Modeling & Device Design V

2nd Floor, Manchester Grand Hyatt, Edward B 7:45am–9:15am

Session Organizer: **Mohammad Poursina**, *University of Arizona, Tucson, AZ, United States*

Session Co-Organizer: **Thenkurussi Kesavadas**, *University at Buffalo, Amherst, NY, United States*

7:45am Design of a Counterweight Walker Active Therapeutic Movement Rehabilitation Rig

Technical Paper Publication. IMECE2013-63647

Israel Aguilera Navarrete, *National Polytechnic Institute, Villagr-n, Guanajuato, Mexico*, Alejandro Alfredo Lozano-Guzman, *National Polytechnic Institute, Queretaro, Mexico*

8:03am Modeling and Stability Analysis of Truncated High Density Lipoprotein (HDL) System Using Martini Coarse Grain Technique

Technical Paper Publication. IMECE2013-64808

Behzad Damirchi, Salman Sohrabi, Seyyed Mahdi Nemati Mehr, *Sharif University of Technology, Tehran, Tehran, Iran*, Amir Rouhollahi, *Iran University of Science and Technology, Tehran, Tehran, Iran*

8:21am Methodology for Haptic Modeling of Trocar Insertion Procedure

Technical Presentation. IMECE2013-65013

Yong Won Seo, Anand Abraham, *University at Buffalo, Buffalo, NY, United States*, Ashirwad Chowriappa, *Khurshid Guru, Roswell Park Cancer Institute, Buffalo, NY, United States*, Thenkurussi Kesavadas, *University at Buffalo, Amherst, NY, United States*

8:39am Framework for Management of Internet Objects in Their Relation With Human Sensations and Emotions

Technical Paper Publication. IMECE2013-65227

Fernando Luis-Ferreira, Catarina Lucena, João Sarraipa, Ricardo Goncalves, *UNINOVA, Caparica, Portugal*

8:57am Mechanical Characterization of the Decellularized Porcine Small Intestinal Submucosa Extracellular Matrix

Technical Paper Publication. IMECE2013-65640

Shijia Zhao, Linxia Gu, *University of Nebraska–Lincoln, Lincoln, NE, United States*, Haili Lang, James M. Hammel, *University of Nebraska Medical Center, Omaha, NE, United States*

3-2 BIOMECHANICS OF TRAUMA DUE TO ACCIDENTS, SURGERY, OR WEAPONS

3-2-4 Injuries Due to Blast, Blunt, and Ballistic Impact—2

2nd Floor, Manchester Grand Hyatt, Edward A 9:30am–11:15am

Session Organizer: **Siddiq Qidwai**, *U.S. Naval Research Laboratory, Washington, DC, United States*

Session Chair: **Nithyanand Kota**, *SAIC, WA, United States*

Session Co-Chair: **Mark Rapo**, *L-3 Applied Technologies, Inc., San Diego, CA, United States*

9:30am Cerebral Blood Pressure Rise During Blast Exposure in a Rat Model of Blast-Induced Traumatic Brain Injury

Technical Paper Publication. IMECE2013-64992

Soroush Assari, Kaveh Laksari, Mary Barbe, Kurosh Darvish, *Temple University, Philadelphia, PA, United States*

9:51am Incorporating Blast Lung Injury Into Physical Performance Predictions in Sheep

Technical Presentation. IMECE2013-63683

Melissa Gibbons, David Shelley, Bryant Sih, Laurel Ng, Philemon Chan, *L-3/Jaycor, San Diego, CA, United States*

10:12am Factors Contributing to Spiral Humerus Fracture During Muscle-Up Exercise

Technical Paper Publication. IMECE2013-62643

Megan Matal, Fred Barez, John Lee, *San Jose State University, San Jose, CA, United States*, David Wagner, *VA Hospital, Palo Alto, CA, United States*

10:33am In Vivo Knee Joint Biomechanics Following Anterior Cruciate Ligament Rupture

Technical Paper Publication. IMECE2013-65278

Mohammad Atarod, Cyril Frank, Nigel Shrive, *University of Calgary, Calgary, AB, Canada*

10:54am Damage Development of the Medial Collateral Ligament Under Dynamic Loading

Extended Abstract Presentation. IMECE2013-63022

Benjamin Claus, Weinong W. Chen, *Purdue University, West Lafayette, IN, United States*, Kamel Fezzaa, *Advanced Photon Source, Argonne, IL, United States*, Sheng N. Luo, *The Peac Institute of Multiscale Sciences, Chengdu, Sichuan, China*

3-7 CLINICAL APPLICATIONS OF BIOENGINEERING**3-7-4 Clinical Applications of Bioengineering IV****2nd Floor, Manchester Grand Hyatt, Edward D 9:30am–11:15am**Session Organizer: **Thomas James**, *Tufts University, Medford, MA, United States*Session Co-Organizer: **Karen C. Yan**, *The College of New Jersey, Ewing, NJ, United States***9:30am PIV Analysis of the Flow Pattern Around an Ablation Catheter to Observe the Flow Effect on the Electrode****Technical Paper Publication.** IMECE2013-62791Kaihong Yu, Makoto Ohta, *Tohoku University, Sendai, Japan*,
Tetsui Yamashita, *JMS Co., Ltd., Tokyo, Japan*, Shigeaki
Shingyochi, *NIDEC Copal Electronics Corporation, Sano, Japan*,
Kazuo Matsumoto, *Saitama Medical University, Tokyo, Japan***9:45am Development of Force-Feedback Technology for Training Clinicians to Deliver Manual Cervical Distraction****Technical Paper Publication.** IMECE2013-64509Maruti Gudavalli, Vikas Yadav, Robert Vining, Michael
Seidman, Stacie Salsbury, Paige Morgenthal, Christine
Goertz, *Palmer Center for Chiropractic Research, Davenport, IA, United States*,
Avinash Patwardhan, *Loyola University Stritch School of Medicine, Maywood, IL, United States***10:00am Patient-Specific Aneurysm Rupture Prediction Using CFD Modeling With Strain Energy Function****Extended Abstract Publication.** IMECE2013-63859Abd Halim Embong, Ahmed Al-Jumaily, Andrew Lowe, *Auckland University of Technology, Auckland, New Zealand*, Giri
Mahadevan, *Department of General Surgery, Counties Manukau District Health Board, Auckland, New Zealand*, Shukei
Sugita, *Center for Fostering Young and Innovative Researchers, Nagoya Institute of Technology, Nagoya, Japan***10:15am The Classification of Blood Flow in Cerebral Aneurysm Considering the Parent Artery Curves****Technical Paper Publication.** IMECE2013-63922Toshio Nakayama, Makoto Ohta, Shin-ichiro Sugiyama, *Tohoku University, Sendai, Miyagi, Japan***10:30am Computational Fluid Dynamics Analysis of Pressure Drop Alteration in the Trachea Before and After Vascular Ring Surgery****Extended Abstract Publication.** IMECE2013-63933Tzu-Ching Shih, *China Medical University, Taichung, Taiwan*,
Tzyy-Leng Horng, *Feng Chia University, Taichung, Taiwan*, Fong-Lin
Chen, *Chung Shang Medical University, Taichung, Taiwan***10:45am Development of a Virtual Coil Model for Blood Flow Simulation in Coil-Embolized Aneurysms****Technical Paper Publication.** IMECE2013-64435Tomohiro Otani, Satoshi Ii, Shigeo Wada, *Osaka University, Toyonaka, Osaka, Japan*,
Toshiyuki Fujinaka, Masayuki Hirata, Junko Kuroda, *Katsuhiko Shibano, Osaka University, Suita, Japan***11:00am Significance of Kinetotherapy in Rehabilitation Treatment of Osteoporosis****Technical Paper Publication.** IMECE2013-64784Petru Pop, Liviu Lazar, Florin M. Marcu, *University of Oradea, Oradea, Romania***3-9 COMPUTATIONAL MODELING AND DEVICE DESIGN****3-9-6 Computational Modeling & Device Design VI****2nd Floor, Manchester Grand Hyatt, Edward B 9:30am–11:15am**Session Organizer: **Qingang Xiong**, *Iowa State University, Ames, IA, United States***9:30am Computational Modeling of Human Skin With Laser Influence****Technical Paper Publication.** IMECE2013-62029Zhen Huang, Pu Wang, Liang Sun, *Shanghai Jiao Tong University, Shanghai, Shanghai, China***9:47am Uncovering the Mechanisms of Soft Tissue Injuries Associated With ACL Tear****Extended Abstract Publication.** IMECE2013-62505Alexander Orsi, *Northeastern University, Roxbury Crossing, MA, United States*,
Ashkan Vaziri, Srinath Chakravarthy, Haimd Nayeb Hashemi, *Northeastern University, Boston, MA, United States*,
Paul K. Canavan, *Windham Hospital, Storrs, CT, United States*,
Ruben Goebel, *Qatar University, Doha, Qatar***10:04am Detection of Subsurface Skin Lesion Using Frequency Modulated Thermal Wave Imaging: A Numerical Study****Technical Paper Publication.** IMECE2013-64200Arka Bhowmik, Ramjee Repaka, Ravibabu Mulaveesala, *Indian Institute of Technology Ropar, Rupnagar, Punjab, India*,
Subhash Chandra Mishra, *Indian Institute of Technology Guwahati, Guwahati, Assam, Assam, India***10:21am A New Method for the Estimation of Total Arterial Compliance From Aortic Pulse Wave Velocity****Plenary Presentation.** IMECE2013-62271Orestis Vardoulis, Theodore Papaioannou, Nikos Stergiopoulos, *EPFL, Lausanne, Vaud, Switzerland***10:38am Predicting the Treatment Response of Oral Appliances for Obstructive Sleep Apnea Using Computational Fluid Dynamic and Fluid-Structure Interaction Simulations****Technical Paper Publication.** IMECE2013-62904Moyin Zhao, Tracie Barber, *University of New South Wales, Sydney, NSW, Australia*,
Peter Cistulli, *University of Sydney, Sydney, NSW, Australia*,
Kate Sutherland, *Royal Northshore Hospital, St Leonards, NSW, Australia*,
Gary Rosengarten, *RMIT University, Carlton, Australia***10:55am Mechanical Properties of a Photopolymerizable Hydrogel for Intervertebral Disc Replacement****Technical Paper Publication.** IMECE2013-65736Andreas Schmocker, Azadeh Khoushabi, Pierre-Etienne Bourban, Christophe Moser, *EPFL, Lausanne, Switzerland*,
Dominique Pioletti, *Laboratory of Biomechanical Orthopedics/EPFL, Lausanne, Switzerland*,
Jan-Anders Manson, *EPFL STI IMX LTC (Laboratory of Composite and Polymer Technology), Lausanne, Switzerland*

TRACK 3 BIOMEDICAL AND BIOTECHNOLOGY ENGINEERING / THURSDAY, NOVEMBER 21

3-12 DYNAMICS AND CONTROL IN BIOMECHANICAL SYSTEMS

3-12-1 Dynamics and Control in Biomechanical Systems I

2nd Floor, Manchester Grand Hyatt, Edward C 9:30am–11:15am

Session Organizer: **Dumitru I. Caruntu**, *University of Texas Pan American, Edinburg, TX, United States*

Session Co-Organizers: **Bogdan I. Epureanu**, *University of Michigan, Ann Arbor, MI, United States*, **Louis A. DiBerardino III**, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

9:30am Nonlinear Dynamics of Ligament Deficient Knees in Proximal-Distal Tibial Oscillatory Motion

Technical Paper Publication. IMECE2013-64078
Dumitru I. Caruntu, Eduardo Granados, Thania Martinez, *University of Texas Pan American, Edinburg, TX, United States*

9:47am A Study on Roles of Lower Extremities During Movement From Sitting to Standing Up: A Simulation Model

Technical Paper Publication. IMECE2013-64222
Athena Jalalian, Soheil Arastehfar, Ian Gibson, Eng Hock Tay, *National University of Singapore, Singapore, Singapore*

10:04am Analytical Model for Estimating Knee Loads During Ladder Climbing

Technical Paper Publication. IMECE2013-65848
Robert Giachetti, Kari Danek, *Exponent Inc., Chicago, IL, United States*

10:21am Modeling Control Adaptations During Recovery From Anterior Cruciate Ligament Reconstruction

Extended Abstract Publication. IMECE2013-66071
Louis A. DiBerardino III, Harry Dankowicz, Elizabeth Hsiao-Wecksler, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

10:38am Frequency Response of Ligament Deficient Knees in Anterior-Posterior Drawer Test

Technical Paper Publication. IMECE2013-66111
Dumitru I. Caruntu, Thania Martinez, Eduardo Granados, *University of Texas Pan American, Edinburg, TX, United States*

10:55am The Protein-Driven Ciliary Motility in Embryonic Nodes: A Computational Model of Ciliary Ultrastructure

Technical Paper Publication. IMECE2013-62460
Duanduan Chen, Jun Ren, *Beijing Institute of Technology, Beijing, Beijing, China*, Kyosuke Shinohara, Hiroshi Hamada, *Osaka University, Osaka, Osaka, Japan*

3-12-4 Dynamics and Control in Biomechanical Systems IV

3rd Floor, Manchester Grand Hyatt, Emma B 9:30am–11:15am

Session Organizer: **Dumitru I. Caruntu**, *University of Texas Pan American, Edinburg, TX, United States*

Session Co-Organizers: **Timothy Doughty**, *University of Portland, Portland, OR, United States*, **Ryan McGinnis**, *University of Michigan, Ann Arbor, MI, United States*

9:30am Benchmarking the Accuracy of Inertial Measurement Units for Estimating Joint Reactions

Technical Paper Publication. IMECE2013-63300
Ryan McGinnis, Jessandra Hough, Noel Perkins, *University of Michigan, Ann Arbor, MI, United States*

9:51am Modeling Wheelchair Users Undergoing Vibrations

Technical Paper Publication. IMECE2013-64024
Korkut Brown, Henryk Flashner, Jill L. McNitt-Gray, *University of Southern California, Los Angeles, CA, United States*, Philip Requejo, *Rancho Los Amigos National Rehabilitation Center, Downey, CA, United States*

10:12am Kinematic Modeling and Kinesiology Study of a Human Index Finger Based on a Tendon-Driven Articulated Manipulator With Disc-Cam Pulleys

Technical Paper Publication. IMECE2013-64204
Win-Bin Shieh, Jian-Sheng Lin, *Ming Chi University of Technology, New Taipei, Taiwan*

10:33am Characterizing the Suitability of Wearable Sensors for Movement Analysis Using a Programmed Robotic Motion

Technical Paper Publication. IMECE2013-65064
Amanda L. Martori, Stephanie L. Carey, Redwan Alqasemi, Daniel Ashley, Rajiv V. Dubey, *University of South Florida, Tampa, FL, United States*

10:54am Reducing Parkinsonian Hand Tremor With a Novel Dynamic Eating Utensil

Technical Paper Publication. IMECE2013-65282
Timothy Doughty, Melissa Ishii, *University of Portland, Portland, OR, United States*, Jordan Heintz, *University of Portland, Maple Valley, WA, United States*

3-2 BIOMECHANICS OF TRAUMA DUE TO ACCIDENTS, SURGERY, OR WEAPONS

3-2-5 Experimental Analysis and Computational Modeling of Injuries

2nd Floor, Manchester Grand Hyatt, Edward A 1:00pm–2:45pm

Session Organizer: **Karim Muci-Kuchler**, *South Dakota School of Mines and Technology, Rapid City, SD, United States*

Session Chair: **Xiangguang Tan**

Session Co-Chair: **Amit Bagchi**, *U.S. Naval Research Laboratory, Washington, DC, United States*

1:00pm Experimental and Numerical Investigation of Airflow Into Surrogate Ballistic Wounds

Technical Paper Publication. IMECE2013-64738

Brandon Hinz, Karim Muci-Kuchler, *South Dakota School of Mines and Technology, Rapid City, SD, United States*

1:17pm Distribution of Bacteria in Simplified Surrogate Extremities Shot With Small Caliber Projectiles

Technical Paper Publication. IMECE2013-64803

Brandon Hinz, Karim Muci-Kuchler, *South Dakota School of Mines and Technology, Rapid City, SD, United States*, Pauline Smith, *U.S. Army Research Laboratory, Aberdeen Proving Ground, MD, United States*

1:34pm Blast Overpressure Measured on a Bare vs. Helmeted Rigid Headform

Technical Paper Publication. IMECE2013-63260

Tim Baumer, Brian Powell, *L-3 Communications, San Diego, CA, United States*, Mark Rapo, Jessica Wong, *L-3 Applied Technologies, Inc., San Diego, CA, United States*, Brett Juhas, Philemon Chan, *L-3/Jaycor, San Diego, CA, United States*, James MacKiewicz, *U.S. Naval Health Research Center, Natick, MA, United States*

1:51pm Design Considerations for Compression Gas Driven Shock Tube to Replicate Field Relevant Primary Blast Condition

Technical Paper Publication. IMECE2013-63732

Aravind Sundaramurthy, Namas Chandra, *University of Nebraska–Lincoln, Lincoln, NE, United States*, Raj K. Gupta, *Department of Defence, Blast Injury Research Program Coordinating Office, Fort Detrick, MD, United States*

2:08pm Characteristics of Falling Impact of Head Using a Test Dummy

Technical Paper Publication. IMECE2013-66546

Marzieh Hajiaghamemar, Morteza Seidi, Vincent Caccese, Mohsen Shahinpoor, *University of Maine, Orono, ME, United States*

2:25pm Expanding Helmet Design Methodologies Through Brain Functional Area Representative Threat Models

Technical Paper Publication. IMECE2013-64959

Matthew Ford, *SAIC, Washington, DC, United States*, Peter Matic, Alan Leung, *U.S. Naval Research Laboratory, Washington, DC, United States*

3-9 COMPUTATIONAL MODELING AND DEVICE DESIGN

3-9-7 Computational Modeling & Device Design VII

2nd Floor, Manchester Grand Hyatt, Edward B 1:00pm–2:45pm

Session Organizer: **Haojie Mao**, *Wayne State University, Detroit, MI, United States*

1:00pm On the Trabecular Morphologies and Load Transfer to the Brain

Technical Paper Publication. IMECE2013-65083

Siavash Hashemi, Shahab M. Baghaei, *City College of the City University of New York, New York, NY, United States*, Parisa Saboori, *Manhattan College, Riverdale, NY, United States*, Ali Sadegh, *City University of New York, New York, NY, United States*

1:17pm An Analytical Study of Skull Deformation During Head Impacts

Technical Paper Publication. IMECE2013-65120

Shahab M- Baghaei, *City College of the City University of New York, New York, NY, United States*, Ali Sadegh, *City University of New York, New York, United States*

1:34pm Evaluation of Head Injury Criteria Under Different Impact Loading

Technical Paper Publication. IMECE2013-65125

Parisa Saboori, *Manhattan College, Riverdale, NY, United States*, Shahab M-Baghaei, *City College of the City University of New York, New York, NY, United States*, Ali Sadegh, *City University of New York, New York, NY, United States*

1:51pm Effects of Attached Body on Biomechanical Response of the Helmeted Human Head Under Blast

Technical Paper Publication. IMECE2013-65140

Mehdi Salimi Jazi, Asghar Rezaei, Ghodrattoll Karami, Fardad Azarmi, Mariusz Ziejewski, *North Dakota State University, Fargo, ND, United States*

2:08pm Analyzing Steady-State Visual Evoked Potentials for Effective User Response Detection for Brain-Computer Interfaces

Technical Paper Publication. IMECE2013-65592

Pouria Riyahi, *George Washington University, Washington, DC, United States*, Azim Eskandarian, *George Washington University, Ashburn, VA, United States*

2:25pm Computational Comparison of Shock Wave Propagation in Explosive Blast and Shock Tube Experiments

Technical Paper Publication. IMECE2013-65073

Kaveh Laksari, Soroush Assari, Kurosh Darvish, *Temple University, Philadelphia, PA, United States*

TRACK 3 BIOMEDICAL AND BIOTECHNOLOGY ENGINEERING / THURSDAY, NOVEMBER 21

3-12 DYNAMICS AND CONTROL IN BIOMECHANICAL SYSTEMS

3-12-2 Dynamics and Control in Biomechanical Systems II

2nd Floor, Manchester Grand Hyatt, Edward C 1:00pm–2:45pm

Session Organizer: **Bogdan I. Epureanu**, *University of Michigan, Ann Arbor, MI, United States*

Session Co-Organizers: **Dumitru I. Caruntu**, *University of Texas Pan American, Edinburg, TX, United States*, **Davide Piovesan**, *Northwestern University, Chicago, IL, United States*

1:00pm **Anthropomorphic and Linear Arm Models for Mechanical Power Tool Testing**

Technical Paper Publication. IMECE2013-62696
Marius Stuecheli, Bastian Leutenecker, Mirko Meboldt, *ETH Zurich, Zurich, Switzerland*

1:21pm **Control Mechanisms in Oscillatory Motor Behavior**

Technical Paper Publication. IMECE2013-63233
Davide Piovesan, *Northwestern University, Chicago, IL, United States*, Felix C. Huang, *Rehabilitation institute of Chicago, Chicago, IL, United States*

1:42pm **A Perspective on Tremor and Stooping in Parkinsonism From Feedback Control Theory**

Technical Presentation. IMECE2013-65050
Sachin Goyal, *University of California, Merced, CA, United States*

2:03pm **Implant Localization in the Human Body Using Adaptive Least-Squares-Based Algorithm**

Technical Paper Publication. IMECE2013-66039
Ahmet Camlica, Baris Fidan, Mustafa Yavuz, *University of Waterloo, Waterloo, Canada*

2:24pm **Control of Ultrasound Contrast Agent Microbubbles: PID and Sliding Mode Control**

Technical Paper Publication. IMECE2013-66353
James M. Carroll, Leal K. Lauderbaugh, Michael L. Calvisi, *University of Colorado, Colorado Springs, Colorado Springs, CO, United States*

3-5 NANOMATERIALS FOR BIOMEDICAL APPLICATIONS

3-5-1 Nanomaterials for Biomedical Applications—I

3rd Floor, Manchester Grand Hyatt, Oxford 3:00pm–4:45pm

Session Organizer: **Jenny Qiu**, *Texas Tech University, Lubbock, TX, United States*

Session Co-Organizer: **Wei Xue**, *Washington State University, Vancouver, WA, United States*

3:00pm **Fibroblast Behavior on Electrospun PMMAEA and PMMAEA-Collagen Nanofibers**

Technical Paper Publication. IMECE2013-62980
Wen Hu, Xun Yu, *University of North Texas, Denton, TX, United States*, Jon Holy, *University of Minnesota, Duluth, TX, United States*

3:15pm **A Novel Nanofibrous Scaffold to Improve Wound Healing**

Extended Abstract Publication. IMECE2013-64223
Eva Yi-Wah Mak, Woon-fong Leung, *Hong Kong Polytechnic University, Hong Kong, China*

3:30pm **Evaluation of Electro-Spun Tubular Scaffolds to Create an Anastomosis Using the CAM Assay**

Technical Paper Publication. IMECE2013-64687
Adam Orendain, Jose Francisco Carrasco, Eniko Enikov, *University of Arizona, Tucson, AZ, United States*, Gholam Peyman, *Arizona Retinal Specialists, Sun City, AZ, United States*

3:45pm **An Electrospun Polyaniline Nanofiber as a Novel Platform for Real-Time COX-2 Biomarker Detection**

Technical Paper Publication. IMECE2013-65269
Ramazan Asmatulu, Anil Mahapatro, Zeinab Veisi, Muhammet Ceylan, *Wichita State University, Wichita, KS, United States*

4:00pm **Osteogenic Potential of PLLA Scaffolds Loaded With Fresh and Cryopreserved Adult Stem Cells**

Technical Presentation. IMECE2013-64287
Harish Chinnasami, Dan Hayes, Jeff Gimble, Ram Devireddy, *Louisiana State University, Baton Rouge, LA, United States*

4:15pm **Development of Biomimetic and Bioactive 3D Nanocomposite Scaffolds for Osteochondral Regeneration**

Technical Paper Publication. IMECE2013-66107
Nathan J. Castro, Christopher O'Brien, Lijie G. Zhang, *George Washington University, Washington, DC, United States*

4:30pm **Simulation of 3-D Core-Shell Hydrogel Swelling Behavior for Controlled Drug Deliver**

Technical Paper Publication. IMECE2013-65070
Jilong Wang, Jenny Qiu, Shiren Wang, *Texas Tech University, Lubbock, TX, United States*

3-9 COMPUTATIONAL MODELING AND DEVICE DESIGN**3-9-8 Computational Modeling & Device Design VIII****2nd Floor, Manchester Grand Hyatt, Edward A 3:00pm–4:45pm**Session Organizer: **Linxia Gu**, *University of Nebraska–Lincoln, Lincoln, NE, United States*Session Chair: **Shijia Zhao**, *University of Nebraska–Lincoln, Lincoln, NE, United States***3:00pm Ergometers Can Now Biomechanically Replicate Straight-Line Floor Wheelchair Propulsion: Two Models are Presented****Technical Paper Publication.** IMECE2013-62327
Zohreh Salimi, Martin W. Ferguson-Pell, *University of Alberta, Edmonton, Canada***3:17pm The Molecular Dynamics Study for Detection of ssDNA by Monolayer Graphene Nanopore****Technical Paper Publication.** IMECE2013-62384
Wei Si, Jingjie Sha, Lei Liu, Yin Zhang, Yunfei Chen, *Southeast University, Nanjing, Jiangsu, China***3:34pm Use of Shock Tubes for Blast Testing****Technical Paper Publication.** IMECE2013-63027
Chong Whang, Warren Chilton, *L-3 Applied Technologies, Inc., San Diego, CA, United States*, Philemon Chan, *L-3/Jaycor, San Diego, CA, United States***3:51pm Development of a Noninvasive Calibration Method for Ocular Tactile Tonometry****Technical Paper Publication.** IMECE2013-63380
Eniko Enikov, Peter Polyvas, *University of Arizona, Tucson, AZ, United States***4:08pm Multiscale Spatial-Temporal Modeling of 18F-FLT Dynamics and Its Relation to 3-Compartment Model****Technical Paper Publication.** IMECE2013-63507
Dan Liu, John D. Fenwick, *University of Oxford, Oxford, United Kingdom*, Anastasia Chalkidou, Paul Marsden, *Kings College London, London, United Kingdom***4:25pm Semi-Rigid Helmet Rotation Measurement Using Linear Accelerometers****Technical Paper Publication.** IMECE2013-64677
Brett Juhas, *L3 Communications - Jaycor, San Diego, CA, United States*, Jessica Wong, Nicole J. Boroumand, Paul Rigby, *L-3 Applied Technologies, Inc., San Diego, CA, United States***3-12 DYNAMICS AND CONTROL IN BIOMECHANICAL SYSTEMS****3-12-3 Dynamics and Control in Biomechanical Systems III****2nd Floor, Manchester Grand Hyatt, Edward C 3:00pm–4:45pm**Session Organizer: **Dumitru I. Caruntu**, *University of Texas Pan American, Edinburg, TX, United States*Session Co-Organizers: **Bogdan I. Epureanu**, **Jessandra Hough**, *University of Michigan, Ann Arbor, MI, United States***3:00pm Benchmarking the Accuracy of Inertial Measurement Units for Estimating Kinetic Energy****Technical Paper Publication.** IMECE2013-63303
Jessandra Hough, Ryan McGinnis, Noel Perkins, *University of Michigan, Ann Arbor, MI, United States***3:21pm 2D Phase-Field Analyses of Axonal Extension of Nerve Cell****Technical Paper Publication.** IMECE2013-64281
Kazuya Nakagawa, Yusuke Morita, Eiji Nakamachi, *Doshisha University, Kyotanabe, Kyoto, Japan*, Tomohiro Takaki, *Kyoto Institute of Technology, Kyoto, Japan***3:42pm Multiphysics Analyses of Articular Cartilage and Subchondral Bone by Using Micro-CT and MPM Measurement-Based Model****Technical Paper Publication.** IMECE2013-64289
Koushi Fukatani, Ryo Mizuta, Yusuke Morita, Eiji Nakamachi, *Doshisha University, Kyotanabe, Kyoto, Japan*, Hidetoshi Sakamoto, *Kumamoto University, Kumamoto, Kumamoto, Japan***4:03pm Transfer Function Relating Tibial Acceleration to Leg Muscle SEMG During Walking****Technical Presentation.** IMECE2013-64068
Edric John Nacpil, George Youssef, *California State University, Northridge, Northridge, CA, United States***4:24pm The Effect of Arm Position as a Comparison Between Gender During Single-Leg Landings****Extended Abstract Publication.** IMECE2013-65609
Chi-yin Tse, *Northeastern University, Somerville, MA, United States*, Haimd Nayeb Hashemi, Ashkan Vaziri, *Northeastern University, Boston, MA, United States*, Paul K. Canavan, *Windham Hospital, Storrs, CT, United States*, Ruben Goebel, *Qatar University, Doha, Qatar*



TRACK 3 BIOMEDICAL AND BIOTECHNOLOGY ENGINEERING / THURSDAY, NOVEMBER 21



DYNAMICS, VIBRATION, AND CONTROL**WEDNESDAY, NOVEMBER 20****4-12 NONLINEAR DYNAMICS, CONTROL, AND STOCHASTIC MECHANICS****4-12-4 Nonlinear Dynamics, Control, and Stochastic Mechanics IV****3rd Floor, Manchester Grand Hyatt, Ford A 1:00pm–2:45pm**Session Organizer: **Dumitru I. Caruntu**, *University of Texas Pan American, Edinburg, TX, United States*Session Co-Organizer: **Albert Luo**, *Southern Illinois University Edwardsville, Edwardsville, IL, United States***1:00pm Multiobjective Optimization With the Simple Cell Mapping Method****Plenary Presentation.** IMECE2013-66866Jian-Qiao Sun, *University of California, Merced, Merced, CA, United States***4-15 FLUID-STRUCTURE COUPLING AND DYNAMICS OF ROTATING MACHINERY****4-15-1 Rotor Dynamics—I****3rd Floor, Manchester Grand Hyatt, Ford B 1:00pm–2:45pm**Session Organizer: **Marco Amabili**, *McGill University, Montreal, Canada*Session Co-Organizer: **Oleg Shiryayev**, *The Petroleum Institute, Abu Dhabi, United Arab Emir***1:00pm Research of Balance Method Without Trial Mass Based on Lag Phase****Technical Paper Publication.** IMECE2013-62853Danmei Xie, Yang Yi, Xiong Yangheng, Zhang Hengliang, Yu Yanzhi, *Wuhan University, Wuhan, China*, Liu Zhanhui, *Henan Electric Power Research Institute, Zhengzhou, Henan, China***1:17pm Scaling Effect on Dynamic Impact Response of Structures in Fluid Fields****Technical Paper Publication.** IMECE2013-62931Zhongheng Guo, Lingyu Sun, Han Li, Yi Cheng, *Beihang University, Beijing, Beijing, China*, Taikun Wang, Junmin Du, *The 713 Institute of China Shipbuilding Industry Corporation, Zhengzhou, Henan Province, China***1:34pm Nonlinear Planar Dynamics of Fluid-Conveying Cantilevered Extensible Pipes****Technical Paper Publication.** IMECE2013-65785Mergen H. Ghayesh, Michael Paidoussis, Marco Amabili, *McGill University, Montreal, QC, Canada***1:51pm Implementation of a Nonlinear Torsional Vibration Absorber for Suppression of Vibrations in Rotating Machinery****Technical Paper Publication.** IMECE2013-63497Ammaar Bin Tahir, Oleg Shiryayev, Nader Vahdati, Hamid Karki, *The Petroleum Institute, Abu Dhabi, United Arab Emir***2:08pm Identification of Dynamics of Surface Suction Over an Airfoil at Low Reynolds Numbers****Technical Paper Publication.** IMECE2013-63527Jasvipul Chawla, Shashikanth Suryanarayanan, *IIT Bombay, Mumbai, Maharashtra, India*, John Sheridan, *Monash University, Monash, Australia*, Brian G. Falzon, *Queens University Belfast, Belfast, Northern Ireland, United Kingdom***2:25pm Effect of Flexible Damped Bearing-Supports on the Dynamic Stability of High-Speed Turbochargers****Technical Paper Publication.** IMECE2013-64539Ali Alsaeed, Salem Bashmal, *King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia*, Gordon Kirk, *Virginia Polytechnic Institute, Blacksburg, VA, United States***4-18 DYNAMICS OF STRUCTURES WITH CONTACT AND/OR FRICTIONAL INTERFACES****4-18-1 Mechanical and Structural Design****3rd Floor, Manchester Grand Hyatt, Ford C 1:00pm–2:45pm**Session Organizer: **Hong Zhou**, *Texas A&M University–Kingsville, Kingsville, TX, United States*Session Co-Organizer: **Peiman Naseradinmousavi**, *Indiana State University, Chicago, IL, United States***1:00pm A New Method to Study the Joint Surfaces With Large Areas and Its Application in Machine Tools****Technical Paper Publication.** IMECE2013-62419Anan Zhou, Xiaopeng Wang, Tianning Chen, *Xi'an Jiaotong University, Xi'an, Shaanxi, China***1:17pm Bending Stiffness and Dynamic Characteristics of a Rotor With Spline Joints****Technical Paper Publication.** IMECE2013-62657Fayong Wu, *Shenyang Aeroengine Research Institute, Shenyang, China*, Zhichao Liang, Yanhong Ma, Zhang Dayi, *Beihang University, Beijing, China***1:34pm Computational Study of Lateral Impact Behavior of Pressurized Pipelines****Technical Paper Publication.** IMECE2013-62971Yangqing Dou, Yucheng Liu, *University of Louisiana at Lafayette, Lafayette, LA, United States***1:51pm Nonlinear Reduced-Order Models for the Structural Dynamics of Combustor Systems With Pre-Stress and Friction****Technical Paper Publication.** IMECE2013-64740Chulwoo Jung, Bogdan I. Epureanu, *University of Michigan, Ann Arbor, MI, United States*, Sanghum Baik, *GE Global Research Center, Niskayuna, NY, United States*, Marcus Huffman, *GE Power and Water, Greenville, SC, United States***2:08pm Spectral Domain Based Impact Force Identification for Rod Structures****Technical Paper Publication.** IMECE2013-64892Pooya Ghaderi, Steven Rich, Andrew Dick, *Rice University, Houston, TX, United States***2:25pm Elastic-Plastic Contact Modeling for Oblique, Frictional Impacts****Technical Presentation.** IMECE2013-62963Mathew Brake, *Sandia National Laboratories, Albuquerque, NM, United States*

TRACK 4 DYNAMICS, VIBRATION, AND CONTROL / WEDNESDAY, NOVEMBER 20**4-10 RENEWABLE ENERGY, STRUCTURAL HEALTH MONITORING, AND DISTRIBUTED STRUCTURAL SYSTEMS****4-10-3 Structural Health Monitoring****3rd Floor, Manchester Grand Hyatt, Ford C 3:00pm–4:45pm**Session Organizer: **Weidong Zhu**, *University of Maryland, Baltimore County, Baltimore, MD, United States*Session Co-Organizer: **Qiang Miao**, *University of Electronic Science and Technology of China, Chengdu, Sichuan, China***3:00pm Use of Forward Dynamics Model for Designing Large-Size Wind Turbine Blades****Technical Paper Publication.** IMECE2013-64309Ahmed H. Bayoumy, *PGESCO, Cairo, New Cairo, Cairo/Egypt, Egypt*, Ayman A. Nada, *Jazan University, Jazan, Jazan, Saudi Arabia*, Said M. Megahed, *Cairo University, Giza, Cairo/Egypt, Egypt***3:17pm Study of Horizontal Axis Wind Turbine Blade in Virtual Wind Tunnel Simulator****Technical Paper Publication.** IMECE2013-64440Radostina Petrova, *Technical University of Sofia, Sliven, Sliven, Bulgaria*, Hirpa G. Lemu, *University of Stavanger, Stavanger, Rogaland, Norway*, Ioan Larion, *Stavanger Offshore Technical College, Stavanger, Rogaland, Norway***3:34pm Crack Identification in Beam Structures Using Homotopy Iteration Algorithm****Technical Paper Publication.** IMECE2013-62382L. Huang, M. Huang, Z.R. Lu, *Sun Yat-sen University, Guangzhou, China***3:51pm Identifying Magnitudes and Locations of Loads on Slender Beams With Welded and Bolted Joints Using a Strain Gage Based Force Transducer With Application to a Portable Army Bridge****Technical Paper Publication.** IMECE2013-63694Edward Bednarz, *Tobyhanna Army Depot, Tobyhanna, PA, United States*, Weidong Zhu, *University of Maryland, Baltimore County, Baltimore, MD, United States***4:08pm Lithium-Ion Battery Cell Health Monitoring Using Vibration Diagnostic Test****Technical Paper Publication.** IMECE2013-63962Huan Pham, Douglas E. Adams, J. Eric Dietz, Nathan D. Sharp, *Purdue University, West Lafayette, IN, United States***4:25pm Structural Health Monitoring of Composite Wind Turbine Blades Using Diffuse Ultrasonic Fields****Technical Paper Publication.** IMECE2013-65044Jeff Tippmann, *University of California, San Diego, Del Mar, CA, United States*, Francesco Lanza Di Scalea, *University of California, San Diego, La Jolla, CA, United States***4-13 GENERAL TOPICS****4-13-1 General Dynamics Topics****3rd Floor, Manchester Grand Hyatt, Ford A 3:00pm–4:45pm**Session Organizer: **Annie Tangpong**, *North Dakota State University, Fargo, ND, United States*Session Co-Organizer: **Mathew Brake**, *Sandia National Laboratories, Albuquerque, NM, United States***3:00pm Control of Friction-Induced Instability in Simultaneous Time-Frequency Domain****Technical Paper Publication.** IMECE2013-65382Meng-Kun Liu, Steve Suh, *Texas A&M University, College Station, TX, United States***3:17pm Guided Wave Propagation in Tubular Section With Multilayered Viscoelastic Coating Part II: Circumferential Waves****Technical Paper Publication.** IMECE2013-65390Chi-Wei Kuo, Steve Suh, *Texas A&M University, College Station, TX, United States***3:34pm Nonlinear Free Vibration Analysis of Axisymmetric Polar Orthotropic Circular Membranes****Technical Presentation.** IMECE2013-62857Zhoulian Zheng, Jianjun Guo, Xiaoting He, Faming Lu, Chuanxi Xie, *Chongqing University, Chongqing, China***3:51pm Multiple Fault Detection and Diagnosis in a Gas Turbine Using Nonlinear Principal Component Analysis and Structured Residuals****Technical Paper Publication.** IMECE2013-62933Amilcar A. Rincon-Charris, *Inter American University of Puerto Rico, Bayamon, Puerto Rico*, Joseba Quevedo-Casin, *Universitat Politecnica de Catalunya, Terrassa, Spain***4:08pm Fatigue Damage Diagnosis using Statistical, Spectral, and Wavelet Analysis Techniques****Technical Paper Publication.** IMECE2013-66518Issam Mahfouz, Amit Banerjee, Ma'moun Abu-Ayyad, *Penn State Harrisburg, Middletown, PA, United States***4:25pm Vulnerability, Uncertainty and Probability Quantification of a Network of Interacting Satellites Using Stochastic Petri Nets****Technical Paper Publication.** IMECE2013-64774Atefeh Einafshar, Farrokh Sassani, *University of British Columbia, Vancouver, BC, Canada***4:30pm Computation of the Virtual Masses of an Unconventional Flexible Airship****Technical Presentation.** IMECE2013-62698Said Chaabani, Naoufel Azouz, Jean Lerbet, *University of Evry, Azgal Abichou, Polytechnic School of Tunis*

4-15 FLUID-STRUCTURE COUPLING AND DYNAMICS OF ROTATING MACHINERY

4-15-2 Rotor Dynamics—II

3rd Floor, Manchester Grand Hyatt, Ford B 3:00pm–4:45pm

Session Organizer: **Yuefang Wang**, *Dalian University of Technology, Dalian, China*

Session Co-Chair: **Guillaume Altmeyer**, *Insa-Lyon, Villeurbanne, France*

3:00pm **Transient Dynamical Analysis of a Dual-Rotor System Excited by a Sudden Loss of Mass of Blade**

Technical Paper Publication. IMECE2013-63548

Jin Huang, Yuefang Wang, *Dalian University of Technology, Dalian, China*

3:21pm **Stability Analysis of a Complex Geared Rotor-Bearing System in a Turbine Reduction Gearbox**

Technical Paper Publication. IMECE2013-63675

Yuanhong Guan, *Caterpillar Inc., East Peoria, IL, United States*, Edward W. Sieveking, Varad Sampathkumar, *Solar Turbines, San Diego, CA, United States*

3:42pm **Streamline Analysis Method to Determine Force Loading on Axial Compressor Blades**

Technical Paper Publication. IMECE2013-63741

Ami Patel, Robert Ribando, Alexandrina Untaroiu, *University of Virginia, Charlottesville, VA, United States*

4:03pm **Time Transient Analysis of Horizontal Rigid Rotor Supported With O-Ring Sealed Squeeze Film Damper**

Technical Paper Publication. IMECE2013-63907

Saeid Dousti, Timothy Dimond, Paul Allaire, Houston G. Wood, *University of Virginia, Charlottesville, VA, United States*

4:24pm **Application of Arlequin Framework for the Numerical Simulation of Rotating Machinery**

Extended Abstract Publication. IMECE2013-64695

Guillaume Altmeyer, *Insa-Lyon, Villeurbanne, France*, Thouraya Nouri-Baranger, *Université Lyon 1, Villeurbanne, France*, Mohamed Torkhani, *EDF, Clamart, France*

4-2 CONTROLS THEORY AND APPLICATION

4-2-3 Controls Theory and Application—III

3rd Floor, Manchester Grand Hyatt, Ford C 5:00pm–6:45pm

5:00pm **Implementation and Testing of Adaptive Augmentation Techniques on the Quanser 2-DOF Helicopter**

Technical Paper Publication. IMECE2013-65237

Pavan Nuthi, Kamesh Subbarao, *University of Texas at Arlington, Arlington, TX, United States*

5:17pm **Stochastic and Deterministic Vibration Analysis on Drill-String With Finite Element Method**

Technical Paper Publication. IMECE2013-62563

Hongyuan Qiu, *Memorial University, St. John's, NF, Canada*, Jianming Yang, *Memorial University of Newfoundland, St. John's, NF, Canada*

5:34pm **A Discrete-Time Model for Lotka-Volterra Equations With Preserved Stability of Equilibria**

Technical Paper Publication. IMECE2013-63049

Triet Nguyen-Van, Noriyuki Hori, *University of Tsukuba, Tsukuba, Ibaraki, Japan*

5:51pm **Cycling Aerodynamics: The Effect of Rider Position on Aerodynamic Drag**

Technical Paper Publication. IMECE2013-63488

Alexander B. Fulton, Genevieve M. Lipp, Brian P. Mann, *Duke University, Durham, NC, United States*, Jeffrey D. Reid, *Duke University, Chattanooga, TN, United States*

6:08pm **Shape Optimization of Engine Mounts for Enhanced Vibration Isolation**

Technical Paper Publication. IMECE2013-64476

Fadi Alkhatib, Anoop Dhingra, *University of Wisconsin at Milwaukee, Milwaukee, WI, United States*

6:25pm **Performance Evaluation of an MR-Compatible Rotating Anode X-Ray Tube**

Extended Abstract Publication. IMECE2013-66460

Mihye Shin, Waldo Hinshaw, Rebecca Fahrig, *Stanford University, Stanford, CA, United States*, Prasheel Lillaney, *University of California, San Francisco, San Francisco, CA, United States*

4-12 NONLINEAR DYNAMICS, CONTROL, AND STOCHASTIC MECHANICS

4-12-5 Nonlinear Dynamics, Control, and Stochastic Mechanics V

3rd Floor, Manchester Grand Hyatt, Ford A 5:00pm–6:45pm

Session Organizer: **Dumitru I. Caruntu**, *University of Texas Pan American, Edinburg, TX, United States*

Session Co-Organizers: **Mathew Brake**, *Sandia National Laboratories, Albuquerque, NM, United States*, **Ioannis Georgiou**, *National Technical University of Athens, Athens, Greece*

5:00pm **The Role of Epistemic Uncertainty of Contact Models in the Design of Mechanical Systems**

Technical Paper Publication. IMECE2013-62961

Mathew Brake, *Sandia National Laboratories, Albuquerque, NM, United States*

5:21pm **Stochastic Sensitivity Analysis of Structural Systems With Interval Uncertainties**

Technical Paper Publication. IMECE2013-63482

Giuseppe Muscolino, Roberta Santoro, *University of Messina, Messina, Italy*, Alba Sofi, *University Mediterranea of Reggio Calabria, Reggio Calabria, Italy*

5:42pm **Static Pull-In Analysis of an Electrically Actuated Piezoelectric Viscoelastic Microbeam**

Technical Paper Publication. IMECE2013-63574

Changping Chen, Shoujian Li, Liming Dai, *Xiamen University of Technology, Xiamen, Fujian, China*

TRACK 4 DYNAMICS, VIBRATION, AND CONTROL / WEDNESDAY, NOVEMBER 20 / THURSDAY, NOVEMBER 21

6:03pm On the Physics of Conversion of Longitudinal Elastic Waves Into Extended Vibrations in a Suspended Aluminum Rod

Technical Paper Publication. IMECE2013-65726
Ioannis Georgiou, *National Technical University of Athens, Athens, Greece*

6:24pm Random Vibration Response of a Spur Gear Pair With Periodic Stiffness and Backlash

Technical Paper Publication. IMECE2013-62996
Yubing Wen, Jianming Yang, *Memorial University of Newfoundland, St. John's, Canada*, Ping Yang, *Jiangsu University, Zhenjiang, China*

4-16 OPTIMAL APPROACHES IN NONLINEAR DYNAMICS AND ACOUSTICS

4-16-1 Optimal Approaches in Nonlinear Dynamics and Acoustics

3rd Floor, Manchester Grand Hyatt, Ford B 5:00pm–6:45pm

Organizer: **Liming Dai**, *University of Regina, Regina, SK, Canada*
Session Chair: **Liming Dai**, *Xiamen University of Technology, Xiamen, Fujian, China*
Xiaojie Wang, *University of Regina, Regina, SK, Canada*

5:00pm Design for Internal Resonances in Nonlinear Transverse Vibrations of Hyperelastic Plates

Technical Paper Publication. IMECE2013-62826
Astitva Tripathi, Anil K. Bajaj, *Purdue University, West Lafayette, IN, United States*

5:17pm Numerical Investigation of Oil Slug Trapped in Capillary Tube With a Level Set Method

Technical Paper Publication. IMECE2013-63238
Liming Dai, Xiaojie Wang, *University of Regina, Regina, SK, Canada*

5:34pm Influences of Water Injection Rate and Oil Length on Oil Slug Mobilization in a Capillary Model

Technical Paper Publication. IMECE2013-63242
Liming Dai, Yihe Zhang, *University of Regina, Regina, SK, Canada*

5:51pm Vibration Control of a Translating Beam With an Active Control Strategy on the Basis of the Fuzzy Sliding Mode Control

Technical Paper Publication. IMECE2013-63565
Liming Dai, *Xiamen University of Technology, Xiamen, Fujian, China*, Lin Sun, *University of Regina, Regina, SK, Canada*

6:08pm Two New Competition Indexes on the Basis of Lotka-Volterra Competition Model

Technical Paper Publication. IMECE2013-63250
Huayong Zhang, Toudeng Huang, *North China Electric Power University, Regina, Canada*, Liming Dai, *University of Regina, Regina, SK, Canada*

6:25pm Periodicities Changes of Nonlinear Oscillatory Behavior of a Fluttering Plate With Periodicity Ratio and Periodicity Change Rate

Technical Paper Publication. IMECE2013-63263
Lu Han, Liming Dai, *University of Regina, Regina, SK, Canada*

THURSDAY, NOVEMBER 21

4-1 VIBRATION AND CONTROL OF MECHANICAL SYSTEMS

4-1-1 VCMS-I: Vibration and Control of Mechanical Systems

3rd Floor, Manchester Grand Hyatt, Ford A

7:45am–9:15am

Session Organizer: **Hamid Hamidzadeh**, *Tennessee State University, Nashville, TN, United States*

Session Co-Organizer: **Albert Luo**, *Southern Illinois University Edwardsville, Edwardsville, IL, United States*

7:45am An Approximate Solution for Period-M Motions in a Periodically Forced Oscillator With Quadratic Nonlinearity

Technical Paper Publication. IMECE2013-62418
Albert Luo, Bo Yu, *Southern Illinois University Edwardsville, Edwardsville, IL, United States*

8:00am Noise and Vibration Reduction on the Single-Axis Adaptive Damping Controls

Technical Paper Publication. IMECE2013-62428
Juchirl Park, John A. Peterson, *Meritor, Inc., Troy, MI, United States*

8:15am Effect Analysis of Dimensional Tolerances on the Dynamic Characteristics of Hydrodynamic Journal Bearing System

Technical Paper Publication. IMECE2013-62535
Yuan Wei, Zhaobo Chen, Yinghou Jiao, *Harbin Institute of Technology, Harbin, China*, Wu-Bin Xu, *Guangxi University of Technology, Liuzhou, Guangxi, China*

8:30am Multiple-References Transfer Path Analysis on Effect of Road Induced Excitation on Steering Wheel

Technical Paper Publication. IMECE2013-62544
Shuang Li, Xiao-kai Chen, Kang Song, Shijie Liang, *Beijing Institute of Technology, Beijing, China*, Zhiyuan Li, *Shanghai Automotive Industry Corporation, Shanghai, China*

8:45am Sliding Mode Control in Zieglers Pendulum With Tracking Force: Novel Modeling Considerations

Technical Paper Publication. IMECE2013-62077
Ehsan Sarshari, *K. N. Toosi University of Technology, Tehran, Tehran, Iran*, Nastaran Vasegh, *Shahid Rajaei Teacher Training University, Tehran, Iran*, Mehran Khaghani, *École Polytechnique Fédérale de Lausanne, ENAC IIE TOPO, Lausanne, Switzerland*, Saeid Dousti, *University of Virginia, Charlottesville, VA, United States*

9:00am Modal Vibration Analysis of Discontinuously Damped Cylinder

Technical Paper Publication. IMECE2013-65163
Hamid Hamidzadeh, Ehsan Sarfaraz, Bashir F. Alsaïdi, *Tennessee State University, Nashville, TN, United States*

4-2 CONTROLS THEORY AND APPLICATION**4-2-1 Controls Theory and Application—I****3rd Floor, Manchester Grand Hyatt, Ford B 7:45am–9:15am**

7:45am Locally Precise Response Surface Models for the Generalization of Controlled Dynamic Systems and Associated Performance Measures

Technical Paper Publication. IMECE2013-62099
Dale McDonald, *Midwestern State University, Wichita Falls, TX, United States*

8:00am Guaranteed Cost Control of Uncertain Discrete-Time System Subjected to Actuator Saturation via Homogenous Polynomial Lyapunov Function

Technical Presentation. IMECE2013-62822
S.M. Nashit Arshad, Muhammad Umer Khan, *Air University, Islamabad, Pakistan, Kamal Mazhar, Nust Pakistan, Islamabad, Pakistan*

8:15am Receding Horizon Real-Time Energy Management Strategy for Hybrid Vehicles

Technical Paper Publication. IMECE2013-64699
Bram de Jager, *Eindhoven University of Technology, Eindhoven, Netherlands, Thijs van Keulen, DAF Trucks N.V., Eindhoven, Netherlands*

8:30am Sensorless Selective Catalytic Reduction Using Artificial Neural Networks for Emissions Prediction With Fuzzy Logic Control

Technical Presentation. IMECE2013-65301
Kenneth Meierjurgan II, Brian Harries, Marc Compere, Yan Tang, *Embry-Riddle Aeronautical University, Daytona Beach, FL, United States*

8:45am Performance of Constant Power Operated Swash Plate Axial Piston Pumps With Fuzzy Logic Controllers

Technical Paper Publication. IMECE2013-65351
Yasser Anis, Saad Kassem, *Cairo University, Giza, Egypt*

9:00am Actuator Array Dynamics Incorporating Actuator Inertia

Technical Paper Publication. IMECE2013-62507
Mark Bedillion, *South Dakota School of Mines and Technology, Rapid City, SD, United States*

4-3 DYNAMICS MODELING, THEORY, AND APPLICATION**4-3-1 Dynamics Modeling, Theory, and Application I****3rd Floor, Manchester Grand Hyatt, Ford C 7:45am–9:15am**

Session Organizer: **Mathew Brake**, *Sandia National Laboratories, Albuquerque, NM, United States*

Session Co-Organizer: **Andrew Dick**, *Rice University, Houston, TX, United States*

7:45am Structural Dynamic Modifications Using Damped Finite Element Model Updating

Technical Paper Publication. IMECE2013-62596
V. Arora, *Institute of Technology and Innovation, Odense, Denmark*

8:00am Significance of Damping and Its Simulation in Fatigue Damage

Technical Paper Publication. IMECE2013-66193
J.S. Rao, *Kumaraguru College of Technology, Coimbatore, India*

8:15am Modeling of Misaligned Rotor System in Aero-Engines and Interval Method Investigation

Technical Paper Publication. IMECE2013-62790
Guihua Wang, *Shenyang Aeroengine Research Institute, Shenyang, China, Yanhong Ma, Tianrang Li, Jun Li, Jie Hong, Beihang University, Beijing, China*

8:30am Optimization for Slip Analysis of Belt Drives With Finite Element Verification

Technical Paper Publication. IMECE2013-62813
Mohammad Hussein, Bassam A. Hussein, Sayed Metwalli, *Cairo University, Cairo, Egypt*

8:45am Dynamic Analysis of a Jack-Up Rig, SDOF Approach: Design Consideration—I

Technical Paper Publication. IMECE2013-63031
Francisco Godoy, Fernando Lorenzo, *Engineering Systems Inc., Houston, TX, United States*

9:00am Inverse Dynamic Simulation of a Hydraulic Drive With Modelica

Technical Paper Publication. IMECE2013-63310
Joseph Saad, Matthias Liermann, *American University of Beirut, Beirut, Lebanon*

TRACK 4 DYNAMICS, VIBRATION, AND CONTROL / THURSDAY, NOVEMBER 21

4-4 MULTIBODY DYNAMIC SYSTEMS AND APPLICATIONS

4-4-3 Automotive Applications

3rd Floor, Manchester Grand Hyatt, Connaught 7:45am–9:15am

Session Organizer: **William Prescott**, *LMS International, Iowa City, IA, United States*

7:45am On the Distortions Caused by Energy Equivalence Approach in Automotive Powertrains Models

Technical Presentation. IMECE2013-64403

Vinícius G.S. Simionatto, Hugo H. Miyasato, Milton Dias Júnior, *State University of Campinas, Campinas, São Paulo, Brazil*

8:03am Modified Vibrational Model of Symmetric Stewart Platforms

Technical Presentation. IMECE2013-66726

Behrouz Afzali Far, Per Lidstrom, *Lund University, Lund, Sweden*

8:21am Automotive Powertrain Vibrations Running on Wide Open Throttle Engine Conditions

Technical Paper Publication. IMECE2013-64333

Hugo H. Miyasato, Vinícius G.S. Simionatto, Milton Dias Júnior, *State University of Campinas, Campinas, São Paulo, Brazil*

8:39am Insights on Centrifugal Pendulum Vibration Absorber Part Two: Behavior of a FWD Powertrain With a CPVA on Its Clutch's Flange

Technical Paper Publication. IMECE2013-64426

Vinícius G.S. Simionatto, Hugo H. Miyasato, Milton Dias Júnior, *State University of Campinas, Campinas, São Paulo, Brazil*

8:57am Precise Shape Control of Laminated Plane Membrane Reflector Based on the Method of Photo/Piezoelectric Hybrid Actuation

Technical Paper Publication. IMECE2013-67385

Hong-Hao Yue, *Harbin Institute of Technology, Harbin, China*

4-5 DESIGN AND CONTROL OF ROBOTS, MECHANISMS, AND STRUCTURES

4-5-1 Robotic Dynamics and Control

3rd Floor, Manchester Grand Hyatt, Mohsen A 7:45am–9:15am

Session Organizer: **Ho-Hoon Lee**, *Southeastern Louisiana University, Hammond, LA, United States*

Session Co-Organizer: **Ying Wang**, *Southern Polytechnic State University, Marietta, GA, United States*

7:45am Determining Optimal Assembly Sequences for a Robotic Autonomous Assembly Task

Technical Paper Publication. IMECE2013-65461

Bin Guo, Tao Zhang, Xinwei Wang, Ying Wang, *Southern Polytechnic State University, Marietta, GA, United States*

8:00am Comparative Study of Solving the Inverse Kinematics for a 6 DOF Articulated Robot Using Analytical, Numerical, and Combined Method

Technical Presentation. IMECE2013-64165

Taeyang Noh, Changwook Jung, Jaemook Jeong, *Hyundai Heavy Industries Co., Ltd., Ulsan, Korea (Republic)*

8:15am Control of a Drilling and Coring Device Based on Online Identification

Technical Paper Publication. IMECE2013-62804

Qiquan Quan, Shengcheng Li, Shengyuan Jiang, Xuyan Hou, Zongquan Deng, *Harbin Institute of Technology, Harbin, Heilongjiang, China*

8:30am Modeling and Adaptive Control for Tracking Wing Trajectories

Technical Paper Publication. IMECE2013-64925

Ian P. Murphy, Javid Bayandor, Shirin Dadashi, *Blacksburg, VA, United States*, Jessica Gregory, Andrew J. Kurdila, Yu Lei, *Virginia Polytechnic Institute and State University, Blacksburg, VA, United States*

8:45am An Operationally Optimized Seven Link Biped Robot Moving on Slopes

Technical Paper Publication. IMECE2013-62036

Peiman Naseradinmousavi, *Indiana State University, Chicago, IL, United States*

9:00am A Leader-Following Formation Control of a Group of Car-Like Mobile Robots

Technical Paper Publication. IMECE2013-66040

Ho-Hoon Lee, *Southeastern Louisiana University, Hammond, LA, United States*

4-7 VIBRATION & NOISE CONTROL AND DAMPING TECHNOLOGIES

4-7-1 Vibration & Noise Control and Damping Technologies—I

3rd Floor, Manchester Grand Hyatt, Mohsen B 7:45am–9:15am

Session Organizer: **Huancai Lu**, Zhejiang University of Technology, Hangzhou, China

Session Co-Organizer: **Sergio Bellizzi**, CNRS, Laboratoire de Mécanique et d'Acoustique, Marseille, France, **Riaan Meeser**, University of Pretoria, Pretoria, South Africa

7:45am Vibration Reduction Using an Attached Local Nonlinear Passive Absorber Based on a Clamped-Clamped Thin Blade

Technical Paper Publication. IMECE2013-62695
Sergio Bellizzi, Cédric Pinhède, CNRS, Laboratoire de Mécanique et d'Acoustique, Marseille, France, Bruno Cochelin, Centrale Marseille, Laboratoire de Mécanique et d'Acoustique, Marseille, France

8:03am Experimental Investigation on Dynamic Mechanical Behavior of the Elastic Ring Support With Metal Rubber

Technical Paper Publication. IMECE2013-62739
Yanhong Ma, Haixiong Zhu, Dayi Zhang, Jie Hong, Beihang University, Beijing, China

8:21am Magneto-Rheological (MR) Damper Design for High-Flow Rate Suspensions

Technical Paper Publication. IMECE2013-62930
Riaan Meeser, University of Pretoria, Pretoria, South Africa, Sudhir Kaul, Western Carolina University, Cullowhee, NC, United States, Schalk Els, University of Pretoria, Hatfield, Pretoria, South Africa

8:39am Vibration Control of H-shaped Planar Frames Based on the Classical Euler-Bernoulli and the Advanced Timoshenko Bending Theories

Technical Paper Publication. IMECE2013-65054
Chunhui Mei, University of Michigan–Dearborn, Dearborn, MI, United States

8:57am Finite Element Modeling of High Temperature Vibration Damping in Thermal Barrier Coatings

Technical Presentation. IMECE2013-65387
Filippo Casadei, David Clarke, Harvard University, Cambridge, MA, United States

4-12 NONLINEAR DYNAMICS, CONTROL, AND STOCHASTIC MECHANICS

4-12-1 Nonlinear Dynamics, Control, and Stochastic Mechanics I

3rd Floor, Manchester Grand Hyatt, Oxford 7:45am–9:15am

Session Organizer: **Marco Amabili**, McGill University, Montreal, Canada

Session Co-Organizer: **Dumitru I. Caruntu**, University of Texas Pan American, Edinburg, TX, United States, **Bogdan I. Epureanu**, University of Michigan, Ann Arbor, MI, United States

7:45am Large Amplitude Vibrations of Thin Hyperelastic Plates: Neo-Hookean Model

Technical Paper Publication. IMECE2013-62253
Ivan Breslavsky, Marco Amabili, Mathias Legrand, McGill University, Montreal, QC, Canada

8:00am Robust and Dynamically Consistent Reduced-Order Models

Technical Paper Publication. IMECE2013-62522
David Segala, Naval Undersea Warfare Center, Newport, RI, United States, David Chelidze, University of Rhode Island, Kingston, RI, United States

8:15am A Generalized Continuation Method With Applications to Limit Cycle Oscillators

Technical Paper Publication. IMECE2013-64019
Bipin Balam, Amrita School of Engineering, Coimbatore, India

8:30am Reduced Order Model of CNT Cantilever Resonators Under AC Voltage Near Half Natural Frequency

Technical Paper Publication. IMECE2013-64075
Dumitru I. Caruntu, Le Luo, University of Texas Pan American, Edinburg, TX, United States

8:45am Geometrically Nonlinear Vibration Analysis of Thin-Walled Composite Beams

Technical Paper Publication. IMECE2013-64129
Seher Durmaz, Metin Orhan Kaya, Istanbul Technical University, Istanbul, Turkey

9:00am Analytical Solutions for Nonlinear Longitudinal Vibrations of an Elastic Rod

Technical Paper Publication. IMECE2013-65990
Hassan Askari, Ebrahim Esmailzadeh, University of Ontario Institute of Technology, Oshawa, Canada, Davood Younesian, Iran University of Science and Technology, Tehran, Iran

TRACK 4 DYNAMICS, VIBRATION, AND CONTROL / THURSDAY, NOVEMBER 21**4-1 VIBRATION AND CONTROL OF MECHANICAL SYSTEMS****4-1-2 VCMS-II: Vibration and Control of Mechanical Systems****3rd Floor, Manchester Grand Hyatt, Ford A 9:30am–11:15am**Session Organizer: **Erno Keskinen**, *Tampere University of Technology, Tampere, Finland*Session Co-Organizer: **Jean Zu**, *University of Toronto, Toronto, Canada***9:30am Predictive Control of Vibration for Spatial Structures Considering Time Delays****Technical Paper Publication.** IMECE2013-62027
Quansen Wang, Mingyuan Wang, Zhen Huang, *Shanghai Jiao Tong University, Shanghai, Shanghai, China***9:47am Analytical Solutions for Periodic Motions in a Hardening Mathieu-Duffing Oscillator****Technical Paper Publication.** IMECE2013-62417
Albert Luo, Dennis O'Connor, *Southern Illinois University Edwardsville, Edwardsville, IL, United States***10:04am Parametric Stability of a Nonlinear Rotating Blade****Technical Paper Publication.** IMECE2013-62141
Fengxia Wang, Albert Luo, *Southern Illinois University Edwardsville, Edwardsville, IL, United States***10:21am Design and Development of an Electromagnetic Linear Position Sensing System****Technical Paper Publication.** IMECE2013-64572
Brian Ma, Vahid Mashatan, Jean Zu, *University of Toronto, Toronto, ON, Canada***10:38am Dynamics of Single-Hit Pneumatic Test Drill for Pulse-Shaping Analysis of Impacting Waves****Technical Paper Publication.** IMECE2013-64835
Jori Montonen, Erno Keskinen, Juha Miettinen, *Tampere University of Technology, Tampere, Finland*, Wolfgang Seeman, *Karlsruhe Institut of Tehnology, Karlsruhe, Germany*, Michel Cotsaftis, *ECE, Paris, Ile-de-France, France***10:55am Analysis and Design of Active Morphing Units Based on SMA Actuators****Technical Paper Publication.** IMECE2013-65546
Hong-Hao Yue, Zhan-Qiu Liu, Han Yuan, Yu-Fei Long, *Harbin Institute of Technology, Harbin, China*, Horn-sen Tzou, *University of Kentucky, Lexington, KY, United States***4-2 CONTROLS THEORY AND APPLICATION****4-2-2 Controls Theory and Application—II****3rd Floor, Manchester Grand Hyatt, Ford B 9:30am–11:15am****9:30am Distributed Sensing in Actuator Array Manipulation**
Technical Paper Publication. IMECE2013-62499Mark Bedillion, Deepak Parajuli, Randy Hoover, *South Dakota School of Mines and Technology, Rapid City, SD, United States***9:47am Research on Valve and Pump Combined Control of Digital Actuator****Technical Paper Publication.** IMECE2013-62685
Fu Yongling, Zhou Guozhe, *Beihang University, Beijing, Beijing, China***10:04am Flutter Suppression of Wind Turbine Blade Using Adaptive Control****Technical Paper Publication.** IMECE2013-63398
Nailu Li, Mark Balas, *University of Wyoming, Laramie, WY, United States***10:21am Nonlinear Model Predictive Tracking Control for Nonholonomic AGV Based on Bio-Inspired NEURODYNAMICS****Technical Paper Publication.** IMECE2013-63551
Xiao-Hong Yin, Can Yang, *Zhejiang Normal University, Jinhua, Zhejiang, China***10:38am An Investigation on Vehicle Active Suspension and Anti-Lock Braking System Coordination Control****Technical Paper Publication.** IMECE2013-63944
Shijie Liang, Xiao-kai Chen, *Beijing Institute of Technology, Beijing, Beijing, China***10:55am Modeling and Control Design for a Wheeled Mobile Platform****Technical Paper Publication.** IMECE2013-64881
Byungchan Jung, Henryk Flashner, Jill L. McNitt-Gray, *University of Southern California, Los Angeles, CA, United States*

4-3 DYNAMICS MODELING, THEORY, AND APPLICATION

4-3-2 Dynamics Modeling, Theory, and Application II

3rd Floor, Manchester Grand Hyatt, Ford C 9:30am–11:15am

Session Organizer: **Christian Firtone**, *Politecnico di Torino, Torino, Italy*

Session Co-Organizer: **Annie Tangpong**, *North Dakota State University, Fargo, ND, United States*

9:30am **Unbalanced Response of Cracked Rotor-Bearing System Under Time-Dependent Base Movements**

Technical Paper Publication. IMECE2013-62637
Qinkai Han, Fulei Chu, *Tsinghua University, Beijing, Beijing, China*

9:47am **Trigonometric Collocation for Computation of the Steady-State Response of a Cracked Beam**

Technical Paper Publication. IMECE2013-63500
Bakeer K. Bakeer, Oleg Shirayayev, *The Petroleum Institute, Abu Dhabi, Abu Dhabi, United Arab Emir.*

10:04am **Effect of Rider Position on Bicycle Stability**

Technical Paper Publication. IMECE2013-63809
Genevieve M. Lipp, Kenneth C. Hall, Brian P. Mann, *Duke University, Durham, NC, United States*

10:21am **Dynamic Performance Simulation of an Aeroderivative Gas Turbine Using the MATLAB Simulink Environment**

Technical Paper Publication. IMECE2013-64102
Elias Tsoutsanis, Nader Meskin, Mohieddine Benammar, *Qatar University, Doha, Qatar, Khashayar Khorasani, Concordia University, Montreal, QC, Canada*

10:38am **Ground Vibration Test Planning of a Fighter Aircraft by Using a Rough Finite Element Model**

Technical Paper Publication. IMECE2013-64206
Sertac Koksak, *EKINOKS-AG Defence Industry Corporation/Middle East Technical University, Ankara, Turkey, Erdinc Nuri Yildiz, EKINOKS-AG Defence Industry Corporation, Ankara, Turkey, Yigit Yazicioglu, Gokhan Osman Ozgen, Middle East Technical University, Ankara, Turkey*

10:55am **Vehicle Sideslip Angle Estimation and Control**

Technical Paper Publication. IMECE2013-64466
Jihan Ryu, Flavio Nardi, Nikolai Moshchuk, *General Motors, Warren, MI, United States*

4-4 MULTIBODY DYNAMIC SYSTEMS AND APPLICATIONS

4-4-4 Other Applications

3rd Floor, Manchester Grand Hyatt, Connaught 9:30am–11:15am

Session Organizer: **William Prescott**, *LMS International, Iowa City, IA, United States*

Session Co-Organizer: **Meng-Kun Liu**, *Texas A & M University, College Station, TX, United States*

9:30am **Simultaneous Time-Frequency Control of Active Magnetic Bearing**

Technical Paper Publication. IMECE2013-65416
Meng-Kun Liu, Steve Suh, *Texas A&M University, College Station, TX, United States*

9:51am **A New Particle Swarm Optimization and Differential Evolution Technique for Constrained Optimization Problems**

Technical Paper Publication. IMECE2013-63877
Dhafar Al-Ani, Saeid Habibi, *McMaster University, Hamilton, ON, Canada*

10:12am **Robust Visual PID Control of Planar Parallel Robots Under External Disturbances**

Technical Paper Publication. IMECE2013-63329
Ruben Garrido, *CINVESTAV, Mexico, DF, México, Miguel A. Trujano, Universidad Politécnica del Valle de México, Tultitlán Edo. de México, Mexico*

10:33am **Precise Shape Control of Laminated Plane Membrane Reflector Based on the Method of Photo/Piezoelectric Hybrid Actuation**

Technical Paper Publication. IMECE2013-67386
Hong-Hao Yue, *Harbin Institute of Technology, Harbin, China*

10:54am **Effects of Aircraft Aeroelastic Deformations on External Store Separation Dynamics**

Technical Paper Publication. IMECE2013-63772
Mustafa Tugrul Kozak, *EKINOKS-AG Defence Industry Corporation/Middle East Technical University, Ankara, Turkey, Erdinc Nuri Yildiz, EKINOKS-AG Defence Industry Corporation, Ankara, Turkey, Yigit Yazicioglu, Ender Cigeroglu, Middle East Technical University, Ankara, Turkey*

TRACK 4 DYNAMICS, VIBRATION, AND CONTROL / THURSDAY, NOVEMBER 21**4-5 DESIGN AND CONTROL OF ROBOTS, MECHANISMS, AND STRUCTURES****4-5-2 Mechanical Dynamics and Control****3rd Floor, Manchester Grand Hyatt, Mohsen A 9:30am–11:15am**Session Organizer: **Randy Hoover**, *South Dakota School of Mines and Technology, Rapid City, SD, United States*Session Co-Organizer: **Duan Shanzhong**, *South Dakota State University, Brookings, SD, United States***9:30am The Effects of Orifice Sizes on a Hydraulic Servo Valve Control System****Technical Paper Publication.** IMECE2013-65239
Marshall McNea, Duan Shanzhong, *South Dakota State University, Brookings, SD, United States***9:47am An Offline-Signal Processing Algorithm for Combining Superior Excitation Methods for an Ultrasonic Piezo Motor****Technical Paper Publication.** IMECE2013-64294
Gunnar Borchert, Annika Raatz, Klaus Dröder, *Technische Universität Braunschweig, Braunschweig, Germany***10:04am Hybrid Inflatable Airfoils for Control of Lift and Drag at Low Reynolds Number****Technical Presentation.** IMECE2013-64950
Jingjin Xie, Woobiehn Kim, Rutvij Patel, James McGovern, Saugata Dutt, Ian Abraham, Aaron Mazzeo, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States***10:21am A Comparison of Feature Extraction Algorithms Based on Sonar Sensor Data****Technical Paper Publication.** IMECE2013-62989
Hesham Ismail, Balakumar Balachandran, *University of Maryland, College Park, MD, United States***10:38am Discrete Topology Optimization of Structures Without Uncertainty****Technical Paper Publication.** IMECE2013-62824
Hong Zhou, Surya Tej Kolavennu, *Texas A&M University-Kingsville, Kingsville, TX, United States***10:55am Development of a Virtual Reality Simulation Testbed for Collaborative UGV and UAV Research Using Matlab****Technical Paper Publication.** IMECE2013-65045
Dale E. Brech, Randy Hoover, *South Dakota School of Mines and Technology, Rapid City, SD, United States***4-7 VIBRATION & NOISE CONTROL AND DAMPING TECHNOLOGIES****4-7-2 Vibration & Noise Control and Damping Technologies—II****3rd Floor, Manchester Grand Hyatt, Mohsen B 9:30am–11:15am**Session Organizer: **Chin An Tan**, *Wayne State University, Detroit, MI, United States*Session Co-Organizers: **Bongsu Kang**, *Indiana University - Purdue University Fort Wayne, Fort Wayne, United States*, **Raj Nair**, *University of Colorado Boulder, Boulder, CO, United States*, **Slawomir (Swavik) Spiewak**, *University of Calgary, Calgary, AB, Canada***9:30am Simulation Study of Active Vibration Control of a Cantilever Beam by Using State and Output Feedback Control Laws****Technical Paper Publication.** IMECE2013-64041
S.M. Khot, Nitesh P. Yelve, *Fr.C.Rodrigues Institute of Technology, Navi Mumbai, Maharashtra, India*, **Raj Nair**, *University of Colorado Boulder, Boulder, CO, United States***9:47am Lateral-Torsional Response Control of MR Damper Connected Buildings****Technical Paper Publication.** IMECE2013-64158
Naresh Chandiramani, Gokarna Motra, *Indian Institute of Technology-Bombay, Mumbai, Maharashtra, India***10:04am Acceleration/Drift Feedback Control of MRD Connected Buildings****Technical Paper Publication.** IMECE2013-64170
Naresh Chandiramani, Gokarna Motra, *Indian Institute of Technology-Bombay, Mumbai, Maharashtra, India***10:21am Innovative Designs for the Suspension System of Horizontal-Axis Washing Machines: Secondary Suspensions and Tuned Mass Dampers****Technical Paper Publication.** IMECE2013-64425
Tommaso Argentini, Marco Belloli, Fabio Robustelli, Luca Martegani, *Politecnico di Milano, Milano, Italy*, Giuseppe Fraternali, *Indesit Company Spa, Fabriano, AN, Italy***10:38am Simplified Modeling Technique for Damping Materials on Light Structures: Experimental Analysis and Numerical Tuning****Technical Paper Publication.** IMECE2013-64542
Luca Splendi, Luca D'Agostino, Marco Pinelli, Francesco Pellicano, Andrea Baldini, *Universita di Modena e Reggio Emilia, Modena, Italy*, Luca Castignani, *Ferrari S.p.A., Maranello, Italy***10:55am High Performance Isolation and Excitation of Vibration for Enhanced Identification of Inertial Sensors****Technical Paper Publication.** IMECE2013-66667
Slawomir (Swavik) Spiewak, *University of Calgary, Calgary, AB, Canada*, Taras Karpachevskyy, *Flexpipe Systems, Calgary, AB, Canada*, Curtis Zaiss, *Special Projects, Inc., Calgary, AB, Canada*

4-12 NONLINEAR DYNAMICS, CONTROL, AND STOCHASTIC MECHANICS

4-12-2 Nonlinear Dynamics, Control, and Stochastic Mechanics II

3rd Floor, Manchester Grand Hyatt, Oxford 9:30am–11:15am

Session Organizer: **Dumitru I. Caruntu**, *University of Texas Pan American, Edinburg, TX, United States*

Session Co-Organizers: **Marco Amabili**, *McGill University, Montreal, Canada*, **Andrew Dick**, *Rice University, Houston, TX, United States*, **Mathew Brake**, *Sandia National Laboratories, Albuquerque, NM, United States*

9:30am Large Amplitude Vibrations of Laminated Rectangular Plates With Free Edges

Technical Paper Publication. IMECE2013-62254
Farbod Alijani, Marco Amabili, *McGill University, Montreal, Canada*

9:47am Nonlinear Free Vibration of a Beam With Off-Axis Attached Mass

Technical Paper Publication. IMECE2013-63353
Pezhman A. Hassanpour, *Loyola Marymount University, Los Angeles, CA, United States*

10:04am Simplified Procedure to Estimate the Wind Turbine Blade Aerodynamic Loadings Without Using CFD

Technical Paper Publication. IMECE2013-65427
Fouad Mohammad, *Wayne State University, Windsor, ON, Canada*, Emmanuel Ayorinde, *Wayne State University, Detroit, MI, United States*

10:21am Nonlinear Dynamics of Axially Moving Plates With Rotational Springs

Technical Paper Publication. IMECE2013-65492
Mergen H. Ghayesh, Marco Amabili, *McGill University, Montreal, QC, Canada*

10:38am Nonlinear Transient Response of Tilting 4 Pad Bearings-Turbocharger Systems

Technical Paper Publication. IMECE2013-64128
Jiayang Ying, Yinghou Jiao, Zhaobo Chen, *Harbin Institute of Technology, Harbin, Heilongjiang, China*, Gordon Kirk, *Virginia Polytechnic Institute, Blacksburg, VA, United States*, Yongxin Feng, *Guangdong Power Test & Research Institute, Guangzhou, Guangdong, China*

10:55am Transient Wave Propagation in a Materially Nonlinear Beam

Technical Paper Publication. IMECE2013-64975
Yu Liu, Andrew Dick, *Rice University, Houston, TX, United States*

4-1 VIBRATION AND CONTROL OF MECHANICAL SYSTEMS

4-1-3 DCMS-III: Vibration and Control of Mechanical Systems

3rd Floor, Manchester Grand Hyatt, Ford A 1:00pm–2:45pm

Session Organizer: **Katsuhide Fujita**, *Ube National College of Technology, Ube, Japan*

Session Co-Organizer: **Stephen Butt**, *Memorial University of Newfoundland, St. John's, Canada*

1:00pm Period-m Motions in a Periodically Forced van der Pol Oscillator

Technical Paper Publication. IMECE2013-62465
Albert Luo, Arash Bagaei Lakeh, *Southern Illinois University Edwardsville, Edwardsville, IL, United States*

1:17pm Dynamic Analysis of Bottom Hole Assembly Within External Vibrating Force Excitation

Technical Paper Publication. IMECE2013-62572
Lei Wang, Stephen Butt, Jianming Yang, *Memorial University of Newfoundland, St. John's, Newfoundland Labrador, Canada*

1:34pm Experimental Research on Dynamic Characteristics of a Rolling Agricultural Tire (Influence of Running Condition)

Technical Paper Publication. IMECE2013-62736
Katsuhide Fujita, *Ube National College of Technology, Ube, Japan*, Takashi Saito, *Yamaguchi University, Ube/Yamaguchi, Japan*, Mitsugu Kaneko, *Yanmar Co., Ltd., Maibara, Shiga, Japan*

1:51pm Design of Vehicle Active Suspension Systems Using Discrete-Time Sliding Mode Control With Parallel Genetic Algorithms

Technical Paper Publication. IMECE2013-63258
Shenjin Zhu, Yuping He, Jing Ren, *University of Ontario Institute of Technology, Oshawa, ON, Canada*

2:08pm Optimum Design of Actively Controlled Structures Using Cooperative Game and Stackelberg Game Theory

Technical Paper Publication. IMECE2013-63290
Arjumand Ali, Anoop Dhingra, Ehsan Ghotbi, *Alfred University, Alfred, NY, United States*

2:25pm Identification of Crack Flaw in Beams

Technical Paper Publication. IMECE2013-63305
Hamid Hamidzadeh, Ehsan Sarfaraz, Bashir F. Alsaedi, *Tennessee State University, Nashville, TN, United States*

TRACK 4 DYNAMICS, VIBRATION, AND CONTROL / THURSDAY, NOVEMBER 21

4-3 DYNAMICS MODELING, THEORY, AND APPLICATION

4-3-3 Dynamics Modeling, Theory, and Application III

3rd Floor, Manchester Grand Hyatt, Ford C 1:00pm–2:45pm

Session Organizer: **Chris Jobes**, *NIOSH, Pittsburgh, PA, United States*

Session Co-Organizer: **Andrew Dick**, *Rice University, Houston, TX, United States*

1:00pm **A Local Refinement Technique for B Spline Finite Element Shell Modeling**

Technical Paper Publication. IMECE2013-63224
Antonio Carminelli, Giuseppe Catania, *University of Bologna, Bologna, Italy*

1:17pm **Automatic Refinement of FE Shell Models Based on a Local Energy Function**

Technical Paper Publication. IMECE2013-63228
Antonio Carminelli, Giuseppe Catania, *University of Bologna, Bologna, Italy*

1:34pm **Free Vibration of Curvilinearly Stiffened Shallow Shells**

Technical Paper Publication. IMECE2013-63814
Peng Shi, *Beijing Institute of Technology, Beijing, Beijing, China*,
Rakesh Kapania, *Virginia Technology, Blacksburg, VA, United States*

1:51pm **Stability and Bifurcations in Three-Dimensional Analysis of Axially Moving Beams**

Technical Paper Publication. IMECE2013-65458
Mergen H. Ghayesh, Marco Amabili, Hamed Farokhi, *McGill University, Montreal, QC, Canada*

2:08pm **Development of an Experimental Method to Estimate the Operating Force of a Handheld Power Tool Utilizing Measured Transfer Functions**

Technical Paper Publication. IMECE2013-65801
Jay Kim, *University of Cincinnati, Cincinnati, OH, United States*,
Edward Zechmann, *National Institute for Occupational Safety and Health, Cincinnati, OH, United States*, Alvin Lim, *Regal Beloit EPC, Inc., Tipp City, OH, United States*

2:25pm **Finite Element Formulation for Prediction and Quantification of Stick-Slip Phenomenon in Down-Hole Tubular Expansion**

Technical Paper Publication. IMECE2013-66228
Omar S. Al-Abri, *Sultan Qaboos University, Muscat, Muscat, Oman*,
Tasneem Pervez, Sayyad Zahid Qamar, Rashid Khan, *Sultan Qaboos University, Al-Khoud, Muscat, Oman*

4-4 MULTIBODY DYNAMIC SYSTEMS AND APPLICATIONS

4-4-1 Multibody Dynamic Systems and Applications I

3rd Floor, Manchester Grand Hyatt, Ford B 1:00pm–2:45pm

Session Organizer: **Duan Shanzhong**, *South Dakota State University, Brookings, SD, United States*

Session Co-Organizer: **William Prescott**, *LMS International, Iowa City, IA, United States*

1:00pm **Computer Simulation of Whole Body Vibrations via Multibody Dynamics Approach**

Technical Presentation. IMECE2013-63787
Duan Shanzhong, *South Dakota State University, Brookings, SD, United States*

1:17pm **Modeling and Simulation of Guide-Wire Interaction With Vasculature Using Constrained Multibody Dynamics**

Technical Paper Publication. IMECE2013-63797
Pramod Chembrammal, Habib Mohd Younus, *University at Buffalo, New York, Buffalo, NY, United States*, Thenkurussi Kesavadas, *University at Buffalo, Amherst, NY, United States*

1:34pm **Parametric Multibody Modelling of Anthropomorphic Robots to Predict Joint Compliance Influence on End Effector Positioning**

Technical Paper Publication. IMECE2013-64815
Stefano Baglioni, Filippo Cianetti, Claudio Braccesi, Luca Landi, *University of Perugia, Perugia, Italy*

1:51pm **Stability Analysis and Optimal Design of High-Speed and High-Load Driving Mechanism With Joint Clearance Based on Multibody Dynamics**

Technical Paper Publication. IMECE2013-62173
Zenglei Zhang, Shijing Wu, Haibo Zhang, Jie Chen, *Wuhan University, Wuhan, HuBei, China*

2:08pm **Dynamic Analysis of Offshore Oil Pipe Installation Using the Absolute Nodal Coordinate Formulation**

Technical Paper Publication. IMECE2013-62947
Soeren Madsen, Jimmy D. Nielsen, Per C. Hyldahl, Ole Balling, *Aarhus University, Aarhus, Denmark*

2:25pm **Influence of Engine Harmonics on Synchroniser Mechanism Dynamics**

Technical Paper Publication. IMECE2013-63911
Paul Walker, Nong Zhang, *University of Technology, Sydney, NSW, Australia*

4-5 DESIGN AND CONTROL OF ROBOTS, MECHANISMS, AND STRUCTURES

4-5-3 Mechanism Analysis and Design

3rd Floor, Manchester Grand Hyatt, Mohsen A 1:00pm–2:45pm

Session Organizer: **Pierre Larochelle**, *Florida Institute of Technology, West Melbourne, FL, United States*

Session Co-Organizer: **Ilie Talpasanu**, *Wentworth Institute of Technology, Boston, MA, United States*

1:00pm A General Method for Kinematic Analysis of Epicyclic Bevel Gear Trains Applied to Robotic Wrist Mechanisms

Technical Paper Publication. IMECE2013-62177
Ilie Talpasanu, *Wentworth Institute of Technology, Boston, MA, United States*

1:17pm A Simple Flexible Plate for Usage as Force Sensor Element With Constant Stiffness

Technical Paper Publication. IMECE2013-63571
Thomas Ottnad, *Technische Universität München, Bavaria, Germany*, **Henrik Lüflmann**, **Tim C. Lueth**, *Technische Universität München, Institute of Micro Technology and Medical Device Technology, Garching, Bavaria, Germany*

1:34pm Design and Path Planning for a Spherical Rolling Robot

Technical Paper Publication. IMECE2013-64994
Jaeyeon Lee, *Wooram Park, University of Texas at Dallas, Richardson, TX, United States*

1:51pm Tire-Terrain Normal and Longitudinal Dynamics and Slip Power Losses of an Unmanned Ground Vehicle

Technical Paper Publication. IMECE2013-65946
Mostafa Salama, **Vladimir Vantsevich**, *University of Alabama at Birmingham, Hoover, AL, United States*

2:08pm Corner Elimination in Discrete Topology Optimization of Compliant Mechanisms

Technical Paper Publication. IMECE2013-62825
Hong Zhou, **Venkat S. Jangam**, *Texas A&M University-Kingsville, Kingsville, TX, United States*

2:25pm A New Concept for Reconfigurable Planar Motion Generators

Technical Paper Publication. IMECE2013-62571
Pierre Larochelle, **Venkatesh Venkataramanujam**, *Florida Institute of Technology, Melbourne, FL, United States*

4-10 RENEWABLE ENERGY, STRUCTURAL HEALTH MONITORING, AND DISTRIBUTED STRUCTURAL SYSTEMS

4-10-1 Renewable Energy

3rd Floor, Manchester Grand Hyatt, Mohsen B 1:00pm–2:45pm

Session Organizer: **Weidong Zhu**, *University of Maryland, Baltimore County, Baltimore, MD, United States*

Session Co-Organizer: **Steve Suh**, *Texas A&M University, College Station, TX, United States*

1:00pm Evaluation of Aerodynamic and Seismic Coupling for Wind Turbines Using Finite Element Approach

Technical Paper Publication. IMECE2013-62506
Mohammad-amin Asareh, **Jeffery S. Volz**, *Missouri University of Science and Technology, Rolla, MO, United States*

1:17pm Wind Energy Conversion: The Potential of a Novel Ducted Turbine for Residential and Commercial Applications

Technical Paper Publication. IMECE2013-63006
Navid Goudarzi, **Weidong Zhu**, *University of Maryland, Baltimore County, Baltimore, MD, United States*, **Habib Bahari**, *Bahari Energy, Rockville, MD, United States*

1:34pm Development of an Active Control System for a Variable Electromotive-Force Generator With Applications to Wind Turbines, Ships, and Hybrid Vehicles

Technical Paper Publication. IMECE2013-63011
Weidong Zhu, **Navid Goudarzi**, **Xuefeng Wang**, *University of Maryland Baltimore County, Baltimore, MD, United States*

1:51pm Studying the Potential of a Novel Multiple-Generator Drivetrain in Wind Energy Conversion Systems

Technical Paper Publication. IMECE2013-63017
Navid Goudarzi, **Weidong Zhu**, *University of Maryland, Baltimore County, Baltimore, MD, United States*

2:08pm Rotordynamics of a Trans-Rotary Magnetic Gear Rotor

Technical Paper Publication. IMECE2013-63813
Janne Heikkinen, *Lappeenranta University of Technology, Lappeenranta, Finland*, **Siavash Pakdelian**, *Texas A&M University, College Station, TX, United States*

2:25pm Current Progress on Wind Turbine Gearbox Condition Monitoring and Health Evaluation

Technical Paper Publication. IMECE2013-63945
Lu Yang, **Lei Xie**, **Jie Wang**, **Qiang Miao**, *University of Electronic Science and Technology of China, Chengdu, Sichuan, China*, **Dong Wang**, *City University of Hong Kong, Hong Kong, China*

TRACK 4 DYNAMICS, VIBRATION, AND CONTROL / THURSDAY, NOVEMBER 21**4-11 DYNAMICS & CONTROL IN MICRO/NANO ENGINEERING****4-11-1 Dynamics & Control in Micro/Nano Engineering I****2nd Floor, Manchester Grand Hyatt, Edward D 1:00pm–2:45pm**Session Organizer: **Dumitru I. Caruntu**, *University of Texas Pan American, Edinburg, TX, United States*Session Co-Organizer: **Bogdan I. Epureanu**, *University of Michigan, Ann Arbor, MI, United States***1:00pm Frequency Dependent Nonlinear Iterative Learning Control With Application to a Wafer Stage****Technical Paper Publication.** IMECE2013-62054Yu Dongdong, Yu Zhu, Yang Kaiming, Li Xin, Jiang Yi, *Tsinghua University, Beijing, China***1:21pm Nonlinear Dynamics of an Electrically Actuated MEMS Device: Experimental and Theoretical Investigation****Technical Paper Publication.** IMECE2013-63627Laura Ruzziconi, Stefano Lenci, *Polytechnic University of Marche, Ancona, Italy*, Abdallah Ramini, Mohammad Younis, *Binghamton University, State University of New York, Binghamton, NY, United States***1:42pm Electrostatically Actuated MEMS Cantilevers of Linear Thickness Variation****Technical Paper Publication.** IMECE2013-64067Dumitru I. Caruntu, Mostafa Fathelden, *University of Texas Pan American, Edinburg, TX, United States***2:03pm Static and Dynamic Analysis of Microcantilever Beam Under Electrical Loading Using Couple Stress Theory****Technical Paper Publication.** IMECE2013-64674Salem Bashmal, *King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia***2:24pm Gravity-Assisted, Passive Cancellation of Disturbances for Inertial Sensors****Technical Paper Publication.** IMECE2013-65775Taras Karpachevskyy, *Flexpipe Systems, Calgary, AB, Canada*, Slawomir (Swavik) Spiewak, *University of Calgary, Calgary, AB, Canada***4-12 NONLINEAR DYNAMICS, CONTROL, AND STOCHASTIC MECHANICS****4-12-3 Nonlinear Dynamics, Control, and Stochastic Mechanics III****3rd Floor, Manchester Grand Hyatt, Oxford 1:00pm–2:45pm**Session Organizer: **Bogdan I. Epureanu**, *University of Michigan, Ann Arbor, MI, United States*Session Co-Organizer: **Dumitru I. Caruntu**, *University of Texas Pan American, Edinburg, TX, United States*, **Giuseppe Muscolino**, *University of Messina, Messina, Italy***1:00pm Nonlinear Dynamic and Control of New Concept Orbital Pulley Infinitely Variable Transmission****Technical Paper Publication.** IMECE2013-62225Orlando Palma-Marrufo, *Universidad Autónoma de Yucatán, Mérida, Yucatán, Mexico*, Carlos A. Cruz Villar, *Sección Mecatrónica, CINVESTAV-IPN, Mexico, Distrito Federal, Mexico***1:21pm Energy Control of Nonlinear Nonhomogeneous Chains****Technical Paper Publication.** IMECE2013-63251Firdaus Udwadia, *Harshavardhan Mylapilli, University of Southern California, Los Angeles, CA, United States***1:42pm Feature Selection in Evolutionary Algorithm-Based Parameter Estimation of Duffing Oscillators****Technical Paper Publication.** IMECE2013-63583Amit Banerjee, Issam Mahfouz, Ma'moun Abu-Ayyad, *Penn State Harrisburg, Middletown, PA, United States***2:03pm Direct Adaptive Control of Discrete-Time Infinite Dimensional Systems in Hilbert Space****Technical Paper Publication.** IMECE2013-64242Mark Balas, *University of Wyoming, Laramie, WY, United States*, Susan Frost, *NASA Ames Research Center, Moffett Field, CA, United States***2:24pm Multiobjective Optimal Control Design With the Simple Cell Mapping Method****Technical Paper Publication.** IMECE2013-65506Jian-Qiao Sun, Yousef Sardahi, Yousef Naranjani, Wei Liang, *University of California, Merced, Merced, CA, United States*, Carlos Hernandez, Oliver Schuetze, *CINVESTAV-IPN, Mexico City, Mexico*

4-1 VIBRATION AND CONTROL OF MECHANICAL SYSTEMS

4-1-4 DCMS-IV: Vibration and Control of Mechanical Systems

3rd Floor, Manchester Grand Hyatt, Ford A 3:00pm–4:45pm

Session Organizer: **Haimd Nayeb Hashemi**, *Northeastern University, Boston, MA, United States*

Session Co-Organizer: **Ebrahim Esmailzadeh**, *University of Ontario Institute of Technology, Oshawa, Canada*

3:00pm Vibration Absorber and Harvester for Energy Efficient Structures

Extended Abstract Publication. IMECE2013-63420

A. Gonzalez-Buelga, L.R. Clare, S.A. Neild, A. Cammarano, D.J. Wagg, S.G. Burrow, *University of Bristol, Bristol, United Kingdom*, D.J. Inman, *University of Michigan, Ann Arbor, MI, United States*

3:17pm System Identification of a Grinding Machine Excited by an Active Tool Holding Device

Technical Paper Publication. IMECE2013-64380

Alexander Boldering, Gunnar Borchert, Annika Raatz, Klaus Dröder, *Technische Universität Braunschweig, Braunschweig, Germany*

3:34pm Vibration Control for Parallel Manipulator Based on the Feed Forward Control Strategy

Technical Paper Publication. IMECE2013-64496

Ming Li, Huapeng Wu, Heikki Handroos, *Lappeenranta University of Technology, Lappeenranta, Finland*, Marco Ceccarelli, *University of Cassino, Ariccia Roma, Italy*, Giuseppe Carbone, *Universita degli studi di Cassino e del Lazio Meridionale, Cassino, Italy*

3:51pm Actuators Orientation Influence in the Energy Consumption of the 3-PRS Manipulator

Technical Paper Publication. IMECE2013-63166

Saioa Herrero, Javier Corral, *University of the Basque Country, Bilbao, Bizkaia, Spain*, Charles Pinto, Oscar Altuzarra, *University of the Basque Country, Vizcaya, Spain*

4:08pm Effect of Circumferentially Cracked Turbo-Generator Shafts on Its Natural Frequencies

Technical Paper Publication. IMECE2013-65593

Mohsen Nabian, Ashkan Vaziri, Haimd Nayeb Hashemi, *Northeastern University, Boston, MA, United States*, Masoud Olia, *Wentworth Institute of Technology, Boston, MA, United States*

4:25pm Analytical Vibration Solutions of Nanobeams Considering Surface Effects

Technical Paper Publication. IMECE2013-65973

Hassan Askari, Ebrahim Esmailzadeh, *University of Ontario Institute of Technology, Oshawa, Canada*, Davood Younesian, *Iran University of Science and Technology, Tehran, Iran*

4-4 MULTIBODY DYNAMIC SYSTEMS AND APPLICATIONS

4-4-2 Multibody Dynamic Systems and Applications II

3rd Floor, Manchester Grand Hyatt, Ford B 3:00pm–4:45pm

Session Organizer: **Mohammad Poursina**, *University of Arizona, Tucson, AZ, United States*

Session Co-Organizer: **Hidenori Murakami**, *University of California, San Diego, La Jolla, CA, United States*

3:00pm A Moving Frame Method for Multi-Body Dynamics

Technical Paper Publication. IMECE2013-62833

Hidenori Murakami, *University of California, San Diego, La Jolla, CA, United States*

3:21pm Nonlinear Multibody Modelling for the Vibrational Prevision of the Shift Lever of Automotive Gearboxes

Technical Paper Publication. IMECE2013-64219

Luca Landi, Claudio Braccesi, Filippo Cianetti, *University of Perugia, Perugia, Italy*

3:42pm A DOE and Kriging-Based Model for Studying on the Dynamics of Multibody Mechanical Systems With Revolute Joint Clearance

Technical Paper Publication. IMECE2013-64667

Zhenhua Zhang, Liang Xu, Hamid Lankarani, *Wichita State University, Wichita, KS, United States*, João Paulo Flores Fernandes, *University of Minho, Guimarães, Portugal*

4:03pm Deployment Analysis of Deployable Structures Based on Linkages Considering Thermal Effect

Technical Paper Publication. IMECE2013-62390

Jianguo Cai, Jian Feng, Yaozong Zhao, *Southeast University, Nanjing, China*

4:24pm Insights on Centrifugal Pendulum Vibration Absorber Part One: Dynamic Modeling and Behavior of Eigenvalues and Eigenvectors Along Rotating Speed

Technical Paper Publication. IMECE2013-64421

Vinicius G.S. Simionatto, Hugo H. Miyasato, Milton Dias Júnior, *State University of Campinas, Campinas, São Paulo, Brazil*

4-6 MULTI-FIELD COUPLING OF SMART STRUCTURES AND STRUCTRONIC SYSTEMS

4-6-1 Smart Structures, Structronic Systems

3rd Floor, Manchester Grand Hyatt, Ford C 3:00pm–4:45pm

Session Organizer: **Hua Li**, *Zhejiang University, Hangzhou, Zhejiang, China*

Session Co-Organizer: **Shundi Hu**, *Zhejiang University, Hangzhou, China*

3:00pm Heating of Long-Stroke Magnetorheological Fluid Damper

Technical Paper Publication. IMECE2013-62604

Jiajia Zheng, *SME of Nanjing University of Science and Technology, Nanjing, Jiangsu, China*, Zhaochun Li, *Nanjing Forestry University, Nanjing, China*, Jiong Wang, *Nanjing University of Science and Technology, Nanjing, China*

TRACK 4 DYNAMICS, VIBRATION, AND CONTROL / THURSDAY, NOVEMBER 21

3:17pm Constitutive Modeling of PLZT Ceramics Based on the Photovoltaic Effect and the Viscoelastic Effect
Technical Paper Publication. IMECE2013-62639
 J.H. Huang, X.J. Wang, J. Wang, *Nanjing University of Science and Technology, Nanjing, Jiangsu, China*

3:34pm The Theoretical and Numerical Analysis of Thickness-Shear Mode in a Two-Layered Piezoelectric Plate Transformer With a Viscoelastic Interface
Technical Paper Publication. IMECE2013-62770
 Liling Tang, Peng Li, Feng Jin, *Xi'an Jiaotong University, Xi'an, Shaanxi Province, China*

3:51pm Control Force Enhancement of Piezoelectric Conical Shells Using Macro Fiber Composite
Technical Paper Publication. IMECE2013-64319
 Hua Li, H.Y. Li, Hornsen Tzou, *Zhejiang University, Hangzhou, Zhejiang, China*

4:08pm Precise Shape Control of Laminated Plane Membrane Reflector Based on the Method of Photo/Piezoelectric Hybrid Actuation
Technical Paper Publication. IMECE2013-64052
 Hong-Hao Yue, Yu-Fei Long, Zong-Quan Deng, *Harbin Institute of Technology, Harbin, China, China, Jing Jiang, Harbin Institute of Technology, Weihai, China, Hornsen Tzou, Zhejiang University, Hangzhou, Hangzhou, China*

4:25pm Wake Structures of a Cantilever Beam Excited by Piezoelectric Actuators
Technical Paper Publication. IMECE2013-64306
 S.S. Wang, Hua Li, Hornsen Tzou, *Zhejiang University, Hangzhou, Hangzhou, China*

4-8 NOVEL CONTROL OF DYNAMIC SYSTEM AND DESIGN

4-8-1 Novel Control of Dynamic System and Design

3rd Floor, Manchester Grand Hyatt, Mohsen A 3:00pm–4:45pm

Session Organizer: **Steve Suh**, *Texas A&M University, College Station, TX, United States*

Session Co-Organizers: **Weidong Zhu**, *University of Maryland, Baltimore County, Baltimore, MD, United States*, **Meng-Kun Liu**, *Texas A&M University, College Station, TX, United States*

3:00pm Neuromodulation Based Control of Autonomous Robots
Technical Paper Publication. IMECE2013-64049
 Biswanath Samanta, Akimul Prince, *Georgia Southern University, Statesboro, GA, United States*

3:17pm Nonlinear Control of a Magnetic Levitation System Using Single Multiplicative Neuron Models
Technical Paper Publication. IMECE2013-64066
 Biswanath Samanta, Daniel Hall, *Georgia Southern University, Statesboro, GA, United States*

3:34pm Vision-Based Trajectory Tracking Approach for Mobile Platforms in 3D World Using 2D Image Space
Technical Paper Publication. IMECE2013-64969
 Semih Dinc, Farbod Fahimi, Ramazan Ayyun, *University of Alabama in Huntsville, Huntsville, AL, United States*

3:51pm External Disturbance Compensation for Humanoid Robots via a Configuration Control Approach
Technical Paper Publication. IMECE2013-65021
 Christopher Nolen, Farbod Fahimi, *University of Alabama in Huntsville, Huntsville, AL, United States*

4:08pm Simultaneous Time-Frequency Synchronization of Non-Autonomous Chaotic Systems
Technical Paper Publication. IMECE2013-65378
 Meng-Kun Liu, Steve Suh, *Texas A&M University, College Station, TX, United States*

4:25pm Guided Wave Propagation in Tubular Section With Multi-Layered Viscoelastic Coating Part I: Axial Waves
Technical Paper Publication. IMECE2013-65386
 Chi-Wei Kuo, Steve Suh, *Texas A&M University, College Station, TX, United States*

4-10 RENEWABLE ENERGY, STRUCTURAL HEALTH MONITORING, AND DISTRIBUTED STRUCTURAL SYSTEMS

4-10-2 Distributed Structural Systems, Structural Health Monitoring, and Wind Energy

3rd Floor, Manchester Grand Hyatt, Mohsen B 3:00pm–4:45pm

Session Organizer: **Steve Suh**, *Texas A&M University, College Station, TX, United States*

Session Co-Organizer: **Albert Luo**, *Southern Illinois University Edwardsville, Edwardsville, IL, United States*

3:00pm Recent Advances in Dynamic System Research: From Vibration of Distributed Structural Systems to Vibration-Based Damage Detection and Infinitely Variable Transmission
Plenary Presentation. IMECE2013-66865
 Weidong Zhu, *University of Maryland, Baltimore County, Baltimore, MD, United States*

EDUCATION AND GLOBALIZATION

TUESDAY, NOVEMBER 19

5-7 PRE-COLLEGE (K-12) STEM-UNIVERSITY, SCHOOL, AND INDUSTRY ALLIANCE

5-7-1 Pre-College (K-12) STEM-University, School, and Industry Alliance

3rd Floor, Manchester Grand Hyatt, Oxford 9:45am–11:30am

Session Organizer: **Devdas Pai**, *North Carolina A&T State University, Greensboro, NC, United States*

9:45am Fostering the Future STEM Workforce via Industry and Capstone Design Class Partnerships

Technical Paper Publication. IMECE2013-62977

Christina L. Carmen, *University of Alabama in Huntsville, Madison, AL, United States*, Deborah L. Fraley, *Quantum Research International Inc., Huntsville, AL, United States*

10:02am Development of K-12 Teaching Modules by Undergraduate Researchers Amidst Their Own Professional Growth as Research Participants

Technical Paper Publication. IMECE2013-63314

Subha Kumpaty, *Milwaukee School of Engineering, Milwaukee, WI, United States*

10:19am Development and Implementation of an Engineering Course Guided by Involvement in University-Based Professional Development

Technical Paper Publication. IMECE2013-64478

Ibrahim Zeid, Claire Duggan, *Northeastern University, Boston, MA, United States*, Mark Casto, *Amesbury High School, Amesbury, MA, United States*

10:36am The University of Tennessee EcoCAR 2 Communications, Outreach, Education, and STEM Recruiting Program Overview: Year 2

Technical Paper Publication. IMECE2013-64907

Katelynn Routh, David Irick, *University of Tennessee, Knoxville, TN, United States*, Scott Curran, *University of Tennessee, Oak Ridge, TN, United States*

10:53am A Regional University Perspective on Engineering Education of Multicultural Freshman Students From South Pacific Countries

Technical Paper Publication. IMECE2013-66589

Krishnil Ravinesh Ram, Roneel Sharan, Mohammed Rafiuddin Ahmed, *University of the South Pacific, Suva, Fiji*

11:10am Implementing Engineering and Sustainability Curriculum in K-12 Education

Technical Paper Publication. IMECE2013-66693

Stefanie Robinson, Jennifer Mangold, *University of California, Berkeley, Berkeley, CA, United States*

5-4 CURRICULUM INNOVATIONS, PEDAGOGY, AND LEARNING METHODOLOGIES

5-4-1 Curriculum Innovations, Pedagogy, and Learning Methodologies—I

2nd Floor, Manchester Grand Hyatt, Betsy A 5:00pm–6:45pm

Session Organizer: **Shannon Flumerfelt**, *Oakland University, Rochester, MI, United States*

Session Co-Organizer: **Amir Karimi**, *University of Texas at San Antonio, San Antonio, TX, United States*

5:00pm Designing a Capstone Design Course to Achieve Student Outcomes

Technical Paper Publication. IMECE2013-63826

Vincent Wilczynski, *Yale University, New Haven, CT, United States*, Andrew Foley, *U.S. Coast Guard Academy, New London, CT, United States*

5:21pm Engaging Engineering Freshman Students in Mathematics, Sciences, and Programming Courses

Technical Presentation. IMECE2013-64719

Anabela Alves, Rui M. Sousa, Maria Alice G. Carvalho, Elisabete Cardoso, Jorge M.S. Figueiredo, Rui M.S. Pereira, *University of Minho, Guimarães, Portugal*, Sandra Fernandes, *University of Coimbra, Coimbra, Portugal*

5:42pm Building a Community—How to Enrich an Engineering Technology Program With an Identity, Presence, and Pride

Technical Paper Publication. IMECE2013-65034

Amy Miller, Jerry Samples, *University of Pittsburgh at Johnstown, Johnstown, PA, United States*

6:03pm Partnering With Industry on Mechanical Engineering Capstone Projects

Technical Paper Publication. IMECE2013-66092

Hani Saad, Marty Weiser, Don Richter, *Eastern Washington University, Cheney, WA, United States*

6:24pm Introduction of Resource Engineering as a Course in an Undergraduate Mechanical Engineering Curriculum

Technical Presentation. IMECE2013-66245

Franz-Josef Kahlen, Nien Tsu Tuan, *University of Cape Town, Cape Town, South Africa*

TRACK 5 EDUCATION AND GLOBALIZATION / WEDNESDAY, NOVEMBER 20 / THURSDAY, NOVEMBER 21

WEDNESDAY, NOVEMBER 20

5-4 CURRICULUM INNOVATIONS, PEDAGOGY, AND LEARNING METHODOLOGIES

5-4-2 Curriculum Innovations, Pedagogy, and Learning Methodologies—II

3rd Floor, Manchester Grand Hyatt, Windsor C 9:45am–11:30am

Session Organizer: **Anabela Alves**, *University of Minho, Guimarães, Portugal*

9:45am Using the Community Project as the Design Project in a Freshman Level CAD/CAM Course

Invited Presentation. IMECE2013-65319

Sung-hwan Joo, *Grand Valley State University, Grand Rapids, MI, United States*

10:02am Integrated Thermal Conduction and Hardenability Laboratory Activity

Technical Paper Publication. IMECE2013-63211

Natasha Smith, Brandon Field, *University of Southern Indiana, Evansville, IN, United States*

10:19am Elements of a Graduate Course in Computational Fluid Dynamics: Successful Assimilation and Implementation

Technical Paper Publication. IMECE2013-63324

Subha Kumpaty, *Milwaukee School of Engineering, Milwaukee, WI, United States*

10:36am Using Open-Ended Undergraduate Robotics Projects to Teach Innovation to Today's Engineering Students

Technical Paper Publication. IMECE2013-65024

Donald Richter, Hani Saad, Marty Weiser, *Eastern Washington University, Cheney, WA, United States*

10:53am A New Way to Present the Important but Difficult Topic of Statistical Mechanics to Engineers

Technical Paper Publication. IMECE2013-66363

John Dartnall, John A. Reizes, *University of Technology, Sydney, NSW, Australia*

11:10am Analysis of a Feedback Assessment Loop in Engineering Sciences Core Curriculum

Technical Paper Publication. IMECE2013-66486

Amitabha Ghosh, *Rochester Institute of Technology, Rochester, NY, United States*

THURSDAY, NOVEMBER 21

5-2 EMERGING AND SUSTAINABLE TRENDS IN ENGINEERING

5-2-1 Emerging and Sustainable Trends in Engineering

2nd Floor, Manchester Grand Hyatt, Betsy B 7:45am–9:15am

Session Organizer: **Nael Barakat**, *Grand Valley State University, Grand Rapids, MI, United States*

Session Co-Organizer: **Amir Karimi**, *University of Texas at San Antonio, San Antonio, TX, United States*

7:45am Development of a Master's Bioinstrumentation Program—First of Its Kind in Saudi Arabia

Technical Presentation. IMECE2013-62124

Harcharan Singh Ranu, *American Orthopaedic Biomechanics Research Institute, Atlanta, GA, United States*, Ali Almejrad, *King Saud University, Riyadh, Saudi Arabia*

8:03am Education for the Renewable Energy Systems in Sustainable Communities

Technical Presentation. IMECE2013-64601

Ion Visa, Anca Duta, Mircea Neagoe, *Transilvania University of Brasov, R&D Institute, Brasov, Brasov, Romania*

8:21am Development of the Transportation Sciences Thrust Area for the University of Tennessee Bredeesen Center for Interdisciplinary Research and Graduate Education

Technical Presentation. IMECE2013-65039

Scott Curran, *University of Tennessee, Oak Ridge, TN, United States*

8:39am Some Management Principles and Practices for Engineering Teaching Institutions to Create Suitable Research Ecosystem

Technical Paper Publication. IMECE2013-65548

Varghese Panthaloorkaran, *Rajagiri School of Engineering & Technology, Kochi, Kerala, India*

8:57am Infusion of Green Energy Manufacturing Into Engineering and Technology Curricula

Technical Paper Publication. IMECE2013-65637

Richard Chiou, Radian Belu, *Drexel University, Philadelphia, PA, United States*, Bill Tseng, *University of Texas at El Paso, El Paso, TX, United States*

5-9 TEACHING LABORATORIES, MACHINE SHOP EXPERIENCE, AND TECHNOLOGY-AIDED LECTURING

5-9-1 Teaching Laboratories, Machine Shop Experience, and Technology-Aided Lecturing—I

2nd Floor, Manchester Grand Hyatt, Betsy C 7:45am–9:15am

Session Organizer: **Wael Mokhtar**, *Grand Valley State University, Grand Rapids, MI, United States*

Session Co-Organizer: **Mohamed Azzouz**, *Midwestern State University, Wichita Falls, TX, United States*

7:45am Structural Health Monitoring Using Piezoelectric Transducers and Wavelets

Technical Paper Publication. IMECE2013-62212

HuiRu Shih, Albert C. McIntyre, *Jackson State University, Jackson, MS, United States*

8:00am Teaching Stress Transformation Through Laboratory Experiments

Technical Paper Publication. IMECE2013-63956

Olanrewaju Aluko, *University of Michigan–Flint, Flint, MI, United States*

8:15am Comparison of Different Preparation Processes and Final Surface Finishes of Metallographic Specimens

Technical Paper Publication. IMECE2013-63971

Takuya Sugimoto, Toshihiko Sakamoto, Yoshiaki Kuwahara, *KOYO Netsuren Corporation, Kyoto, Japan*, Tetsushi Koshino, Atsushi Endo, *Kyoto Institute of Technology, Kyoto, Japan*, Yuka Takai, Akihiko Goto, *Osaka Sangyo University, Daito, Japan*

8:30am Real-Time 3D Model Reconstruction and Interaction Using Kinect for a Game-Based Virtual Laboratory

Technical Paper Publication. IMECE2013-64518

Zhou Zhang, Mingshao Zhang, Yizhe Chang, El-sayed Aziz, Sven Esche, Constantin Chassapis, *Stevens Institute of Technology, Hoboken, NJ, United States*

8:45am Application of Creativity Tools to Gas Turbine Engine Compressor Clearance Control

Technical Paper Publication. IMECE2013-64932

Godwin I. Ekong, C.A. Long, *University of Sussex, Brighton, United Kingdom*, P.R.N Childs, *Imperial College London, London, United Kingdom*

9:00am A Teaching Strategy for Advanced Manufacturing Courses

Technical Paper Publication. IMECE2013-63674

Basel Alsayed Ahmad, *United Arab Emirates University, Al Ain, United Arab Emir.*

5-3 SOCIETAL AND ETHICAL DIMENSIONS OF ENGINEERING, ASSESSMENT, AND SAFETY ISSUES

5-3-1 Societal and Ethical Dimensions of Engineering, Assessment, and Safety Issues

2nd Floor, Manchester Grand Hyatt, Betsy B 9:30am–11:15am

Session Organizer: **Nael Barakat**, *Grand Valley State University, Grand Rapids, MI, United States*

Session Co-Organizers: **Hiroshi Honda**, *Industry Frontier Research and Development Committee, Narashino City, Chiba Prefecture, Japan*, **Don Phillips**, *National Forensic Engineers, Inc., Lansdale, PA, United States*

9:30am Engaging Underrepresented Undergraduates in Engineering Through a Hands-on Automotive-Themed REU Program

Technical Paper Publication. IMECE2013-62111

Laila Guessous, Qian Zou, Brian Sangeorzan, J. David Schall, Gary Barber, Lian X. Yang, Michael Latcha, Alex Alkidas, Xia Wang, *Oakland University, Rochester, MI, United States*

9:47am What Lean Teaches Us About Ethics in Engineering

Technical Paper Publication. IMECE2013-62393

Shannon Flumerfelt, *Oakland University, Rochester, MI, United States*, Anabela Alves, *University of Minho, Guimarães, Portugal*, Franz-Josef Kahlen, *University of Cape Town, Cape Town, South Africa*

10:04am Factors That Can Influence Mentorship Relationships in Advanced Education: A Critical Insight

Technical Paper Publication. IMECE2013-64589

Celina P. Leão, Ana C. Ferreira, *Universidade do Minho, Guimarães, Portugal*

10:21am Development and Implementation of an Engineering Course Guided by Involvement in University-Based Professional Development

Technical Paper Publication. IMECE2013-64653

Mark Casto, *Amesbury High School, Amesbury, MA, United States*, Claire Duggan, Ibrahim Zeid, *Northeastern University, Boston, MA, United States*

10:38am Integrating Safety Into the Academic Culture

Technical Paper Publication. IMECE2013-64861

Dan Kuespert, Nathaniel Leon, *Johns Hopkins University, Baltimore, MD, United States*

10:55am Understanding Why Engineering Students Take Too Long to Graduate

Technical Paper Publication. IMECE2013-65367

Amir Karimi, Randall Manteufel, *University of Texas at San Antonio, San Antonio, TX, United States*

TRACK 5 EDUCATION AND GLOBALIZATION / THURSDAY, NOVEMBER 21**5-5 DISTANCE/ONLINE ENGINEERING EDUCATION, MODELS, AND ENABLING TECHNOLOGIES****5-5-1 Distance/Online Engineering Education, Models, and Enabling Technologies****2nd Floor, Manchester Grand Hyatt, Betsy C 9:30am–11:15am**Session Organizer: **Mohammad Naraghi**, *Manhattan College, Riverdale, NY, United States*Session Co-Organizer: **Hephzibah Kumpaty**, *University of Wisconsin, Whitewater, Whitewater, WI, United States***9:30am E-Training Development Approach for Enterprise Knowledge Evolution****Technical Paper Publication.** IMECE2013-65118João Sarraipa, Catarina Lucena, Ricardo Goncalves, *UNINOVA, Caparica, Portugal, Pedro Oliveira, New University of Lisbon / FCT / UNINOVA, Caparica, Portugal, João P. Mendonça, Universidade do Minho, Guimaraes, Portugal***9:47am Integrating Experimental Data Analysis Through Online Modules****Technical Paper Publication.** IMECE2013-65413Kumar Singh, Fazeel Khan, Neal Birchfield, *Miami University, Oxford, OH, United States***10:04am The Automation of Education: How Computers Will Take Over Most Teaching Jobs****Technical Paper Publication.** IMECE2013-66504Hatem Wasfy, Jeanne Peters, *Advanced Science and Automation Corporation, Indianapolis, IN, United States, Tamer Wasfy, Indiana University-Purdue University Indianapolis, Indianapolis, IN, United States, Riham Mahfouz, Thomas Nelson Community College, Hampton, VA, United States***10:21am Utilizing Multidisciplinary Tools for Optimized Delivery of Distance Learning Material****Extended Abstract Presentation.** IMECE2013-65595Chris Kobus, *Oakland University, Rochester, MI, United States***10:38am Development of a Mobile App for Learning System Dynamics****Technical Paper Publication.** IMECE2013-62512Weihang Zhu, Jiang Zhou, Md. Aminul Islam, Md. Abu Shufean, Xinyu Liu, *Lamar University, Beaumont, TX, United States***10:55am Use of Mobile Devices as an Interactive Learning Method in a Mechatronics Engineering Course: A Case Study****Technical Paper Publication.** IMECE2013-66396Hamid Alemohammad, *University of Waterloo, Waterloo, ON, Canada, Mohsen Shahini, Top Hat Monocle Inc., Toronto, ON, Canada***5-9 TEACHING LABORATORIES, MACHINE SHOP EXPERIENCE, AND TECHNOLOGY-AIDED LECTURING****5-9-2 Teaching Laboratories, Machine Shop Experience, and Technology-Aided Lecturing—II****2nd Floor, Manchester Grand Hyatt, Betsy B 1:00pm–2:45pm**Session Organizer: **Hephzibah Kumpaty**, *University of Wisconsin, Whitewater, Whitewater, WI, United States*Session Co-Organizer: **Mustapha Fofona**, *Worcester Polytechnic Institute, Worcester, MA, United States***1:00pm Kinect Based Universal Range Sensor for Laboratory Experiments****Technical Paper Publication.** IMECE2013-62979Mingshao Zhang, Zhou Zhang, El-sayed Aziz, Sven Esche, Constantin Chassapis, *Stevens Institute of Technology, Hoboken, NJ, United States***1:17pm An Affordable Machining Laboratory Approach for Undergraduate Engineers****Technical Paper Publication.** IMECE2013-63838Vishnu Vardhan Chandrasekaran, Lewis Payton, Chase Wortman, Wesley Hunko, *Auburn University, Auburn, AL, United States***1:34pm Stepwise Comparison of Expert and Nonexpert Preparations of a Polished Metallographic Surface****Technical Paper Publication.** IMECE2013-63989Takuya Sugimoto, Toshihiko Sakamoto, Yoshiaki Kuwahara, *KOYO Netsuren Corporation, Kyoto, Japan, Tetsushi Koshino, Atsushi Endo, Kyoto Institute of Technology, Kyoto, Japan, Yuka Takai, Akihiko Goto, Osaka Sangyo University, Daito, Japan***1:51pm Teaching High Technological Skills in Automation Domain****Technical Presentation.** IMECE2013-64592José Machado, Paulo Carneiro, Filomena Soares, João P. Mendonça, *Universidade do Minho, Guimarães, Portugal***2:08pm Experiences During the Formation of a Product Realization and Teaching Laboratory****Technical Presentation.** IMECE2013-65738John Dartnall, Holger Roser, *University of Technology, Sydney NSW, Australia***2:25pm New LabVIEW and Measure Foundry Based Data Acquisition System for Mechanical Engineering Technology Laboratories****Technical Paper Publication.** IMECE2013-66652Emin Yilmaz, *University of Maryland Eastern Shore, Princess Anne, MD, United States*

5-11 APPLIED MECHANICS, DYNAMIC SYSTEMS, AND CONTROL ENGINEERING

5-11-1 Applied Mechanics, Dynamic Systems, and Control Engineering

3rd Floor, Manchester Grand Hyatt, Maggie 1:00pm–2:45pm

Session Organizer: **Mohammad Mahinfalah**, *Milwaukee School of Engineering, Milwaukee, WI, United States*

1:00pm **Novel, Inexpensive Robot for Teaching Controls Engineering**

Technical Paper Publication. IMECE2013-62245
Andrew Wright, *University of Arkansas at Little Rock, Little Rock, AR, United States*, Ann Wright, *Hendrix College, Conway, AR, United States*

1:17pm **Mechanical Design and Students Creativity Think Outside the Box**

Technical Paper Publication. IMECE2013-63679
Wael Mokhtar, *Grand Valley State University, Grand Rapids, MI, United States*

1:34pm **Solving Design and Industrial Problems in Manufacturing Automation**

Invited Presentation. IMECE2013-64191
Zbigniew Bzymek, Kayla Kamerer, Andrew Walton, *University of Connecticut, Storrs, CT, United States*

1:51pm **Cyber-Physical Vehicle Modeling, Design, and Development**

Technical Paper Publication. IMECE2013-64401
Tom Withrow, Michael R. Myers, Ted Bapty, Sandeep Neema, *Vanderbilt University, Nashville, TN, United States*

2:08pm **Implementing Advanced Control Systems Using a Low-Cost Rapid Control Prototyping Platform**

Technical Paper Publication. IMECE2013-65568
Francisco Franquiz, Alecia Hurst, Yan Tang, *Embry-Riddle Aeronautical University, Daytona Beach, FL, United States*

2:25pm **Experimental Vehicles Program Aides in Innovative Hands-On Learning Experiences**

Technical Paper Publication. IMECE2013-66100
Saeed Foroudastan, Brigitte Thompson, *Middle Tennessee State University, Murfreesboro, TN, United States*

5-6 GLOBALIZATION OF ENGINEERING

5-6-1 Globalization of Engineering

2nd Floor, Manchester Grand Hyatt, Betsy A 3:00pm–4:45pm

Session Organizer: **Peter Prassinos**, *NASA Retired, Boyds, MD, United States*

Session Co-Organizer: **Kathryn Jablokow**, *Penn State University, Malvern, PA, United States*

3:00pm **Study of Impact and Report of Introduction High Education Tuning Africa in Mechanical Engineering**

Technical Paper Publication. IMECE2013-62014
Léonard Kabeya Mukeba Yakasham, *ESURS/ISTA-KIN, Kinshasa, Congo*, R. Ancha, *Jimma University, Jimma, Ethiopia*

3:21pm **Overview of Planned ASME/VURPE Conference Meetings on Vulnerability, Uncertainty, and Probability in Regulatory Engineering and IMECE2012/FEOfS2013 RE Sessions**

Technical Paper Publication. IMECE2013-62471
Hiroshi Honda, *Industry Frontier Research and Development Committee, Narashino City, Chiba Prefecture, Japan*

3:42pm **Comparing Engineering Education Systems Among USA, EU, Philippines, and South Africa**

Technical Paper Publication. IMECE2013-63254
Anabela Alves, *University of Minho, Guimarães, Portugal*, Franz-Josef Kahlen, *University of Cape Town, Cape Town, South Africa*, Shannon Flumerfelt, *Oakland University, Rochester, MI, United States*, Anna Bella Siriban-Manalang, *De La Salle University, Manila, Philippines*

4:03pm **Effective Use of Engineering in Teaching Secondary STEM/STEAM Courses: A Robotics Course Example**

Technical Paper Publication. IMECE2013-62569
Diana Cost, *Global Learning Charter Public School, New Bedford, MA, United States*, Jessica Chin, Ibrahim Zeid, Claire Duggan, Sagar Kamarthi, *Northeastern University, Boston, MA, United States*

4:24pm **Integration of Manufacturing Into Mechanical Engineering Curricula**

Technical Paper Publication. IMECE2013-63930
Robert Mott, *University of Dayton, Dayton, OH, United States*, Ronald J. Bennett, *University of St. Thomas, Saint Paul, MN, United States*, Marshall Gartenlaub, *QIEDU Associates, Upland, CA, United States*, Scott Danielson, *Arizona State University-Polytechnic Campus, Mesa, AZ, United States*, Mark Stratton, *Society of Manufacturing Engineers, Dearborn, MI, United States*, Hugh Jack, *Grand Valley State University, Allendale, MI, United States*, Henry Kraebber, *Purdue University, West Lafayette, IN, United States*, Phillip Waldrop, *Georgia Southern University, Jasper, GA, United States*

TRACK 5 EDUCATION AND GLOBALIZATION / THURSDAY, NOVEMBER 21

5-8 PROBLEM SOLVING IN ENGINEERING EDUCATION, RESEARCH, AND PRACTICE

5-8-1 Problem Solving in Engineering Education, Research, and Practice

2nd Floor, Manchester Grand Hyatt, Betsy B 3:00pm–4:45pm

Session Organizer: **Zbigniew Bzymek**, *University of Connecticut, Storrs, CT, United States*

Session Co-Organizer: **Hephzibah Kumpaty**, *University of Wisconsin, Whitewater, Whitewater, WI, United States*

3:00pm Development of Diagnostic Program for Gas Compressor Using Knowledge Based Management Concept

Technical Paper Publication. IMECE2013-65914
Mohd Shahrizal Jasmani, Khairil Ikhwan Abdul Rahman, *Petronas Carigali Sdn. Bhd., Kerteh, Terengganu, Malaysia*,
Shaharin Anwar Sulaiman, *Universiti Teknologi Petronas, Tronoh, Perak, Malaysia*

3:17pm Application of Advanced Problem Solving Software in Conceptual Design

Technical Paper Publication. IMECE2013-62717
Zbigniew Bzymek, Yang Xu, *University of Connecticut, Storrs, CT, United States*

3:34pm Incorporating Research Into Capstone Design Projects

Technical Paper Publication. IMECE2013-63205
Grant Warner, *Howard University, Washington, DC, United States*, Tim O'Hern, *Sandia National Laboratories, Albuquerque, NM, United States*

3:51pm Integrated Design and Production Problem Solving in Industry-Sponsored Academic Education

Technical Paper Publication. IMECE2013-63278
Zbigniew Bzymek, Manuel Manuel Nunez, *University of Connecticut, Storrs, CT, United States*

4:08pm V-Learn-Fact: A New Approach for Teaching Manufacturing and Design to Mechanical Engineering Students

Technical Paper Publication. IMECE2013-63817
Thenkurussi Kesavadas, *University at Buffalo, Buffalo, NY, United States*

4:25pm Storytelling—A Most Powerful Tool in Shaping Lesson Plans in Engineering Education

Technical Paper Publication. IMECE2013-65604
Chris Kobus, *Oakland University, Rochester, MI, United States*

5-10 FLUID MECHANICS, HEAT TRANSFER, EXPERIMENTS, AND ENERGY SYSTEMS

5-10-1 Fluid Mechanics, Heat Transfer, Experiments, and Energy Systems

3rd Floor, Manchester Grand Hyatt, Maggie 3:00pm–4:45pm

Session Organizer: **Wael Mokhtar**, *Grand Valley State University, Grand Rapids, MI, United States*

3:00pm Development of a Fluids Laboratory Experience in Dimensional Analysis and Similitude Applied to Vortex Shedding From a Cylinder in Cross-Flow

Technical Paper Publication. IMECE2013-63570
Matthew J. Anderson, Dylan J. Shiltz, Christopher J. Damm, *Milwaukee School of Engineering, Milwaukee, WI, United States*

3:17pm Nucleate Boiling Enhancement Experiments for Heat Transfer Laboratory

Technical Paper Publication. IMECE2013-63860
Birce Dikici, Marc Compere, Eno Edidiong, *Embry-Riddle Aeronautical University, Daytona Beach, FL, United States*

3:34pm Undergraduate Research on Trailer-Truck Aerodynamic Drag

Technical Paper Publication. IMECE2013-65218
Mir Atiqullah, Benjamin Hamler, Rigoverto Sanchez, *Southern Polytechnic State University, Marietta, GA, United States*

3:51pm Teaching Computational Fluid Dynamics Using MATLAB

Technical Paper Publication. IMECE2013-66458
Amitabha Ghosh, Carlos Pantaleón, *Rochester Institute of Technology, Rochester, NY, United States*

4:08pm A 3D Wind Turbine Simulator for Aerodynamics Education

Technical Paper Publication. IMECE2013-65893
John Moreland, Steve Dubec, Tyamo Okosun, Xiuling Wang, Chenn Zhou, *Purdue University Calumet, Hammond, IN, United States*

4:25pm Development of New Hydraulic Power Control Course in SDSU Mechanical Engineering Program

Technical Paper Publication. IMECE2013-65312
Duan Shanzhong, Kurt Bassett, *South Dakota State University, Brookings, SD, United States*

EMERGING TECHNOLOGIES

WEDNESDAY, NOVEMBER 20

6-1 INNOVATIONS IN PROCESSING, CHARACTERIZATION, AND APPLICATIONS OF BIOENGINEERED, COMPOSITE, GENOME, AND NANO-MATERIALS
6-1-1 Innovations in Processing, Characterization, and Applications of Bioengineered, Composite, Genome, and Nano-Materials
3rd Floor, Manchester Grand Hyatt, Connaught 9:45am–11:30am

 Session Organizer: **Matthew Franchetti**, *University of Toledo, Toledo, OH, United States*

 Session Co-Organizer: **Kishor Ashtankar**, *VNIT, Nagpur, Nagpur, Maharashtra, India*
9:45am Post-Consumer Plastics Sortation for Recycling With the Use of an Electromagnetic Separation Method
Technical Paper Publication. IMECE2013-62396

 Matthew Franchetti, Connor Kress, *University of Toledo, Toledo, OH, United States*
10:02am An Innovative Micro Actuator Using Electro Rheological Fluid Technology for Visually Impaired Tactile Display Information Technology Access Applications
Technical Paper Publication. IMECE2013-62924

 Mahmoud Shafik, Barry Mills, *University of Derby, Derby, United Kingdom*
10:19am Effect of Build Orientation on Mechanical Properties of Rapid Prototyping (Fused Deposition Modeling) Made Acrylonitrile Butadiene Styrene (ABS) Parts
Technical Paper Publication. IMECE2013-63146

 Kishor Ashtankar, Abhaykumar Kuthe, Bechu Singh Rathour, *Visvesvaraya National Institute of Technology, Nagpur, Nagpur, Maharashtra, India*
10:36am Wear and Corrosion Resistance of High-Velocity Oxy-Fuel Sprayed Iron-Based Composite Coatings
Technical Paper Publication. IMECE2013-63397

 Andrea Milanti, Heli Koivuluoto, Petri Vuoristo, *Tampere University of Technology, Tampere, Finland*, Giovanni Bolelli, Luca Lusvarghi, Francesco Bozza, *University of Modena and Reggio Emilia, Modena, Italy*
10:53am Enhanced Electrical and Mechanical Properties of Nanotube Reinforced Composites
Extended Abstract Publication. IMECE2013-64249

 Kaushik Pal, *Indian Institute of Technology, Roorkee, India*, Jin Kuk Kim, *Polymer Science and Engineering, School of Nano and Advanced Materials Engineering, Jinju, Gyeongnam, Korea (Republic)*
11:10am Quality of Reamed Surface Using Serrated Blades as Compared to a Conventional Acetabular Reamer
Technical Paper Publication. IMECE2013-64930

 Annie Levasseur, *LIO-HSCM, Montreal, Canada*, Jérémie Ménard, *Imaging and Orthopaedic Research Laboratory (LIO), Research Center, Hôpital Sacré-Cœur de Montréal, Montreal, QC, Canada*, Victor Songmene, Yvan Petit, *École de Technologie Supérieure, Montreal, QC, Canada*, Julio Fernandes, *Hôpital Sacré-Cœur de Montréal, Montreal, QC, Canada*
6-2 EMERGING TECHNOLOGIES IN TRANSPORTATION INDUSTRY
6-2-1 Emerging Technologies in Transportation Industry
3rd Floor, Manchester Grand Hyatt, Connaught 1:00pm–2:45pm

 Session Organizer: **Mohamed Azzouz**, *Midwestern State University, Wichita Falls, TX, United States*

 Session Co-Organizer: **Thompson Nguyen**, *University of California, San Diego, La Jolla, CA, United States*
1:00pm Comparative Studies on Performance and Emissions of Two-Stroke and Four-Stroke Copper-Coated Spark Ignition Engines With Methanol Blended Gasoli
Technical Paper Publication. IMECE2013-62264

 Venkata Krishna Murthy, Baswaraju Dewarasetty, *Jaya Prakash Narayan College of Engineering, Mahabub Nagar, Andhra Pradesh, India*, Ch Indira Priyadarsini, *M.V.S. Murali Krishna, Chaitanya Bharathi Institute of Technology, Andhra Pradesh, India*, P. Ushasri, *University College of Engineering Osmania, Hyderabad, Andhra Pradesh, India*
1:17pm High-Speed Non-Contact Ultrasonic Guided Wave Inspection of Rails
Technical Paper Publication. IMECE2013-63029

 Thompson Nguyen, Stefano Mariani, Robert R. Phillips, Francesco Lanza Di Scalea, *University of California, San Diego, La Jolla, CA, United States*, Piotr Kijanka, Wieslaw J. Staszewski, *AGH University of Science and Technology, Krakow, Poland*
1:34pm Active Road Rumble Energy Harvesting Panels
Technical Paper Publication. IMECE2013-64483

 Mohamed Azzouz, Abhishek Chatterjee, Robert Rorabaugh, Christopher Venegas, Krista Duke, John Weller, *Midwestern State University, Wichita Falls, TX, United States*, Chris Smith, *Vernon College, Wichita Falls, TX, United States*
1:51pm Automotive Safety—Past, Present, and the Future
Plenary Presentation. IMECE2013-67387

 Priyaranjan Prasad, *Prasad Consulting, LLC, Plymouth, MI, United States*
2:08pm Advanced Approaches to Reduce Fuel Consumption in Military Surface Ships
Technical Presentation. IMECE2013-66549

 George Baum, Brian D. James, Whitney Colella, *Strategic Analysis Inc., Arlington, VA, United States*

TRACK 6 EMERGING TECHNOLOGIES / WEDNESDAY, NOVEMBER 20

2:25pm **Advanced Metallic Solution for Toe Cap Component**
Technical Paper Publication. IMECE2013-65221
 Sergio Costa, Joel Silva, Nuno Peixinho, João P. Mendonça,
Universidade do Minho, Guimarães, Portugal

6-7 EMERGING TECHNOLOGIES IN ENERGY SECTOR

6-7-1 Emerging Technologies in Energy Sector

3rd Floor, Manchester Grand Hyatt, Connaught 3:00pm–4:45pm

Session Organizer: **Yonas Tadesse**, *University of Texas at Dallas, Richardson, TX, United States*

Session Co-Organizer: **Singiresu Rao**, *University of Miami, Miami, FL, United States*

3:00pm **Quantifying the Effect of Plug-in Electric Vehicles on Future Grid Operations and Ancillary Service Procurement Requirements**

Technical Paper Publication. IMECE2013-63335
 Chioke Harris, *University of Texas at Austin, Austin, TX, United States*, Michael E. Webber, *University of Texas at Austin, Webber Energy Group, Austin, TX, United States*

3:17pm **Robust Design of Horizontal Axis Wind Turbines Using Taguchi Method**

Technical Presentation. IMECE2013-63924
 Singiresu Rao, *University of Miami, Miami, FL, United States*

3:34pm **Rotary Multimodal Energy Harvesting Device**

Technical Paper Publication. IMECE2013-65189
 Miles Larkin, *Yonas Tadesse, University of Texas at Dallas, Richardson, TX, United States*

3:51pm **Monitoring of a Single Cylinder Engine Running on Gasoline and Gasoline-Ethanol Blend Using Wear Particle Analysis as an Engine Condition Monitoring Technique**

Technical Paper Publication. IMECE2013-65910
 Sayed Y. Akl, *British University in Egypt, Sherouk City, Egypt*, Ahmed A. Abdel-Rehim, *Shoubra Faculty of Engineering/Benha University, Cairo, Egypt*

4:08pm **On the Computations of Flow Regimes and Thermal Patterns in Large-Scale High Compute Density Data Centers**

Technical Paper Publication. IMECE2013-66642
 Essam E. Khalil, *Cairo University, Dokki, Egypt*, Mena H. Aziz, *Cairo University, Cairo, Cairo, Egypt*

4:25pm **Effect of Catalyst Used in the Sol-Gel Process on the Microstructure and Adsorption/Desorption Performance of Silica Aerogels**

Technical Paper Publication. IMECE2013-66768
 Kashif Nawaz, Shelly Schmidt, Anthony Jacobi, *University of Illinois at Urbana Champaign, Urbana, IL, United States*

6-13 EMERGING MODELING AND SIMULATION CAPABILITIES FOR DIGITAL MANUFACTURING AND MANUFACTURING SYSTEMS AUTOMATION

6-13-1 Emerging Modeling and Simulation Capabilities for Digital Manufacturing and Manufacturing Systems Automation

3rd Floor, Manchester Grand Hyatt, Oxford 5:00pm–6:45pm

Session Organizer: **Balaji Sadasivam**, *TMK IPSCO-Houston R&D, Houston, TX, United States*

Session Co-Organizer: **Xun Xu**, *University of Auckland, Auckland, New Zealand*

5:00pm **How Technology and Innovation are Enhancing Oilfield Well Performance**

Plenary Presentation. IMECE2013-67388
 Rustom Mody, *Baker Hughes, Houston, TX, United States*

5:17pm **A New Paradigm Shift for Manufacturing Businesses**

Technical Paper Publication. IMECE2013-62640
 Yuqian Lu, Jenny Xu, Xun Xu, *University of Auckland, Auckland, New Zealand*

5:34pm **Linked Product and Process Monitoring in Smart Factories Based on Federative Factory Data Management**

Technical Paper Publication. IMECE2013-63848
 André Picard, Reiner Anderl, *Technische Universität Darmstadt, Darmstadt, Germany*, Klaus Schützer, Antonio Alvaro de Assis Moura, *Universidade Metodista de Piracicaba, Santa Barbara D'Oeste, SP, Brazil*

5:51pm **Integration of a Reliability Model Within a Virtual Analysis System for Printed Circuit Boards**

Technical Paper Publication. IMECE2013-65668
 Benjamin Goerdt, *University of Iowa Center for Computer-Aided Design, Iowa City, IA, United States*, Amer Dababneh, Ibrahim Ozbolat, Benjamin Weintraub, *University of Iowa, Iowa City, IA, United States*, R. Timothy Marler, *University of Iowa Virtual Soldier Research Program, Rock Island, IL, United States*, Ross Johnson, *Mazira, LLC, Coralville, IA, United States*

6:08pm **Modeling and Simulation Method Comparison for the Lotka-Volterra Model**

Technical Paper Publication. IMECE2013-64193
 Yasaman Vaghei, Yashar Sarbaz, Ahmad Ghanbari, *University of Tabriz, Tabriz, Iran*

6:25pm **Modeling and Control of a Network of Cooperative Satellites by Applying Neural Networks**

Technical Paper Publication. IMECE2013-65962
 Atefeh Einafshar, Farrokh Sassani, *University of British Columbia, Vancouver, BC, Canada*

THURSDAY, NOVEMBER 21

6-14 SYMPOSIUM IN INTEGRATED/SUSTAINABLE BUILDINGS EQUIPMENT & SYSTEMS

6-14-1 Energy Modelling—1

2nd Floor, Manchester Grand Hyatt, Betsy A 7:45am–9:15am

Session Organizer: **Jorge Gonzalez**, *City College of New York, New York, NY, United States*Session Co-Organizer: **Scott Thompson**, *Mississippi State University, Mississippi State, MS, United States*7:45am **Using the Bootstrap Method to Determine Uncertainty Bounds for Change Point Utility Bill Energy Models****Technical Paper Publication.** IMECE2013-62209
James Tyler, Agami Reddy, *Arizona State University, Tempe, AZ, United States*8:00am **An International Outlook of Innovative Energy Efficient Designs of Low Carbon Buildings****Technical Paper Publication.** IMECE2013-62842
Essam E. Khalil, *Cairo University, Dokki, Egypt*8:15am **VAV System Operating in an Educational Building Under Tropical Conditions: Modeling and Simulation****Technical Paper Publication.** IMECE2013-63557
Antonio Bula, Oscar Alvarez, Fabian Amaya, Marco Sanjuan, *Universidad del Norte, Barranquilla, Colombia*8:30am **Understanding the Effect of Baseline Modeling Implementation Choices on Analysis of Demand Response Performance****Technical Paper Publication.** IMECE2013-63717
Nathan Addy, Sila Kiliccote, *Lawrence Berkeley National Lab, Berkeley, CA, United States*, Johanna L. Mathieu, *ETH Zurich, Zurich, Switzerland*, Duncan S. Callaway, *University of California, Berkeley, Berkeley, CA, United States*8:45am **Performance Analysis of a Simplified Model of Cooling Load for a Typical Office Building****Technical Paper Publication.** IMECE2013-64040
Oluwaseyi Oguniola, Li Song, *University of Oklahoma, Norman, OK, United States*9:00am **Fabrication and Characterization of ZnO Nanorods Grown on Cellulose****Technical Presentation.** IMECE2013-63097
Jaehwan Kim, *Inha University, Nam-ku, Korea (Republic)*, Hyun-U Ko, Seong Cheol Mun, Lindong Zhai, *Inha University, Incheon, Korea (Republic)*

6-14 SYMPOSIUM IN INTEGRATED/SUSTAINABLE BUILDINGS EQUIPMENT & SYSTEMS

6-14-2 Energy Modeling—2

4th Floor, Manchester Grand Hyatt, Randle B 1:00pm–2:45pm

Session Organizer: **Essam E. Khalil**, *Cairo University, Dokki, Egypt*Session Co-Organizer: **Scott Thompson**, *Mississippi State University, Mississippi State, MS, United States*1:00pm **Design of a Data Acquisition System for Temperatures Monitoring in Thermal Envelope and Water Consumption in Housing****Technical Paper Publication.** IMECE2013-65480
Diego Ramón Bonilla García, Alejandro A. Lambert Arista, Ramsés Vega Castellanos, *Universidad Autonoma de Baja California, Mexicali, Baja California, Mexico*1:17pm **Computational Study of Single-Sided Ventilation Through a 3-Dimensional Room With Rounded Edges****Technical Paper Publication.** IMECE2013-65843
Awang Idris, *Universiti Kuala Lumpur, Kedah, Malaysia*, Phuoc Huynh, *University of Technology Sydney, Sydney, NSW, Australia*1:34pm **Pressure Exchange Heat Pump: Natural Gas Residential Air Conditioning****Technical Paper Publication.** IMECE2013-65944
Charles Garris, *George Washington University, Washington, DC, United States*, Chunlei Liang, *George Washington University, Fairfax, VA, United States*1:51pm **Heat Recovery With Oscillating Heat Pipes****Technical Paper Publication.** IMECE2013-66241
Charles McCullough, Scott Thompson, Heejin Cho, *Mississippi State University, Mississippi State, MS, United States*2:08pm **Droplets Wetting on Filaments: Morphology and Surface Energy****Technical Presentation.** IMECE2013-62651
Xiangfa Wu, Meng Yu, Zhengping Zhou, Amol Bedarkar, *North Dakota State University, Fargo, ND, United States*2:25pm **Organic Thermoelectric Composites****Technical Presentation.** IMECE2013-64526
Shiren Wang, Jenny Qiu, *Texas Tech University, Lubbock, TX, United States*



TRACK 6 EMERGING TECHNOLOGIES / THURSDAY, NOVEMBER 21



ENERGY

MONDAY, NOVEMBER 18

7-2 FUNDAMENTALS OF THERMODYNAMICS

7-2-1 Fundamentals of Thermodynamics I

3rd Floor, Manchester Grand Hyatt, Ford C 9:45am–11:30am

Session Organizer: **Ana-Maria Blanco-Marigorta**, *Universidad de Las Palmas de Gran Canaria, Las Palmas de Gran Canaria, Spain*

9:45am WILSAK and THODOS EOS for Refrigerants
Technical Paper Publication. IMECE2013-64573
 Emmanuel Rogdakis, Irene Koronaki, Lefteris Gorgoraptis,
National Technical University of Athens, Zografou, Greece

10:02am Second Law Analysis of Tree-Shaped Fins for the Heat Transfer Enhancement in a PCM Thermal Storage System

Technical Paper Publication. IMECE2013-65105
 Vittorio Verda, *Dip Energetica Politech, Torino, Italy*, Adriano Sciacovelli, *Politecnico Di Torino Dener, Torino, Italy*, Elisa Guelpa, *Politecnico di Torino, Torino, Italy*

10:19am Transient Exergy Analysis for Solar Desalination Processes

Technical Paper Publication. IMECE2013-65466
 Gregory Kowalski, Masoud Modaresifar, *Northeastern University, Boston, MA, United States*, Mansour Zenouzi, *Wentworth Institute of Technology, Boston, MA, United States*

10:36am Constrained-Equilibrium Modeling of Methane Oxidation in Air

Technical Paper Publication. IMECE2013-62138
 Mohamad (Hameed) Metghalchi, Ghassan Nicolas, Mohammad Janbozorgi, *Northeastern University, Boston, MA, United States*

10:53am Dynamic Modeling, Simulation and Exergy Analysis of an Innovative Hydronic Heating System

Technical Paper Publication. IMECE2013-63560
 Roozbeh Sangi, Rita Streblov, Dirk Müller, *RWTH Aachen University, Aachen, NRW, Germany*

11:10am Strengths and Limitations of Advanced Exergetic Analyses

Technical Paper Publication. IMECE2013-64320
 Tatiana Morosuk, George Tsatsaronis, *Technical University Berlin, Berlin, Germany*

7-4 ELECTROCHEMICAL ENERGY CONVERSION AND STORAGE

7-4-2 Advanced Electrochemical Storage Concepts I

3rd Floor, Manchester Grand Hyatt, Ford A 9:45am–11:30am

Session Organizer: **Partha Mukherjee**, *Texas A&M University, College Station, TX, United States*

Session Co-Organizers: **Xinran Xiao**, *Michigan State University, Lansing, MI, United States*, **Ilya Avdeev**, *University of Wisconsin–Milwaukee, Milwaukee, WI, United States*

9:45am Thermal Abuse Response of a Lithium-Ion Battery
Technical Presentation. IMECE2013-63277

Malcolm Macdonald, Srinivas Garimella, Thomas F. Fuller,
Georgia Institute of Technology, Atlanta, GA, United States

10:06am Modeling Longitudinal and Transverse Impact in Cylindrical Battery Cells

Technical Presentation. IMECE2013-65001
 Mehdi Gilaki, Ilya Avdeev, *University of Wisconsin–Milwaukee, Milwaukee, WI, United States*

10:27am Mechanical Characterization and Constitutive Modeling of Polymer Separators

Technical Presentation. IMECE2013-65007
 Michael Martinsen, Alex Francis, Ilya Avdeev, *University of Wisconsin–Milwaukee, Milwaukee, WI, United States*

10:48am An Overview of Solid-Like Electrolytes for Supercapacitors

Technical Paper Publication. IMECE2013-64069
 Xudong Fang, Donggang Yao, *Georgia Institute of Technology, Atlanta, GA, United States*

11:09am Multidimensional Modeling of Lithium-Air Batteries

Technical Paper Publication. IMECE2013-66809
 Yun Wang, Sung Chan Cho, *University of California, Irvine, Irvine, CA, United States*

7-7 COMBINED CYCLES, CHP, & CCHP TECHNOLOGY

7-7-1 Combined Heat and Power (CHP)

3rd Floor, Manchester Grand Hyatt, Madeleine D 9:45am–11:30am

Session Organizer: **Mansour Zenouzi**, *Wentworth Institute of Technology, Boston, MA, United States*

9:45am Effect of Different Italian Regulatory Frameworks on the Energetic Assessment of CHP Plants: A Comparative Design and Experimental Condition Analysis

Technical Paper Publication. IMECE2013-62139
 Marco Badami, Giacomo Bocci, Francesco Camillieri, Davide Pagliarulo, Armando Portoraro, Elisa Vigliani, *Politecnico di Torino–DENERG, Torino, Italy*

TRACK 7 ENERGY / MONDAY, NOVEMBER 18

10:02am The Impact of Australia's Carbon Price on the Optimization and Selection of a Gas Turbine CHP System

Technical Paper Publication. IMECE2013-63040
Chanel Gibson, Mehdi Aghaei Meybodi, Masud Behnia, University of Sydney, Sydney, NSW, Australia

10:19am Economic, Emissions, and Energy Benefits From Combined Heat and Power Systems by Location in the United States Based on System Component Efficiencies

Technical Paper Publication. IMECE2013-64566
Amanda D. Smith, University of Utah, Salt Lake City, UT, United States, Pedro J. Mago, Mississippi State University, Mississippi State, MS, United States

10:36am Optimization of CHCP Operation Strategy: Cost vs. Primary Energy Consumption Minimization

Technical Paper Publication. IMECE2013-64965
Andrea Luigi Facci, Fabrizio Martini, University of Naples Parthenope, Naples, Italy, Luca Andreassi, University of Rome Tor Vergata, Rome, Italy, Stefano Ubertini, University of Tuscia, Viterbo, Italy

10:53am Thermal-Economic Modeling of a Micro-CHP Unit Based on a Stirling Engine

Technical Paper Publication. IMECE2013-65126
Ana Ferreira, Senhorinha Teixeira, Manuel Nunes, José Carlos Teixeira, Christophe Ferreira, Luis Martins, University of Minho, Guimarães, Portugal

11:10am What Fraction of the Fuel Consumed by a Heat-and-Power Cogeneration Facility Should be Allocated to the Heat Produced? Old Problem, Novel Approach

Technical Paper Publication. IMECE2013-66705
Paolo Iora, Gian-Paolo Beretta, University of Brescia, Brescia, Italy, Ahmed F. Ghoniem, Massachusetts Institute of Technology, Cambridge, MA, United States

7-8 EMERGING ENERGY TECHNOLOGIES OF THE 21ST CENTURY

7-8-1 Wind and Other Alternative Power Source Turbines for Energy Generation

3rd Floor, Manchester Grand Hyatt, Ford B 9:45am–11:30am

Session Organizer: **Laura Schaefer**, University of Pittsburgh, Pittsburgh, PA, United States

Session Co-Organizer: **Kevin Anderson**, California State Polytechnic University at Pomona, Pomona, CA, United States

9:45am Computational Modeling of Ducted Wind Turbines for Home Applications

Technical Paper Publication. IMECE2013-66213
Bridget Buehrle, Ravi A. Kishore, Shashank Priya, Virginia Technology, Blacksburg, VA, United States

10:02am Energy Production Through Wind Using Personal Use Wind Turbines: UAE Case Study

Technical Paper Publication. IMECE2013-66323
Mohamed Gadalla, Sayem Zafar, American University of Sharjah, Sharjah, United Arab Emir.

10:19am Numerical Investigation to Assess an Optimal Blade Profile for the Drag Based Vertical Axis Wind Turbine

Technical Paper Publication. IMECE2013-64001
Sukanta Roy, Ujjwal K. Saha, Indian Institute of Technology Guwahati, Guwahati, India

10:36am Counter-Rotating Type Pump Turbine Unit Stabilizing Momentarily Fluctuating Power From Renewable Energy Resources

Technical Paper Publication. IMECE2013-66000
Toshiaki Kanemoto, Risa Kasahara, Hiroataka Honda, Toru Miyaji, Jin-Hyuk Kim, Kyushu Institute of Technology, Kitakyushu, Fukuoka, Japan

10:53am Performance Analysis of a 40MW Class Advanced Humid Air Turbine Pilot Plant

Technical Paper Publication. IMECE2013-65339
Yutaka Watanabe, Toru Takahashi, Central Research Institute of Electric Power Industry, Yokosuka-shi, Kanagawa-ken, Japan

11:10am Experimental Investigation of the Performance of a Micro Gas Turbine Fueled With Mixtures of Natural Gas and Biogas

Technical Paper Publication. IMECE2013-64299
Homam Nikpey Somehsaraei, Mohsen Assadi, University of Stavanger, Stavanger, Norway, Peter Breuhaus, International Research institute of Stavanger, Stavanger, Norway

7-12 NANOMATERIALS AND NANOSTRUCTURES FOR ENERGY APPLICATIONS

7-12-6 Materials Challenges for Energy

3rd Floor, Manchester Grand Hyatt, Madeleine B 9:45am–11:30am

Session Organizer: **Hsiao-Ying Shadow Huang**, North Carolina State University, Raleigh, NC, United States

Session Co-Organizer: **Xi Chen**, Columbia University, New York, NY, United States

7-13 HEAT TRANSFER FOR GREEN AND RENEWABLE ENERGY

7-13-2 Applications in Heating and Cooling Systems

3rd Floor, Manchester Grand Hyatt, Madeleine C 9:45am–11:30am

Session Organizer: **Yunho Hwang**, University of Maryland, College Park, MD, United States

9:45am Study of Turbulent Natural Convection in Vertical Storage Tubes for Supercritical Thermal Storage System

Technical Paper Publication. IMECE2013-62716
Reza Baghaei Lakeh, H. Pirouz Kavehpour, Adrienne Lavine, Richard E. Wirz, University of California, Los Angeles, Los Angeles, CA, United States, Gani/B. Ganapathi, Jet Propulsion Laboratory, Pasadena, CA, United States

10:06am **Experimental Study of the Physical Processes That May Occur at the Heat Transfer Plates of an Indirect Evaporative Cooler**

Technical Presentation. IMECE2013-63722

John Dartnall, Vahik Avakien, *University of Technology, Sydney, NSW, Australia*

10:27am **Adsorption Cooling With Multistage Desiccant Processes**

Technical Paper Publication. IMECE2013-64480

Chen-kang Huang, *National Taiwan University, Taipei, Taiwan*

10:48am **Thermodynamically Efficient Solar Cooling**

Technical Presentation. IMECE2013-62972

Roland Winston, Lun Jiang, Bennett Widyolar, *University of California, Merced, Merced, CA, United States*

11:09am **Repurposing Waste Steam and Hot Water to Accelerate Plant Growth in Heated Green Roofs**

Technical Paper Publication. IMECE2013-65200

Robert Dell, Chih Shing Wei, William Foley, *The Cooper Union, New York, NY, United States*, Runar Unnthorsson, *University of Iceland, Reykjavik, Iceland*

7-16 NUCLEAR POWER PLANTS: DESIGN, ANALYSIS, AND SAFETY

7-16-1 ASME NED—Plenary Session

3rd Floor, Manchester Grand Hyatt, Madeleine A 9:45am–11:30am

Session Organizer: **Jovica Riznic**, *Canadian Nuclear Safety Commission, Ottawa, ON, Canada*

Session Co-Organizer: **Hakan Ozaltun**, *Idaho National Laboratory, Idaho Falls, ID, United States*

9:45am **Final Report and Proposal by JSME on Damages of Machines and Structures Caused the Great East Japan Earthquake and Following Tsunami**

Plenary Presentation. IMECE2013-67390

Shigehiko Kaneko, *University of Tokyo, Tokyo, Japan*

10:35am **Comprehensive Analyses Nuclear Safety System Codes**

Technical Paper Publication. IMECE2013-63773

Glenn Roth, Fatih Aydogan, *University of Idaho, Idaho Falls, ID, United States*

11:00am **A Review of Nuclear Power in China**

Technical Paper Publication. IMECE2013-65712

Fred Catlow, *Fred Catlow Engineering, Thurso Caithness, United Kingdom*

7-4 ELECTROCHEMICAL ENERGY CONVERSION AND STORAGE

7-4-3 Advanced Electrochemical Storage Concepts II

3rd Floor, Manchester Grand Hyatt, Ford A

1:00pm–2:45pm

Session Organizer: **George Nelson**, *University of Alabama in Huntsville, Huntsville, AL, United States*

Session Co-Organizer: **Soumik Banerjee**, *Washington State University, Pullman, WA, United States*

1:00pm **A Coupled Finite Volume Method for Particle Scale Electrochemical Modeling of Lithium-Ion Batteries**

Technical Paper Publication. IMECE2013-65774

Bradley L. Trembacki, Ajay Vadakkepatt, Sanjay R. Mathur, Jayathi Murthy, *University of Texas, Austin, TX, United States*

1:21pm **Development of Novel Carbon Nanotube for Zn-Br Redox Flow Battery**

Technical Presentation. IMECE2013-65949

Santanu Mukherjee, Alex M. Bates, Sam Park, *University of Louisville, Louisville, KY, United States*, Sang Cheol Lee, Osung Kwon, Sungmok Ha, *Daegu Gyeongbuk Institute of Science and Technology, Daegu, Korea (Republic)*

1:42pm **Electrode Separation and Operating Orientation: Mechanisms for Maximizing Performance of Cu/Cu²⁺ Aqueous Thermogalvanic Cells**

Extended Abstract Publication. IMECE2013-66106

Hechao Li, Andrey Gunawan, Vladimiro Mujica, Daniel Buttry, *Arizona State University, Tempe, AZ, United States*, Ravi Prasher, *Arizona State University, Mc Lean, VA, United States*, Robert A. Taylor, *University of New South Wales, Sydney, NSW, Australia*, Patrick Phelan, *Arizona State University, Arlington, VA, United States*

2:03pm **Modeling Ionic Liquid Based Electrolytes for Lithium Batteries**

Extended Abstract Publication. IMECE2013-66497

Soumik Banerjee, *Washington State University, Pullman, WA, United States*

2:24pm **Performance Impacts of Tailored Surface Geometry in Li-Ion Battery Cathodes**

Extended Abstract Publication. IMECE2013-65230

George Nelson, *University of Alabama in Huntsville, Huntsville, AL, United States*

TRACK 7 ENERGY / MONDAY, NOVEMBER 18**7-6 BIOFUEL CONVERSION, APPLICATION, AND INSTRUMENTATION****7-6-1 Biofuels for Internal Combustion Engines I****3rd Floor, Manchester Grand Hyatt, Emma C 1:00pm–2:45pm**Session Organizer: **Stephen P. Gent**, *South Dakota State University, Brookings, SD, United States*Session Co-Organizer: **Reza Khatami**, *Northeastern University, Boston, MA, United States***1:00pm Effects of Environmental Factors on the Growth of Algae for Biofuel Production in a Household Based Alternative Energy System****Technical Paper Publication.** IMECE2013-62775
Seyed Allameh, Ella Beckman, Clara Schutzman, Hadi Allameh, Miriam Kannan, *Northern Kentucky University, Highland Heights, KY, United States***1:17pm Characterization of Biomass Producer Gas Generation in Biomass Gasification****Technical Paper Publication.** IMECE2013-63986
Yunye Shi, Tejasvi Sharma, Albert Ratner, *University of Iowa, Iowa City, IA, United States***1:34pm Performance Study of Anaerobic Digestion of Organic Municipal Waste in Upflow Bioreactor With Central Substrate Dispenser****Technical Paper Publication.** IMECE2013-64064
Emmanuel Enyioma Anyanwu, Kevin N. Nwaigwe, Nnamdi V. Ogueke, Chibuike Ononogbo, *Federal University of Technology, Owerri, Nigeria***1:51pm Thermogravimetric Analysis and Characterization of Yard Waste as a Feedstock to Gasification Process****Technical Paper Publication.** IMECE2013-64415
Anjireddy Bhavanam, R.C. Sastry, *NIT Warangal, Warangal, Andhra Pradesh, India***2:08pm Investigating the Rheological Properties of Chopped Corn Stover Biomass in Bulk****Technical Paper Publication.** IMECE2013-65018
Ozan Ozdemir, Taylor Suess, Todd M. Letcher, Stephen P. Gent, *South Dakota State University, Brookings, SD, United States***2:25pm Production, Performance, and Emissions of Biodiesel as Compression Ignition Engine Fuel****Technical Paper Publication.** IMECE2013-62748
Ambarish Datta, Bijan Kumar Mandal, *Bengal Engineering and Science University, Shibpur, Howrah, West Bengal, India***7-7 COMBINED CYCLES, CHP, & CCHP TECHNOLOGY****7-7-2 Waste Heat Recovery and Hybrid Cycles****3rd Floor, Manchester Grand Hyatt, Madeleine D 1:00pm–2:45pm**Session Organizer: **Mansour Zenouzi**, *Wentworth Institute of Technology, Boston, MA, United States*Session Co-Organizer: **Hanfei Tuo**, *University of Illinois, Urbana, IL, United States***1:00pm Design and Operation of a Hybrid CCHP System Including PV-Wind Devices****Technical Paper Publication.** IMECE2013-64513
J.L. Wang, J.Y. Wu, C.Y. Zheng, *Shanghai Jiao Tong University, Shanghai, China***1:17pm Technical, Economical and Environmental Evaluation of Large-Scale Commercial Coal Gasifiers****Technical Paper Publication.** IMECE2013-62586
Orlando M. Ramirez, Lesme Corredor, *Universidad del Norte, Barranquilla, Atlantico, Colombia***1:34pm Investigation of an Ammonia-Water Based Power/Cooling Cogeneration System Using Sensible Waste Heat****Technical Paper Publication.** IMECE2013-62879
Liuli Sun, Wei Han, Na Zhang, Hongguang Jin, *Institute of Engineering Thermophysics, Chinese Academy of Sciences, Beijing, China*, Noam Lior, *University of Pennsylvania, Philadelphia, PA, United States***1:51pm A Parametric Study Method of Enhancing the Efficiency of Gas Turbine Combined Cycle Power Plant****Technical Paper Publication.** IMECE2013-63363
Jingjin Ji, Bo Sun, Dequan Zuo, Lei He, *Shanghai Electric Power Generation R & D Center, Shanghai, China***2:08pm Feedwater Repowering of Coal Fired Power Plants: Effects of Steam Turbine Overloads on Energy and Economic Performance of the Integrated Power System****Technical Paper Publication.** IMECE2013-63492
Roberto Carapellucci, Lorena Giordano, *University of L'Aquila, L'Aquila, Italy***2:25pm Retrofit Engineering Design of Existing Simple Small/Medium Size Gas Turbine Power Cycle Into Combined Cycle Power Plant****Technical Presentation.** IMECE2013-65075
Kwangkook Jeong, Nathan Edgar, *Arkansas State University, State University, AR, United States*

7-8 EMERGING ENERGY TECHNOLOGIES OF THE 21ST CENTURY

7-8-2 Waste Heat, Energy Storage, and Energy Recovery

3rd Floor, Manchester Grand Hyatt, Ford C 1:00pm–2:45pm

Session Organizer: **Kevin Anderson**, *California State Polytechnic University at Pomona, Pomona, CA, United States*

Session Co-Organizer: **Laura Schaefer**, *University of Pittsburgh, Pittsburgh, PA, United States*

1:00pm Waste Heat Recovery From the Exhaust of a Diesel Generator Using Shell and Tube Heat Exchanger

Technical Paper Publication. IMECE2013-63080

Shekh Nisar Hossain, *University of South Australia, Mawson Lakes, SA, Australia*, Saiful Bari, *University of South Australia, Adelaide, Australia*

1:17pm Technologies for Waste Heat Recovery in Offshore Applications

Technical Paper Publication. IMECE2013-62304

Leonardo Pierobon, *Denmarks Tekniske Universitet, Kongens Lyngby, Denmark*, Fredrik Haglind, *Technical University of Denmark, Kgs. Lyngby, Denmark*, Rambabu Kandepu, *Teknova AS, Kristiansand, Norway*, Alessandro Fermi, *Nicola Rossetti, Turboden s.r.l., Brescia, Italy*

1:34pm Characterizing High-Temperature Thermoelectric Modules

Technical Paper Publication. IMECE2013-66120

Satchit Mahajan, *Reginald Pierce, Robert Stevens, Rochester Institute of Technology, Rochester, NY, United States*

1:51pm Feasibility Study of Heat Pump in Maine Using Attic Heat Source

Technical Paper Publication. IMECE2013-66636

Lin Lin, *Stephen B. Knittweis, Julie A. Doxsey, University of Southern Maine, Gorham, ME, United States*

2:08pm A Study on Power Uprating of a Steam Injected Gas Turbine Cogeneration System by Compressor Discharge Air Bypass

Technical Paper Publication. IMECE2013-64371

Do Won Kang, *Hyuck Jun Jang, Tong Seop Kim, Inha University, Incheon, Korea (Republic)*

2:25pm Dynamic Modeling of Community Energy Storage for Lifetime Estimation During Islanding

Technical Presentation. IMECE2013-63210

Robert Fares, *University of Texas at Austin, Austin, TX, United States*, Michael E. Webber, *University of Texas at Austin, Webber Energy Group, Austin, TX, United States*

7-9 CONCENTRATING SOLAR POWER AND SOLAR THERMOCHEMISTRY

7-9-1 Concentrating Solar Power and Thermal Applications

3rd Floor, Manchester Grand Hyatt, Ford B 1:00pm–2:45pm

Session Organizer: **Alvaro Lentz**, *Asociación Nacional de Energía Solar, A.C., Condesa, Mexico*

1:00pm Modeling and Analysis of the Performance of a Parabolic Trough Solar Concentrator System

Technical Presentation. IMECE2013-63411

Mahmoud A Hammad, *University of Jordan and University of Philadelphia, Amman, Jordan*, Alaa Al-Quteimat, *Tafila Technical University, Tafila, Jordan*, Abed Alrzaq Alshqirate, *AlBalqa Applied University, Al-Salt, Jordan*, Ehsan Abbasi Baharanchi, *Najafabad Azad University, Isfahan, Iran*

1:21pm Utilizing Solar Power in Gulf Countries

Technical Presentation. IMECE2013-62231

Hani Sait, *King Abdulaziz University, Rabigh, Saudi Arabia*

1:42pm Development of an Analytical Optical Evaluation Tool for Line-Focus Concentrating Solar Collectors

Technical Presentation. IMECE2013-63775

Guangdong Zhu, *National Renewable Energy Laboratory, Golden, CO, United States*

2:03pm Angularly Dependent Emissivity Using Optical Cavities

Technical Presentation. IMECE2013-64894

Lee Weinstein, *Daniel Kraemer, Kenneth Mc Enaney, Gang Chen, Massachusetts Institute of Technology, Cambridge, MA, United States*

2:24pm What Fraction of the Electrical Energy Produced in a Hybrid Solar-Fossil Power Plant Should Qualify as Renewable Electricity?

Technical Paper Publication. IMECE2013-66706

Paolo Iora, *Gian-Paolo Beretta, University of Brescia, Brescia, Italy*, Ahmed F. Ghoniem, *Massachusetts Institute of Technology, Cambridge, MA, United States*

TRACK 7 ENERGY / MONDAY, NOVEMBER 18**7-12 NANOMATERIALS AND NANOSTRUCTURES FOR ENERGY APPLICATIONS****7-12-1 Energy Storage and Applications****3rd Floor, Manchester Grand Hyatt, Madeleine B 1:00pm–2:45pm**Session Organizer: **Ganhua Lu**, *University of Alaska Anchorage, Anchorage, AK, United States***1:00pm Anomalous Capacitive Behaviors in Graphene Oxide Based Solid State Supercapacitors****Invited Presentation.** IMECE2013-66500Binggong Wei, *University of Delaware, Newark, DE, United States***1:17pm Single-Wire Metal-O₂ Battery Operating in Biological Fluids for Portable Point of Care Devices****Technical Presentation.** IMECE2013-65051Gareth Fotouhi, Jong-Hoon Kim, Caleb Ogier, John C. Kramlich, Amy Q. Shen, Jae-hyun Chung, *University of Washington, Seattle, WA, United States*, Kyong-Hoon Lee, *NanoFactory, Inc., Bellevue, WA, United States***1:34pm Synthesis, Characterization, & Energy–Multifunctional Applications of Nanodiamond/Graphene Conductive Polymer Nanocomposites Films****Technical Presentation.** IMECE2013-66418Humberto Gomez, *Universidad del Norte, Barranquilla, Colombia*, Manoj Ram, *University of South Florida, Tampa, FL, United States***1:51pm Silicon Nanotube Anode for Lithium-Ion Batteries****Technical Presentation.** IMECE2013-66481Junhong Chen, Zhenhai Wen, Shun Mao, Haejune Kim, Shumao Cui, Xingkang Huang, *University of Wisconsin–Milwaukee, Milwaukee, WI, United States*, Ganhua Lu, *University of Alaska Anchorage, Anchorage, AK, United States*, Kehan Yu, *Case Western Reserve University, Cleveland, OH, United States*, Patrick Hurley, *Johnson Controls, Milwaukee, WI, United States***2:08pm Heat Transfer Studies in Thermally Conducting and Electrically Insulating Nano-Oils in a Natural Circulation Loop****Technical Paper Publication.** IMECE2013-64285Manu Mohan, Choondal Sobhan, *National Institute of Technology Calicut, Calicut, India*, Shijo Thomas, *National Institute of Technology Calicut, Calicut, Kerala, India*, Jaime Taha-Tijerina, T.N. Narayanan, Pulickel M. Ajayan, *Rice University, Houston, TX, United States***2:25pm FEM Simulation of Swelling Elastomer Seals in Downhole Applications****Technical Paper Publication.** IMECE2013-64312Maaz Akhtar, *NED University of Engineering and Technology, Karachi, Sindh, Pakistan*, Sayyad Zahid Qamar, Tasneem Pervez, *Sultan Qaboos University, Al-Khoud, Oman*, Farooq Khalfan Al-Jahwari, *Sultan Qaboos University, Muscat, Oman***7-13 HEAT TRANSFER FOR GREEN AND RENEWABLE ENERGY****7-13-3 Applications of Solar Energy****3rd Floor, Manchester Grand Hyatt, Madeleine C 1:00pm–2:45pm**Session Organizer: **Peter Loutzenhiser**, *Georgia Institute of Technology, Atlanta, GA, United States***1:00pm Heat Transfer Enhancement in a Parabolic Trough Receiver Using Wall Detached Twisted Tape Inserts****Technical Paper Publication.** IMECE2013-62745Aggrey Mwesigye, Josua/J.P. Meyer, *University of Pretoria, Pretoria, South Africa*, Tunde Bello-Ochende, *University of Cape Town, Cape Town, South Africa***1:21pm Pulsed Heat Transfer for Thermal Maximum Power Point Tracking****Technical Paper Publication.** IMECE2013-62998Ian Salmon McKay, Evelyn Wang, *Massachusetts Institute of Technology, Cambridge, MA, United States***1:42pm Design and Manufacture of a Solar-Electric Snow Melting Device for Making Potable Water on Mt. Rainier****Technical Paper Publication.** IMECE2013-64021Whitney Hopple, *Oregon State University, Aloha, OR, United States*, John Parmigiani, *Oregon State University, Corvallis, OR, United States***2:03pm CO₂-Filled Vertical Geothermal Boreholes: Modeling and Application****Technical Paper Publication.** IMECE2013-64643Parham Eslami Nejad, Mohamed Ouzzane, Zine Aidoun, *CanmetENERGY, Varennes, Canada***2:24pm Formula Electric System: Thermal Management Design****Technical Paper Publication.** IMECE2013-65279Jackson Smith, Monem Beitelmal, Timothy Hight, Bryan Bidwell, *Santa Clara University, Santa Clara, CA, United States*

7-16 NUCLEAR POWER PLANTS: DESIGN, ANALYSIS, AND SAFETY

7-16-2 Operations, Safety, and Security

3rd Floor, Manchester Grand Hyatt, Madeleine A 1:00pm–2:45pm

Session Organizer: **Jovica Riznic**, *Canadian Nuclear Safety Commission, Ottawa, ON, Canada*

Session Co-Organizer: **Hakan Ozaltun**, *Idaho National Laboratory, Idaho Falls, ID, United States*

1:00pm Preliminary Analysis of SGTR Accident for an Integral Effect Test Facility, SMART-ITL

Technical Paper Publication. IMECE2013-63108
Hee Kyung Kim, Soo Hyoung Kim, *Young-Jong Chung, Korea Atomic Energy Research Institute, Daejeon, Korea (Republic), Hyeon Soo Kim, Chungnam National University, Daejeon, Korea (Republic)*

1:17pm Application of the Statistical Safety Evaluation Method to the Small Break LOCA With High-Pressure Injection Failure

Technical Paper Publication. IMECE2013-64305
Toshihide Torige, *Institute of Nuclear Safety System, Inc., Fukui-ken, Japan, Ikuo Kinoshita, Institute of Nuclear Safety System, Inc., Mikata-gun, Fukui, Japan*

1:34pm Development of the PIRT for the Small Break Loss-of-Coolant Accident With High-Pressure Injection Failure

Technical Paper Publication. IMECE2013-63682
Ikuo Kinoshita, Toshihide Torige, Michio Murase, Yoshitaka Yoshida, *Institute of Nuclear Safety System, Inc., Mikata-gun, Fukui, Japan, Minoru Yamada, MHI Nuclear Engineering Co., Ltd., Yokohama, Kanagawa, Japan*

1:51pm Integral Effect Test on Operational Performance of the PAFS (Passive Auxiliary Feedwater System) for a SGTR (Steam Generator Tube Rupture) Accident

Technical Paper Publication. IMECE2013-63937
Yusun Park, Seok Kim, Byoung-Uhn Bae, Yun-je Cho, Kyoung-Ho Kang, *Korea Atomic Energy Research Institute, Daejeon, Korea (Republic)*

2:08pm A Study on Doppler Weighting Factor for Control Element Assembly Ejection Accident by Using Newly Developed Nuclear Design Code and Non-Loca Methodology

Extended Abstract Publication. IMECE2013-65996
Kyungmin Yoon, Chansu Jang, Jooil Yoon, *KEPCO Nuclear Fuel, Daejeon, Korea (Republic)*

2:25pm Verification, Validation, and Uncertainty Quantification of a Nuclear Thermal Hydraulics Code

Technical Paper Publication. IMECE2013-63021
Fatih Aydogan, *University of Idaho, Idaho Falls, ID, United States*

7-5 FUEL CELL SYSTEMS DESIGN AND APPLICATION

7-5-1 High Temperature Fuel Cells

3rd Floor, Manchester Grand Hyatt, Ford A 3:00pm–4:45pm

Session Organizer: **Roberto Carapellucci**, *University of L'Aquila, L'Aquila, Italy*

Session Co-Organizer: **George Nelson**, *University of Alabama in Huntsville, Huntsville, AL, United States*

3:00pm Perspectives on Lattice Boltzmann Modeling of Transport Processes With Electrochemical Reactions in SOFCs

Technical Paper Publication. IMECE2013-62159
Hedvig Paradis, Martin Andersson, Bengt Sundén, *Lund University, Lund, Sweden*

3:17pm An Electricity and Value-Added Gases Co-generation System via Solid Oxide Fuel Cells

Technical Paper Publication. IMECE2013-62353
Kang Wang, Pingying Zeng, Jeongmin Ahn, *Syracuse University, Syracuse, NY, United States*

3:34pm Parametric Analysis on Hybrid System of Solid Oxide Fuel Cell and Gas Turbine With CO₂ Capture

Technical Paper Publication. IMECE2013-62808
Dengji Zhou, Jiaojiao Mei, Jinwei Chen, Huisheng Zhang, Shilie Weng, *Shanghai Jiao Tong University, Shanghai, China*

3:51pm Mechanical and Thermal Engineering for High-Temperature Fuel Cell Systems

Technical Paper Publication. IMECE2013-64236
Pauli Salminen, Esa Ahlgren, Petri Kuosmanen, *Aalto University, Espoo, Finland*

4:08pm Examining Effects of Sulfur Poisoning on Ni/YSZ Solid Oxide Fuel Cell Anodes Using Synchrotron-Based X-Ray Imaging Techniques

Extended Abstract Publication. IMECE2013-63972
William Harris, Jeffrey L. Lombardo, Wilson K.S. Chiu, *University of Connecticut, Storrs, CT, United States, Barry Lai, Advanced Photon Source, Argonne, IL, United States, George Nelson, University of Alabama in Huntsville, Huntsville, AL, United States, Steve Wang, Joan Vila-Comamala, Advanced Photon Source, Argonne, IL, United States, Mingfei Liu, Meilin Liu, Georgia Institute of Technology, Atlanta, GA, United States*

4:25pm Numerical Analysis of the Internal Fuel Processing in Solid Oxide Fuel Cells

Technical Paper Publication. IMECE2013-65273
Ernesto De la Pena-Cortes, Francisco Elizalde-Blancas, Abel Hernandez-Guerrero, Armando Gallegos-Munoz, Juan M. Belman-Flores, *University of Guanajuato, Salamanca, Guanajuato, Mexico*

TRACK 7 ENERGY / MONDAY, NOVEMBER 18**7-6 BIOFUEL CONVERSION, APPLICATION, AND INSTRUMENTATION****7-6-2 Biofuels for Internal Combustion Engines II****3rd Floor, Manchester Grand Hyatt, Emma C 3:00pm–4:45pm**Session Organizer: **Sayed Allameh**, *Northern Kentucky University, Highland Heights, KY, United States*Session Co-Organizer: **Emil Geiger**, *University of Nevada, Reno, Reno, NV, United States***3:00pm Combustion Analysis of Twisting-Blade Piston Diesel Engine Fuelled With Karanja Bio-Diesel****Technical Paper Publication.** IMECE2013-64138C.R. Rajashekhar, T.K. Chandrashekar, *Mangalore Institute of Technology and Engineering, Mangalore, India*, C. Umashankar, *Rayalaseema University, Kurnool, India*, Kemparaju C.R. Tejendra Prasad, *SSIT, Tumkur, India***3:17pm A Study on the Performance and Emission Characteristics of a Diesel Engine Fueled With Linseed Oil and Diesel Blends****Technical Paper Publication.** IMECE2013-65937Ashutosh Kumar Rai, Bhupendra S. Chauhan, Naveen Kumar, *Delhi Technological University, Delhi, India*, Haeng M. Cho, *Kongju National University, Cheonan, Korea (Republic)***3:34pm Combustion of Reformed Propane as Segue to Glycerin****Technical Paper Publication.** IMECE2013-62355Derek Pickett, Christopher Depcik, *University of Kansas, Lawrence, KS, United States***3:51pm Knocking Control in Gas Fueled Spark Ignition Internal Combustion Engines Turbocharged for Genset Application****Technical Paper Publication.** IMECE2013-62161German Amador, Jorge Duarte, Lesme Corredor, Fabio Blanco, Ricardo Vasquez, *Universidad del Norte, Barranquilla, Colombia***4:08pm Combustion Characteristics of Spray Flames of Canola Methyl Ester/Diesel Blends in a Furnace****Technical Paper Publication.** IMECE2013-63004Cory Morton, Victor Tran, Ramkumar Parthasarathy, Subramanyam Gollahalli, *University of Oklahoma, Norman, OK, United States***4:25pm Laminar Flame Characteristics of Partially Premixed Palm Methyl Ester Gas Flames****Technical Paper Publication.** IMECE2013-63005Diego Romero, Ramkumar Parthasarathy, Subramanyam Gollahalli, *University of Oklahoma, Norman, OK, United States***7-8 EMERGING ENERGY TECHNOLOGIES OF THE 21ST CENTURY****7-8-3 Advanced Alternative Energy Cycles, Systems, and Fuels I****3rd Floor, Manchester Grand Hyatt, Ford C 3:00pm–4:45pm**Session Organizer: **Laura Schaefer**, *University of Pittsburgh, Pittsburgh, PA, United States*Session Co-Organizer: **Kevin Anderson**, *California State Polytechnic University at Pomona, Pomona, CA, United States***3:00pm Analysis of Advanced Supercritical Carbon Dioxide Power Cycles With a Bottoming Cycle for Concentrating Solar Power Applications****Technical Paper Publication.** IMECE2013-63753Saeb Mostaghim Besarati, D. Yogi Goswami, *University of South Florida, Tampa, FL, United States***3:17pm Potential of a Medium Grade Low Heat Rejection Diesel Engine With Crude Tobacco Seed Oil****Technical Paper Publication.** IMECE2013-62262Venkata Krishna Murthy, Pujari Pavan Kumar, *Jaya Prakash Narayan Educational Society Group of Institutions, Mahabubnagar, Andhra Pradesh, India*, MVS Murali Krishna, *Chaitanya Bharathi Institute of Technology, Hyderabad, Andhra Pradesh, India*, Baswaraju Dewarasetty, *Jaya Prakash Narayan College of Engineering, Mahabub Nagar, Andhra Pradesh, India***3:34pm Dissociation of Carbon Dioxide Using a Microdischarge Plasma Reactor****Technical Paper Publication.** IMECE2013-64632Onur Taylan, Halil Berberoglu, *University of Texas at Austin, Austin, TX, United States***3:51pm Modeling of a Microhollow Cathode Discharge Reactor for Carbon Dioxide Dissociation****Technical Paper Publication.** IMECE2013-64637Onur Taylan, Halil Berberoglu, *University of Texas at Austin, Austin, TX, United States***4:08pm Micro-Nanostructured Pt/TiO₂/Ti System as a Chemical-Electrical Transducer****Technical Presentation.** IMECE2013-63867Mohammad A. Hashemian, Maksym M. Plakhotnyuk, *University of Illinois at Chicago, Chicago, IL, United States*, Eduard G. Karpov, *University of Illinois at Chicago, Glenview, IL, United States***4:25pm Experimental Investigation on Groundnut Shell Gasification Using Fluidized Bed****Technical Presentation.** IMECE2013-63788S. Baskara Sethupathy, M. Deepak Kumar, *Velammal Engineering College, Chennai, India*, E. Natarajan, *Anna University Chennai, Chennai, India*

7-9 CONCENTRATING SOLAR POWER AND SOLAR THERMOCHEMISTRY

7-9-2 Solar Thermochemistry and Related Themes

3rd Floor, Manchester Grand Hyatt, Ford B 3:00pm–4:45pm

Session Organizer: **Eduardo Rincón-Mejía**, *Universidad Autónoma de la Ciudad de México, Mexico City, Estado de México, Mexico*

3:00pm Chemical Reaction Enhancement in CaO-H₂O by Nanoparticles for Thermochemical Energy Storage

Technical Presentation. IMECE2013-65241

Leah Haling, Soochan Lee, *Arizona State University, Tempe, AZ, United States*, Patrick Phelan, *Arizona State University, Arlington, VA, United States*

3:17pm Non-Concentrated Solar Collector for Solarthermal Chemical Reactions

Technical Paper Publication. IMECE2013-65433

Nico Hotz, *Duke University, Durham, NC, United States*

3:34pm Optical Design of Multi-Source High-Flux Solar Simulators

Technical Presentation. IMECE2013-65821

Roman Bader, Daryl Lee, *University of Minnesota, Minneapolis, MN, United States*, Sophia Haussener, *EPFL, Lausanne, Switzerland*, Wojciech Lipinski, *Australian National University, Canberra, ACT, Australia*

3:51pm Durable Coatings for High-Temperature Concentrating Solar Power

Technical Presentation. IMECE2013-65891

Jaeyun Moon, Dylan Lu, Seong Deok Kong, Sungho Jin, Zhaowei Liu, Renkun Chen, *University of California, San Diego, La Jolla, CA, United States*

4:08pm Density and Thermal Conductivity Measurements of Eutectic Molten Salt Mixtures as Future High-Temperature Heat Transfer Fluids

Technical Presentation. IMECE2013-66127

Qing Hao, Mingqing Li, Peiwen Li, *University of Arizona, Tucson, AZ, United States*

4:25pm A Hybrid Geothermal-Solar Power System: Optimal Design and Operation

Technical Paper Publication. IMECE2013-63576

Hadi Ghasemi, *Massachusetts Institute of Technology, Cambridge, MA, United States*, Alexander Mitsos, *RWTH Aachen University, Aachen, Germany*

7-12 NANOMATERIALS AND NANOSTRUCTURES FOR ENERGY APPLICATIONS

7-12-2 Energy Conversion

3rd Floor, Manchester Grand Hyatt, Madeleine B 3:00pm–4:45pm

Session Organizer: **Junhong Chen**, *University of Wisconsin–Milwaukee, Milwaukee, WI, United States*

Session Co-Organizer: **Humberto Gomez**, *Universidad del Norte, Barranquilla, Colombia*

3:00pm Enhancement of the Optical Efficiency in Organic and Non-Organic Photovoltaic Cells With Inclusion of Metallic Nanoparticles

Technical Paper Publication. IMECE2013-62023

Ivan I. Muñoz, *SIRVE S.A., Santiago, Chile*, Amador M. Guzmán, *Pontificia Universidad Católica de Chile, Santiago, Región Metropolitana, Santiago, Chile*, Andres J. Diaz, *Universidad Diego Portales, Santiago, Región Metropolitana, Santiago, Chile*

3:17pm Nitrogen-Doped Carbon Nanomaterials as Efficient Electrodes for Fuel Cells and Dye-Sensitized Solar Cells

Technical Presentation. IMECE2013-66471

Mingtao Li, Zhenhai Xia, *University of North Texas, Denton, TX, United States*, Lipeng Zhang, *University of Akron, Akron, OH, United States*

3:34pm Enhanced Chemcurrent Effect of H₂ Oxidation on Pt/TiO₂/Ti Micro-Nanostructure Surface

Technical Presentation. IMECE2013-63846

Eduard G. Karpov, *University of Illinois at Chicago, Glenview, IL, United States*, Mohammad A. Hashemian, Maksym M. Plakhotnyuk, *University of Illinois at Chicago, Chicago, IL, United States*

3:51pm Spin Photovoltaic Effect on Molecule Coupled Ferromagnetic Films of a Magnetic Tunnel Junction

Technical Paper Publication. IMECE2013-63866

Pawan Tyagi, *University of the District of Columbia, Washington, DC, United States*

4:08pm Quantitative Methods in the Design, Measurement and Validation of a PECVD-Based Thin-Film Solar Cell

Technical Presentation. IMECE2013-65322

Shima Hajimirza, John R. Howell, *University of Texas at Austin, Austin, TX, United States*

4:25pm Modeling of Nanoparticles and Conjugated Polymers in Aromatic Solvents to Mimic Synthesis of Photoactive Layers of Organic Photovoltaic Solar Cells

Technical Presentation. IMECE2013-66492

S.M. Mortuza, Soumik Banerjee, *Washington State University, Pullman, WA, United States*

TRACK 7 ENERGY / MONDAY, NOVEMBER 18**7-16 NUCLEAR POWER PLANTS: DESIGN, ANALYSIS, AND SAFETY****7-16-3 Materials and Structures****3rd Floor, Manchester Grand Hyatt, Madeleine A 3:00pm–4:45pm**Session Organizer: **Hakan Ozaltun**, *Idaho National Laboratory, Idaho Falls, ID, United States*Session Co-Organizer: **Jovica Riznic**, *Canadian Nuclear Safety Commission, Ottawa, ON, Canada***3:00pm Finite Element Simulations and Experimental Testing of Creep Fracture in Welded 9Cr-1Mo Steels****Invited Presentation.** IMECE2013-66519Mehdi Basirat, Triratna Shrestha, Gabriel Potirniche, Indrajit Charit, *University of Idaho, Moscow, ID, United States***3:17pm Microstructural Effects on Thermal Conductivity of Uranium Oxide: A 3D Multi-Physics Simulation****Technical Paper Publication.** IMECE2013-65343Harn Chyi Lim, *Arizona State University, Phoenix, AZ, United States*, Pedro Peralta, Karin Rudman, Robert McDonald, Kapil Krishnan, *Arizona State University, Tempe, AZ, United States*, Patricia Dickerson, Darrin Byler, Chris Stanek, Kenneth J. McClellan, *Los Alamos National Lab, Los Alamos, NM, United States***3:34pm Hydrogen-Air Deflagration in the Presence of Longitudinal Concentration Gradients****Technical Paper Publication.** IMECE2013-66619Mike Kuznetsov, *Institute for Nuclear and Energy Technologies, Karlsruhe Institute of Technology, Karlsruhe, Germany*, Joachim Grune, *Pro-Science GmbH, Ettingen, Germany*, Sergey Kudriakov, *Etienne Studer, CEA/Saclay, Gif-sur-Yvette, France***3:51pm Evaluation of Irradiation Behavior of Monolithic Mini-Plates With U7Mo Fuel and Zircaloy Cladding****Technical Presentation.** IMECE2013-66593Hakan Ozaltun, Pavel Medvedev, *Idaho National Laboratory, Idaho Falls, ID, United States***4:08pm Influence of Fabrication Parameters on the Irradiation Behavior of U10Mo Alloy Based Experimental Mini-Plates****Technical Paper Publication.** IMECE2013-66595Hakan Ozaltun, *Idaho National Laboratory, Idaho Falls, ID, United States*, Robert M. Allan, *Mississippi State University, Starkville, MS, United States*, You Sung Han, *Purdue University, West Lafayette, IN, United States***4:25pm Modeling the Ductile Brittle Fracture Transition in Reactor Pressure Vessel Steels Using a Cohesive Zone Model-Based Approach****Technical Paper Publication.** IMECE2013-65164Pritam Chakraborty, *Battelle Energy Alliance LLC, Idaho Falls, ID, United States*, S. Bulent Biner, *Idaho National Lab, Idaho Falls, ID, United States***7-17 SYMPOSIUM ON ENERGY-WATER NEXUS****7-17-1 Symposium on Energy-Water Nexus I****3rd Floor, Manchester Grand Hyatt, Madeleine C 3:00pm–4:45pm**Session Organizer: **Marco Sanjuan**, *Universidad del Norte, Barranquilla, Colombia*Session Chair: **Ziv Lang**, *California Air Resources Board, Sacramento, CA, United States***3:00pm Water Consumption Due to Electricity Generation Versus Manufacturing Processes in an Automotive LifeCycle****Technical Paper Publication.** IMECE2013-63998John Semmens, Bert Bras, Tina Guldberg, *Georgia Institute of Technology, Atlanta, GA, United States***3:17pm Water Supply Sustainability Indicators for the Southern California-Baja California Area****Technical Paper Publication.** IMECE2013-64540Margarita Gil Samaniego Ramos, Hector E. Campbell-Ramirez, Juan C. Tapia-Olivas, *Universidad Autonoma de Baja California, Mexicali, Baja California, Mexico***3:34pm Implications of Thermal Discharge Limits on Future Power Generation in Texas****Technical Paper Publication.** IMECE2013-65110Margaret Cook, *University of Texas at Austin, Austin, TX, United States*, Carey W. King, *Center for International Energy and Environmental Policy, University of Texas at Austin, Austin, TX, United States*, Michael E. Webber, *University of Texas at Austin, Webber Energy Group, Austin, TX, United States***3:51pm Energy Benchmarking of Water and Wastewater Treatment, Distribution, and Collection: A Case Study of the Austin Water Utility****Technical Paper Publication.** IMECE2013-65309Jill B. Kjellsson, *University of Texas at Austin, Austin, TX, United States*, David Greene, Raj Bhattarai, *Austin Water, Austin, TX, United States*, Michael E. Webber, *University of Texas at Austin, Webber Energy Group, Austin, TX, United States***4:08pm Water Use in Low-Carbon Electricity Futures: National and Regional Analysis****Technical Presentation.** IMECE2013-66408Sandra Sattler, Steve Clemmer, John Rogers, *Union of Concerned Scientists, Cambridge, MA, United States*, Jordan Macknick, *National Renewable Energy Laboratory, Golden, CO, United States***4:25pm Potential Game Changing Cooling Technology Development for Power Plant Water Conservation****Technical Presentation.** IMECE2013-64101Jessica Shi, Sean Bushart, *Electric Power Research Institute, Palo Alto, CA, United States*

TUESDAY, NOVEMBER 19

7-3 DESIGN AND ANALYSIS OF ENERGY
CONVERSION SYSTEMS

7-3-1 Solar Thermal and Cooling Systems

3rd Floor, Manchester Grand Hyatt, Emma C 9:45am–11:30am

Session Organizer: Halil Berberoglu, *University of Texas at Austin, Austin, TX, United States*9:45am **Experimental Analysis of a Tracking Solar Water Heating System by Real-Time Digital Tracking Method**

Technical Paper Publication. IMECE2013-62030
P. Rhushi Prasad, K.S. Badarinarayan, *MVJ College of Engineering, Bangalore, Karnataka Sate, India*, P.B. Gangavati, *Basaveshwar Engineering College, Bagalkot, Karnataka, India*, H.V. Byregowda, *Ghousia College of Engineering, Ramanagaram, Karnataka Sate, India*

10:02am **Design and Analysis of Solar Tracking System for Multipurpose Domestic Applications**

Extended Abstract Publication. IMECE2013-62102
P. Rhushi Prasad, K.S. Badarinarayan, *MVJ College of Engineering, Bangalore, Karnataka Sate, India*, P.B. Gangavati, *Basaveshwar Engineering College, Bagalkot, Karnataka, India*, H.V. Byregowda, *Ghousia College of Engineering, Ramanagaram, Karnataka Sate, India*

10:19am **Numerical Simulation of Aerodynamic Force on Solar Panels**

Technical Paper Publication. IMECE2013-63725
Aklilu G. Giorges, Guillermo J. Amador, Joseph Goodman, Kevin Caravati, *Georgia Institute of Technology, Atlanta, GA, United States*

10:36am **Preliminary Investigation of a Liquid Desiccant System for Dehumidification and Cooling in Athens**

Technical Paper Publication. IMECE2013-63376
Irene Koronaki, Emmanuel Rogdakis, *National Technical University of Athens, Zografou, Greece*, Rosa Christodoulaki, Vassileios Papaefthimiou, *National Technical University of Athens, Athens, Greece*

10:53am **Geothermal-Driven Ejector Refrigeration System**

Technical Paper Publication. IMECE2013-64949
Mark Anthony Redo, Menandro Berana, *University of the Philippines, Quezon City, Metro Manila, Philippines*

11:10am **A CFD-Based Robust Design of Operating Conditions for an HVAC System**

Technical Paper Publication. IMECE2013-66431
Luis Arias, Marco Sanjuan, Antonio Bula, *Universidad del Norte, Barranquilla, Colombia*

7-5 FUEL CELL SYSTEMS DESIGN AND APPLICATION

7-5-3 Low Temperature Fuel Cells

3rd Floor, Manchester Grand Hyatt, Connaught 9:45am–11:30am

Session Organizer: Abel Hernandez-Guerrero, *University of Guanajuato, Salamanca, Guanajuato, Mexico*Session Co-Organizer: Whitney Colella, *Strategic Analysis Inc., Arlington, VA, United States*9:45am **Parametric Analysis of Single-Phase and Two-Phase Models of a Microfluidic Direct Methanol Fuel Cell**

Technical Paper Publication. IMECE2013-62210
Usama Tohid, Arturo Pacheco-Vega, *California State University, Los Angeles, Los Angeles, CA, United States*

10:11am **Analyze of Impedance for Water Management in Proton Exchange Membrane Fuel Cells Using Factorial Design of (DoE) Methodology**

Technical Paper Publication. IMECE2013-63475
Khaled Mammam, *University of Bechar, Bechar, Algeria*, Belkacem Ould Bouamama, *École Polytechnique Universitaire de Lille (LAGIS), Lille, France*

10:37am **Analysis of a Permselective Membrane-Free Alkaline Direct Ethanol Fuel Cell**

Technical Paper Publication. IMECE2013-64988
Jing Huang, Amir Faghri, *University of Connecticut, Storrs, CT, United States*, Hafez Bahrami, *University of Connecticut, Willington, CT, United States*

11:03am **Two-Phase Flows in Gas Flow Channels of PEM Fuel Cells**

Technical Paper Publication. IMECE2013-66070
Sung Chan Cho, Yun Wang, *University of California, Irvine, Irvine, CA, United States*

7-8 EMERGING ENERGY TECHNOLOGIES OF THE
21ST CENTURY7-8-4 Advanced Alternative Energy Cycles, Systems,
and Fuels II

3rd Floor, Manchester Grand Hyatt, Emma B 9:45am–11:30am

Session Organizer: Yanan Gan, *Praxair Inc., Tonawanda, NY, United States*9:45am **Flame-Made Catalyst for Bio-Methanol Steam Reforming**

Technical Paper Publication. IMECE2013-65425
Nico Hotz, *Duke University, Durham, NC, United States*

10:02am **Analysis and Experiment on Dynamic Prediction in Magnesium Hydride Hydrolysis as Hydrogen Generator**

Technical Paper Publication. IMECE2013-62502
Chung-Hsing Chao, Yen-Hsi Ho, *University of Wisconsin, Milwaukee, Milwaukee, WI, United States*, Tien-Chien Jen, *University of Alaska, Anchorage, Anchorage, AK, United States*

TRACK 7 ENERGY / TUESDAY, NOVEMBER 19

10:19am Mathematical Modeling of Hydrogen Production by Steam Reforming of Methane Produced by Biomass Gasification

Technical Paper Publication. IMECE2013-63149
Parham Sadooghi, Reinhard Rauch, *Vienna University of Technology, Vienna, Austria*

10:36am Modeling of a Catalytic Flat Plate Fuel Reformer for Hydrogen-Rich Reformate Fuel

Technical Paper Publication. IMECE2013-63298
Susanta Kumar Das, Kranthi Gadde, *Kettering University, Flint, MI, United States*

10:53am Combustion Simulation of Hydrogen-Fueled Diesel Engines Using Detailed Chemical Kinetics

Technical Paper Publication. IMECE2013-65194
Hassan Khairallah, Umit O. Koçlu, *Missouri University of Science and Technology, Rolla, MO, United States*

11:10am Combustion Characteristics of Biomass Ash and Lignite Blend Under Oxy-Fuel Conditions

Technical Paper Publication. IMECE2013-65182
Ehsan Abbasi Atibeh, *McGill University, Montreal, QC, Canada*, Ahmet Yozgatligil, *Middle East Technical University, Ankara, Turkey*

7-11 WIND, GEOTHERMAL, AND OCEAN ENERGY**7-11-1 Wind Energy I**

4th Floor, Manchester Grand Hyatt, Randle E 9:45am–11:30am

Session Organizer: **Rajnish N. Sharma**, *University of Auckland, Auckland, New Zealand*

Session Chair: **Mohammed Rafiuddin Ahmed**, *University of the South Pacific, Suva, Fiji*

9:45am A Numerical Study on the Effects of Unsteady Wind on Vertical Axis Wind Turbine Performance

Technical Paper Publication. IMECE2013-62493
Louis Angelo Danao, *University of the Philippines, Quezon City, Philippines*, Jonathan Edwards, Okeoghene Eboibi, Robert Howell, *University of Sheffield, Sheffield, United Kingdom*

10:02am Twenty Percent Wind, Energy Storage, and the Texas Grid

Technical Presentation. IMECE2013-63073
Jared Garrison, Ross Baldick, *University of Texas at Austin, Austin, TX, United States*, Carey W. King, *Center for International Energy and Environmental Policy, University of Texas at Austin, Austin, TX, United States*, Michael E. Webber, *University of Texas at Austin, Webber Energy Group, Austin, TX, United States*

10:19am Dynamic Analysis of a Gearless Wind Turbine Coupled to a DFIG

Technical Paper Publication. IMECE2013-63473
Grant Ericson, Nilabh Srivastava, *University of North Carolina at Charlotte, Charlotte, NC, United States*

10:36am Design Software for Vortex-Induced Vibration Wind Energy Harvester

Technical Presentation. IMECE2013-63608
James Chen, Jason Norman, Caleb J. Fisher, *Pennsylvania State University, Altoona, PA, United States*

10:53am Value-Centric Approaches to Design, Operations, and Maintenance of Wind Turbines.

Technical Paper Publication. IMECE2013-63834
Madhur Khadabadi, Karen Marais, *Purdue University, West Lafayette, IN, United States*

11:10am Simulation of Vertical Axis Wind Turbines With Variable Pitch Foils

Technical Paper Publication. IMECE2013-65694
Damon Woods, *University of Idaho Integrated Design Lab, Boise, ID, United States*, John F. Gardner, *Boise State University, Boise, ID, United States*, Kurt Myers, *Idaho National Laboratory, Idaho Falls, ID, United States*

7-12 NANOMATERIALS AND NANOSTRUCTURES FOR ENERGY APPLICATIONS**7-12-3 Energy Conversion and Storage**

3rd Floor, Manchester Grand Hyatt, Emma A 9:45am–11:30am

Session Organizer: **Zhenhai Xia**, *University of North Texas, Denton, TX, United States*

9:45am Electrospun TiO₂ Nanorod With Carbon Nanotube for Efficient Electron Collection in Dye Sensitized Solar Cell

Technical Presentation. IMECE2013-65486
Lijun Yang, Woon-fong Leung, *Hong Kong Polytechnic University, Hong Kong, China*

10:02am Designer Thermal Storage Composites Using Size-Dependent Melting and Monodisperse Nanoparticle Ensembles

Technical Presentation. IMECE2013-63662
Minglu Liu, Robert Wang, *Arizona State University, Tempe, AZ, United States*

10:19am Zinc Oxide Nano Structures on Zinc Plate for Energy Harvesting Application

Technical Paper Publication. IMECE2013-64418
Naveed Sheikh, Nitin Afzulpurkar, Shahzadi Tayyaba, *Asian Institute of Technology, Thailand, Bangkok, Thailand*, Muhammad Waseem Ashraf, *GC University Lahore Pakistan, Lahore, Pakistan*

10:36am Effects of Conductive Nanomaterials on Hydrogen Production During Electrolysis

Technical Paper Publication. IMECE2013-66512
Ramazan Asmatulu, Vishal Nageshkar, Madhulika Srikanth, Emil Jurak, *Wichita State University, Wichita, KS, United States*

10:53am Accessing Quantum Capacitance in Nanomaterials

Technical Presentation. IMECE2013-65468
Yuranan Hanlumuayang, Pradeep Sharma, Xiaobao Li, *University of Houston, Houston, TX, United States*

11:10am Glass-Oxide Nanocomposites as Effective Thermal Insulation Materials

Technical Presentation. IMECE2013-65972
Qing Hao, Mingqing Li, Qiang Li, Garrett Joseph Coleman, Pierre Lucas, *University of Arizona, Tucson, AZ, United States*

7-3 DESIGN AND ANALYSIS OF ENERGY CONVERSION SYSTEMS

7-3-2 Exergy Analysis and Thermoconomics

3rd Floor, Manchester Grand Hyatt, Emma C 1:00pm–2:45pm

Session Organizer: **George Tsatsaronis**, *Technical University Berlin, Berlin, Germany*

Session Co-Organizer: **Roberto Carapellucci**, *University of L'Aquila, L'Aquila, Italy*

1:00pm Integrated Study of a Minimum Exergy Destruction Building Conditioning System

Technical Paper Publication. IMECE2013-62672
Claudia Toro, Enrico Sciubba, Fabrizio Ferraro, *University of Rome Sapienza, Roma, Italy*

1:17pm On the Additivity of Entropy, the Geometry of Thermodynamics, and the Maximizing of Power-Plant Thermal Efficiency at No Cost

Technical Paper Publication. IMECE2013-63369
Eli Yasni, *Entropy NZ, Dunedin, New Zealand*

1:34pm Exergy Optimization for Gas Turbine Based Cogeneration Systems

Technical Paper Publication. IMECE2013-65080
Ana Ferreira, Senhorinha Teixeira, Luis Martins, Manuel Nunes, José Carlos Teixeira, *University of Minho, Guimarães, Portugal*

1:51pm Thermal Design of Alkaline Water Electrolysis Assisted by Combined Flash Binary Geothermal Power Plant

Technical Paper Publication. IMECE2013-62671
Mehmet Kanoglu, Ceyhun Yilmaz, *University of Gaziantep, Gaziantep, Turkey*

2:08pm Extended Exergy as a Locally Significant Environmental Indicator

Technical Paper Publication. IMECE2013-63649
Enrico Sciubba, *University of Roma Sapienza, Italy, Roma, Italy*

2:25pm Exergoeconomic Evaluation of a Solid-Oxide Fuel-Cell-Based Combined Heat and Power Generation System

Technical Paper Publication. IMECE2013-64527
Young Duk Lee, Kook Young Ahn, *Korea Institute of Machinery & Materials, Daejeon, Korea (Republic)*, Tatiana Morosuk, George Tsatsaronis, *Technical University Berlin, Berlin, Germany*

7-11 WIND, GEOTHERMAL, AND OCEAN ENERGY

7-11-2 Wave Energy

3rd Floor, Manchester Grand Hyatt, Emma B 1:00pm–2:45pm

Session Organizer: **Yingchen Yang**, *University of Texas at Brownsville, Brownsville, TX, United States*

1:00pm A Mathematical Model for a Gyroscopic Ocean-Wave Energy Converter

Technical Paper Publication. IMECE2013-62834
Hidenori Murakami, Oscar Rios, *University of California, San Diego, La Jolla, CA, United States*

1:17pm Establishment of a Wave Energy and Technology Lab to Promote the Experimental Study of Ocean and Wave Energy

Technical Paper Publication. IMECE2013-62968
Yucheng Liu, Jeremiah Pastor, Raul Viera, *University of Louisiana at Lafayette, Lafayette, LA, United States*

1:34pm Wave to Drive a Direct Rotor for Unidirectional Rotation

Technical Paper Publication. IMECE2013-64394
Yingchen Yang, *University of Texas at Brownsville, Brownsville, TX, United States*

1:51pm Floating Type Ocean Wave Power Station (Wells Type Runner Work Submerged in Seawater)

Technical Paper Publication. IMECE2013-65997
Shun Okamoto, Toru Eshima, Toshiaki Kanemoto, Toshihiko Umekage, *Kyushu Institute of Technology, Kitakyushu, Japan*

2:08pm Overview of Ocean Energy Research in the South Pacific

Technical Presentation. IMECE2013-66143
Mohammed Rafiuddin Ahmed, *University of the South Pacific, Suva, Fiji*

2:25pm Experimental and Computational Investigation of the Drag of a Towed Hydropower Turbine

Technical Paper Publication. IMECE2013-63700
Grant Bryan, Max Platzer, Young Kwon, *Naval Postgraduate School, Monterey, CA, United States*

TRACK 7 ENERGY / TUESDAY, NOVEMBER 19**7-12 NANOMATERIALS AND NANOSTRUCTURES FOR ENERGY APPLICATIONS****7-12-4 Nanomaterial Fibers****3rd Floor, Manchester Grand Hyatt, Emma A 1:00pm–2:45pm**Session Organizer: **Binggong Wei**, *University of Delaware, Newark, DE, United States*Session Co-Organizer: **Robert Vajtai**, *Rice University, Houston, TX, United States***1:00pm Strong, Light, Multifunctional Fibers of Carbon Nanotubes With Ultrahigh Conductivity****Invited Presentation.** IMECE2013-65902Matteo Pasquali, *Rice University, Houston, TX, United States***1:17pm Highly Conductive Carbon Nanotube Fibers****Invited Presentation.** IMECE2013-66242Jinquan Wei, Kunlin Wang, Dehai Wu, Fengmei Guo, Shaoqing He, *Tsinghua University, Beijing, China***1:34pm Controlled Self-Assembly of Functionalized Carbon Nanotubes on Silicon Substrates****Technical Paper Publication.** IMECE2013-66579S.M. Mortuza, Soumik Banerjee, *Washington State University, Pullman, WA, United States***1:51pm Ampacity of Carbon Nanotube Fibers for Power Transmission****Technical Presentation.** IMECE2013-66237Xuan Wang, Colin C. Young, Dmitri E. Tsentlovich, Natnael Behabtu, Matteo Pasquali, Junichiro Kono, *Rice University, Houston, TX, United States***2:08pm Carbon Nanotube Wires****Invited Presentation.** IMECE2013-65908Robert Vajtai, *Rice University, Houston, TX, United States***2:25pm Carbon Fiber****Invited Presentation.** IMECE2013-67419Christopher Dyke, *NanoRidge Materials, Inc., Houston, TX, United States***7-3 DESIGN AND ANALYSIS OF ENERGY CONVERSION SYSTEMS****7-3-3 Low-Grade Heat Recovery Systems****3rd Floor, Manchester Grand Hyatt, Emma C 3:00pm–4:45pm**Session Organizer: **Roberto Capata**, *University of Roma, Roma, Italy*Session Co-Organizer: **Zhen Huang**, *IBM, Austin, TX, United States***3:00pm Optimization of Screw Expanders for Power Recovery From Low Grade Heat Sources****Technical Paper Publication.** IMECE2013-62129Matthew Read, Ian Smith, Nikola Stosic, *City University, London, United Kingdom***3:17pm Feasibility Study of a Supercritical Cycle as a Waste Heat Recovery System****Technical Paper Publication.** IMECE2013-62603Antonio Agresta, Fausto Gamma, *University of Rome Sapienza, Rome, Italy*, Antonella Ilgenito, *La Sapienza, Roma, Italy*, Roberto Andriani, *Milan Polytechnic, Milan, Italy***3:34pm Performance of Cogeneration Systems Using Waste Heat****Technical Paper Publication.** IMECE2013-63026Mohammed Khennich, Nicolas Galanis, Mikhail Sorin, *Université de Sherbrooke, Sherbrooke, QC, Canada***3:51pm A Small-Scale ORC Energy Recovery System for Vehicular Application: Feasibility Analysis and Preliminary Components Design****Technical Paper Publication.** IMECE2013-63410Roberto Capata, *University of Roma, Roma, Italy*, Enrico Sciubba, *University of Roma Sapienza, Italy, Roma, Italy***4:08pm Design and Analysis of Ejector Powerplant System****Technical Paper Publication.** IMECE2013-65130Menandro Berana, *University of the Philippines, Quezon City, Metro Manila, Philippines*, Edward Bermido, *Moretek Systems Inc., Quezon City, Metro Manila, Philippines***4:25pm Design and Optimization of a Low-Temperature Organic Rankine Cycle and Turbine****Technical Paper Publication.** IMECE2013-66727Murat Erbas, Mehmet Alper Sofuoglu, Atila Biyikoglu, Ibrahim Uslan, *Gazi University, Ankara, Turkey***7-11 WIND, GEOTHERMAL, AND OCEAN ENERGY****7-11-3 Geothermal and Tidal Energy****3rd Floor, Manchester Grand Hyatt, Emma B 3:00pm–4:45pm**Session Organizer: **Hadi Ghasemi**, *Massachusetts Institute of Technology, Cambridge, MA, United States*Session Co-Organizer: **Mohammed Rafiuddin Ahmed**, *University of the South Pacific, Suva, Fiji***3:00pm Numeric Modeling of Fluid Flow and Thermal Behavior in Geothermal Heat Exchangers****Technical Paper Publication.** IMECE2013-65098Willis H. Thompson III, Srinath Ekkad, C. Guney Olgun, Joseph Wheeler, *Virginia Polytechnic Institute and State University, Blacksburg, VA, United States***3:17pm Feasibility Analysis for a Tidal Energy Pilot Site in the Gulf of California****Technical Paper Publication.** IMECE2013-65084Juan C. Tapia-Olivas, Hector Campbell, Margarita Gil Samaniego Ramos, *Universidad Autonoma de Baja California, Mexicali, Baja C., Mexico***3:34pm Counter-Rotating Type Tidal-Stream Power Unit Playing Favorable Features in Various Ocean Circumstances****Technical Paper Publication.** IMECE2013-66001Yuta Usui, Kohei Takaki, Toshiaki Kanemoto, Koju Hiraki, *Kyushu Institute of Technology, Kitakyushu, Fukuoka, Japan*

3:51pm Optimization of Hydrofoils for Horizontal Axis Marine Current Turbines Using Genetic Algorithm

Technical Paper Publication. IMECE2013-66416

Krishnil Ravinesh Ram, Jai N. Goundar, Deepak Prasad, Sunil Lal, Mohammed Rafiuddin Ahmed, *University of the South Pacific, Suva, Fiji*

4:08pm Design and Performance Testing of a Ducted Savonius Turbine for Marine Current Energy Extraction

Technical Paper Publication. IMECE2013-66417

Jai N. Goundar, Deepak Prasad, Mohammed Rafiuddin Ahmed, *University of the South Pacific, Suva, Fiji*

4:25pm Numerical Simulation of Hydrodynamic Performance of a Horizontal Axis Tidal Current Turbine With Bidirectional-Flow

Technical Presentation. IMECE2013-62851

Ze Wang, Long Li, Yu Chen, Ping Wang, *Hohai University, Nanjing, Jiangsu, China*

7-16 NUCLEAR POWER PLANTS: DESIGN, ANALYSIS, AND SAFETY

7-16-4 Neutronics, Fluid, Thermal

3rd Floor, Manchester Grand Hyatt, Connaught 3:00pm–4:45pm

Session Organizer: **Hakan Ozaltun**, *Idaho National Laboratory, Idaho Falls, ID, United States*

Session Co-Organizer: **Jovica Riznic**, *Canadian Nuclear Safety Commission, Ottawa, ON, Canada*

3:00pm Evaluation of Advanced Thermal-Hydraulic System Codes for Safety Analysis of Integral Type PWR

Technical Paper Publication. IMECE2013-63215

Jong Ho Choi, *International Atomic Energy Agency, Vienna, Austria*, Brian G. Woods, *Oregon State University, Corvallis, OR, United States*

3:21pm Multidimensional Thermal-Hydraulic Analysis on Natural Circulation Behavior in Ex-Vessel Fuel Storage Tank of MONJU

Technical Paper Publication. IMECE2013-64037

Jun Ohno, Takero Mori, Masutake Sotsu, Hiroaki Ohira, *Japan Atomic Energy Agency, Tsuruga-shi, Fukui-ken, Japan*

3:42pm Optimization of Thermodynamics Cycles of the Generation IV Gas-Cooled Fast Reactors

Technical Paper Publication. IMECE2013-64565

Jiri Polansky, Roman Gáapár, *University of West Bohemia, Pilsen, Czech Republic*

4:03pm Thermal Predictions of the AGR-3/4 Experiment

Technical Paper Publication. IMECE2013-65155

Grant Hawkes, James Sterbentz, John Maki, *Idaho National Laboratory, Idaho Falls, ID, United States*

4:24pm Experimental Study of the Cooling Performance of the PAFS (Passive Auxiliary Feedwater System) During Transient Operation

Technical Paper Publication. IMECE2013-63978

Byoung-Uhn Bae, Seok Kim, Yusun Park, Kyoung-Ho Kang, *Korea Atomic Energy Research Institute, Daejeon, Korea (Republic)*

7-18 SYMPOSIUM ON THERMAL ENERGY STORAGE

7-18-1 Symposium on Thermal Energy Storage I

3rd Floor, Manchester Grand Hyatt, Emma A

3:00pm–4:45pm

Session Organizer: **Reza Baghaei Lakeh**, *University of California, Los Angeles, Los Angeles, CA, United States*

Session Co-Organizer: **Amanda D. Smith**, *University of Utah, Salt Lake City, UT, United States*

3:00pm Halloysite Clay Nanotubes With PCM for Thermal Energy Storage and Efficiency

Technical Paper Publication. IMECE2013-63567

Suvhashis Thapa, Yafei Zhao, Yuri Lvov, Leland Weiss, *Louisiana Tech University, Ruston, LA, United States*

3:21pm Numerical Solution of Heat Transfer During Solidification of an Encapsulated Phase Change Material

Technical Paper Publication. IMECE2013-64474

Antonio Ramos, Muhammad Rahman, D. Yogi Goswami, Elias Stefanakos, *University of South Florida, Tampa, FL, United States*

3:42pm Melting in Vertical Cylinders During Thermal Energy Storage

Technical Paper Publication. IMECE2013-64820

Prashanth Sridharan, Antonio Ramos, Muhammad Rahman, D. Yogi Goswami, Elias Stefanakos, *University of South Florida, Tampa, FL, United States*

4:03pm Flash Boiling and Desorption From a Macroporous Carbon-Boron-Nitrogen Foam

Technical Paper Publication. IMECE2013-64884

Jeffrey D. Engerer, Galen R. Jackson, Rajib Paul, Timothy S. Fisher, *Purdue University, West Lafayette, IN, United States*

4:24pm Isobaric, Isochoric, and Supercritical Thermal Energy Storage in R134a

Technical Paper Publication. IMECE2013-64947

Benjamin Furst, Adrienne Lavine, Reza Baghaei Lakeh, Richard E. Wirz, *University of California, Los Angeles, Los Angeles, CA, United States*

TRACK 7 ENERGY / TUESDAY, NOVEMBER 19**7-3 DESIGN AND ANALYSIS OF ENERGY
CONVERSION SYSTEMS****7-3-4 Design and Analysis of Energy Systems I****3rd Floor, Manchester Grand Hyatt, Emma C 5:00pm–6:45pm**Session Organizer: **Mark Deinert**, *University of Texas at Austin, Austin, TX, United States*Session Co-Organizer: **Lorena Giordano**, *University of L'Aquila, L'Aquila, Italy***5:00pm Design and Optimization of Free Piston Expander for Energy Harvesting****Technical Paper Publication.** IMECE2013-64798
Christopher Champagne, Leland Weiss, *Louisiana Tech University, Ruston, LA, United States***5:17pm Self-Powered Interface External Circuit for Low-Frequency Acoustic Energy Harvester****Technical Paper Publication.** IMECE2013-65824
Bin Li, Jeong Ho You, *Southern Methodist University, Dallas, TX, United States*, Yong-Joe Kim, *Texas A&M University, College Station, TX, United States***5:34pm Single-Phase Ceramic Membranes Integrated Into Combustion Processes****Technical Paper Publication.** IMECE2013-62351
Pingying Zeng, Kang Wang, Ryan Falkenstein-Smith, Jeongmin Ahn, *Syracuse University, Syracuse, NY, United States***5:51pm Systems Generating Electricity Through Expansion of Natural Gas: Effect of the Ambient Temperature to the Performance****Technical Paper Publication.** IMECE2013-64313
Tatiana Morosuk, George Tsatsaronis, Stefanie Tesch, *Technical University Berlin, Berlin, Germany***6:08pm Optimal Control of the Pumping System in Large District Heating Network****Technical Paper Publication.** IMECE2013-65169
Vittorio Verda, Adriano Sciacovelli, Elisa Guelpa, *Politecnico di Torino, Torino, Italy***6:25pm Development of a Comprehensive Virtual Training Package for Power Plant Boiler****Technical Paper Publication.** IMECE2013-66570
Bin Wu, Chenn Zhou, Guangwu Tang, Fan Li, Litao Shen, *Purdue University Calumet, Hammond, IN, United States*, Joel E. Heim, *Northern Indiana Public Service Company, LaPorte, IN, United States***7-11 WIND, GEOTHERMAL, AND OCEAN ENERGY****7-11-4 Wind Energy II****3rd Floor, Manchester Grand Hyatt, Emma B 5:00pm–6:45pm**Session Organizer: **Toshiaki Kanemoto**, *Kyushu Institute of Technology, Kitakyushu, Fukuoka, Japan*Session Co-Organizer: **Mohammed Rafiuddin Ahmed**, *University of the South Pacific, Suva, Fiji***5:00pm Parametric Analysis of a Savonius Rotor Through Comparison of Various Turbulence Models****Technical Paper Publication.** IMECE2013-64003
Sukanta Roy, Ujjwal K. Saha, *Indian Institute of Technology Guwahati, Guwahati, India***5:17pm Turbulence Reduction in the Wake Using Suction****Technical Presentation.** IMECE2013-64307
Jasvipul Chawla, Shashikanth Suryanarayanan, *Indian Institute of Technology Bombay, Mumbai, Maharashtra, India*, John Sheridan, *Monash University, Monash, Australia*, Brian G. Falzon, *Queens University Belfast, Belfast, Northern Ireland, United Kingdom***5:34pm Optimization of Wind Turbine Airfoil With Good Stall Characteristics by Genetic Algorithm Using CFD and Neural Network****Technical Paper Publication.** IMECE2013-64598
Amir Latifi Bidarouni, *Ferdowsi University of Mashhad, Lahijan, Iran*, Mohammad Hasan Djavareshkian, *Ferdowsi University of Mashhad, Mashhad, Iran***5:51pm Direct Adaptive Individual Blade Pitch Control for Large Wind Turbines****Technical Paper Publication.** IMECE2013-64817
Kaman Thapa Magar, Mark Balas, *University of Wyoming, Laramie, WY, United States*, Susan Frost, *NASA Ames Research Center, Moffett Field, CA, United States***6:08pm Design and Analysis of a Dual-Axis Phase Locked Resonant Excitation Fatigue Test****Technical Paper Publication.** IMECE2013-65065
Jenna Beckwith, Darris White, Domenic Barsotti, *Embry-Riddle Aeronautical University, Daytona Beach, FL, United States***6:25pm Computational Studies on the Flow Field of Various Shapes-Bladed Vertical Axis Savonius Turbine in Static Condition****Technical Paper Publication.** IMECE2013-65081
Jobaidur Khan, Mohammad M. Bashar, Mosfequr Rahman, *Georgia Southern University, Statesboro, GA, United States*

7-17 SYMPOSIUM ON ENERGY-WATER NEXUS**7-17-2 Symposium on Energy-Water Nexus II****3rd Floor, Manchester Grand Hyatt, Connaught 5:00pm–6:45pm**Session Organizer: **Neda Nazemifard**, *University of Alberta, Edmonton, Canada*Session Chair: **Michael Hightower**, *Sandia National Laboratories, Albuquerque, NM, United States***5:00pm Modeling a Combined Energy-Water Storage System for Residential Homes and Analyzing Water Storage Tank Size****Technical Paper Publication.** IMECE2013-63967Charles R. Upshaw, Joshua D. Rhodes, *University of Texas at Austin, Austin, TX, United States*, Michael E. Webber, *University of Texas at Austin, Webber Energy Group, Austin, TX, United States***5:17pm Power Plant Heat Rejection System Modeling and Comparison****Technical Paper Publication.** IMECE2013-64446Thomas Carter, *Johnson Controls, Inc., Olney, MD, United States*, James Furlong, *Johnson Controls, Waynesboro, PA, United States*, Sean Bushart, Jessica Shi, *Electric Power Research Institute, Palo Alto, CA, United States***5:34pm Infrared Imaging of the Spatial Distribution of Fouling on a Membrane Surface****Presentation Only.** IMECE2013-65203Kennethrex Ndukaife, George Agbai Nnanna, *Purdue University Calumet, Hammond, IN, United States***5:51pm The Permeability, Salt Rejection, and Strength of Inorganic Nanostructured Reverse Osmosis Membrane****Technical Presentation.** IMECE2013-66042Yilun Liu, Xi Chen, *Columbia University, New York, NY, United States***6:08pm Ion Rejection Ability of Directional Solvent****Technical Presentation.** IMECE2013-66049Daniel Rish, Brien Kurtz, Tengfei Luo, *University of Notre Dame, Notre Dame, IN, United States***6:25pm Experimental Study of a Solar Thermal Desalination Unit****Technical Paper Publication.** IMECE2013-66174Mohammad Abutayeh, Mohammad Humood, Ammar Abdulkarim Alsheghri, Abdullah Al Hammadi, Abdul Rahman Farraj, *Khalifa University of Science, Technology & Research, Abu Dhabi, United Arab Emir.***7-18 SYMPOSIUM ON THERMAL ENERGY STORAGE****7-18-2 Symposium on Thermal Energy Storage II****3rd Floor, Manchester Grand Hyatt, Emma A 5:00pm–6:45pm**Session Organizer: **Monica Hansel**, *Siemens Energy, Orlando, FL, United States*Session Co-Organizer: **Glenn MacDonald**, *Stress Subsea, Inc., Houston, TX, United States***5:00pm Ice Build-Up Modeling and Performance Effectiveness of the Customized External-Melt Ice Thermal Energy Storage in the Philippines****Technical Paper Publication.** IMECE2013-65300Ruben Bongat, *Technological Institute of the Philippines, Quezon City, Metro Manila, Philippines*, Menandro Berana, *University of the Philippines, Quezon City, Metro Manila, Philippines***5:26pm Numerical Simulation of Heat Pipe-Assisted Latent Heat Thermal Energy Storage Unit for Dish-Stirling Systems****Technical Paper Publication.** IMECE2013-65487Hamidreza Shabgard, *University of Connecticut, Willimantic, CT, United States*, Amir Faghri, *University of Connecticut, Storrs, CT, United States*, Theodore Bergman, *University of Kansas, Lawrence, KS, United States*, Charles Andraka, *Sandia National Laboratories, Albuquerque, NM, United States***5:52pm Material Compatibility Study for Thermal Energy Storage Containment Structure With Phase Change Material****Technical Paper Publication.** IMECE2013-66634Songgang Qiu, *Temple University, Philadelphia, PA, United States*, Ross Galbraith, *Infinia Corporation, Ogden, UT, United States***6:18pm Opportunities for Thermal Storage in Buildings****Technical Presentation.** IMECE2013-64464Patrick Phelan, Omar Abdelaziz, Karma Sawyer, *U.S. Department of Energy, Washington, DC, United States*

TRACK 7 ENERGY / THURSDAY, NOVEMBER 21

THURSDAY, NOVEMBER 21

7-14 CLEAN TECHNOLOGIES FOR EFFICIENCY AND SUSTAINABILITY

7-14-1 Renewable Energy Systems Analyses

3rd Floor, Manchester Grand Hyatt, Emma C 7:45am–9:15am

Session Organizer: **Chuanwei Zhuo**, *Northeastern University, Boston, MA, United States*

7:45am **Small Scale Prototype Biomass Drying System for Co-Combustion With Coal**

Technical Paper Publication. IMECE2013-62188
Heather Roberts, Mitch Favrow, Jesse Coatney, David Yoe, Chenaniah Langness, Christopher Depcik, *University of Kansas, Lawrence, KS, United States*

8:03am **Proof-of-Concept Combined Shrouded Wind Turbine and Compressed Air Energy Storage System**

Technical Paper Publication. IMECE2013-62226
Chenaniah Langness, Daniel Kolsky, Tyler Busch, Colin Davidson, Christopher Depcik, *University of Kansas, Lawrence, KS, United States*

8:21am **Economic Modeling of Hybrid Energy System**

Technical Paper Publication. IMECE2013-63663
Olumide Bello, Dajanel Roberts-Smith, Landon Onyebueke, *Tennessee State University, Nashville, TN, United States*

8:39am **Factors Affecting Consumer Demand for Photovoltaic Systems**

Technical Presentation. IMECE2013-65581
Brady Stoll, Tim Smith, Mark Deinert, *University of Texas at Austin, Austin, TX, United States*

8:57am **Power Load Cost Optimization for a High Solar Penetration Community**

Technical Presentation. IMECE2013-65014
Amanpreet Kaur, Hugo T.C. Pedro, Carlos Coimbra, *University of California, San Diego, La Jolla, CA, United States*, Bron Davis, *University of California, Merced, Merced, CA, United States*

7-14 CLEAN TECHNOLOGIES FOR EFFICIENCY AND SUSTAINABILITY

7-14-2 Combustion, Gasification, Generation, and Efficiency

3rd Floor, Manchester Grand Hyatt, Emma C 9:30am–11:15am

Session Organizer: **Reza Khatami**, *Northeastern University, Boston, MA, United States*

9:30am **Numerical Research on Dual Fuel Combustor Combustion Performance**

Technical Paper Publication. IMECE2013-62435
Gang Pan, Hongtao Zheng, Chunliang Zhou, Zhijia Song, *Harbin Engineering University, Harbin, Heilongjiang, China*

9:43am **Technology Outlook and Sustainability of the Synthetic Natural Gas Production Process Derived From Coal**

Technical Paper Publication. IMECE2013-62584
Orlando M. Ramirez, Lesme Corredor, *Universidad del Norte, Barranquilla, Atlantico, Colombia*

9:56am **CO₂ Capture Using Calcium Oxide Applicable to in Situ Separation of CO₂ From H₂ Production Processes**

Technical Paper Publication. IMECE2013-62619
Saeed Danaei Kenarsari, Yuan Zheng, *University of Wyoming, Laramie, WY, United States*

10:09am **Study of a Concrete Mixer Hybrid Truck**

Technical Paper Publication. IMECE2013-62955
Ferdinando L. Mapelli, Davide Tarsitano, Davide Annese, *Politecnico di Milano, Milan, Italy*, Nicola Pirri, Emanuele Zorzi, *CIFA Spa, Senago - MI, Italy*

10:22am **A Study of High-Pressure CO₂ Recycling Using Pinewood Char Gasification**

Technical Paper Publication. IMECE2013-63530
Indraneel Sircar, Anup Sane, Jay Gore, *Purdue University, West Lafayette, IN, United States*

10:35am **SCU Formula Electric: Design and Integration**

Technical Paper Publication. IMECE2013-65214
Dominic Villa, Mark Allison, Kevin Claggett, Stuart Hopson, Monem Beitelmal, Timothy Hight, *Santa Clara University, Santa Clara, CA, United States*

10:48am **Power Generation With Pressure Retarded Osmosis**

Technical Paper Publication. IMECE2013-66590
Waqas Akram, Mostafa H. Sharqawy, *King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia*

11:01am **Developing a Methodology for Measuring the Comparative Energy Efficiency of Elevators**

Technical Paper Publication. IMECE2013-66663
James Bos, *James W Bos, LLC, Plano, TX, United States*, Robert Dell, Chih Shing Wei, William Foley, *The Cooper Union, New York, NY, United States*

7-14 CLEAN TECHNOLOGIES FOR EFFICIENCY AND SUSTAINABILITY

7-14-3 Solar Energy and Heat Transfer for Sustainability

3rd Floor, Manchester Grand Hyatt, Emma B 1:00pm–2:45pm

Session Organizer: **Andy Miller**, *U.S. EPA Office of Research and Development, Los Angeles, CA, United States*

1:00pm **Solar-Powered Water Distillation System**

Technical Paper Publication. IMECE2013-63786
Monem Beitelmal, Drazen Fabris, Reece Kiriu, *Santa Clara University, Santa Clara, CA, United States*

1:26pm **Solar Energy in the Housing. Case: Mexicali, Baja California, Mexico**

Technical Paper Publication. IMECE2013-64916
Hector Campbell, Rene Delgado, Alejandro A. Lambert Arista, Margarita Gil Samaniego Ramos, *Universidad Autonoma de Baja California, Mexicali, Baja California, Mexico*

1:52pm Feasibility and Basic Design of Solar Integrated Absorption Refrigeration for a Pakistani Industry

Technical Paper Publication. IMECE2013-65043

Saad Ilyas, Saad Akhtar, *GIK Institute, Swabi, KPK, Pakistan*, Tariq S. Khan, *Petroleum Institute, Abu Dhabi, Abu Dhabi, United Arab Emir.*, Mohamed Alshehhi, *Petroleum Institute, Abu Dhabi, Sas Al Nakh, United Arab Emir.*

2:18pm Experimental Investigation of the Effect of Materials and Their Surface Colours on Nocturnal Cooling

Technical Paper Publication. IMECE2013-65920

Nnamdi V. Ogueke, Chidiebere Nwaiwu, Emmanuel Enyioma Anyanwu, *Federal University of Technology, Owerri, Nigeria*, Kevin N. Nwaigwe, *Federal University of Technology, Owerri, Imo State, Nigeria*

7-20 ENERGY SYSTEMS AND THE ENVIRONMENT

7-20-1 Energy in Buildings

3rd Floor, Manchester Grand Hyatt, Emma C 1:00pm–2:45pm

Session Organizer: **Paulo Tabares**, *National Renewable Lab, Golden, CO, United States*

1:00pm Analytical and Experimental Investigation to Determine the Variation of H-W-B Constants for a Scaled Forced Circulation Flat Plate Solar Water Heater

Technical Paper Publication. IMECE2013-63453

Arunachala Chandavar, *Manipal University, Manipal, India, Udupi, India*, Siddhartha Bhatt, *Central Power Research Institute, Bangalore, India*, L.K. Sreepathi, *J N N College of Engineering, Karnataka, India*

1:26pm Prediction of Space Heating Consumption in District Heated Apartments

Technical Paper Publication. IMECE2013-64422

Daniela Popescu, Florina Ungureanu, *Technical University "Gheorghe Asachi" of Iasi, Iasi, Romania*

1:52pm A Parametric Study of Temperature and Volumetric Flow Rate Effects of a Data Center Using Multizone Building Energy Simulation

Technical Paper Publication. IMECE2013-66530

Long Phan, Cheng-xian Lin, *Florida International University, Miami, FL, United States*

2:18pm CFD Modeling of Pressure Coefficients for a Natural Ventilation Study in an Experimental Low Rise Building

Technical Paper Publication. IMECE2013-66789

Robel Kiflemariam, Cheng-xian Lin, *Florida International University, Miami, FL, United States*

7-3 DESIGN AND ANALYSIS OF ENERGY CONVERSION SYSTEMS

7-3-5 Design and Analysis of Energy Systems II

3rd Floor, Manchester Grand Hyatt, Windsor C 3:00pm–4:45pm

Session Organizer: **Mark Deinert**, *University of Texas at Austin, Austin, TX, United States*

Session Co-Organizer: **Lorena Giordano**, *University of L'Aquila, L'Aquila, Italy*

3:00pm Numerical Analysis of Thermoelectric Modules for Automobile Waste Heat Recovery Systems

Technical Presentation. IMECE2013-66072

Sumeet Kumar, Stephen D. Heister, Xianfan Xu, *Purdue University, West Lafayette, IN, United States*, James R. Salvador, *General Motors Global R&D Center, Warren, MI, United States*

3:35pm Design and Computational Validation of In-Line Bare Tube Economizer for 210 MW Pulverized Coal Fired Boiler

Technical Paper Publication. IMECE2013-62073

Pradyumna Dhamangaonkar, Santosh Pansare, Milankumar Nandgaonkar, *College of Engineering, Pune, Pune, Maharashtra, India*, Abhishek Deshmukh, *German Research School for Simulation Sciences, Aachen, Germany*

4:10pm The Dynamic Modeling and Simulation on a Shell Gasifier

Technical Paper Publication. IMECE2013-63550

Huisheng Zhang, Di Huang, Dengji Zhou, Shilie Weng, Zhenhua Lu, *Shanghai Jiao Tong University, Shanghai, China*

7-15 COMPRESSOR TECHNOLOGY

7-15-1 Compressor Technologies

3rd Floor, Manchester Grand Hyatt, Windsor B 3:00pm–4:45pm

Session Organizer: **Guy Phuong**, *Daikin McQuay, Plymouth, MN, United States*

3:00pm Design of Centrifugal Compressor Using CFD Analysis

Technical Paper Publication. IMECE2013-62022

K.V. Muralidharan, *MVJ College of Engineering, Bangalore, Karnataka, India*

3:17pm Compressor Performance Verification: Measuring Tolerances and Guaranteed Power Consumption

Technical Paper Publication. IMECE2013-62032

Marco Ferioli, *Air Liquide, Champigny sur Marne, France*

3:34pm The Effect of Gas Models on Compressor Efficiency Including Uncertainty

Technical Paper Publication. IMECE2013-62611

Fangyuan Lou, John Fabian, Nicole L. Key, *Purdue University, West Lafayette, IN, United States*

3:51pm 3D CFD Analysis of an Oil-Injected Twin Screw Expander

Technical Paper Publication. IMECE2013-64224

Iva Papes, Joris Degroote, Jan Vierendeels, *University of Ghent, Ghent, Belgium*

TRACK 7 ENERGY / THURSDAY, NOVEMBER 21

4:08pm A New Model on Performance of Two-Phase Ejector
Technical Paper Publication. IMECE2013-64411
 Jinsheng Lv, Bo Zhang, *Dalian University of Technology, Dalian, Liaoning, China*

4:25pm Design of a Single-Stage Centrifugal Compressor and Numerical Investigation of Simultaneous Adjustment of Inlet Guide Vanes and Diffuser Vanes
Technical Paper Publication. IMECE2013-65383
 Qifeng Ni, Anping Hou, Ye Tian, *Beihang University, Beijing, China*, Quanyong Xu, *Tsinghua University, Beijing, China*, Enlai Liu, *WeiFang FuYuan Turbochargers Co., Ltd., Weifang, Shandong, China*

7-20 ENERGY SYSTEMS AND THE ENVIRONMENT**7-20-2 Environmental Emissions and Solar Resource Assessments**

3rd Floor, Manchester Grand Hyatt, Emma C 3:00pm–4:45pm

Session Organizer: **Robert Braun**

3:00pm Feasibility and Energy-Saving Effect Analysis for Innovative Environmental Control System of Subway
Technical Paper Publication. IMECE2013-64361
 Zhao Yang, Feng Ma, Xiangchao Su, Longqing Yu, *Tianjin University, Tianjin, China*

3:13pm Evaluating the Rate of Technological Improvement Needed to Achieve Greenhouse Gas Reduction Targets
Technical Paper Publication. IMECE2013-64664
 Andy Miller, *U.S. EPA Office of Research and Development, Los Angeles, CA, United States*

3:26pm Cooling Systems for Power Plants in an Energy-Water Nexus Era
Technical Paper Publication. IMECE2013-64920
 Kau-fui Wong, James Johnston, *University of Miami, Coral Gables, FL, United States*

3:39pm Contrail Effects on Ground-Based Solar Irradiance Measurements
Technical Presentation. IMECE2013-65006
 Marina Fernandez, David Larson, Carlos Coimbra, *University of California San Diego, La Jolla, CA, United States*

3:52pm The Effect of Cloud Cover on Global Solar Resources
Technical Presentation. IMECE2013-65562
 Brady Stoll, Mark Deinert, *University of Texas at Austin, Austin, TX, United States*

4:05pm (A Review) Carbon Nanotubes Used for Renewable Energy Applications and Environmental Protection/Remediation
Technical Paper Publication. IMECE2013-63523
 Kau-fui Wong, Benoit Bachelier, *University of Miami, Coral Gables, FL, United States*

4:18pm CFD Simulation of Multiple Arrays Arrangement of Micro Hydro Power Turbines

Technical Paper Publication. IMECE2013-63561
 Tuan Mohammad Yusoff Shah Tuan Ya, *Universiti Teknologi Petronas, Tronoh, Perak, Malaysia*, N.T. Rao, Idris Mat Sahat, Muhammad Ammar Nik Mutasim, M.A. At-Tasneem, *University Malaysia Pahang, Pekan, Pahang, Malaysia*

4:31pm Enhanced Carbon Capture in a Multiport Microscale Absorber

Technical Paper Publication. IMECE2013-66345
 Harish Ganapathy, Sascha Steinmayer, Amir Shooshtari, Serguei Dessiatoun, Michael Ohadi, *University of Maryland, College Park, MD, United States*, Mohamed Alshehhi, *The Petroleum Institute, Abu Dhabi, Sas Al Nakhl, United Arab Emir.*

7-21 ENERGY SYSTEMS COMPONENTS**7-21-1 Energy Systems Components—General**

3rd Floor, Manchester Grand Hyatt, Connaught 3:00pm–4:45pm

Session Organizer: **Roberto Capata**, *University of Roma, Roma, Italy*
 Session Co-Organizer: **Zhen Huang**, *IBM, Austin, TX, United States*

3:00pm CFD Analysis on Inert Gas Purging in Crude Oil Tank of FPSO

Technical Presentation. IMECE2013-62489
 Jung-Il Lee, Byeong Soo Min, Jung Rae Kim, *Hyundai Heavy Industries, Ulsan, Korea (Republic)*

3:17pm Numerical Calculations of Bidirectional Characteristics on Tidal Current Runner

Technical Paper Publication. IMECE2013-62850
 Long Li, Yu Chen, Ze Wang, *Hohai University, Nanjing, Jiangsu, China*

3:34pm First-Principles Dynamic Modeling of a Linear Micro-Compressor

Technical Paper Publication. IMECE2013-64520
 Mahmoud Alzoubi, Guanqiu Li, TieJun Zhang, *Masdar Institute of Science and Technology, Abu Dhabi, United Arab Emir.*

3:51pm Effect of Adhesive Flaws on the Strength of Adhesive Joints

Extended Abstract Publication. IMECE2013-64533
 Yi Hua, Linxia Gu, *University of Nebraska–Lincoln, Lincoln, NE, United States*

4:08pm The On-Line Calculation Method of Exhaust Steam Humidity Based on BP Neural Network for Steam Turbine

Technical Paper Publication. IMECE2013-62735
 Likun Zheng, *Guangdong Electric Power Science Research Institute, Guangzhou, Guangdong, China*, Chang Chen, Danmei Xie, Hengliang Zhang, Yanzhi Yu, *Wuhan University, Wuhan, Hubei, China*

4:25pm Influence of Skewing of Contact Face on Performance of Wave Rotor Refrigerators and Superchargers

Technical Paper Publication. IMECE2013-63449
 Dia Yuqiang, Fengxia Liu, Wu JinTao, Wei Wei, Hu Dapeng, Liu Xuewu, *Dalian University of Technology, Dalian, Liao Ning, China*

FLUIDS ENGINEERING SYSTEMS & TECHNOLOGIES

MONDAY, NOVEMBER 18

8-3 11TH SYMPOSIUM ON ELECTRIC, MAGNETIC, AND THERMAL PHENOMENA IN MICRO- AND NANOSCALE SYSTEMS

8-3-1 Electric, Magnetic, and Thermal Phenomena in Micro- and Nanoscale Systems I

2nd Floor, Manchester Grand Hyatt, Betsy A 9:45am–11:30am

Session Organizer: **Dennis Siginer**, *Universidad de Santiago de Chile, Santiago, Chile*Session Co-Organizer: **Prashanta Dutta**, *Washington State University, Pullman, WA, United States*

9:45am The Nanoaquarium—A Tool for Visualizing Processes in Liquid Media With Nanometer Resolution

Plenary Presentation. IMECE2013-62431Haim Bau, Sean Anderson, *University of Pennsylvania, Philadelphia, PA, United States*

10:15am Field-Driven Oscillations of Micro-Droplets

Technical Presentation. IMECE2013-63637Boris Khusid, Ezinwa Elele, Yueyang Shen, *New Jersey Institute of Technology, Newark, NJ, United States*

10:30am Electrohydrodynamic Patterning of Micro-/Nanostructures on Thin Polymer Films

Technical Paper Publication. IMECE2013-64471Qingzhen Yang, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*, Ben Q. Li, *University of Michigan Dearborn, Dearborn, MI, United States*, Yucheng Ding, *Xi'an Jiaotong University, Xi'an, China*

10:45am Modeling and Simulation of Microscale Bipolar Particle Dynamics in an Applied Electric Field

Technical Paper Publication. IMECE2013-64806Mohammad Hossan, Prashanta Dutta, Robert Dillon, *Washington State University, Pullman, WA, United States*

11:00am A Milli-Fluidic Device for Electrical Impedance Spectroscopy of Complex Liquids

Technical Paper Publication. IMECE2013-65293Seyedehsan Shahidi, Charles R. Koch, Subir Bhattacharjee, *University of Alberta, Edmonton, Alberta, Canada*

8-4 9TH FORUM ON RECENT DEVELOPMENTS IN MULTIPHASE FLOW

8-4-2 Forum on Recent Developments in Multiphase Flow I

2nd Floor, Manchester Grand Hyatt, Betsy B 9:45am–11:30am

Session Organizer: **Tim O'Hern**, *Sandia National Laboratories, Albuquerque, NM, United States*Session Co-Organizer: **Deborah Pence**, *Oregon State University, Corvallis, OR, United States*

9:45am Experimental Study of Effects of Dynamic Surface Tension on Bubble Growth Dynamics

Technical Paper Publication. IMECE2013-64800Deepak Saagar Kalaikadal, Milind A. Jog, Raj M. Manglik, *University of Cincinnati, Cincinnati, OH, United States*

10:02am Euler-Lagrange Simulations of Bubble Cloud Dynamics Near a Wall

Technical Paper Publication. IMECE2013-65191Jingsen Ma, Chao-Tsung Hsiao, Georges L. Chahine, *Dynaflo, Inc., Jessup, MD, United States*

10:19am Nonlinear Dynamics of Ultrasound Contrast Agent Microbubbles: Simulation and Experimentation

Technical Paper Publication. IMECE2013-66371James M. Carroll, Sean A. Burritt, Michael L. Calvisi, Leal K. Lauderbaugh, *University of Colorado, Colorado Springs, Colorado Springs, CO, United States*

10:36am Development of Ballast Water Treatment Systems Using Interaction of Bubbles, Shock Waves, and Discharges and Analysis of Their Interactions

Technical Presentation. IMECE2013-66571Masaaki Tamagawa, *Kyushu Institute of Technology, Kitakyushu, Japan*, Satoshi Ihara, *Saga University, Saga, Japan*, Keiichi Komaki, *Honda Pump Co. Ltd., Kama, Japan*

10:53am An Experimental Investigation of a Temperature Controlled Vapor Supply System

Technical Paper Publication. IMECE2013-63806Robert Ryan, Jeffrey Bunting, *California State University, Northridge, Northridge, CA, United States*

11:10am Multiphase Flow Simulation of Water-Entry and -Exit of Axisymmetric Bodies

Technical Paper Publication. IMECE2013-64691Warn Park, Van-Tu Nguyen, Cong-Tu Ha, *Pusan National University, Busan, Korea (Republic)*

TRACK 8 FLUIDS ENGINEERING SYSTEMS & TECHNOLOGIES / MONDAY, NOVEMBER 18

8-5 14TH SYMPOSIUM ON FUNDAMENTAL ISSUES AND PERSPECTIVES IN FLUID MECHANICS

8-5-1 Turbulence Modeling and Applications

2nd Floor, Manchester Grand Hyatt, Betsy C 9:45am–11:30am

Session Organizer: **Deify Law**, *California State University, Fresno, Fresno, CA, United States*

Session Co-Organizer: **Khaled Hammad**, *Central Connecticut State University, Simsbury, CT, United States*

9:45am **Application of a Novel Approach for Turbulence Model Initialization**

Technical Presentation. IMECE2013-65771

Bertrand Rollin, Nicholas A. Denissen, Jon M. Reisner, Malcolm Andrews, *Los Alamos National Laboratory, Los Alamos, NM, United States*

10:02am **Dynamic Modeling of Turbulence**

Technical Paper Publication. IMECE2013-62330

Abdel Mazher, Changki Mo, *Washington State University, Richland, WA, United States*

10:19am **Some Results of Statistical Modeling of the Small-Scale Structure of Turbulent Flows Revealed With Consideration of Intermittency**

Technical Paper Publication. IMECE2013-62645

Yuriy Nuzhnov, *Al-Farabi Kazakh National University, Combustion Problems Institute, Almaty, Kazakhstan*

10:36am **Mach Number on Outlet Plane of a Straight Micro-Tube**

Technical Paper Publication. IMECE2013-64188

Yutaka Asako, Daisuke Kawashima, *Tokyo Metropolitan University, Hachioji Tokyo, Japan*, Toru Yamada, *Lund University, Lund, Sweden*, Chungpyo Hong, *Kagoshima University, Kagoshima, Japan*

10:53am **LES Investigation of Passive Flow Control Around an Ahmed Body**

Technical Paper Publication. IMECE2013-62373

Sinisa Krajnovic, *Chalmers University of Technology, Göteborg, Sweden*

11:10am **Numerical Investigation of the Flow Instability on the Rear of a Vehicle-Like Bluff Body**

Technical Presentation. IMECE2013-62337

Sinisa Krajnovic, *Chalmers University of Technology, Göteborg, Sweden*

8-6 SYMPOSIUM ON CFD APPLICATIONS FOR OPTIMIZATION AND CONTROLS

8-6-1 CFD Applications for Optimization and Controls I

2nd Floor, Manchester Grand Hyatt, Edward A 9:45am–11:30am

Session Organizer: **Zhongquan Zheng**, *University of Kansas, Lawrence, KS, United States*

Session Co-Organizer: **Ning Zhang**, *McNeese State University, Lake Charles, LA, United States*

9:45am **High Fidelity Simulation of Multiscale Turbulent Flows in the Environment**

Invited Presentation. IMECE2013-67381

Sutanu Sarkar, *University of California, La Jolla, United States*

10:15am **Study of Turbulent Incompressible Flow Separation on High Lift Devices Using CutCell Meshing**

Technical Paper Publication. IMECE2013-62623

Ramadan Ghmatl, *Tripoli University, Tripoli, Libya*, Selin Arslan, Badih Jawad, Liping Liu, *Lawrence Technological University, Southfield, MI, United States*

10:30am **Three-Dimensional Mesh Morphing Methodology for Scouring Around Bridge Piers Based on Computational Fluid Dynamic Solution**

Technical Paper Publication. IMECE2013-62278

Pradip Majumdar, Chris Edwards, *Northern Illinois University, DeKalb, IL, United States*, Steven Lottes, *Argonne National Laboratory, Lemont, IL, United States*

10:45am **Effect by Guide Vane Swirl and Tumble Device to Improve the Air-Fuel Mixing of Diesel Engine Running With Higher Viscous Fuels**

Technical Paper Publication. IMECE2013-62297

Idris Saad, *Universiti Teknologi MARA, University of South Australia, Shah Alam, Selangor, Malaysia*, Saiful Bari, *University of South Australia, Adelaide, Australia*

11:00am **New Curve Optimization Method and Its Application to Shape Design for Die Casting Using a CFD Simulation**

Technical Paper Publication. IMECE2013-62541

Ken'ichi Kanazawa, Ken'ichi Yano, *Mie University, Tsu, Mie, Japan*, Jun'ichi Ogura, *Yamaha Motor Co., Ltd., Iwata, Shizuoka, Japan*, Shuhei Baba, *Flow Science Japan, Inc., Hamamatsu, Shizuoka, Japan*

8-8 22ND SYMPOSIUM ON INDUSTRIAL FLOWS**8-8-1 Industrial Applications 1: Turbulent Flows I****2nd Floor, Manchester Grand Hyatt, Edward B 9:45am–11:30am**Session Organizer: **Lubomir Ribarov**, *United Technologies Aerospace Systems, Windsor Locks, CT, United States*Session Co-Organizers: **Jie Xu**, *Washington State University Vancouver, Vancouver, WA, United States*, **Wayne Strasser**, *Eastman Chemical Co., Kingsport, TN, United States***9:45am Pressure Waves and Premixed Flames****Invited Presentation.** IMECE2013-62019Andy McIntosh, *University of Leeds, Leeds, West Yorks, United Kingdom***10:15am Numerical Study of Straight Annular Seals Versus Convergent Annular Seals at Different Geometries, Surface Roughness, and Operating Conditions****Technical Paper Publication.** IMECE2013-62248Serafettin Ustun, Gerald Morrison, *Texas A&M University, College Station, TX, United States*, Emanuel Marsis, *Baker Hughes Inc., College Station, TX, United States***10:30am Switching Criteria of Three Stage Air Valves****Technical Paper Publication.** IMECE2013-66729Hassan Warda, Ihab Adam, Ahmed Rashad, *Alexandria University, Alexandria, Egypt***10:45am Characteristics of Turbulent Wakes Generated by Twin Parallel Cylinders****Technical Presentation.** IMECE2013-64241Tarek N. Aboulfetouh, *PGESCO, Cairo, Egypt*, Lamyaa El-Gabry, *American University in Cairo, Cairo, Egypt*, Ahmed Elbaz, Mahmoud Abdelrasheed, *Ain Shams University, Cairo, Cairo, Egypt***11:00am Generation of Pressure Distribution Inside a Decay Tank in a Research Reactor Using CFD****Extended Abstract Publication.** IMECE2013-63934Seong Hoon Kim, Kyoungwoo Seo, Dae-Young Chi, Juhyeon Yoon, *Korea Atomic Energy Research Institute, Daejeon, Korea (Republic)***8-9 MICROFLUIDICS 2013—FLUID ENGINEERING IN MICRO- AND NANOSYSTEMS****8-9-1 Microscale Multiphase Flow and Surface Interactions—I****2nd Floor, Manchester Grand Hyatt, Edward C 9:45am–11:30am**Session Organizer: **Nail Gumerov**, *University of Maryland, College Park, MD, United States*Session Co-Organizer: **Shaurya Prakash**, *Ohio State University, Columbus, OH, United States***9:45am Charge Inversion of Mica Surface in Multivalent Electrolytes****Technical Paper Publication.** IMECE2013-62356Qiyang Tan, Weichuan Guo, Gutian Zhao, Yajing Kan, Yinghua Qiu, Yunfei Chen, *Southeast University, Nanjing, Jiangsu, China***10:02am A Modified Disjoining Pressure Model for Thin Film Evaporation of Water****Technical Paper Publication.** IMECE2013-62986Hassan Azarkish, *University of Sistan and Baluchestan, Sherbrooke, Canada*, Amin Behzadmehr, *University of Sistan and Baluchestan, Zahedan, Iran*, Luc Frechette, *Université de Sherbrooke, Sherbrooke, QC, Canada*, Tahereh Fanaie Sheykhoul Eslami, *University of Sistan and Baluchestan, Zahedan, Iran*, Seyyed Masoud Hosseini Sarvari, *Shahid Bahonar University, Kerman, Iraq***10:19am FMM/GPU Accelerated BEM Simulations of Emulsion Flows in Microchannels****Technical Paper Publication.** IMECE2013-63193Olga A. Abramova, Yulia A. Itkulova, *Bashkir State University, Ufa, Russia*, Nail Gumerov, *University of Maryland, College Park, MD, United States***10:36am Molecular Dynamics Simulations of Nanobubbles on Liquid-Solid Interface****Technical Presentation.** IMECE2013-63295Elena F. Moiseeva, Dmitry F. Maryin, Victor L. Malyshev, Constantin I. Mikhaylenko, *Bashkir State University, Ufa, Russia*, Nail Gumerov, *University of Maryland, College Park, MD, United States*, Iskander Akhatov, *North Dakota State University, Fargo, ND, United States***10:53am Effect of Charge Distribution at the Three Phase Contact Line for an Electrolyte Drop****Technical Paper Publication.** IMECE2013-63357Diby Sarkar, Siddhartha Das, Sushanta Mitra, *University of Alberta, Edmonton, AB, Canada***11:10am Fully Lagrangian Modeling of Two-Phase Impulse Microjets****Technical Paper Publication.** IMECE2013-64111Natalia Lebedeva, Alexander Osiptsov, *Lomonosov Moscow State University, Moscow, Russia*, Sergei Sazhin, *University of Brighton, Brighton, United Kingdom*

TRACK 8 FLUIDS ENGINEERING SYSTEMS & TECHNOLOGIES / MONDAY, NOVEMBER 18

8-10 SYMPOSIUM ON FLUID MEASUREMENTS AND INSTRUMENTATION

8-10-1 Fluid Measurements and Instrumentation – 1

2nd Floor, Manchester Grand Hyatt, Edward D 9:45am–11:30am

Session Organizer: **Judith Bamberger**, *Pacific Northwest National Laboratory, Richland, WA, United States*

Session Co-Organizers: **Joel Park**, *Naval Surface Warfare Center Carderock Division, West Bethesda, MD, United States*,

Francisco Diez, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*, **Gerald Morrison**, *Texas A&M University, College Station, TX, United States*

9:45am **Instrumentation to Monitor Transient Periodic Developing Flow in Non-Newtonian Slurries**

Invited Paper Publication. IMECE2013-65374

Judith Bamberger, Carl W. Enderlin, *Pacific Northwest National Laboratory, Richland, WA, United States*

10:15am **The Study of a Liquid Droplet Falling Through Two Immiscible Layers of Liquids**

Technical Paper Publication. IMECE2013-66126

Bianca Mesa, *Florida Atlantic University, Boca Raton, FL, United States*

10:30am **Flow Regime Identification of Horizontal Two Phase Refrigerant R-134a Flow Using Neural Networks**

Technical Paper Publication. IMECE2013-62510

Paul Kreitzer, *UES Inc., Dayton, OH, United States*, Michael S. Hanchak, *University of Dayton Research Institute, Dayton, OH, United States*, Larry Byrd, *Air Force Research Laboratory, Wright Patterson AFB, OH, United States*

10:45am **Boundary Layer Measurements on a Rotating Disk**

Technical Paper Publication. IMECE2013-63556

Vrishank Raghav, Narayanan Komerath, *Georgia Institute of Technology, Atlanta, GA, United States*

11:00am **Experimental Evaluation of Impeller Surface Geometry Effect on the Performance of a Centrifugal Pump**

Technical Paper Publication. IMECE2013-63288

Susanta Kumar Das, M. Firoz Ali, *Kettering University, Flint, MI, United States*

8-3 11TH SYMPOSIUM ON ELECTRIC, MAGNETIC, AND THERMAL PHENOMENA IN MICRO- AND NANO-SCALE SYSTEMS

8-3-2 Electric, Magnetic, and Thermal Phenomena in Micro- and Nanoscale Systems: What Can We Do With Electric and Magnetic Fields? – Panel Discussion

2nd Floor, Manchester Grand Hyatt, Betsy A 1:00pm–2:45pm

Session Organizer: **Boris Khusid**, *New Jersey Institute of Technology, Newark, NJ, United States*

Session Co-Organizer: **Blanca Lapizco-Encinas**, *Rochester Institute of Technology, Rochester, NY, United States*

1:00pm **Panel**

Technical Presentation. IMECE2013-65955

Boris Khusid, *New Jersey Institute of Technology, Newark, NJ, United States*

1:21pm **Panel on Electric and Magnetic Micro- and Nano-Fluidics**

Panel Presentation. IMECE2013-66023

Iskander Akhatov, *North Dakota State University, Fargo, ND, United States*

1:42pm **Panel on Electric and Magnetic Micro- and Nano-Fluidics**

Technical Presentation. IMECE2013-66320

Steven Wereley, *Purdue University, West Lafayette, IN, United States*

2:03pm **Panel On Electric and Magnetic Micro- and Nano-Fluidics**

Technical Presentation. IMECE2013-66457

Blanca Lapizco-Encinas, *Rochester Institute of Technology, Rochester, NY, United States*

2:24pm **Panel Discussion**

Technical Presentation. IMECE2013-65953

Haim Bau, Sean Anderson, *University of Pennsylvania, Philadelphia, PA, United States*

8-4 9TH FORUM ON RECENT DEVELOPMENTS IN MULTIPHASE FLOW

8-4-3 Forum on Recent Developments in Multiphase Flow II

2nd Floor, Manchester Grand Hyatt, Betsy B 1:00pm–2:45pm

Session Organizer: **Malcolm Andrews**, *Los Alamos National Laboratory, Los Alamos, NM, United States*

Session Co-Organizer: **Mark Duignan**, *Savannah River National Laboratory, Aiken, SC, United States*

1:00pm A Numerical Approach to Simulation of Internal Nozzle Flow in a Pressure Swirl Atomizer Using Different Turbulent Models and Toward an Effective Weber Number

Technical Paper Publication. IMECE2013-65627
Ahmadreza Abbasi Baharanchi, Seckin Gokaltun, *Florida International University, Miami, FL, United States*, Shahla Eshraghi, *Payame Noor University of Tehran, Eastern Center, Tehran, Tehran, Iran*

1:15pm CFD Simulation of Gas-Liquid Two-Phase Flow Through an Orifice in Millimeter-Scale Rectangular Channel

Technical Paper Publication. IMECE2013-65283
Fuad Ismayilov, Olusegun Ilegbusi, *University of Central Florida, Orlando, FL, United States*

1:30pm The Effects of Surfactant on Simplex Nozzle Spray Behavior and Its Comparison to Liquid Fuels

Technical Paper Publication. IMECE2013-65116
Ashkan Davanlou, Joshua Lee, Ranganathan Kumar, *University of Central Florida, Orlando, FL, United States*, Saptarshi Basu, *Indian Institute of Science, Bangalore, India*

1:45pm Stratification in Isothermal Ice-Slurry Pipe Flow

Technical Paper Publication. IMECE2013-63801
C. Landa Onokoko, Nicolas Galanis, *Université de Sherbrooke, Sherbrooke, QC, Canada*

2:00pm An Adaptive-Grid Projection Method for High Density Ratio Interfacial Flows

Technical Paper Publication. IMECE2013-64652
Pablo Gomez, Claudio Zanzi, Julian Palacios, Julio Hernandez, *Universidad Nacional de Educación a Distancia, Madrid, Spain*, Joaquin Lopez, *Universidad Politecnica De Cartagena, Cartagena Murcia, Spain*

2:15pm A Simplified Model for the Flow Inside Cascade Impactor

Technical Paper Publication. IMECE2013-63756
Seyyed Mahdi Nemati Mehr, Salman Sohrabi, Pedram Falsafi, Paniz Gorji, *Sharif University of Technology, Tehran, Iran*

2:30pm Effect of Venturi Meter Design on Wet Gas Flow Characteristics in Gas Pipeline

Technical Presentation. IMECE2013-65280
Fuad Ismayilov, Olusegun Ilegbusi, *University of Central Florida, Orlando, FL, United States*

8-5 14TH SYMPOSIUM ON FUNDAMENTAL ISSUES AND PERSPECTIVES IN FLUID MECHANICS

8-5-2 Fluid Flow Theory and Applications

2nd Floor, Manchester Grand Hyatt, Betsy C 1:00pm–2:45pm

Session Organizer: **Khaled Hammad**, *Central Connecticut State University, Simsbury, CT, United States*

Session Co-Organizer: **Francine Battaglia**, *Virginia Technology, Blacksburg, VA, United States*

1:00pm Thermorheological and Magnetorheological Effects on Rayleigh-Bénard-Marangoni Convection in Ferromagnetic Liquids With Nonuniform Basic Temperature Gradient

Technical Paper Publication. IMECE2013-64522
Prakash Revanna, *G. Jayalatha, R.V. College of Engineering, Bangalore, India*, G.N. Sekhar, *B M S College of Engineering, Bangalore, India*

1:17pm Rayleigh-Taylor Instability Studied With Multi-Relaxation Lattice Boltzmann Method

Technical Paper Publication. IMECE2013-62763
Saeed Almalawi, Dennis E. Oztekin, Alparslan Oztekin, *Lehigh University, Bethlehem, PA, United States*

1:34pm Coupling of Microscale and Macroscale Eulerian-Lagrangian Models for the Computation of Shocked Particle-Laden Flows

Technical Paper Publication. IMECE2013-62521
Sean Davis, Gustaaf B. Jacobs, *San Diego State University, San Diego, CA, United States*, H.S. Udaykumar, Oishik Sen, *University of Iowa, Iowa City, IA, United States*

1:51pm Experimental Study of Swirling Jets and Axial Forcing on Round Jets

Technical Paper Publication. IMECE2013-63904
Amy McCleney, Philippe Bardet, *George Washington University, Washington, DC, United States*

2:08pm Harvesting Downstream Energy to Improve Efficiency: Creating Apparent Discharge Coefficients of Jet Nozzles Greater Than 1.3

Technical Paper Publication. IMECE2013-62062
Jim B. Surjaatmadja, Billy W. McDaniel, *Halliburton, Duncan, OK, United States*, Bharat B. Pawar, *Boots and Coots, A Halliburton Company, Pune, India*

2:25pm Experimental Characterization of Flow Regimes for a Rotating Disc Over a Range of Gas Pressures

Technical Paper Publication. IMECE2013-63014
Thathagata Acharya, Jordan Falgoust, Michael James Martin, *Louisiana State University, Baton Rouge, LA, United States*, Richard E. Rasmussen, *Guidance Dynamics Corporation, Simi Valley, CA, United States*

TRACK 8 FLUIDS ENGINEERING SYSTEMS & TECHNOLOGIES / MONDAY, NOVEMBER 18

8-6 SYMPOSIUM ON CFD APPLICATIONS FOR OPTIMIZATION AND CONTROLS

8-6-2 CFD Applications for Optimization and Controls II

2nd Floor, Manchester Grand Hyatt, Edward A 1:00pm–2:45pm

Session Organizer: **Zhongquan Zheng**, *University of Kansas, Lawrence, KS, United States*

Session Co-Organizer: **Selin Arslan**, *Lawrence Technological University, Southfield, MI, United States*

1:00pm **Boundary Layer Separation Control on an Inclined Plate Using Jet and Vortex Actuator**

Technical Paper Publication. IMECE2013-62551
Sertac Cadirci, Hasan Gunes, *Istanbul Technical University, Istanbul, Turkey*

1:17pm **Numerical Research on Fluid Field for Petroleum Tar Cutting Pump**

Technical Paper Publication. IMECE2013-62587
Jingning Hu, Jing Wang, Rengui Gu, Yingying Tian, Qun Ye, *Jiangsu University, Zhenjing, Jiangsu Province, China*

1:34pm **Numerical and Experimental Investigation of Performance and Reliability in New Reverse Osmosis Seawater Desalination High Pressure Pump**

Technical Paper Publication. IMECE2013-62598
Xiaoyan Ye, Jingning Hu, Jing Wang, Yaoning Feng, *Jiangsu University, Zhenjing, Jiangsu Province, China*, Wei Jiang, *Xi'an Jiaotong University, Xi'an, China*

1:51pm **Effects of Blade Tip Geometries on the Aerodynamic Performance of a Compressor Cascade**

Technical Paper Publication. IMECE2013-62642
Hongwei Ma, Zhang Jun, Wei Wei, *Beihang University, Beijing, P.R. China*

2:08pm **CFD-Based Reactor Optimization to Minimize the Decomposition in Polymerization Reactions**

Technical Paper Publication. IMECE2013-62682
Ervin Cutright, Mellitanya Bun, Justin Nixon, Dung Nguyen, Ning Zhang, *McNeese State University, Lake Charles, LA, United States*

2:25pm **Numerical Simulation of the Subcritical Flow Over a Circular Cylinder With “U” and “V” Grooves**

Technical Paper Publication. IMECE2013-62720
Alejandro Alonzo-Garcia, Claudia del C. Gutierrez-Torres, Jose A. Jimenez-Bernal, Juan G. Barbosa-Saldaña, Helvio R. Mollinedo-Ponce de Leon, *Instituto Politécnico Nacional, Mexico City, Mexico*, Sergio A. Martínez-Delgado, *Universidad Autónoma Metropolitana Azcapotzalco, Mexico City, Mexico*

8-8 22ND SYMPOSIUM ON INDUSTRIAL FLOWS

8-8-2 Industrial Applications 2: Turbulent Flows II

2nd Floor, Manchester Grand Hyatt, Edward B 1:00pm–2:45pm

Session Organizer: **Yanan Gan**, *Praxair Inc., Tonawanda, NY, United States*

Session Co-Organizer: **Wayne Strasser**, *Eastman Chemical Co., Kingsport, TN, United States*

1:00pm **Insect Inspiration From the Bombardier Beetle Invited Presentation.** IMECE2013-62018

Andy McIntosh, *University of Leeds, Leeds, West Yorks, United Kingdom*

1:30pm **Numerical Study of Single Phase Liquid Mixing in Stirred Tanks Fitted With Rushton Turbine and Flotation Impeller**

Technical Paper Publication. IMECE2013-65277
Manjunath Basavarajappa, Sanja Miskovic, *University of Utah, Salt Lake City, UT, United States*

1:45pm **Analysis of Entrainment at the Turbulent/Non-Turbulent Interface of a Square Jet**

Technical Paper Publication. IMECE2013-65355
Abbas Ghasemi, Vesselina Roussinova, Ron. M. Barron, Ram Balachandar, *University of Windsor, Windsor, Canada*

2:00pm **Experimental Investigation on Pressure Drop in Corrugated Pipes**

Technical Paper Publication. IMECE2013-66061
Hojin Ahn, Ibrahim Uslu, *Yeditepe University, Umraniye/Istanbul, Turkey*

2:15pm **Computational Investigation of Vortex Structure in the Corrugated Channel**

Technical Paper Publication. IMECE2013-66062
Efe Unal, Esra Sorguven, Hojin Ahn, *Yeditepe University, Umraniye/Istanbul, Turkey*

8-9 MICROFLUIDICS 2013—FLUID ENGINEERING IN MICRO- AND NANOSYSTEMS

8-9-2 Droplet/Particle/Bubble Dynamics and Capillary Flow—I

2nd Floor, Manchester Grand Hyatt, Edward C 1:00pm–2:45pm

Session Organizer: **Jie Xu**, *Washington State University Vancouver, Vancouver, WA, United States*

Session Co-Organizer: **Sushanta Mitra**, *University of Alberta, Edmonton, AB, Canada*

1:00pm **Droplet Spreading on Textured Surface Based on SPH Method**

Technical Paper Publication. IMECE2013-62948
Shuai Meng, Zhen Zhao, Qian Wang, Rui Yang, *Tsinghua University, Beijing, Beijing, China*

1:17pm Fast Droplet Generation With a Printhead Manufactured by Rapid Manufacturing Techniques Mounted on a Carrier Board

Technical Paper Publication. IMECE2013-63147
Markus Kagerer, *Technische Universität München, Garching, Germany*, Dominik Rumschoettel, Tim C. Lueth, Franz Irlinger, *Technische Universität München, Institute of Micro Technology and Medical Device Technology, Garching, Germany*, Thomas Ottnad, *Technische Universität München, Bavaria, Germany*

1:34pm Waves of Acoustically Induced Transparency in Bubbly Liquids: Theoretical Prediction and Experimental Validation

Technical Paper Publication. IMECE2013-63284
Nail Gumerov, *University of Maryland, College Park, MD, United States*, Iskander Akhatov, *North Dakota State University, Fargo, ND, United States*, Claus-Dieter Ohl, *Nanyang Technological University, Singapore, Singapore*, Sergei Sametov, *Maxim Khasimullin, Galia Gilmanova, Bashkir State University, Ufa, Russia*

1:51pm Dynamics of Viscous Droplets Falling Toward Micro-Patterned Solid Surfaces

Technical Paper Publication. IMECE2013-63891
Kevin M. Beussman, Yechun Wang, Wei Y. Lim, Qixin Zhou, *North Dakota State University, Fargo, ND, United States*

2:08pm An AC Dielectrophoretic Trap for Cellular Assembly

Technical Paper Publication. IMECE2013-64819
Mohammad Hossan, Robert Dillon, Prashanta Dutta, *Washington State University, Pullman, WA, United States*

2:25pm Boundary Element Simulations of Compressible Bubble Dynamics in Stokes Flows

Technical Paper Publication. IMECE2013-63200
Yulia A. Itkulova, Olga A. Abramova, *Bashkir State University, Ufa, Russia*, Nail Gumerov, *University of Maryland, College Park, MD, United States*

8-10 SYMPOSIUM ON FLUID MEASUREMENTS AND INSTRUMENTATION

8-10-2 Fluid Measurements and Instrumentation—2

2nd Floor, Manchester Grand Hyatt, Edward D 1:00pm–2:45pm

Session Organizer: **Francisco Diez**, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*

Session Co-Organizers: **Joel Park**, *Naval Surface Warfare Center Carderock Division, West Bethesda, United States*, **Judith Bamberger**, *Pacific Northwest National Laboratory, Richland, WA, United States*, **Gerald Morrison**, *Texas A&M University, College Station, TX, United States*

1:00pm An Experimental Study of the Effect of Drag Reducing Additive on the Structure of Turbulence in Concentric Annular Pipe Flow Using Particle Image Velocimetry Technique

Technical Paper Publication. IMECE2013-64663
Fabio Ernesto Rodriguez Corredor, Majid Bizhani, Ergun Kuru, *University of Alberta, Edmonton, AB, Canada*

1:17pm An Experimental Study of Turbulent Non-Newtonian Fluid Flow in Concentric Annuli Using Particle Image Velocimetry Technique

Technical Paper Publication. IMECE2013-65232
Majid Bizhani, Fabio Ernesto Rodriguez Corredor, Ergun Kuru, *University of Alberta, Edmonton, AB, Canada*

1:34pm Sub-Diffraction Limit Three-Dimensional Particle Tracking Velocimetry

Technical Paper Publication. IMECE2013-65522
Craig Snoeyink, Gordon Christopher, Sourav Barman, *Texas Tech University, Lubbock, TX, United States*, Steven Wereley, *Purdue University, West Lafayette, IN, United States*

1:51pm Instantaneous Aerodynamic Load Calculations in Rotating Airfoils From TR-PIV Measurements

Technical Paper Publication. IMECE2013-65850
Arturo Villegas, Francisco Diez, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*

2:08pm A Technique for the Measurement of Wall Shear Stress Based on Microfabricated Hot-Film Sensor

Technical Paper Publication. IMECE2013-63091
Takuya Sawada, Osamu Terashima, Yasuhiko Sakai, Kouji Nagata, Mitsuhiro Shikida, Hirotaka Hida, Kazuhiro Onishi, Yasumasa Ito, *Nagoya University, Nagoya, Japan*

2:25pm Experimental Study on the Internal Separated and Inverse Flow Between the Blades

Technical Paper Publication. IMECE2013-63090
Hiroki Furuta, Osamu Terashima, Yasuhiko Sakai, Kouji Nagata, Yasumasa Ito, *Nagoya University, Nagoya, Japan*, Syunsuke Ishiguro, Masaharu Sakai, *Denso Corporation, Kariya, Japan*

8-3 11TH SYMPOSIUM ON ELECTRIC, MAGNETIC, AND THERMAL PHENOMENA IN MICRO- AND NANOSCALE SYSTEMS

8-3-3 Electric, Magnetic and Thermal Phenomena in Micro- and Nanoscale Systems II

2nd Floor, Manchester Grand Hyatt, Betsy A 3:00pm–4:45pm

Session Organizer: **Haim Bau**, *University of Pennsylvania, Philadelphia, PA, United States*

Session Co-Organizer: **Steven Wereley**, *Purdue University, West Lafayette, IN, United States*

3:00pm Development of Ink-Particle Flight Simulation for Continuous Inkjet Printer

Technical Paper Publication. IMECE2013-63094
Masato Ikegawa, *Hitachi Ltd., Ibaraki, Japan*, Eiji Ishii, *Hitachi Ltd., Hitachinaka, Ibaraki, Japan*, Nobuhiro Harada, *Tsuneaki Takagishi, Hitachi Industrial Equipment Systems Co. Ltd., Hitachi, Ibaraki, Japan*

3:17pm Growth of Patterned Micropores in Poly-Dimethylsiloxane (PDMS) Using the Thermocapillary Effect

Technical Paper Publication. IMECE2013-65865
Arya Banait, Vivek Vishwakarma, Leila Choobineh, Ankur Jain, *University of Texas at Arlington, Arlington, TX, United States*

TRACK 8 FLUIDS ENGINEERING SYSTEMS & TECHNOLOGIES / MONDAY, NOVEMBER 18

3:34pm Particle Manipulation in Dielectrophoretic Devices
Technical Paper Publication. IMECE2013-66439

Aytug Gencoglu, David Olney, Alexandra La Londe, Karuna Koppula, Blanca Lapizco-Encinas, *Rochester Institute of Technology, Rochester, NY, United States*

3:51pm Field-Driven Mesoscale Phase Transitions in Colloids
Technical Presentation. IMECE2013-65927

Boris Khusid, Yueyang Shen, Ezinwa Elele, *New Jersey Institute of Technology, Newark, NJ, United States*, Yugang Sun, *Argonne National Laboratory, Lemont, IL, United States*

4:08pm Molecular Dynamics Simulation of Electrically Assisted Spreading of an Ionically Conducting Water Droplet

Technical Paper Publication. IMECE2013-65345

Fenhong Song, Chao Liu, *Chongqing University, Chongqing, China*, Ben Q. Li, *University of Michigan Dearborn, Dearborn, United States*

4:25pm Analysis of the Effectiveness of Electromagnetic Acoustic Transduction in Containerless Processing Operations

Technical Presentation. IMECE2013-66592

Yinghui Shi, John Petrykowski, *University of Dayton, Dayton, OH, United States*

8-4 9TH FORUM ON RECENT DEVELOPMENTS IN MULTIPHASE FLOW

8-4-4 Forum on Recent Developments in Multiphase Flow III

2nd Floor, Manchester Grand Hyatt, Betsy B 3:00pm–4:45pm

Session Organizer: **Mark Duignan**, *Savannah River National Laboratory, Aiken, SC, United States*

Session Co-Organizer: **Malcolm Andrews**, *Los Alamos National Laboratory, Los Alamos, NM, United States*

3:00pm Modeling of Coal-Biomass Fluidization Using Computational Fluid Dynamics

Technical Paper Publication. IMECE2013-63339

Bahareh Estejab, Francine Battaglia, *Virginia Technology, Blacksburg, VA, United States*

3:17pm Improvements in Precision, Accuracy, and Efficiency in Standardizing the Characterization of Granular Materials

Technical Paper Publication. IMECE2013-65027

Jonathan Tucker, Lawrence Shadle, Sofiane Benyahia, Joesph Mei, Chris Guenther, *NETL-Department of Energy, Morgantown, WV, United States*, Mark Koepke, *West Virginia University, Morgantown, WV, United States*

3:34pm Spreading-Droplet Simulation With Surface Tension Model Using Interparticle Force in Particle Method

Technical Paper Publication. IMECE2013-62542

Eiji Ishii, Taisuke Sugii, *Hitachi, Ltd., Hitachinaka, Ibaraki, Japan*

3:51pm Cavitating Flow in Engine Piston Ring-Cylinder Liner Conjunction

Technical Paper Publication. IMECE2013-62395

Hamed Shahmohamadi, Ramin Rahmani, Homer Rahnejat, Paul King, Colin Garner, *Loughborough University, Loughborough, Leicestershire, United Kingdom*

4:08pm Modified Multiscale Finite Volume Method for Two Phase Flow in Porous Media

Technical Paper Publication. IMECE2013-62208

Mahdi Saeidimanesh, *Sharif University of Technology, Tehran, Iran*, Hamed Eksiri, *University of South Carolina, Columbia, SC, United States*

4:25pm Unsteady Hydromagnetic Radiative Flow of a Dusty Fluid Past a Porous Plate With Ramped Wall Temperature

Technical Paper Publication. IMECE2013-66699

Raj Nandkeolyar, Precious Sibanda, *University of KwaZulu-Natal, Pietermaritzburg, KwaZulu-Natal, South Africa*, Md. S. Ansari, *Pandit Deendayal Petroleum University, Gandhinagar, Gujarat, India*

8-5 14TH SYMPOSIUM ON FUNDAMENTAL ISSUES AND PERSPECTIVES IN FLUID MECHANICS

8-5-3 Fluid Flow Separation and Transport

2nd Floor, Manchester Grand Hyatt, Betsy C 3:00pm–4:45pm

Session Organizer: **Francisco Diez**, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*

Session Co-Organizer: **German Drazer**, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*

3:00pm Hemorheology and the Flow Behavior in a Separated Flow Region

Technical Paper Publication. IMECE2013-62548

Khaled Hammad, *Central Connecticut State University, Simsbury, CT, United States*

3:17pm Wall Effect on Separated Flow Around an Inclined Flat Plate at High Incidence

Technical Paper Publication. IMECE2013-65261

Chuanjin Lan, Yanbao Ma, *University of California, Merced, Merced, CA, United States*, Laibing Jia, *University of Science and Technology of China, Hefei, Anhui, China*, Zhen Li, *Brown University, Providence, RI, United States*

3:34pm High-Lift and Flow Separation Control Via Moving Wall Effects: Numerical and Experimental Investigation

Technical Presentation. IMECE2013-63938

Tibor Pechan, Adrian Sescu, *Mississippi State University, Mississippi State, MS, United States*

3:51pm Airflow and Heat Transfer in a Room With a Large Opening

Technical Paper Publication. IMECE2013-63341

David Park, Francine Battaglia, *Virginia Technology, Blacksburg, VA, United States*

4:08pm Hydrodynamic Modeling of the Helical Membrane Modules

Technical Paper Publication. IMECE2013-63460
Fengxia Liu, Wei Wei, Guan Wang, Xiaofei Xu, Zhijun Liu, Lifan Liu, Fenglin Yang, *Dalian University of Technology, Dalian, Liao Ning, China*

4:25pm Flow Analysis On Piping Networks Using Finite Element Method

Technical Paper Publication. IMECE2013-63553
Carlos Luis Moreno Negrin, *Universidad Simon Bolivar, Caracas, Miranda, Venezuela*

8-6 SYMPOSIUM ON CFD APPLICATIONS FOR OPTIMIZATION AND CONTROLS

8-6-3 CFD Applications for Optimization and Controls III

2nd Floor, Manchester Grand Hyatt, Edward A 3:00pm–4:45pm

Session Organizer: **Philipp Epple**, *HS Coburg, Nurnberg, Bavaria, Germany*
Session Co-Organizer: **Ning Zhang**, *McNeese State University, Lake Charles, LA, United States*

3:00pm Experimental Improvement of Ejector Performance Through Numerical Optimization of Nozzle Geometry

Technical Paper Publication. IMECE2013-62031
Navid Sharifi, *Amirkabir University, Tehran, Iran*, Majid Sharifi, *Drexel University, Philadelphia, PA, United States*

3:17pm Numerical Investigation of JaVA-Induced Flow in Quiescent Water

Technical Paper Publication. IMECE2013-62550
Sertac Cadirci, Hasan Gunes, *Istanbul Technical University, Istanbul, Turkey*, Ulrich Rist, *Universität Stuttgart, Stuttgart, Germany*

3:34pm Computational Study of Flow and Mixing Characteristics of Turbulent Opposed Jets

Technical Paper Publication. IMECE2013-62805
Tarek Abdel-Salam, *East Carolina University, Greenville, NC, United States*, Srikanth Pidugu, *University of Arkansas at Little Rock, Little Rock, AR, United States*

3:51pm Finite Element Approximation of Fluid Structure Interaction (FSI) Optimization in Arbitrary Lagrangian-Eulerian Coordinates

Technical Paper Publication. IMECE2013-62291
Bhuiyan Shameem Mahmood Ebna Hai, Markus Bause, *Helmut Schmidt University (University of the Federal Armed Forces Hamburg), Hamburg, Germany*

4:08pm Parametric Analysis and Optimization of Inlet Inflection Angle in Torque Converters

Technical Paper Publication. IMECE2013-64783
Cheng Liu, Qingdong Yan, Wei Wei, *Beijing Institute of Technology, Beijing, China*, Alexandrina Untaroiu, *Houston G. Wood, University of Virginia, Charlottesville, VA, United States*

4:25pm Near Wall Turbulence Characteristics of a Drag Reducing Polymer Fluid Flow in Concentric Annulus Using CFD

Technical Paper Publication. IMECE2013-65268
Aziz Rahman, Fabio Ernesto Rodriguez Corredor, Majid Bizhani, Ergun Kuru, *University of Alberta, Edmonton, AB, Canada*

8-8 22ND SYMPOSIUM ON INDUSTRIAL FLOWS

8-8-3 Industrial Applications 3: Heat Transfer

2nd Floor, Manchester Grand Hyatt, Edward B 3:00pm–4:45pm

Session Organizer: **Ramin Rahmani**, *Loughborough University, Leicestershire, United Kingdom*
Session Co-Organizer: **Wayne Strasser**, *Eastman Chemical Co., Kingsport, TN, United States*

3:00pm Numerical Simulation of Heat Transfer and Thermal Phase Change in Multiphase Flows

Invited Presentation. IMECE2013-66377
Huiying Li, *ANSYS Inc., Lebanon, NH, United States*, Sergio A. Vasquez, *ANSYS Inc., Sheffield, United Kingdom*

3:30pm Flow Structures and Losses in the Exhaust Port of an Internal Combustion Engine

Technical Paper Publication. IMECE2013-64610
Yue Wang, Bernhard Semlitsch, Mihai Mihaescu, Laszlo Fuchs, *KTH Royal Institute of Technology, Stockholm, Sweden*

3:45pm Numerical and Experimental Investigations of Non-Newtonian Polymer Heating in a Static Mixer

Technical Paper Publication. IMECE2013-63195
George Chamoun, Wayne Strasser, Pedro Renato Acosta, Bob Casper, *Eastman Chemical Co., Kingsport, TN, United States*

4:00pm CFD Loading Assessments on a Liquid Quenched Propane System

Technical Paper Publication. IMECE2013-65209
Michael Kinzel, *Bechtel, Reston, VA, United States*, Sanjeeb Pal, *Bechtel Systems & Infrastructure Inc., Reston, VA, United States*, David Messersmith, *Bechtel Corporation, Houston, TX, United States*, Sanjay Ganjam, *Prakash Desai, Philip Diwakar, Bechtel Oil, Gas & Chemicals, Houston, TX, United States*, Christopher Kennedy, *Bechtel National Inc., San Francisco, CA, United States*, Ajay Prakash, *Bechtel National Inc., San Ramon, CA, United States*, John Berkoe, *Bechtel Corporation, San Francisco, CA, United States*, Kelly Knight, *Bechtel National Inc., Reston, VA, United States*, Leonard J. Peltier, *Bechtel, BSII, Reston, VA, United States*

4:15pm Design of a Discharge Header and a Working Platform for a Research Reactor With a CFD Model

Technical Paper Publication. IMECE2013-62143
Kyoungwoo Seo, Hyungi Yoon, Dae-Young Chi, Seong Hoon Kim, Juhyeon Yoon, *Korea Atomic Energy Research Institute, Daejeon, Korea (Republic)*

TRACK 8 FLUIDS ENGINEERING SYSTEMS & TECHNOLOGIES / MONDAY, NOVEMBER 18 / TUESDAY, NOVEMBER 19

8-9 MICROFLUIDICS 2013—FLUID ENGINEERING IN MICRO- AND NANOSYSTEMS

8-9-3 Devices, Experimental Investigation of Micro-/Nanofluidics—I

2nd Floor, Manchester Grand Hyatt, Edward C 3:00pm–4:45pm

Session Organizer: **Rohit Karnik**, *Massachusetts Institute of Technology, Cambridge, MA, United States*

Session Co-Organizer: **Jie Xu**, *Washington State University Vancouver, Vancouver, WA, United States*

3:00pm Dynamic Particle Concentration for Bio-Signal Enhancement Based on an Optoelectric Microchip

Extended Abstract Publication. IMECE2013-62329

Kuan-Chih Wang, Han-Sheng Chuang, *National Cheng Kung University, Tainan City, Taiwan*, Steven Wereley, *Purdue University, West Lafayette, IN, United States*, Aloke Kumar, *University of Alberta, Edmonton, AB, Canada*

3:17pm On-Chip Power Generation: Microfluidic-Based Reactor for Catalytic Combustion of Methanol

Technical Paper Publication. IMECE2013-62776

Sheng Tian, Thomas Thundat, Subir Bhattacharjee, Kenneth Cadien, Sushanta Mitra, *University of Alberta, Edmonton, AB, Canada*

3:34pm Segregated Parallel Computing for Isoelectric Focusing of Proteins

Technical Paper Publication. IMECE2013-64830

Kisoo Yoo, Jin Liu, Prashanta Dutta, *Washington State University, Pullman, WA, United States*

3:51pm Three-Dimensional Paper-Based Microfluidics for Analyte Detection

Technical Presentation. IMECE2013-65380

Katherine Clayton, Steven Wereley, *Purdue University, West Lafayette, IN, United States*

4:08pm Numerical Modeling of Fluidic Pumping in Micronetworks of Plants

Technical Paper Publication. IMECE2013-64826

Tsun-Kay Sze, Jin Liu, Prashanta Dutta, *Washington State University, Pullman, WA, United States*

4:25pm Regimes Map and Transition Boundaries for Immiscible Liquids Flow in Co-Axial Microtubes

Technical Paper Publication. IMECE2013-64983

In-hwan Yang, Mohamed El-Genk, *University of New Mexico, Albuquerque, NM, United States*

8-11 CFD / EFD (EXPERIMENTAL FLUID DYNAMICS) CHOICE A DILEMMA FOR INDUSTRIES!

8-11-1 CFD / EFD (Experimental Fluid Dynamics) Choice A Dilemma for Industries!

2nd Floor, Manchester Grand Hyatt, Edward D 3:00pm–4:45pm

Session Organizer: **B.G. Shiva Prasad**, *Wright State University, Dayton, OH, United States*

Session Co-Organizer: **Joel Park**, *Naval Surface Warfare Center Carderock Division, West Bethesda, MD, United States*

TUESDAY, NOVEMBER 19

8-1 20TH SYMPOSIUM ON FLUID MECHANICS AND RHEOLOGY OF NONLINEAR MATERIALS AND COMPLEX FLUIDS

8-1-1 Fluid Mechanics and Rheology of Nonlinear Materials and Complex Fluids I

2nd Floor, Manchester Grand Hyatt, Betsy A 9:45am–11:30am

Session Organizer: **Dennis Siginer**, *Universidad de Santiago de Chile, Santiago, Chile*

Session Co-Chair: **M'hamed Boutaous**, *Université de Lyon-INSA, Villeurbanne, France*

9:45am Multiscale Analysis of Thermoplastic Polymers With Regard to Their Thermomechanical History: SThM and DSC Measurements

Technical Paper Publication. IMECE2013-64961

M'hamed Boutaous, Severine Gomes, Zakariaa Refaa, Matthieu Zinet, Patrick Bourgin, *INSA de Lyon, Villeurbanne, France*

10:02am On the Behavior of an Oblate Spheroidal Hematite Particle in a Simple Shear Flow Under a Uniform Magnetic Field Applied in the Flow Direction

Technical Paper Publication. IMECE2013-64226

Akira Satoh, Haruka Yokoyama, *Akita Prefectural University, Yuri-honjo, Akita, Japan*

10:19am Influence of Fluid Parameters on Vortex Shedding and Other Characteristics of a Herschel-Bulkley Fluid Flow Over a Circular Cylinder

Technical Paper Publication. IMECE2013-62766

Raed Bourisli, *Kuwait University, Rawda, Kuwait*

10:36am Analysis of Secondary Flows in Straight Noncircular Tubes for a Giesekus Fluid

Technical Paper Publication. IMECE2013-62340

Mario Letelier, Dennis Siginer, Juan Stockle, *University of Santiago of Chile, Santiago, Chile*

10:53am Experimental Study of Dispersion of Particles at a Two-Fluid Interface

Technical Paper Publication. IMECE2013-65348

Vadim Linevich, Shriram Pillapakam, *Temple University, Philadelphia, PA, United States*, Pushendra Singh, *New Jersey Institute of Technology, Newark, NJ, United States*

11:10am Bi-Dimensional Analysis of Transient Pipe Flow Using Non-Conventional Constitutive Models

Technical Paper Publication. IMECE2013-66617

Silvio Sorrentino, *University of Modena and Reggio Emilia, Modena, Italy*, Giuseppe Catania, *University of Bologna, Bologna, Italy*

8-8 22ND SYMPOSIUM ON INDUSTRIAL FLOWS

8-8-4 Industrial Applications 4: Turbulent Flows III

2nd Floor, Manchester Grand Hyatt, Betsy B 9:45am–11:30am

Session Organizer: **George Chamoun**, *Eastman Chemical Co., Kingsport, TN, United States*

Session Co-Organizers: **Judith Bamberger**, *Pacific Northwest National Laboratory, Richland, WA, United States*, **Wayne Strasser**, *Eastman Chemical Co., Kingsport, TN, United States*

9:45am Investigation of the Surge Phenomena in a Centrifugal Compressor Using Large Eddy Simulation

Technical Paper Publication. IMECE2013-66301

Bernhard Semlitsch, *Jyothish Kumar, Mihai Mihaescu, Laszlo Fuchs, KTH Royal Institute of Technology, Stockholm, Sweden*, Ephraim Gutmark, *University of Cincinnati, Cincinnati, OH, United States*

10:02am Experimental Investigation of Vortex Structure in the Corrugated Channel

Technical Paper Publication. IMECE2013-66063

Efe Unal, *Hojin Ahn, Esra Sorguven, Yeditepe University, Umraniye/Istanbul, Turkey*, Zafer Gul, *Marmara University, Istanbul, Turkey*

10:19am Theoretical Analysis and Simulation of a Jet Flow Water in High Pressure

Technical Paper Publication. IMECE2013-64902

Carlos Escobar, *Salvador Barragan, Azael Garcia, Gilberto Villalobos, University of Colima, Colima, Mexico*

10:36am Gas Separation Using a Membrane

Technical Paper Publication. IMECE2013-62764

Nawaf Alkhamis, *Ali Anqi, Dennis E. Oztekin, Abdulmohsen Alsaiani, Alparslan Oztekin, Lehigh University, Bethlehem, PA, United States*

10:53am A Study on the Influence of the Suction Arrangement on the Performance of Twin Screw Compressors

Technical Paper Publication. IMECE2013-62391

Maria Pascu, *Sebastien Mounoury, Graeme Cook, Howden Compressors Ltd., Glasgow, United Kingdom*, Manoj Heiyanthuduwege, *Howden Compressors Ltd, Renfrewshire, United Kingdom*, Ahmed Kovacevic, *City University London, United Kingdom*

11:10am Effects of Surface Microgeometry on the Lubrication Characteristics of Slipper for Axial Piston Pump

Technical Paper Publication. IMECE2013-62668

Chao Wei, *Yuan Shihua, Hu Jibin, ChongBo Jing, BeiJing Institute of Technology, BeiJing, China*

8-9 MICROFLUIDICS 2013—FLUID ENGINEERING IN MICRO- AND NANOSYSTEMS

8-9-4 Plenary (Topic 8-9)

2nd Floor, Manchester Grand Hyatt, Betsy C 9:45am–11:30am

Session Organizer: **Michael Schertzer**, *University of Toronto, Toronto, Canada*

Session Co-Organizer: **Cullen Buie**, *Massachusetts Institute of Technology, Cambridge, MA, United States*

9:45am Free-Surface Microfluidics and SERS for High Performance Sample Capture and Analysis

Plenary Presentation. IMECE2013-67406

Carl Meinhart, *University of California, Santa Barbara, Santa Barbara, CA, United States*

8-12 YOUNG ENGINEER PAPER (YEP) CONTEST FLUIDS ENGINEERING DIVISION

8-12-1 Young Engineer Paper (YEP) Contest Fluids Engineering Division

3rd Floor, Manchester Grand Hyatt, Maggie 9:45am–11:30am

Session Organizer: **B. Terry Beck**

9:45am A Novel MEMS-Based Immunosensor for Ebola Virus Detection

Technical Paper Publication. IMECE2013-66025

Adarsh Venkataraman Ganesan, *BITS Pilani, Dubai Campus, Dubai, United Arab Emir.*

10:06am Gallium Conduction Pump Design and Analysis

Technical Paper Publication. IMECE2013-67341

Ari Umans, *Kristen Railey, David Wise, Massachusetts Institute of Technology, Belmont, MA, United States*

10:27am A New Quantitative 3D Imaging Method for Characterizing Spray in the Near-Field of Nozzle Exits

Technical Paper Publication. IMECE2013-65329

Daniel Eichner, *United States Military Academy, West Point, United States*, Bret Van Poppel, *Michael Benson, United States Military Academy, Cornwall on Hudson, NY, United States*, Filippo Coletti, *Stanford University, Stanford, CA, United States*

10:48am A Numerical Study for Biomimetic Structures to Control Wall Shear Stress in Water

Technical Paper Publication. IMECE2013-67342

Matthew Gerber, *Ohio State University, Columbus, OH, United States*

11:09am Flow Control on the Ahmed Body Vehicle Model Using Fluidic Oscillators

Technical Paper Publication. IMECE2013-67343

Matthew Metka, *Ohio State University, Columbus, OH, United States*

TRACK 8 FLUIDS ENGINEERING SYSTEMS & TECHNOLOGIES / TUESDAY, NOVEMBER 19

8-1 20TH SYMPOSIUM ON FLUID MECHANICS AND RHEOLOGY OF NONLINEAR MATERIALS AND COMPLEX FLUIDS

8-1-2 Fluid Mechanics and Rheology of Nonlinear Materials and Complex Fluids—Plenary

2nd Floor, Manchester Grand Hyatt, Betsy A 1:00pm–2:45pm

Session Organizer: **Dennis Siginer**, *Universidad de Santiago de Chile, Santiago, Chile*

Session Co-Organizer: **Patrick Bourgin**, *INSA de Lyon, Villeurbanne, France*

1:00pm **On the Development of a Thermodynamic Framework for Developing Implicit Constitutive Relations**

Plenary Presentation. IMECE2013-65574

Kumbakonam Rajagopal, *Texas A&M University, College Station, TX, United States*

8-7 SYMPOSIUM ON WIND TURBINES: AERODYNAMICS AND CONTROL

8-7-1 Wind Turbines: Aerodynamics and Control

3rd Floor, Manchester Grand Hyatt, Oxford 1:00pm–2:45pm

Session Organizer: **Jaikrishnan Kadambi**, *Case Western Reserve University, Cleveland, OH, United States*

Session Co-Organizer: **Majid Rashidi**, *Cleveland State University, Cleveland, OH, United States*

1:00pm **Aerodynamic Characteristics of Horizontal Axis Wind Turbine With Archimedes Spiral Blade**

Extended Abstract Publication. IMECE2013-62734

Kyung Chun Kim, Yoon Kee Kim, Ho Seong Ji, *Pusan National University, Busan, Korea (Republic)*, Joon-Ho Baek, *ESCO RTS Co. Ltd., Seoul, Korea (Republic)*, Rinus Mieremet, *The Archimedes, Rotterdam, Netherlands*

1:17pm **Design Criteria on Sizing and Material Selection of SB-VAWTS**

Technical Paper Publication. IMECE2013-63367

Mojtaba Ahmadi-Baloutaki, Rupp Cariveau, David S.-K. Ting, *University of Windsor, Windsor, ON, Canada*

1:34pm **Comparison of Overspeeding Analysis for Different Cup Anemometers**

Technical Presentation. IMECE2013-63525

Yng-Ru Chen, Iwan Alexander, *Case Western Reserve University, Cleveland, OH, United States*, Michael Hoelling, *ForWind - Center for Wind Energy Research, Oldenburg, Germany*

1:51pm **Atmospheric Icing Effects on Aerodynamics of Wind Turbine Blade**

Technical Paper Publication. IMECE2013-64085

Rho Shin Myong, *Gyeongsang National University, Jinju, Gyeongnam, Korea (Republic)*

2:08pm **Characterization of Model Wind Turbines in Turbulent Wind Fields**

Technical Presentation. IMECE2013-64373

Michael Hoelling, *ForWind - Center for Wind Energy Research, Oldenburg, Germany*, Jannik Schottler, *Piere Schulze, University of Oldenburg, Oldenburg, Germany*

2:25pm **Derivation and Validation of a Two-Pressure-Velocity Correction Immersed Boundary Methods for Three-Dimensional Incompressible Flows**

Technical Paper Publication. IMECE2013-63484

Osama Sabir, Nukman Yusoff, Norhafizan Ahmed, *University of Malaya, Kuala Lumpur, Kuala Lumpur, Malaysia, T.M.Y.S.*, Tuan Ya, *University Technology Petronas, Tronoh, Bandar Seri Iskandar, Tronoh, Perak, Malaysia*

8-8 22ND SYMPOSIUM ON INDUSTRIAL FLOWS

8-8-5 Industrial Applications 5: Multiphase Flows

2nd Floor, Manchester Grand Hyatt, Betsy B 1:00pm–2:45pm

Session Organizer: **Wayne Strasser**, *Eastman Chemical Co., Kingsport, TN, United States*

1:00pm **Mechanical Engineering in Stimulating Well Production in the Oilfield**

Technical Paper Publication. IMECE2013-62412

Jim B. Surjaatmadja, *Halliburton, Duncan, OK, United States*

1:17pm **Front Wave Prediction in Water Hammer Phenomena Involving Dual-Phase Flows**

Technical Paper Publication. IMECE2013-65838

Alina Bogoi, Radu Rugescu, *University Politehnica of Bucharest, Bucharest, Bucharest, Romania*, Jean-Marie Seynhaeve, Michel Giot, *Université Catholique de Louvain, Louvain-la-Neuve, Belgium*, Oliviu Sugar, *École de Technologie Supérieure, Montreal, QC, Canada*

1:34pm **Experimental Investigation of Slug Characteristics Through a Standard Pipe Bend**

Technical Paper Publication. IMECE2013-62896

Netaji Ravikiran Kesana, Ronald Vieira, Brenton Mc Laury, Siamack Shirazi, *University of Tulsa, Tulsa, OK, United States*, Eckhard Schleicher, Uwe Hampel, *Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany*

1:51pm **Risk Assessment in Damaged Clean Rooms by Using Lattice Boltzmann Methods**

Technical Paper Publication. IMECE2013-62020

Piroz Zamankhan, *University of Iceland, Reykjavik, Iceland*

2:08pm **Study on the Configuration Effect of a Vortex Finder for a Gas-Solid Cyclone Separator Using Eulerian-Eulerian Approach**

Technical Paper Publication. IMECE2013-63408

Moonho Choi, Sungwon Lee, *Hyundai Heavy Industries Co., Ltd., Yongin-si, Gyeonggi, Korea (Republic)*, Jin-ki Ham, *Hyundai Heavy Industries Co. Ltd., Kyunggi-do, Korea (Republic)*

2:25pm Simulation of Gas-Liquid Free Surface Flows in a Refrigerant Distributor and a Nozzle of Continuous-Inkjet

Technical Paper Publication. IMECE2013-63955
Masanori Ishikawa, Eiji Ishii, *Hitachi, Ltd., Hitachinaka, Ibaraki, Japan*, Masato Ikegawa, *Hitachi Ltd., Ibaraki, Japan*

8-9 MICROFLUIDICS 2013— FLUID ENGINEERING IN MICRO- AND NANOSYSTEMS

8-9-5 Microscale Multiphase Flow and Surface Interactions—II

2nd Floor, Manchester Grand Hyatt, Betsy C 1:00pm–2:45pm

Session Organizer: **Shaurya Prakash**, *Ohio State University, Columbus, OH, United States*

Session Co-Organizer: **Daniel Maynes**, *Brigham Young University, Provo, UT, United States*

1:00pm Numerical Modeling of Annular Flow With Phase Change in a Microchannel

Technical Paper Publication. IMECE2013-64262
S. Jesseela, *Government Engineering College Kozhikode, Kozhikode, India*, Sarith P. Sathian, Choondal Sobhan, *National Institute of Technology Calicut, Calicut, India*

1:17pm Evaluation of Fluid Behavior and Mixing Efficiency in Predefined Serpentine Micro-Fracture System

Technical Paper Publication. IMECE2013-65124
Gorakh Pawar, Ilija Miskovic, Manjunath Basavarajappa, *University of Utah, Salt Lake City, UT, United States*

1:34pm Droplets Motion by Dissipative Particle Dynamics on Inclined Flat Plate With Oil Film Covered

Technical Presentation. IMECE2013-65333
Chuanjin Lan, Yanbao Ma, *University of California, Merced, Merced, CA, United States*, Zhen Li, *Brown University, Providence, RI, United States*, Laibing Jia, *University of Science and Technology of China, Hefei, Anhui, China*

1:51pm Scale-Up Laws on Mixing of Two Fluids in a Rotating Microchannel

Technical Presentation. IMECE2013-65517
Woon-fong Leung, Yong Ren, *Hong Kong Polytechnic University, Hong Kong, China*

2:08pm Modeling Leftward Flow in the Embryonic Node

Technical Paper Publication. IMECE2013-62503
Andrey Kuznetsov, *North Carolina State University, Raleigh, NC, United States*, D.G. Blinov, A.A. Avramenko, *Institute of Engineering Thermophysics, Kiev, Ukraine*, Igor V. Shevchuk, *MBtech Group GmbH & Co. KGaA, Fellbach-Schmidlen, Germany*, A.I. Tyrinov, *Institute of Engineering Thermophysics, Kiev, Ukraine*, Ivan A. Kuznetsov, *Johns Hopkins University, Baltimore, MD, United States*

2:25pm Design, Simulation, and Development of Gold Microneedles Patch

Technical Paper Publication. IMECE2013-64443
Shahzadi Tayyaba, Nitin Afzulpurkar, *AIT, Thailand, Bangkok, Thailand*, Muhammad Waseem Ashraf, Muhammad Khaleequr Rahman, *GC University Lahore Pakistan, Lahore, Pakistan*

8-1 20TH SYMPOSIUM ON FLUID MECHANICS AND RHEOLOGY OF NONLINEAR MATERIALS AND COMPLEX FLUIDS

8-1-3 Fluid Mechanics and Rheology of Nonlinear Materials and Complex Fluids II

2nd Floor, Manchester Grand Hyatt, Betsy A 3:00pm–4:45pm

Session Organizer: **Patrick Bourgin**, *INSA de Lyon, Villeurbanne, France*

Session Co-Organizer: **M'hamed Boutaous**, *Université de Lyon- INSA, Villeurbanne, France*

3:00pm Self-Assembly of Monolayers of Submicron Sized Particles on Thin Liquid Films

Technical Paper Publication. IMECE2013-65324
Shriram Pillapakkam, *Temple University, Trenton, PA, United States*, Pushpendra Singh, Naga Aditya Musunuri, *New Jersey Institute of Technology, Newark, NJ, United States*

3:17pm Surface Tension Driven Kinetics of the Triple Line of a Liquid Metal Free Surface

Technical Paper Publication. IMECE2013-62945
Hai Fu, Fangxiao Dong, Dusan P. Sekulic, *University of Kentucky, Lexington, KY, United States*, Sinisa Mesarovic, *Washington State University, Pullman, WA, United States*, Mikhail Krivilev (Krivilyov), *Udmurt State University, Izhevsk, Russia*

3:34pm On the Influence of Relative Humidity on the Contact Angle of a Water Droplet on a Silicon Wafer Surface

Extended Abstract Publication. IMECE2013-63781
Jose L. Perez-Diaz, Marco Antonio Alvarez-Valenzuela, Ignacio Valiente, Juan Sanchez-Garcia-Casarrubios, Cristian Cristache, *Universidad Carlos III, Leganes, Spain*, Sergio Jiménez-López, *Universidad Carlos III de Madrid, Madrid, Spain*, Marta Palacios, Oscar Garcla, *Instituto de Ciencia y Tecnologia de Polimeros. CSIC, Madrid, Spain*, Efen Diez-Jimenez, *Universidad Carlos III de Madrid, Leganes, Spain*

3:51pm Channel Flow of a Mixture of Granular Materials and a Fluid

Technical Paper Publication. IMECE2013-65385
Weitao Wu, *Carnegie Mellon University, Pittsburgh, PA, United States*, Nadine Aubry, *Northeastern University, Boston, MA, United States*, Mehrdad Massoudi, *Department of Energy National Energy Technology Lab, Pittsburgh, PA, United States*

4:08pm Collapse of Rectangular Granular Piles in Air and Water

Extended Abstract Publication. IMECE2013-65012
Mohammad Hossein Babaei, *National Research Council of Canada, Ocean, Coastal, and River Engineering, Ottawa, ON, Canada*

4:25pm Plastic Flow Establishment in Tubes: A Comparison of Pressure Gradient and Yield Stress Change Effects

Technical Paper Publication. IMECE2013-62344
Mario Letelier, Gonzalo Uribe, Dennis Siginer, Juan Stockle, *University of Santiago of Chile, Santiago, Chile*

TRACK 8 FLUIDS ENGINEERING SYSTEMS & TECHNOLOGIES / TUESDAY, NOVEMBER 19

8-6 SYMPOSIUM ON CFD APPLICATIONS FOR OPTIMIZATION AND CONTROLS

8-6-4 CFD Applications for Optimization and Controls IV

2nd Floor, Manchester Grand Hyatt, Betsy B 3:00pm–4:45pm

Session Organizer: **Ning Zhang**, *McNeese State University, Lake Charles, LA, United States*

Session Co-Organizer: **Philipp Epple**, *HS Coburg, Nurnberg, Bavaria, Germany*

3:00pm The Research on Performance of Hovercraft Gas Turbine Anti-icing Device

Technical Paper Publication. IMECE2013-63332
Zhongyi Wang, Fei Li, Zhengheng Zhao, *Harbin Engineering University, Harbin, Heilongjiang, China*, Changlong Yuan, *Avic Shenyang Engine Design & Research Institute, Shenyang, Liaoning, China*

3:17pm Three Dimensional CFD Analysis of Solar Air Heater for Enhancement of Thermal Performance Using Arc-Shaped and V Shaped Wire Turbulators

Technical Paper Publication. IMECE2013-64028
Vasudeva Karanth, M.S. Manjunath, Yagnesh N. Sharma, *Manipal University, Manipal, Karnataka, India*

3:34pm Analysis and Simulation of Oil Lubrication Pump for Internal Combustion Engine

Technical Paper Publication. IMECE2013-63468
Emma Frosina, Adolfo Senatore, Dario Buono, *University of Naples Federico II, Naples, Naples, Italy*, Luca Santato, *Lombardini, Reggio Emilia, Italy*

3:51pm High-Efficiency Propeller Design Based on the Betz Minimum Induced Loss Condition and CFD Validation on an APC 8i Propeller

Technical Paper Publication. IMECE2013-64382
Sven Albert, Bettina Willinger, Antonio Delgado, *University of Erlangen-Nürnberg, Erlangen, Germany*, Philipp Epple, *HS Coburg, Nurnberg, Bavaria, Germany*

4:08pm Aerodynamic Shape Optimization of a Helicopter Main Rotor Hub Beanie Using Advanced Multi-Objective Evolutionary Algorithms

Technical Paper Publication. IMECE2013-64441
Lorenzo Dal Mas, Ernesto Benini, *University of Padova, Padova, Padova, Italy*, Rita Ponza, *HIT09, Padova, Padova, Italy*

4:25pm Computational Fluid Dynamics Simulations of a Micro Hydro Turbine

Technical Paper Publication. IMECE2013-65474
Jacob Riglin, William C. Schleicher, Zachary Kraybill, *Alparslan Oztekin, Lehigh University, Bethlehem, PA, United States*, Robert C. Klein, *e-Harvest Systems, Inc., Glenn Gardner, NJ, United States*

8-9 MICROFLUIDICS 2013—FLUID ENGINEERING IN MICRO- AND NANOSYSTEMS

8-9-6 Droplet/Particle/Bubble Dynamics and Capillary Flow—II

2nd Floor, Manchester Grand Hyatt, Betsy C 3:00pm–4:45pm

Session Organizer: **Sushanta Mitra**, *University of Alberta, Edmonton, AB, Canada*

Session Co-Organizer: **Rohit Karnik**, *Massachusetts Institute of Technology, Cambridge, MA, United States*

3:00pm Simulation of Micro Droplet Generation and Deposition Using Dissipative Particle Dynamics Method

Technical Presentation. IMECE2013-65215
Laibing Jia, *University of Science and Technology of China, Hefei, Anhui, China*, Chuanjin Lan, *Yanbao Ma, University of California, Merced, Merced, CA, United States*, Zhen Li, *Brown University, Providence, RI, United States*

3:17pm Active Migration of Circulating Cells in a Microchannel Explored by Three-Dimensional Numerical Simulation

Technical Presentation. IMECE2013-65224
Hongzhi Lan, *Damir Khismatullin, Tulane University, New Orleans, LA, United States*

3:34pm Monocyte Rolling and Adhesion in a Microchannel Lined With Vascular Endothelial Cells Activated by Inflammatory Mediators

Technical Presentation. IMECE2013-65305
Chong Chen, *Damir Khismatullin, Tulane University, New Orleans, LA, United States*

3:51pm Numerical Study of Platelets Aggregation in a Microfluidic Flow Chamber

Technical Presentation. IMECE2013-65344
You Lu, *Damir Khismatullin, Tulane University, New Orleans, LA, United States*

4:08pm Micro Thermal Lab in a Droplet

Technical Paper Publication. IMECE2013-66002
Meng Gao, Lin Gui, *Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, Beijing, Beijing, China*

4:25pm Instability of the Flow of Inverse Emulsions in Microchannels

Technical Presentation. IMECE2013-66153
Alfir T. Akhmetov, Artur A. Rakhimov, Azat A. Valiev, *Institute of Mechanics of Ufa Branch, RAS; Bashkir State University, Ufa, Bashkortostan, Russia*, Iskander Akhatov, *North Dakota State University, Fargo, ND, United States*

8-6 SYMPOSIUM ON CFD APPLICATIONS FOR OPTIMIZATION AND CONTROLS

8-6-5 CFD Applications for Optimization and Controls V

2nd Floor, Manchester Grand Hyatt, Betsy B 5:00pm–6:45pm

Session Organizer: **Ning Zhang**, *McNeese State University, Lake Charles, LA, United States*

Session Co-Organizer: **Yulin Wu**, *Tsinghua University, Beijing, China*

5:00pm **Three-Dimensional CFD Simulation of Thermosyphon Flow in an Unglazed Solar Flat Plate Collector**

Technical Paper Publication. IMECE2013-64090

N. Yagnesh Sharma, M.S. Manjunath, Vasudeva Karanth, *Manipal University, Manipal, Karnataka, India*

5:17pm **CFD Research on Francis Pump-Turbine Load Rejection Transient Under Pump Condition**

Technical Paper Publication. IMECE2013-64195

Daqing Zhou, Languo Zhang, *Hohai University, Nanjing, China*

5:34pm **Comparison of Dynamic and Aerodynamic Characteristics of the Centrifugal Fan Calculated by Different Methods**

Technical Paper Publication. IMECE2013-64196

Roman Gáapár, Jiri Polansky, *University of West Bohemia, Plzen, Czech Republic*, László Kalmár, *University of Miskolc, Miskolc, Hungary*

5:51pm **CFD Analyses and Design of a Turbocompound System**

Technical Paper Publication. IMECE2013-64444

Thomas Vogel, Andreas Hermann, *Voith Turbo GmbH & Co. KG, Crailsheim, Germany*, Philipp Epple, *HS Coburg, Nurnberg, Bavaria, Germany*, Bettina Willinger, Antonio Delgado, *University of Erlangen-Nürnberg, Erlangen, Germany*

6:08pm **Deviation of Axisymmetric Simulation From Three-Dimensional Approach at the Suction Surface of Thermo-Compressors**

Technical Paper Publication. IMECE2013-64672

Navid Sharifi, *Amirkabir University, Tehran, Iran*, Majid Sharifi, *Drexel University, Philadelphia, PA, United States*

6:25pm **Hole-Pattern Seals Performance Optimization Using Computational Fluid Dynamics and Design of Experiment Techniques**

Technical Paper Publication. IMECE2013-66387

Alexandrina Untaroiu, Patrick Migliorini, *Houston G. Wood, University of Virginia, Charlottesville, VA, United States*, Cheng Liu, *Beijing Institute of Technology, Beijing, China*, Costin Untaroiu, *Virginia Technology, Blacksburg, VA, United States*

8-9 MICROFLUIDICS 2013—FLUID ENGINEERING IN MICRO- AND NANOSYSTEMS

8-9-7 Devices, Experimental Investigation of Micro-/Nanofluidics—II

2nd Floor, Manchester Grand Hyatt, Betsy C 5:00pm–6:45pm

Session Organizer: **Nazmul Islam**, *University of Texas at Brownsville, Brownsville, TX, United States*

Session Co-Organizer: **Rasim Guldiken**, *University of South Florida, Tampa, FL, United States*

5:00pm **Dielectrophoretic Actuation of Janus Particles Under Electrolyte Concentration Gradient**

Technical Presentation. IMECE2013-65392

Nathaniel Thorne, Ying Sun, *Drexel University, Philadelphia, PA, United States*

5:17pm **Transitional and Turbulent Flow Modeling in a Tesla Valve**

Technical Paper Publication. IMECE2013-65526

Scott Thompson, Keith Walters, Tausif Jamal, Basil J. Paudel, *Mississippi State University, Mississippi State, MS, United States*

5:34pm **Vortical Flow and Mixing in Rotating Milli/Micro Chambers**

Technical Presentation. IMECE2013-65556

Yong Ren, Woon-fong Leung, *Hong Kong Polytechnic University, Hong Kong, China*

5:51pm **Method for Individual Control of Multiplexed Droplet Generation in Digital Microfluidic Devices**

Technical Paper Publication. IMECE2013-65935

Michael Schertzer, Zhifang Yang, Ridha Ben-Mrad, Pierre Sullivan, *University of Toronto, Toronto, Canada*

6:08pm **Electrohydrodynamics of a Point-and-Plate Nanoneedle**

Technical Presentation. IMECE2013-64773

Kurtis Heacox, Robert W. Cohn, Stuart Williams, *University of Louisville, Louisville, KY, United States*

6:25pm **Microfluidics and Fluorescence Imaging Methods for Developing Nanoparticle CO₂ Foam Technology in Enhanced Oil Recovery**

Technical Presentation. IMECE2013-66256

Phong Nguyen, Hossein Fadaei, David Sinton, *University of Toronto, Toronto, Canada*

TRACK 8 FLUIDS ENGINEERING SYSTEMS & TECHNOLOGIES / WEDNESDAY, NOVEMBER 20

WEDNESDAY, NOVEMBER 20

8-9 MICROFLUIDICS 2013—FLUID ENGINEERING IN MICRO- AND NANOSYSTEMS

8-9-8 Droplet/Particle/Bubble Dynamics and Capillary Flow—III

3rd Floor, Manchester Grand Hyatt, Maggie 9:45am–11:30am

Session Organizer: **Michael Schertzer**, *University of Toronto, Toronto, Canada*

Session Co-Organizer: **Scott Thompson**, *Mississippi State University, Mississippi State, MS, United States*

9:45am Aerodynamic Focusing of Microparticles in Flows With Shock Waves

Technical Paper Publication. IMECE2013-64238

Alexander Osiptsov, Irina Golubkina, Oyuna Rybdylova, *Lomonosov Moscow State University, Moscow, Russia*

10:02am Lateral Migration and Deformation of Circulating Cells in a Rectangular Microchannel

Technical Presentation. IMECE2013-65179

Hongzhi Lan, Damir Khismatullin, *Tulane University, New Orleans, LA, United States*, S.J. Claire Hur, *Harvard University, Cambridge, MA, United States*, Dino Di Carlo, *University of California, Los Angeles, Los Angeles, CA, United States*

10:19am Numerical Investigation of Dielectrophoresis Directed Assembly of Nanoparticles and Nanowires

Extended Abstract Presentation. IMECE2013-66696

Guoliang He, Tsorng-Whay Pan, Dong Liu, *University of Houston, Houston, TX, United States*

10:36am Study the Geometrical Effects on the Unsteady Pulsatile Flow Behavior Through a Microchannel With a Sudden Step Shape Working as a Microvalve

Technical Paper Publication. IMECE2013-66315

Amir Nejat, Farshad Kowsary, Saman Ebrahimi, A. Hasanzadeh, *University of Tehran, Tehran, Iran*

10:53am Modifying Electrode Geometry for Unequal Droplet Splitting in Digital Microfluidics

Technical Paper Publication. IMECE2013-66844

Ehsan Samiei, Mina Hoorfar, *University of British Columbia, Kelowna, Canada*

11:10am High Fidelity Simulation of Multiscale Turbulent Flows in the Environment.

Plenary Presentation. IMECE2013-67396

Sutanu Sarkar, *University of California, La Jolla, United States*

8-9 MICROFLUIDICS 2013—FLUID ENGINEERING IN MICRO- AND NANOSYSTEMS

8-9-9 Novel Applications of Micro-/Nanofluidics

3rd Floor, Manchester Grand Hyatt, Oxford 1:00pm–2:45pm

Session Organizer: **Daniel Maynes**, *Brigham Young University, Provo, UT, United States*

Session Co-Organizer: **Nail Gumerov**, *University of Maryland, College Park, MD, United States*

1:00pm The Effect of Flow Pulsation on Ultrafiltration System Limiting Flux Behavior

Technical Paper Publication. IMECE2013-62514

Chyohuwu B. Huang, Hung-Shyong Chen, *Cheng Shiu University, Kaohsiung City, Taiwan*

1:17pm Hydrodynamic Loads on Vibrating Cantilevers Under a Free Surface in Viscous Fluids With SPH

Technical Paper Publication. IMECE2013-63792

Angelantonio Tafuni, *Polytechnic Institute of New York University, New York, NY, United States*, Iskender Sahin, *Polytechnic Institute of New York University, Brooklyn, NY, United States*

1:34pm Effect of Rotation and Magnetic Field on Thermal Stability of Ferromagnetic Fluid

Technical Paper Publication. IMECE2013-64288

Amrish Aggarwal, Anushri Verma, *Jaypee Institute of Information Technology, Noida (UP), Uttar Pradesh, India*

1:51pm Numerical Investigation of the Pressure Drop Through Micro-Pillar Arrays for a Wide Range of Aspect Ratios

Technical Paper Publication. IMECE2013-64445

Ahmed M. Taher, *KACST-Intel Consortium Center of Excellence in Nano-Manufacturing Applications, Riyadh, Saudi, Heverlee, Leuven, Belgium*, Benjamin Jones, *Liesbet Lagae, Interuniversity Microelectronics Center, Heverlee, Leuven, Belgium*, Ihab Adam, *Alexandria University, Alexandria, Alexandria, Egypt*

2:08pm A Gravity Driven Microfluidic Platform for DNA Enrichment

Technical Paper Publication. IMECE2013-64599

Conor McCarthy, Tara M. Dalton, Mark R. Davies, *University of Limerick, Limerick, Limerick, Ireland*

2:25pm A Novel Passive Three-Dimensional Asymmetric Arc Micromixer Based on the Concept of Chaotic Advection and Unbalanced Splitting-Collision

Technical Paper Publication. IMECE2013-64728

Lin Li, Qingde Chen, Chi-tay Tsai, *Florida Atlantic University, Boca Raton, FL, United States*, Liang Hou, *Xiamen University, Xiamen, Fujian, China*, Guodong Sui, *Fudan University, Shanghai, Shanghai, China*

HEAT TRANSFER AND THERMAL ENGINEERING

MONDAY, NOVEMBER 18

9-2 THEORY AND FUNDAMENTAL RESEARCH

9-2-1 Fundamentals of Natural and Mixed Convection—I

3rd Floor, Manchester Grand Hyatt, Windsor B 9:45am–11:30am

Session Organizer: **Chris Kobus**, *Oakland University, Rochester, MI, United States*Session Co-Organizer: **Patrick Oosthuizen**, *Queen's University, Kingston, Canada*

9:45am Estimation of the Transient Surface Temperature and Heat Transfer Coefficient of Convective Cooling for infinite Slab, infinite Cylinder, and Sphere by Using an Inverse Heat Method

Technical Paper Publication. IMECE2013-62205
Ramin Soujoudi, Antonio Campo, *University of Texas at San Antonio, San Antonio, TX, United States*

10:02am Pressure Drop in Mini-Scale Coiled Tubing

Technical Paper Publication. IMECE2013-63348
Mehdi Ghobadi, *Memorial University, St. John's, Canada*, Yuri Muzychka, *Memorial University of Newfoundland, St. John's, NF, Canada*

10:19am Effect of Plumes Dynamics for Heat Transfer Enhancement at Solid-Liquid Interface

Technical Paper Publication. IMECE2013-62778
Sudhakar Subudhi, *IIT Roorkee, Roorkee, India*, Jaywant Arakeri, *IISc Bangalore, Bangalore, Karnataka, India*

10:36am Fully Developed Heat Transfer in Mini Scale Coiled Tubing for Constat Wall Temperature

Technical Paper Publication. IMECE2013-63344
Mehdi Ghobadi, Yuri Muzychka, *Memorial University of Newfoundland, St. John's, NF, Canada*

10:53am Effect of Viscous Dissipation on Forced Convection Heat Transfer in Parallel Plate Channels With Asymmetric Boundary Conditions

Technical Paper Publication. IMECE2013-63112
Ramjee Repaka, *Indian Institute of Technology Ropar, Rupnagar, India*, V.V. Satyamurty, *Indian Institute of Technology Kharagpur, Kharagpur, West Bengal, India*

11:10am A Method of Identifying the Ingredient of Homoeotrope by Measurable Temperature Field of Pipe Convective Heat Transfer Model

Technical Paper Publication. IMECE2013-62066
Xin Wang, Ning Mei, Yan Li, *Ocean University of China, Qingdao, Shandong, China*, Xijun Yu, *Public Heating Management Office, Qingdao, Shandong, China*

9-3 NANOSCALE THERMAL TRANSPORT

9-3-1 Thermal Transport Through Interfaces

3rd Floor, Manchester Grand Hyatt, Windsor C 9:45am–11:30am

Session Organizer: **Deyu Li**, *Vanderbilt University, Nashville, TN, United States*Session Co-Chair: **Renkun Chen**, *University of California, San Diego, La Jolla, CA, United States*

9:45am Interfacial Thermal Transport Between Ultrathin Polymer Films and Inorganic Materials

Technical Presentation. IMECE2013-66438
Jun Liu, Xiaokun Gu, Ronggui Yang, *University of Colorado Boulder, Boulder, CO, United States*, Shenghong Ju, Xingang Liang, *Tsinghua University, Beijing, China*, Jie Zhu, *Institute of Thermophysics, Beijing, China*

10:00am Theory on Electron-Phonon Coupling and Thermal Conductance at Free Electron Metal/Insulator Interfaces

Technical Presentation. IMECE2013-63890
Patrick Hopkins, *University of Virginia, Charlottesville, VA, United States*

10:15am Temperature Dependent Thermal Transport Across Metal/Dielectric Multilayers

Technical Presentation. IMECE2013-64716
Edward Dechaumphai, Renkun Chen, *University of California, San Diego, La Jolla, CA, United States*

10:30am Atomistic Mechanisms of Thermal Transport Across Organic-Inorganic Interfaces

Technical Presentation. IMECE2013-65251
Shubhaditya Majumdar, Wee Liat Ong, Jonathan Malen, Alan McGaughey, *Carnegie Mellon University, Pittsburgh, PA, United States*

10:45am Thermal Interface Materials: Interfaces and Nanocontact (Invited)

Invited Presentation. IMECE2013-67294
Sebastian Volz, *École Centrale Paris, Paris, France*

9-3-4 Nanomaterials in Energy Systems

3rd Floor, Manchester Grand Hyatt, Connaught 9:45am–11:30am

Session Organizer: **Renkun Chen**, *University of California, San Diego, La Jolla, CA, United States*Session Co-Organizer: **Greg Walker**

9:45am Thermal Conductivity of Carbon Doped Oxide Thin Films and Estimation of Interfacial Thermal Resistance

Technical Presentation. IMECE2013-64846
Raghu Pulavarthy, Baoming Wang, Tarek Alam, Md Haque, *Pennsylvania State University, University Park, PA, United States*, Sean King, *Intel Corporation, Hillsboro, OR, United States*

TRACK 9 HEAT TRANSFER AND THERMAL ENGINEERING / MONDAY, NOVEMBER 18

10:00am Thermoelectric Properties of Doped Few Atomic Layer Bismuth Telluride Nanoplates

Technical Presentation. IMECE2013-63089

Michael Pettes, Insun Jo, Zhen Yao, Li Shi, *University of Texas, Austin, TX, United States*

10:15am Carrier Dynamics in Skutterudites

Extended Abstract Publication. IMECE2013-63667

Liang Guo, Xianfan Xu, *Purdue University, West Lafayette, IN, United States*

10:30am Contributions of Electron and Phonon Transport to the Thermal Conductivity of GdFeCo and TbFeCo Amorphous Rare-Earth Transition-Metal Alloys

Technical Presentation. IMECE2013-63868

Patrick Hopkins, Manli Ding, Joe Poon, *University of Virginia, Charlottesville, VA, United States*

10:45am Porous Thin Films for Thermoelectrics (Invited)

Invited Presentation. IMECE2013-67295

Koji Miyazaki, *Kyushu Institute of Technology, Kitakyushu, Japan*

9-4 HEAT TRANSFER EQUIPMENT

9-4-1 Heat Exchangers Performance, Microchannels, and Nanofluids

3rd Floor, Manchester Grand Hyatt, Maggie 9:45am–11:30am

Session Organizer: **Arun Muley**, *Boeing Research and Technology, Huntington Beach, CA, United States*

Session Co-Organizer: **Raj M. Manglik**, *University of Cincinnati, Cincinnati, OH, United States*, **Ravi Gururajan**, *Wichita State University, Wichita, KS, United States*

9:45am Experimental Investigation to Evaluate the Performance of Helical Coiled Tube Heat Exchanger With Using TiO₂ Nanofluid

Technical Paper Publication. IMECE2013-62230

Qasim Saleh, Sahar Abdulfatah, Firas Jumia, *Al-Mustansiryia University, Baghdad, Iraq*

10:02am Cryogenic Cooling System Krioblast Increased Efficiency and Lowered the Operation Time of Protective Electrical Induction-Induced Devices

Technical Paper Publication. IMECE2013-62383

Vladimir F. Bolyukh, Igor I. Katkov, *CELLTRONIX, San Diego, CA, United States*

10:19am Experimental Study on the Heat Transfer Performance of the Diffusion-Bonded Micro Channel Heat Exchanger in the Pilot-Scale Test Facility

Technical Paper Publication. IMECE2013-63426

Seok Ho Yoon, Dong-Wook Oh, Jun Seok Choi, Young Kim, *Korea Institute of Machinery and Materials, Daejeon, Korea (Republic)*

10:36am Investigations of Different-Shaped Helical Baffles on Heat Transfer and Fluid Flow Performance in the Shell Side of Heat Exchangers

Technical Paper Publication. IMECE2013-63510

Lin Cheng, Hongfu Wang, Wenjing Du, *Shandong University, Jinan City, China*

10:53am Production, Characterization and Application of Meso-, Micro-, and Nanoscaled Surface Structured Devices for Boilers and Heat Exchangers

Technical Paper Publication. IMECE2013-62949

Axel K'ling, Stefan Kohn, Michael Beyer, Mario Nowitzki, Hagen Sagasser, *ERK Eckrohrkessel GmbH, Berlin, Germany*, Udo Hellwig, *University of Applied Science Wildau, Wildau, Germany*, Nikolai Schano, *La Mont-Kessel GmbH & Co. KG, Wildau, Germany*

11:10am Boiling Water Treatment for Wettability Improvement of Aluminum Fin Surfaces

Technical Paper Publication. IMECE2013-62697

Jianlong Gao, Jiheng Zhao, Wei Xue, *Washington State University, Vancouver, Vancouver, WA, United States*, Xinmiao Chen, Liping Liu, *Lawrence Technological University, Southfield, MI, United States*

9-6 COMBUSTION AND FIRE SIMULATION, MODELING, AND EXPERIMENTAL TECHNIQUES

9-6-1 Combustion and Fire—Experimental & Modeling Techniques—I

3rd Floor, Manchester Grand Hyatt, Oxford

9:45am–11:30am

Session Organizer: **Tariq Shamim**, *Masdar Institute of Science & Technology, Abu Dhabi, Abu Dhabi, United Arab Emir*

Session Co-Organizer: **Cheng Zhang**, *Georgia Southern University, Statesboro, GA, United States*

9:45am Some Experimental Results on Internal Fire Whirls in a Vertical Shaft

Technical Paper Publication. IMECE2013-62148

Ye Gao, G.W. Zou, S.S. Li, *Harbin Engineering University, Harbin, China*, W.K. Chow, *Hong Kong Polytechnic University, Hong Kong, China*

10:02am Effect of Helical Vane Swirler Geometry on Heat Transfer Characteristics for Compressed Natural Gas/Air Swirling Flame Impinging on a Flat Surface

Technical Paper Publication. IMECE2013-63968

Subhash Chander Sharma, *National Institute of Technology, Jalandhar, Punjab, India*, Gurpreet Singh, *Lala Lajpat Rai Institute of Engineering and Technology, Moga, India*

10:19am Effect of Swirl Intensity on Heat Transfer Characteristics of Swirling Flame Impinging on a Flat Surface

Technical Paper Publication. IMECE2013-64178

Gurpreet Singh, *Lala Lajpat Rai Institute of Engineering and Technology, Moga, India*, Subhash Chander Sharma, *National Institute of Technology, Jalandhar, Punjab, India*

10:36am Assessment and Calibration of Semi-Empirical Models for Predicting Pollutant Emissions of the ERICA Tiltrotor Turboshift Engine

Technical Paper Publication. IMECE2013-64490

Lorenzo Dal Mas, Ernesto Benini, *University of Padova, Padova, Padova, Italy*, Rita Ponza, *HIT09, Padova, Padova, Italy*

10:53am Simple Expression for the Emittance of H₂O-CO₂ Mixtures in Zonal Methods of Radiation Transfer Modeling

Technical Paper Publication. IMECE2013-62738
Vladimir Lisienko, German Malikov, Alexandr Titaev, *Ural Federal University, Ekaterinburg, Russia*, Raymond Viskanta, *Purdue University, West Lafayette, IN, United States*

11:10am Simulation of an Industrial Boiler Firing Metallurgical Gases

Technical Paper Publication. IMECE2013-63219
Bin Wu, Chenn Zhou, Guangwu Tang, *Purdue University Calumet, Hammond, IN, United States*, Kurt W. Johnson, *ArcelorMittal, Global Research and Development, East Chicago, IL, United States*, Albert J. Kirk, *ArcelorMittal Burns Harbor, Burns Harbor, IN, United States*

9-10 HEAT TRANSFER IN MULTIPHASE FLOW

9-10-1 Boiling Heat Transfer

2nd Floor, Manchester Grand Hyatt, Molly A 9:45am–11:30am

Session Organizer: **Cheng-xian Lin**, *Florida International University, Miami, FL, United States*

Session Co-Organizer: **Sujoy Saha**, *Bengal Engineering & Science University, Howrah, India*

9:45am On Development of a Semi-Mechanistic Wall Boiling Model

Technical Paper Publication. IMECE2013-66179
Saurish Das, Hemant Puneekar, *Ansys Inc., Pune, India*

10:06am Numerical Investigation of Droplet Evaporation in Turbulent Flows Under Diesel Engine Conditions

Technical Paper Publication. IMECE2013-66217
Maher M. Aboualood, Mahmoud Ahmed, *Assiut University, Assiut, Assiut, Egypt*

10:27am Exploration of Impinging Water Spray Heat Transfer at System Pressures Near the Triple-Point

Technical Paper Publication. IMECE2013-66872
Eric Gollhofer, *NASA Glenn Research Center, Cleveland, OH, United States*, Shi-chune Yao, *Carnegie Mellon University, Pittsburgh, PA, United States*

10:48am The Influence of a Harmonic Motion on a Melting Process With Natural Convection

Technical Paper Publication. IMECE2013-64833
Ruben Avila, *Universidad Nacional Autónoma de México, Mexico D. F., Mexico D.F., Mexico*, Eduardo Ramos, *Universidad Nacional Autónoma de México, Temixco, Morelos, Mexico*

11:09am Cooling Capacity of Metal Phase Change Material for Thermal Management of Mobile Phone Subject to Long Time Communication

Technical Paper Publication. IMECE2013-66240
Haoshan Ge, *Technical Institute of Physics and Chemistry, Beijing, China*, Jing Liu, *Chinese Academy of Sciences, Beijing, China*

9-13 HEAT TRANSFER IN ELECTRONIC EQUIPMENT

9-13-1 Liquid and Phase Change Cooling I

2nd Floor, Manchester Grand Hyatt, Molly B 9:45am–11:30am

Session Organizer: **Esam Alawadhi**, *Kuwait University, Safat, Kuwait*

Session Co-Organizers: **Yaguo Wang**, *University of Texas at Austin, Austin, TX, United States*, **Karthik S. Remella**, *National Institute of Technology, Durgapur, India*

9:45am Piezoelectric Synthetic Jet Integrated With Heat Sink for Heat Transfer Enhancement

Technical Paper Publication. IMECE2013-62782
Qiao Li, Longzhong Huang, Terrence Simon, Tianhong Cui, *University of Minnesota, Minneapolis, MN, United States*, Min Zhang, *Tsinghua University, Shenzhen, Guangdong, China*, Mark North, *Thermacore Inc., Lancaster, PA, United States*

10:02am An Experimental Study of a Single-Device Jet Impingement Cooler With Phase Change Using HFE-7100 and a Vapor Extraction

Technical Paper Publication. IMECE2013-63249
Shailesh Joshi, Ercan Dede, *Toyota, Ann Arbor, MI, United States*, Matthew J. Rau, *Purdue University, West Lafayette, IN, United States*

10:19am Experimental Study on Evaporative Heat Sink

Technical Paper Publication. IMECE2013-64370
Moojoong Kim, Sangjin Kim, Kuen Tae Park, Hyun Jung Kim, Dong-Kwon Kim, *Ajou University, Suwon, Korea (Republic)*

10:36am Investigation of Enhancement in Pool Boiling Heat Transfer of a Binary Temperature Sensitive Magnetic Fluid

Technical Paper Publication. IMECE2013-66308
Giti Karimi-Moghaddam, Richard Gould, Subhashish Bhattacharya, *North Carolina State University, Raleigh, NC, United States*

10:53am Steady State Parametric Modeling of Non-Conventional Loop Heat Pipes

Technical Paper Publication. IMECE2013-63991
Karthik S. Remella, *National Institute of Technology, Durgapur, India*, Frank M. Gerner, *University of Cincinnati, Cincinnati, OH, United States*, Ahmed Shuja, *BritePointe Inc., Hayward, CA, United States*

11:10am Thermal-Aware Micro-Channel Cooling of Multicore Processors: A Three-Stage Design Approach

Technical Paper Publication. IMECE2013-63265
Yubai Li, Dongzhi Guo, Shi-chune Yao, *Carnegie Mellon University, Pittsburgh, PA, United States*

TRACK 9 HEAT TRANSFER AND THERMAL ENGINEERING / MONDAY, NOVEMBER 18

9-15 HEAT TRANSFER UNDER EXTREME CONDITIONS

9-15-1 Heat and Mass Transfer Under Extreme Conditions

2nd Floor, Manchester Grand Hyatt, Gregory B 9:45am–11:30am

Session Organizer: **Zhixiong Guo**, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*

Session Co-Organizers: **Qiuwang Wang**, *Xian Jiaotong University, Xi'an, China*, **TieJun Zhang**, *Masdar Institute of Science and Technology, Abu Dhabi, United Arab Emir.*

9:45am **Vibration Effects on Surface Coke Deposition of Hydrocarbon Fuel at Supercritical Pressure Condition in Micro-Tubes**

Technical Paper Publication. IMECE2013-62871
Yanchen Fu, Zhi Tao, Guoqiang Xu, Hongwu Deng, *Beihang University, Beijing, Beijing, China*

10:02am **Optimized Multi-Floor Throughflow Micro Heat Exchangers**

Technical Paper Publication. IMECE2013-63590
Abas Abdoli, George Dulikravich, *Florida International University, Miami, FL, United States*

10:19am **Fundamental Considerations for Designing Compact Solar Thermal Power and Cooling Systems in Hot Climates**

Technical Paper Publication. IMECE2013-65928
TieJun Zhang, Saleh Mohamed, *Guanqiu Li, Masdar Institute of Science and Technology, Abu Dhabi, United Arab Emir.*

10:36am **CFD Study on Counterflow Ceramic Microchannel Heat Exchanger With Different Fins**

Technical Paper Publication. IMECE2013-66154
Wenxiao Chu, Ting Ma, Min Zeng, Qiuwang Wang, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*

10:53am **Effect of Offset-Bubble Profile on Thermo-Hydraulic Performance of Primary Surface Channel**

Technical Paper Publication. IMECE2013-66161
Jie Zhang, Ting Ma, Min Zeng, Qiuwang Wang, *Xian Jiaotong University, Xi'an, Shaanxi, China*

11:10am **Experimental Study of Deicing Process in an Airfoil Application**

Technical Paper Publication. IMECE2013-64977
Pablo Perez, Luis Vilar-Carrasquillo, Gerardo Carbajal, *Universidad del Turabo, Gurabo, PR, United States*

9-16 ENVIRONMENTAL HEAT TRANSFER

9-16-1 Environmental Heat Transfer

3rd Floor, Manchester Grand Hyatt, Emma A 9:45am–11:30am

Session Organizer: **Cheng-xian Lin**, *Florida International University, Miami, FL, United States*

Session Co-Organizer: **Sandra Boetcher**, *Embry Riddle Aeronautical University, Daytona Beach, FL, United States*

9:45am **Numerical Simulation of Natural Ventilation in a Large-Scale Factory Building Based on Orthogonal Test Design**

Technical Paper Publication. IMECE2013-62233
Yan Long, Jinming Feng, Shiping Jin, *HuaZhong University of Science and Technology, Wuhan, China*, Ke Liu, *Wuhan Metallurgical Construction Co., Ltd. of MCC Group, Wuhan, China*, Yan Fu, *WISDRI Engineering & Research Co., Ltd. of MCC Group, Wuhan, China*

10:02am **Personal Ventilation and Displacement Ventilation Assesment in Cubicle Workstations**

Technical Paper Publication. IMECE2013-62774
Waleed Abdelmaksoud, Essam Khalil, *Cairo University, Giza, Egypt*

10:19am **An Investigation of Heat Transfer Characteristics of Cool Coating for Building Roofs in the Tropical Climate**

Technical Paper Publication. IMECE2013-63999
Kishor Zingre, Man Pun Wan, *Nanyang Technological University, Singapore, Singapore*

10:36am **Numerical Modeling of the Moisture Transfer Through Wooden Desk by Linking ANSYS and Matlab Software**

Technical Paper Publication. IMECE2013-66347
Goran Simeunovic, Ivana Oswaldova, Tomas Vyhldal, Pavel Zitek, *Czech Technical University in Prague, Prague, Czech Republic*

10:53am **The Effect of Bench Arrangements on the Natural Ventilation of a Multispan Greenhouse**

Technical Paper Publication. IMECE2013-63304
Sunita Kruger, *University of Johannesburg, Johannesburg, Gauteng, South Africa*, Leon Pretorius, *University of Pretoria, Pretoria, South Africa*

11:10am **3D Wind Field Construction for Suburban Environment by Parallel Computational Fluid Dynamics Techniques**

Technical Paper Publication. IMECE2013-66637
Yuntian Ge, Rui Zhang, Xiuling Wang, *Purdue University Calumet, Hammond, IN, United States*

9-21 THERMOPHYSICAL PROPERTIES

9-21-1 Thermophysical Properties—I

2nd Floor, Manchester Grand Hyatt, Gregory A 9:45am–11:30am

Session Organizer: **Heng Ban**, *Utah State University, Logan, UT, United States*9:45am **Synthesis and Experimental Characterization of Rheological Behavior of EG and Water Based hBN Nanofluids****Technical Paper Publication.** IMECE2013-63582
Melike Kurt, Hakan Erturk, Kunt Atalik, *Bogazici University, Bebek, Istanbul, Turkey*10:06am **Experimental Investigation of Latent Heat in Aqueous Nanofluids****Technical Presentation.** IMECE2013-64217
Soochan Lee, Lenore Dai, Ravi Prasher, Andrey Gunawan, *Arizona State University, Tempe, AZ, United States*, Patrick Phelan, *Arizona State University, Arlington, VA, United States*, Robert A. Taylor, *University of New South Wales, Sydney, New South Wales, Australia*10:27am **Experimental Characterization of Adsorption and Transport Properties for Advanced Thermo-Adsorptive Batteries****Technical Paper Publication.** IMECE2013-65490
Hyunho Kim, Sungwoo Yang, Shankar Narayanan, Ian Salmon McKay, Evelyn Wang, *Massachusetts Institute of Technology, Cambridge, MA, United States*10:48am **Thermal Conductivity Measurements of Ultrathin Amorphous Poly(methyl Methacrylate) (PMMA) Films****Technical Paper Publication.** IMECE2013-66507
Ickchan Kim, *LG Innotek, Ansan, Korea (Republic)*, Mihai Burzo, *University of North Texas, Denton, TX, United States*, Peter Raad, Pavel Komarov, *Southern Methodist University, Dallas, TX, United States*11:09am **Thermal Properties of Natural and Synthetic Spider Silks at Cryogenic Temperatures****Technical Paper Publication.** IMECE2013-66630
Troy Munro, Changhu Xing, Andrew Marquette, Heng Ban, Cameron Copeland, Randolph Lewis, *Utah State University, Logan, UT, United States*

9-2 THEORY AND FUNDAMENTAL RESEARCH

9-2-2 Fundamentals of Boiling/Phase Change

3rd Floor, Manchester Grand Hyatt, Windsor B 1:00pm–2:45pm

Session Organizer: **Amitabh Narain**, *Michigan Technological University, Houghton, MI, United States*Session Co-Organizers: **Satish Kandlikar**, *Rochester Institute of Technology, Rochester, NY, United States*, **Weilin Qu**, *University of Hawaii, Honolulu, HI, United States*, **Chen Fang**, *Stanford University, Palo Alto, CA, United States*, **Mark Steinke**, *IBM, Raleigh, NC, United States*1:00pm **Thin Film Evaporation Model With Retarded van der Waals Interaction****Technical Paper Publication.** IMECE2013-62397
Michael S. Hanchak, Marlin D. Vangsness, Jamie S. Ervin, *University of Dayton Research Institute, Dayton, OH, United States*, Nadina Gheorghiu, *Universal Technology Corporation, Dayton, OH, United States*, Larry Byrd, John G. Jones, *Air Force Research Laboratory, Wright-Patterson AFB, OH, United States*1:17pm **Thermal Transport to Sessile Droplets on Superhydrophobic Surfaces With Rib and Cavity Features****Technical Paper Publication.** IMECE2013-63780
Robb Hays, Julie Crockett, Daniel Maynes, Brent Webb, *Brigham Young University, Provo, UT, United States*1:34pm **Active Control of Nucleate Boiling With UV Illumination****Technical Presentation.** IMECE2013-65414
Jaymeen Shah, Gang Qiu, Han Hu, Ying Sun, *Drexel University, Philadelphia, PA, United States*1:51pm **Passivation and Performance of Inorganic Aqueous Solutions in a Grooved, Aluminum Flat Heat Pipe****Technical Paper Publication.** IMECE2013-65641
Michael Stubblebine, Ladan Amouzegar, Ivan Catton, *University of California, Los Angeles, Los Angeles, CA, United States*2:08pm **Phase-Field Simulations of Bubble Growth Under Convective Conditions****Technical Paper Publication.** IMECE2013-65925
Arnoldo Badillo, *Paul Scherrer Institute, Villigen, Aargau, Switzerland*2:25pm **Preliminary Results of Pressure Drop Modeling During Flow Boiling in Open Microchannels With Uniform and Tapered Manifolds (OMM)****Technical Paper Publication.** IMECE2013-64463
Ankit Kalani, Satish Kandlikar, *Rochester Institute of Technology, Rochester, NY, United States*

TRACK 9 HEAT TRANSFER AND THERMAL ENGINEERING / MONDAY, NOVEMBER 18

9-3 NANOSCALE THERMAL TRANSPORT

9-3-2 Near-Field Thermal Radiation and Metamaterials

3rd Floor, Manchester Grand Hyatt, Windsor C 1:00pm–2:45pm

Session Organizer: **Liping Wang**, *Arizona State University, Tempe, AZ, United States*

Session Co-Organizer: **Yu-Bin Chen**, *National Cheng Kung University, Tainan City, Taiwan*

1:00pm Study of Near-Field Radiative Transport Between Parallel Surfaces Using Picowatt Resolution Calorimetry

Technical Presentation. IMECE2013-66520

Seid Sadat, Yashar Ganjeh, Bai Song, Dakotah R. Thompson, Anthony R. Fiorino, Pramod Reddy, Edgar Meyhofer, *University of Michigan, Ann Arbor, MI, United States*

1:17pm Energy Streamlines in Metalodielectric Photonic Crystals

Technical Presentation. IMECE2013-66104

Trevor Bright, Xianglei Liu, Zhuomin Zhang, *Georgia Institute of Technology, Atlanta, GA, United States*

1:34pm Negative Refraction in the Mid-Infrared Region With a Doped-Silicon Nanowire Array

Technical Presentation. IMECE2013-66105

Xianglei Liu, Zhuomin Zhang, *Georgia Institute of Technology, Atlanta, GA, United States*

1:51pm Perfect Solar Absorbers Made of Multisize-Square Metamaterial

Technical Presentation. IMECE2013-63798

Hao Wang, Liping Wang, *Arizona State University, Tempe, AZ, United States*

2:08pm Interaction Between the Magnetic Polariton and Surface Plasmon Polariton

Technical Paper Publication. IMECE2013-63333

Yu-Bin Chen, Chien-Jing Chen, *National Cheng Kung University, Tainan City, Taiwan*

2:25pm Near-Field Thermal Radiation Between Two Planar Surfaces and Application to Curved Surfaces

Technical Presentation. IMECE2013-65047

Yi Zheng, Arvind Narayanaswamy, *Columbia University, New York, NY, United States*

9-3-5 Multiscale Simulation and Modeling—I

3rd Floor, Manchester Grand Hyatt, Connaught 1:00pm–2:45pm

Session Organizer: **Yanbao Ma**, *University of California, Merced, Merced, CA, United States*

Session Co-Organizer: **Tengfei Luo**, *University of Notre Dame, Notre Dame, IN, United States*

1:00pm Thermal Conductivity of Graphene Nanoribbons From Perturbation Theory

Technical Presentation. IMECE2013-66145

Prabhakar Marepalli, Jayathi Murthy, *University of Texas at Austin, Austin, TX, United States*, Dhruv Singh, *Intel Corporation, Hillsboro, OR, United States*, Timothy Fisher, *Purdue University, West Lafayette, IN, United States*

1:15pm Numerical Study on the Diffusive-Ballistic Heat Transport in a Two-Dimensional Square Plate

Technical Paper Publication. IMECE2013-64360

Toru Yamada, Bengt Sunden, *Lund University, Lund, Sweden*, Keunhan (Kay) Park, Mohammad Faghri, *University of Rhode Island, Kingston, RI, United States*, Yutaka Asako, *Tokyo Metropolitan University, Tokyo, Japan*

1:30pm Concurrent Atomistic-Continuum Simulations of Heat Transfer in Covalent Materials

Technical Presentation. IMECE2013-65978

Liming Xiong, Youping Chen, *University of Florida, Gainesville, FL, United States*

1:45pm Effect of Resonant Bonding on Softening of Transverse Optical Phonon Modes and Low Thermal Conductivity in IV-VI, V2-VI3, and Element V Materials

Technical Presentation. IMECE2013-66027

Sangyeop Lee, Gang Chen, *Massachusetts Institute of Technology, Cambridge, MA, United States*, Keivan Esfarjani, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*, Tengfei Luo, *University of Notre Dame, Notre Dame, IN, United States*

2:00pm Multiscale Phonon Transport Analysis of Alloyed and Nanostructured Thermoelectric Materials (Invited)

Invited Presentation. IMECE2013-67302

Junichiro Shiomi, *University of Tokyo, Tokyo, Japan*

9-4 HEAT TRANSFER EQUIPMENT

9-4-3 Heat Pumps, Cooling, Refrigeration, and HVAC Systems

3rd Floor, Manchester Grand Hyatt, Maggie 1:00pm–2:45pm

Session Organizer: **Mikhail Gorbounov**, *United Technologies Research Center, East Hartford, CT, United States*Session Co-Organizer: **Hal Strumpf**, *Honeywell Aerospace, Torrance, CA, United States*, **Yaroslav Chudnovsky**, *Gas Technology Institute, Des Plaines, IL, United States*

1:00pm Behavior and Performance of Refrigerant Mixture HFC125/HC290 in Heat Pumps

Technical Paper Publication. IMECE2013-63552
Xiaowei Fan, Fang Wang, Di Xu, *Zhengzhou University, Zhengzhou City, China*, Huifan Zheng, *Zhongyuan Institute of Technology, Zhengzhou, Henan, China*, Xianping Zhang, *Henan Institute of Engineering, Zhengzhou City, China*

1:17pm Performance Analysis of Two HVAC Systems for Zero Energy Research Laboratory, Denton, TX

Technical Paper Publication. IMECE2013-65660
Naimee Hasib, Junghyon Mun, Yong Tao, *University of North Texas, Denton, TX, United States*

1:34pm Magnetic Field Enhancement in Water-Lithium Bromide Absorption Refrigeration Systems

Technical Paper Publication. IMECE2013-64192
Moradeyo Odunfa, Richard Fagbenle, Miracle Oyewola, *University of Ibadan, Ibadan, Nigeria*

1:51pm Removal Mechanisms of Suspended Particulate Matter in Humidity Swing Air Cleaning Method

Technical Paper Publication. IMECE2013-64433
Nagisa Onoda, Osamu Nakabeppu, *Meiji University, Kawasaki, Kanagawa, Japan*

2:08pm Investigation of Airflow Cooling of Li-Ion Batteries

Technical Paper Publication. IMECE2013-63095
Alexey Lukhanin, Dmitriy Fedorchenko, Andrey Byelyayev, Manap Khazhmuradov, Oleksandr Lukhanin, Yegor Rudychev, Sergey Martynov, Eugen Sporov, *Kharkov Institute of Physics and Technology, Kharkov, Ukraine*, Upendra Rohatgi, *Brookhaven National Lab, Upton, NY, United States*

2:25pm Experimental and CFD Investigations of Heat Transfer in Helical Coils for the Development of Correlations for Newtonian and Non Newtonian Fluids in Transient State-Space Conditions

Technical Paper Publication. IMECE2013-63481
Sandipan Pawar, Vivek Sunnapwar, Vivek Yakkundi, *Lokmanya Tilak College of Engineering, Navi Mumbai, Maharashtra, India*

9-6 COMBUSTION AND FIRE SIMULATION, MODELING, AND EXPERIMENTAL TECHNIQUES

9-6-3 Modeling and Simulation of Combustion, Fire, and Reactive Flow

3rd Floor, Manchester Grand Hyatt, Oxford 1:00pm–2:45pm

Session Organizer: **Kwasi Foli**, *Woodward, Inc., Greenville, SC, United States*Session Co-Organizer: **Sujith Sukumaran**, *Iowa State University, Ames, IA, United States*

1:00pm Modeling on N-Heptane Pool Fire Behavior in an Altitude Chamber

Technical Paper Publication. IMECE2013-62367
Liu Quanyi, Yao Wei, Yin Jiusheng, Rui Yang, Zhang Hui, *Tsinghua University, Beijing, China*

1:17pm A Distributed Method for Predicting Building Fires Based on a Two-Layer Zone Model

Technical Paper Publication. IMECE2013-62810
Nan Wu, Rui Yang, Hui Zhang, *Tsinghua University, Beijing, China*

1:34pm Computational Study of Fuel Dilution Effect on the Soot Formation in Methane-Air Laminar Confined Diffusion Flame

Technical Paper Publication. IMECE2013-62901
Achin Kumar Chowdhuri, Somnath Chakraborti, Bijan Kumar Mandal, *Bengal Engineering and Science University, Shibpur, Howrah, India*, Arindam Mitra, *Budge Budge Institute of Technology, Kolkata, West Bengal, India*

1:51pm Characteristics of Flame Bases for V-Gutters Stabilized Premixed Flames

Technical Paper Publication. IMECE2013-63196
Fan Gong, Yong Huang, *Beihang University, Beijing, China*

2:08pm Prediction of Radiative Transport in Combustion Gas Mixtures With a Wide Band Cumulative Absorption Coefficient Distribution Model

Technical Paper Publication. IMECE2013-63987
Liping Liu, *Lawrence Technological University, Southfield, United States*, Jing He, *Heatcraft Refrigeration Products, Stone Mountain, GA, United States*

2:25pm Large Eddy Simulation of a Swirl-Stabilized Flame

Technical Paper Publication. IMECE2013-65100
Cheng Zhang, *Georgia Southern University, Statesboro, GA, United States*, Wei Zhao, *General Electric, Greenville, SC, United States*

TRACK 9 HEAT TRANSFER AND THERMAL ENGINEERING / MONDAY, NOVEMBER 18

9-10 HEAT TRANSFER IN MULTIPHASE FLOW

9-10-2 Condensation Heat Transfer and Two Phase Flows

2nd Floor, Manchester Grand Hyatt, Molly A 1:00pm–2:45pm

Session Organizer: **Amitabh Narain**, *Michigan Technological University, Houghton, MI, United States*

Session Co-Organizer: **Vinod Narayanan**, *Oregon State University, Corvallis, OR, United States*

1:00pm Numerical Investigation of Heat Transfer in Wet Steam Flow in Convergent-Divergent Nozzles

Technical Paper Publication. IMECE2013-62406

Navid Sharifi, *Amirkabir University, Tehran, Iran*, Majid Sharifi, *Drexel University, Philadelphia, PA, United States*

1:17pm Analysis of Coupled Heat and Mass Transfer During Condensation of High Temperature Glide Zeotropic Mixtures in Small Channels

Technical Paper Publication. IMECE2013-63273

Brian Fronk, *Georgia Institute of Technology, Decatur, GA, United States*, Srinivas Garimella, *Georgia Institute of Technology, Atlanta, GA, United States*

1:34pm Visualization of Condensing Propane Flowing Through Smooth Horizontal Tubes

Technical Presentation. IMECE2013-63276

Jeffrey Milkie, Srinivas Garimella, *Georgia Institute of Technology, Atlanta, GA, United States*

1:51pm Transient Pressure-Based Condensation Heat Transfer Measurement

Technical Presentation. IMECE2013-63768

Nenad Miljkovic, Daniel John Preston, Evelyn Wang, *Massachusetts Institute of Technology, Cambridge, MA, United States*

2:08pm Experimental Investigation on the Condensation Efficiency of Humid Air in a Crossflow Condenser

Technical Paper Publication. IMECE2013-64331

Hojin Ahn, Burhan Gül, *Yeditepe University, Umraniye/Istanbul, Turkey, Turkey*, Yavuz Sahin, Onur Hartoka, *Arçelik A.S., Istanbul, Turkey*

2:25pm Numerical Study of Transient Multiphase Slug Flow Through a Tube at High Velocity

Technical Paper Publication. IMECE2013-65104

Carlton Adam, *U.S. Army Armament Research, Development, and Engineering Center, Picatinny Arsenal, NJ, United States*, Hamid Hadim, *Stevens Institute of Technology, Hoboken, NJ, United States*

9-13 HEAT TRANSFER IN ELECTRONIC EQUIPMENT

9-13-2 Advances in Heat Sink Technology

2nd Floor, Manchester Grand Hyatt, Molly B 1:00pm–2:45pm

Session Organizer: **Victor Chiriac**

Session Co-Organizer: **Hemanth Dhavaleswarapu**, *Intel Corporation, Chandler, AZ, United States*

1:00pm Optimization of Heat-Sink Fin Feature w/FEA

Technical Paper Publication. IMECE2013-63529

Jing-Heng Wen, Michael Neely, *E-Z-GO, Textron, Augusta, GA, United States*

1:21pm Experimental Study on Natural Convection From Vertical Cylinders With Branched Fins

Technical Paper Publication. IMECE2013-64353

Kuen Tae Park, Byeongdong Kang, Hyun Jung Kim, Dong-Kwon Kim, *Ajou University, Suwon, Korea (Republic)*

1:42pm Analysis of Pin-Fin Heat Sinks With an Unconventional Fin Profile

Technical Paper Publication. IMECE2013-66359

Jose-Luis Gonzalez-Hernandez, Abel Hernandez-Guerrero, Cuauhtemoc Rubio-Arana, *University of Guanajuato, Salamanca, Guanajuato, Mexico*, Carlos Rubio-Jimenez, *General Electric, Queretaro, Queretaro, Mexico*

2:03pm Experimental and Numerical Analysis of Convective Heat Transfer From Notched Fin Arrays With Pin Fins

Poster Paper Publication. IMECE2013-62818

Sunil Dingare, *MAEER's MIT College of Engineering, Pune, Maharashtra, India*, Suneeta Sane, *PVG's College of Engineering & Technology, University of Pune, Pune, Maharashtra, India*, Hrishikesh Kulkarni, Aniket Kawade, Kaustibh Suranglikar, *MIT College of Engineering, Pune, India*

2:24pm Study of the Cooling Performance of Oscillating Piezoelectric Fans

Technical Paper Publication. IMECE2013-64280

Mohammad Ahmadi Bidakhvidi, Rasoul Shirzadeh, Steve Vanlanduit, *Vrije Universiteit Brussel, Brussels, Belgium*

9-18 ADVANCES IN HEAT TRANSFER EDUCATION**9-18-1 Future Directions for Heat Transfer Engineering, Research, and Education—A Perspective on the 75th Anniversary of the Heat Transfer Division****2nd Floor, Manchester Grand Hyatt, Gregory B 1:00pm–2:45pm**Session Organizer: **S.A. Sherif**, *University of Florida, Gainesville, FL, United States***1:00pm Future Directions for Heat Transfer Engineering, Research and Education—1st Presentation****Panel Presentation.** IMECE2013-67398Francis Kulacki, *University of Minnesota, Minneapolis, MN, United States***1:26pm Results and Analysis of a Survey of the ASME Heat Transfer Division****Panel Presentation.** IMECE2013-67399Timothy Fisher, *Purdue University, West Lafayette, IN, United States***1:52pm Future Directions of Heat Transfer Research and Education: A Perspective From Academia****Panel Presentation.** IMECE2013-67407Richard Figliola, *Central, United States***2:18pm Future Directions of Heat Transfer Research and Education: A Perspective From Funding Agencies****Panel Presentation.** IMECE2013-67408Sumanta Acharya, *National Science Foundation, Washington, DC, United States***9-21 THERMOPHYSICAL PROPERTIES****9-21-2 Thermophysical Properties—II****2nd Floor, Manchester Grand Hyatt, Gregory A 1:00pm–2:45pm**Session Organizer: **Heng Ban**, *Utah State University, Logan, UT, United States***1:00pm An Instrument for Simultaneous Measurement of Thermal Properties of Materials With Loss Compensation****Technical Paper Publication.** IMECE2013-64495Tassio Silva, Francisco Belo, Marceu Adissi, Lamartine Daniel, Abel Lima Filho, *Federal University of Paraiba, Joao Pessoa, Brazil*, Ruan Gomes, *Federal Institute for Education, Science and Technology Paralba - Campus Guarabira, Guarabira, Brazil***1:21pm A Modified Stepwise Transient Method for Measuring the Thermal Conductivity of Anisotropic Materials****Technical Paper Publication.** IMECE2013-64624Xiaofei Li, Kai Yue, Xinxin Zhang, *University of Science and Technology Beijing, Beijing, China***1:42pm An Algorithm to Determine the Optimized Data Range in Transient Hotwire Thermal Property Measurement****Technical Paper Publication.** IMECE2013-64940Gabriela Bran, Adrienne Lavine, Richard E. Wirz, Reza Baghaei Lakeh, H. Pirouz Kavehpour, *University of California, Los Angeles, Los Angeles, CA, United States***2:03pm Thermophysical Properties of AS4/3501-6 Carbon-Epoxy Composite****Technical Paper Publication.** IMECE2013-65186Amber Vital, Bradley Doleman, Messiha Saad, *North Carolina A&T State University, Greensboro, NC, United States***2:24pm Thermal Conductivity Measurements of Lithium-Ion Battery Electrodes****Technical Presentation.** IMECE2013-65968Qing Hao, Mingqing Li, *University of Arizona, Tucson, AZ, United States*, Yan Wang, *Worcester Polytechnic Institute, Worcester, MA, United States***9-2 THEORY AND FUNDAMENTAL RESEARCH****9-2-3 Fundamentals of Multiscale Modeling****3rd Floor, Manchester Grand Hyatt, Windsor B 3:00pm–4:45pm**Session Organizer: **Yanbao Ma**, *University of California, Merced, Merced, CA, United States*Session Co-Organizer: **Tengfei Luo**, *University of Notre Dame, Notre Dame, IN, United States***3:00pm Heat Charge-Discharge Cycle for a Non-Equilibrium Thermoelectric Power Generation****Extended Abstract Presentation.** IMECE2013-64098Kazuaki Yazawa, Ali Shakouri, *Purdue University, West Lafayette, IN, United States***3:17pm Study of Combined Heat and Mass Transfer From Fins Using Non-Dimensional Finite Element Formulation****Technical Paper Publication.** IMECE2013-64514Sulaman Pashah, Syed Muhammad Zubair, Abul Fazal M. Arif, *King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia***3:34pm Growth of Pre-Existing Micro-Void in Infinite Elastoplastic Body Under Remote Thermal and Mechanical Loads****Technical Paper Publication.** IMECE2013-62538Xingye Shi, Xinchun Shang, *University of Science and Technology Beijing, Beijing, China***3:51pm Performance Assessment of Blends of CO₂ With Eco-Friendly Working Fluids for Heat Pump Applications****Technical Paper Publication.** IMECE2013-63354Xianping Zhang, *Henan Institute of Engineering, Zhengzhou City, China*, Xiaowei Fan, Fang Wang, Xiaojing Zhang, *Zhongyuan University of Technology, Zhengzhou, China*, Xinli Wei, *Zhengzhou University, Zhengzhou, Henan Province, China*

TRACK 9 HEAT TRANSFER AND THERMAL ENGINEERING / MONDAY, NOVEMBER 18

4:08pm **Study of Solar Ejector Refrigerant System Using Refrigerant R717 in Office Building**

Technical Paper Publication. IMECE2013-63918
Huifan Zheng, Xiaowei Fan, Hongchao Liu, *Zhongyuan University of Technology, Zhengzhou, China*

4:25pm **Errors and Uncertainties: What Hath the GUM Wrought?**

Technical Paper Publication. IMECE2013-64825
Ashley Emery, *University of Washington, Seattle, WA, United States*, Theodore Vosk, *Cowan Kirk Gaston Law Firm, Seattle, WA, United States*

9-3 NANOSCALE THERMAL TRANSPORT

9-3-3 Engineered Surfaces of Phase-Change Heat Transfer

3rd Floor, Manchester Grand Hyatt, Windsor C 3:00pm–4:45pm

Session Organizer: **Dong Liu**, *University of Houston, Houston, TX, United States*

Session Co-Organizers: **Evelyn Wang**, *Massachusetts Institute of Technology, Cambridge, MA, United States*, **Debjyoti Banerjee**, *Texas A&M University, College Station, TX, United States*

3:00pm **Nucleate Boiling Heat Transfer Enhancement With Electrowetting**

Technical Presentation. IMECE2013-66582
Aritra Sur, Yi Lu, Carmen Pascente, Paul Ruchhoeft, Dong Liu, *University of Houston, Houston, TX, United States*

3:17pm **Bubble Dynamics in Electrowetting-Modulated Nucleate Boiling**

Technical Presentation. IMECE2013-66694
Aritra Sur, Yi Lu, Carmen Pascente, Paul Ruchhoeft, Dong Liu, *University of Houston, Houston, TX, United States*

3:34pm **The Effect of Mixed Hydrophobic and Hydrophilic Surfaces on Frost Nucleation and Growth**

Technical Paper Publication. IMECE2013-62620
Alexander S. Van Dyke, Amy Betz, *Kansas State University, Manhattan, KS, United States*

3:51pm **Flow Boiling Enhancement in Microtubes With Cross-linked Phema Coatings**

Extended Abstract Publication. IMECE2013-64388
Ali Kosar, Taha Cikim, Gozde Ince, Efe Armagan, *Sabanci University, Istanbul, Turkey*

4:08pm **Supperhydrophobic Nanowired Surfaces for Enhancement of Dropwise Condensation Heat Transfer**

Technical Presentation. IMECE2013-66447
Jiafeng Wu, Qian Li, Gensheng Wu, Miao Tian, Ronggui Yang, *University of Colorado Boulder, Boulder, CO, United States*, Yunfei Chen, *Southeast University, Nanjing, China*

4:25pm **Graphitic Petal-Decorated Carbon Nanotubes for Enhanced Boiling**

Technical Presentation. IMECE2013-66064
Arun Selvaraj Kousalya, Timothy Fisher, *Purdue University, West Lafayette, IN, United States*

9-4 HEAT TRANSFER EQUIPMENT

9-4-4 Heat Pipes and Thermosyphons

3rd Floor, Manchester Grand Hyatt, Maggie 3:00pm–4:45pm

Session Organizer: **Bengt Sunden**, *Lund University, Lund, Sweden*

Session Co-Organizers: **Amir Jokar**, *Exponent-Thermal Sciences, Irvine, CA, United States*, **Sandra Boetcher**, *Embry Riddle Aeronautical University, Daytona Beach, FL, United States*

3:00pm **A Study of a New Cooling Device Based on the Electrocaloric Effect**

Technical Paper Publication. IMECE2013-62258
Wataru Sato, *Hitachi, Ltd. Hitachi Research Laboratory, Hitachinaka, Ibaraki, Japan*

3:17pm **Investigation of Methanol Based Air-Air Thermosyphon Heat Exchangers**

Technical Paper Publication. IMECE2013-63693
Bharath Viswanath Ravi, S. Audithya Krishna, Lakshmanan Arunachalam, *Sri Venkateswara College of Engineering, Chennai, Tamil Nadu, India*, Mukilan S. Michael, *Sri Venkateswara College of Engineering, Sriperumbudur, Tamil Nadu, India*, Suresh Mariappan, *SSN College of Engineering, Chennai, Tamil Nadu, India*

3:34pm **Using an Inorganic Aqueous Solution in Copper and Aluminum Phase Change Heat Transfer Devices**

Technical Paper Publication. IMECE2013-63886
Qi Yao, Michael Stubblebine, Sean Reilly, Ladan Amouzegar, Ivan Catton, *University of California, Los Angeles, Los Angeles, CA, United States*

3:51pm **The Thermosiphon Heat Exchange Equipment for Passive Cooling Systems of the Nuclear Power Plant**

Technical Presentation. IMECE2013-66096
Igor Sviridenko, *Sevastopol National Technical University, Sevastopol, Ukraine*, Dmitry Shevielov, *NAEK Energoatom Scientific and Technical Center, Sevastopol, Ukraine*, Georhiy Balakan, *South Ukraine NPP, Yuzhnoukrainsk, Ukraine*, Oleksiy Polyakov, *International Atomic Energy Agency, Vienna, Austria*, Helen Skop, *Smart Heat Corporation, Skokie, IL, United States*

4:08pm **Efficient Heat Transfer From Non-Condensable Gas in the Process of Moist Exhaust Heat Recovery**

Technical Paper Publication. IMECE2013-66117
Helen Skop, Valeriy Oleynikov-White, *Smart Heat Corporation, Skokie, IL, United States*

4:25pm **Analysis of the Possibility of Water Induction in Turbine From Direct Contact Feedwater Heater at Load Shedding Power**

Technical Paper Publication. IMECE2013-63833
Mikhail Gotovsky, Viktor F. Ermolov, Vladimir E. Mikhailov, Nikolay N. Trifonov, Yuri G. Sukhorukov, *Polzunov Institute, Saint Petersburg, Russia*

9-6 COMBUSTION AND FIRE SIMULATION, MODELING, AND EXPERIMENTAL TECHNIQUES

9-6-2 Combustion and Fire—Experimental & Modeling Techniques—II

3rd Floor, Manchester Grand Hyatt, Oxford 3:00pm–4:45pm

Session Organizer: **Tariq Shamim**, *Masdar Institute of Science & Technology, Abu Dhabi, Abu Dhabi, United Arab Emir.*

Session Co-Organizer: **Ofodike Ezekoye**, *University of Texas at Austin, Austin, TX, United States*

3:00pm Comparison and Evaluation of Performance, Emission, and Wear Analysis of Diesel, JP-8 and Pure Karanja Biodiesel in a Military 780 hp CIDI Engine

Technical Paper Publication. IMECE2013-63244

Anand Kumar Pandey, P. Sivakumar, K.V. Anand Kumar, A. Kumarasamy, *Combat Vehicles Research & Development Establishment, Chennai, Tamilnadu, India*, M.R. Nandgaonkar, *College of Engineering, Pune, Maharashtra, India*

3:15pm Temperature Measurements in Cone Calorimeter Tests of Generic Wall Assemblies

Technical Paper Publication. IMECE2013-63981

Charles T. Aire, David A. Torvi, *University of Saskatchewan, Saskatoon, SK, Canada*, Elizabeth J. Weckman, *University of Waterloo, Waterloo, ON, Canada*

3:30pm High-Speed Combustion Imaging in a Large Bore Gas Engine: The Relationship Between Pre and Main Chamber Heat Release

Technical Paper Publication. IMECE2013-64286

Jeudi Duong, *Lund University/Wärtsilä Finland Oy, Vaasa, Finland*, Rikard Wellander, Övind Andersson, Mattias Richter, Bengt Johansson, Marcus Aldén, *Lund University, Lund, Sweden*, Jari Hyvonen, *Wärtsilä Finland Oy, Vaasa, Finland*

3:45pm Measuring the Coefficient of Thermal Resistance for Nanospring Combustion Catalysts

Technical Paper Publication. IMECE2013-64912

Courtney Quinn, J. Steciak, Ralph Budwig, *University of Idaho Boise, Boise, ID, United States*, D. McIlroy, Steven Beyerlein, *University of Idaho, Moscow, ID, United States*

4:00pm Compartment Fire Growth Effects on Firefighter Alarm Signal Detection

Technical Paper Publication. IMECE2013-66367

Mustafa Abbasi, Joelle Suits, Preston Wilson, Ofodike Ezekoye, *University of Texas at Austin, Austin, TX, United States*

4:15pm Numerical Modeling of Soot Emissions in Diesel Spray Using Multistep Soot Model

Technical Presentation. IMECE2013-66011

Sujith Sukumaran, Song-Chang Kong, *Iowa State University, Ames, IA, United States*

4:30pm Smoke and Heat Propagation Modeling in Transportation Interchange Stations Using LES and RANS Methods

Technical Paper Publication. IMECE2013-66037

Claudio Zanzi, Alberto Mozas, Julio Hernandez, *Universidad Nacional de Educación a Distancia, Madrid, Spain*, Antonio Garcia-Hortelano, Javier Aldecoa, *Consortio Regional de Transportes de Madrid, Madrid, Spain*

9-10 HEAT TRANSFER IN MULTIPHASE FLOW

9-10-3 Microchannel Phase Change Heat Transfer

2nd Floor, Manchester Grand Hyatt, Molly A 3:00pm–4:45pm

Session Organizer: **Sujoy Saha**, *Bengal Engineering & Science University, Howrah, India*

3:00pm Numerical Study of Micro Encapsulated Phase Change Material Slurry Flow Inside a Microchannel in Presence of Film Evaporation

Technical Paper Publication. IMECE2013-62839

Yasmin Khakpour, Jamal Yagoobi, *Worcester Polytechnic Institute, Worcester, MA, United States*

3:21pm Flow Boiling in an In-Line Set of Short Narrow Gap Channels

Technical Paper Publication. IMECE2013-63676

Daniel D. Janssen, John M. Dixon, Francis Kulacki, *University of Minnesota, Minneapolis, MN, United States*, Steven J. Young, *General Dynamics-Advanced Information Systems, Minneapolis, MN, United States*

3:42pm Porous Media Modeling of Two-Phase Flow Heat Transfer in Micro-Channels of Electronic Chips With Non-Uniform Power Distribution

Technical Paper Publication. IMECE2013-64481

Hua Zhang, Jun Jie Liu, Yubai Li, Shi-chune Yao, *Carnegie Mellon University, Pittsburgh, PA, United States*

4:03pm Modeling Criteria for Extraction Regime Transitions for Microscale In Situ Vapor Extraction Application

Technical Paper Publication. IMECE2013-65764

Saran Salakij, Deborah Pence, James Liburdy, *Oregon State University, Corvallis, OR, United States*

4:24pm Boiling Under Hele-Shaw Flow Conditions: The Occurrence of Viscous Fingering

Technical Paper Publication. IMECE2013-62886

Felix Reinker, Marek Kapitza, Stefan Aus der Wiesche, *University of Applied Sciences Muenster, Steinfurt, Germany*

TRACK 9 HEAT TRANSFER AND THERMAL ENGINEERING / MONDAY, NOVEMBER 18

9-11 HEAT TRANSFER IN GAS TURBINE SYSTEMS

9-11-2 Gas Turbine Heat Transfer

2nd Floor, Manchester Grand Hyatt, Gregory B 3:00pm–4:45pm

Session Organizer: **Mounir Ibrahim**, *Cleveland State University, Cleveland, OH, United States*

Session Co-Organizer: **Malak Malak**, *Lamyaa El-Gabry, American University in Cairo, Cairo, Egypt*

3:00pm Conjugate Heat Transfer CFD Predictions of the Surface Averaged Impingement Heat Transfer Coefficients for Impingement Cooling With Backside Cross-flow

Technical Paper Publication. IMECE2013-63580
Abubakar El-Jumma, Gordon E. Andrews, John E.J. Staggs, Reyad A.A. Abdul Husain, *University of Leeds, Leeds, West Yorkshire, United Kingdom*

3:15pm Experimental Study of Heat Transfer Characteristics of a Bluff Body Interacting With Ribs by Using Liquid Crystal Thermography

Technical Paper Publication. IMECE2013-64328
Bengt Sunden, Zahra Ghorbani-Tari, Lei Wang, *Lund University, Lund, Sweden*

3:30pm Numerical Investigation of Flow and Heat Transfer in Passages for Jet Impingement in Cooling of Rotating Turbine Blade

Technical Presentation. IMECE2013-65531
Woon-fong Leung, Yong Ren, *Hong Kong Polytechnic University, Hong Kong, China*

3:45pm Conjugate CFD Analysis of a Jet-Impingement Configuration With Sudden Changes in Heating and Cooling Loads

Technical Paper Publication. IMECE2013-65542
Chien-Shing Lee, Tom Shih, *Purdue University, West Lafayette, IN, United States*, Kenneth Bryden, *Iowa State University, DoE Ames Laboratory, Ames, IA, United States*

4:00pm Test Rig Design to Explore Water Droplet Behavior in a Four Stage Axial Compressor

Technical Paper Publication. IMECE2013-63429
Stefan Clauss, Jan Philipp Schnitzler, Botond Barabas, Friedrich-Karl Benra, Hans Josef Dohmen, Pradeep Somanahalli Nagabhushan, *University of Duisburg-Essen, Duisburg, Germany*

4:15pm High Pressure Turbine Rotor Stage Endwall Cooling and Passage Thermal Fields as Affected by Leakage Flow and Combustor Liner Coolant Streams

Technical Paper Publication. IMECE2013-65601
Arya Ayaskanta, Terrence Simon, Ryan Erickson, *University of Minnesota, Minneapolis, MN, United States*, Hee-Koo Moon, Luzeng Zhang, *Solar Turbines Inc., San Diego, CA, United States*

4:30pm Large Eddy Simulation of Turbine Internal Cooling Ducts

Technical Paper Publication. IMECE2013-66187
James Tyacke, Paul G. Tucker, *University of Cambridge, Cambridge, United Kingdom*

9-13 HEAT TRANSFER IN ELECTRONIC EQUIPMENT

9-13-3 Thermal Transport in Materials, Devices, and Systems

2nd Floor, Manchester Grand Hyatt, Molly B 3:00pm–4:45pm

Session Organizer: **Seungbae Park**, *Binghamton University, State University of New York, Binghamton, NY, United States*

Session Co-Organizer: **Yaguo Wang**, *University of Texas at Austin, Austin, TX, United States*

3:00pm Effect of Gamma-Ray Irradiation on the Thermal Contact Conductance of Carbon Nanotube Thermal Interface Materials

Technical Paper Publication. IMECE2013-62773
Stephen Hodson, *Timothy Fisher, Purdue University, West Lafayette, IN, United States*, Robert Sayer, *Timothy Koehler, Justin Serrano, Scott Dalton, Sandia National Laboratories, Albuquerque, NM, United States*

3:15pm Modeling of Effective Thermal Conductance of Metal Foam Contact Thermal Interfaces

Technical Paper Publication. IMECE2013-64132
Ninad Trifale, Kazuaki Yazawa, Eric Nauman, *Purdue University, West Lafayette, IN, United States*

3:30pm Reducing Thermal Impedance Using Surface Engineering

Technical Presentation. IMECE2013-65938
Hafez Raeisi Fard, *Theodorian Borca-Tasciuc, Joel Plawsky, Robert F. Karlicek Jr., Rensselaer Polytechnic Institute, Troy, NY, United States*

3:45pm Heat Flow Improvement for Chips Using a Swinging Plate

Technical Paper Publication. IMECE2013-62217
Esam Alawadhi, *Kuwait University, Safat, Kuwait*

4:00pm Numerical Study to Analyze the Effect of Hot/Cold Aisle Configurations on Heat Transfer Phenomenon in a Data Centre

Technical Paper Publication. IMECE2013-64457
Kamran Nazir, Imran Akhtar, Muhammad Saif Ullah Khalid, *National University of Science and Technology, Pakistan, Rawalpindi, Pakistan*, Naveed Durrani, *Institute of Space Technology, Islamabad, Pakistan, Islamabad, Pakistan*

4:15pm An Invariant Descriptor for the Conjugate Cooling of Discrete Heaters in a Duct

Technical Paper Publication. IMECE2013-63604
Bruna R. Loiola, Carlos A.C. Altamani, *University of Campinas, Campinas, Brazil*

4:30pm A Nondimensional Analysis to Characterize Thermomagnetic Convection of a Temperature-Sensitive Magnetic Fluid in a Flow Loop

Technical Paper Publication. IMECE2013-66313
Giti Karimi-Moghaddam, Richard Gould, Subhashish Bhattacharya, *North Carolina State University, Raleigh, NC, United States*

9-14 HEAT AND MASS TRANSFER IN BIOTECHNOLOGY

9-14-1 Bioheat and Mass Transfer

2nd Floor, Manchester Grand Hyatt, Gregory A 3:00pm–4:45pm

Session Organizer: **Igor I. Katkov**, *CELLTRONIX, San Diego, CA, United States*

Session Co-Organizer: **Jing Liu**, *Chinese Academy of Sciences, Beijing, China*

3:00pm Toward Thermal Characterization of Pico-Liter Volumes Using the 3omega Method

Technical Paper Publication. IMECE2013-66428

Shilpi Roy, Takashi Kodama, Srilakshmi Lingamneni, Mehdi Asheghi, Kenneth E. Goodson, *Stanford University, Stanford, CA, United States*, Matthew A. Panzer, *KLA-Tencor Corporation, Milpitas, CA, United States*

3:15pm Analytical Temperature Distribution in a Multilayer Tissue Structure in the Presence of a Tumor

Technical Paper Publication. IMECE2013-63275

Daipayan Sarkar, Ankur Jain, Abdolhossein Haji-Sheikh, *University of Texas at Arlington, Arlington, TX, United States*

3:30pm Temperature Measurements of a Gold Nanosphere Solution in Response to Light-Induced Hyperthermia

Technical Paper Publication. IMECE2013-66424

Robert A. Taylor, Jun Kai Wong, Sungchul Baek, Yasitha Hewakuruppu, Xuchuan Jiang, Chuyang Chen, *University of New South Wales, Sydney, New South Wales, Australia*

3:45pm Modeling the Effect of the Leidenfrost Vapor Coat Behavior on the Vitrification of Biologicals Using the Cryogenic Droplets Levitation Time

Technical Paper Publication. IMECE2013-65434

Igor I. Katkov, Vladimir F. Bolyukh, Ilya Yakhnenko, *CELLTRONIX, San Diego, CA, United States*

4:00pm Comparison of 4 Methods for Scalable Kinetic (Fast) Vitrification of Cells: From Theoretical Considerations to Feasibility and Practicality

Technical Paper Publication. IMECE2013-62436

Igor I. Katkov, Vladimir F. Bolyukh, Stephen B. Jones, Vsevolod Katkov, *CELLTRONIX, San Diego, CA, United States*

4:15pm Infrared Image Evaluation on the Burning of Human Skin Caused by Laptop Computer

Technical Paper Publication. IMECE2013-66601

Zhizhu He, Xu Xue, Zhong-Shan Deng, *Technical Institute of Physics and Chemistry, Beijing, China*, Jing Liu, *Chinese Academy of Sciences, Beijing, China*

4:30pm Serum Free Cryopreservation of Adult Stem Cells

Technical Presentation. IMECE2013-64297

Jishnu Medhi, Jeff Gimble, Ram Devireddy, *Louisiana State University, Baton Rouge, LA, United States*

9-19 HEAT TRANSFER PHOTOGALLERY

9-19-1 Photogallery—Heat and Mass Transfer Visualization

3rd Floor, Manchester Grand Hyatt, Madeleine D 3:00pm–4:45pm

Session Organizer: **Chang Kyoung Choi**, *Michigan Technological University, Houghton, MI, United States*

Session Co-Organizers: **David Pratt**, **Shalabh C. Maroo**, *Syracuse University, Syracuse, NY, United States*

3:00pm High-Speed Visualization of Horizontal Two Phase R-134a Flows

Extended Abstract Presentation. IMECE2013-64424

Paul Kreitzer, *UES Inc., Dayton, OH, United States*, Larry Byrd, *Air Force Research Laboratory, Wright Patterson AFB, OH, United States*

3:26pm Condensation Patterns on Different Wettability Copper Plates

Poster Paper Publication. IMECE2013-67409

Seong Hyuk Lee, *Chung-ang University, Seoul, Korea (Republic)*

3:52pm Two-Phase Instabilities in Shell and Tube Heat Exchangers

Poster Paper Publication. IMECE2013-67410

Siddharth Talapatra, *Heat Transfer Research Inc., College Station, TX, United States*

4:18pm A Reverse Flow in a Nanofluid Droplet Due to an Encapsulated Bubble

Poster Paper Publication. IMECE2013-67412

Chang Choi, *Kyung Hee University, Youngin-si, Korea (Republic)*

TRACK 9 HEAT TRANSFER AND THERMAL ENGINEERING / TUESDAY, NOVEMBER 19

TUESDAY, NOVEMBER 19

9-3 NANOSCALE THERMAL TRANSPORT

9-3-6 Nanoscale Thermal Metrology—I

3rd Floor, Manchester Grand Hyatt, Windsor B 9:45am–11:30am

Session Organizer: **Keunhan (Kay) Park**, *University of Rhode Island, Kingston, RI, United States*

Session Co-Organizer: **Aaron Schmidt**, *Boston University, Boston, MA, United States*

9:45am Frequency Domain Fiber Aligned Thermo Reflectance and Three Omega Measurements of Thermal Conductivity of Carbon Nanotube-Graphene Hybrid Structures

Technical Presentation. IMECE2013-66661

Pankaj Kaul, Hao Jiang, Vikas Prakash, *Case Western Reserve University, Cleveland, OH, United States*

10:02am Mode Resolved Thermal Transport in Amorphous Silicon

Technical Presentation. IMECE2013-64608

Christopher H. Baker, Pamela M. Norris, *University of Virginia, Charlottesville, VA, United States*

10:19am Raman Thermometry as Contactless Method for Thermal Conductivity Determination: The Case of Thermal Conductivity Reduction in Si and Ge Free-Standing Membranes

Technical Presentation. IMECE2013-65082

Juan Sebastian Reparaz, Jordi Gomis Bresco, Francesc Alzina Sureda, Clivia M. Sotomayor Torres, *Catalan Institute of Nanotechnology, Bellaterra, Spain*, **Emigdio Chávez Ángel**, *Catalan Institute of Nanoscience and Nanotechnology, Barcelona, Barcelona, Spain*, **M.R.W. Wagner**, *ICN, Barcelona, Spain*, **John Cuffe**, *Massachusetts Institute of Technology, Boston, MA, United States*, **Vish Shah, M. Myronov, David Leadley**, *Warwick UNI, Warwick, United Kingdom*, **Andrey Shchepetov, Mika Prunnila, Jouni Ahopelto**, *VTT Technical Research Centre of Finland, Espoo, Finland*

10:36am Phonon Mean Free Path Spectra Measured by Broadband Frequency Domain Thermoreflectance

Technical Presentation. IMECE2013-65117

Keith Regner, Justin P. Freedman, Jason Larkin, Alan McGaughey, Jonathan Malen, *Carnegie Mellon University, Pittsburgh, PA, United States*, **Nikolay Abrosimov**, *Institute for Crystal Growth, Berlin, Germany*, **Sean Lubner, Chris Dames**, *University of California, Berkeley, Berkeley, CA, United States*

10:53am Measurement of Phonon Mean Free Paths in Nanocrystalline Silicon

Technical Presentation. IMECE2013-65263

Xiangwen Chen, Daniel Holland, Austin Minnich, Geoffrey Blake, *Caltech, Pasadena, CA, United States*

11:10am Impact of Boundary Scattering on Nanoscale Thermal Transport Properties in Ultrathin Si Based Nanostructures

Technical Presentation. IMECE2013-64555

Markus R. Wagner, Emigdio Chávez Ángel, Jordi Gomis Bresco, Juan Sebastian Reparaz, Francesc Alzina Sureda, Clivia M. Sotomayor Torres, *Catalan Institute of Nanotechnology, Bellaterra, Spain*, **Andrey Shchepetov, Mika Prunnila, Jouni Ahopelto**, *VTT Technical Research Centre of Finland, Espoo, Finland*

9-4 HEAT TRANSFER EQUIPMENT

9-4-6 Thermal Management Challenges in Energy Conversion and Conservation

3rd Floor, Manchester Grand Hyatt, Windsor C 9:45am–11:30am

Session Organizer: **Ali Khounsary**, *Argonne National Laboratories, Argonne, IL, United States*

Session Co-Organizer: **Dereje Agonafer**, *University of Texas at Arlington, Arlington, TX, United States*

9-1 HEAT TRANSFER IN ENERGY SYSTEMS

9-1-1 Radiation in Energy Systems

3rd Floor, Manchester Grand Hyatt, Windsor C 1:00pm–2:45pm

Session Organizer: **Wojciech Lipinski**, *Australian National University, Canberra, ACT, Australia*

Session Co-Organizer: **Michael Modest**, *University of California, Merced, Merced, CA, United States*

1:00pm Finite Volume Solution of the Radiative Transfer Equation Using Nvd and Tvd Schemes in Unstructured Grids

Technical Paper Publication. IMECE2013-66253

Pedro J. Coelho, *Instituto Superior Tecnico, Technical University of Lisbon, Lisboa, Portugal*

1:17pm Investigation of the Sensitivity of Inferred Parameters in Laserinduced Incandescence Experiments

Technical Presentation. IMECE2013-64730

T.A. Sipkens, Kyle Daun, *University of Waterloo, Waterloo, ON, Canada*

1:34pm The Thermal Discrete Dipole Approximation (T-DDA) for Numerical Simulation of Near-Field Thermal Radiation

Technical Presentation. IMECE2013-65313

Sheila Edalatpour, Mathieu Francoeur, *University of Utah, Salt Lake City, UT, United States*

1:51pm Infrared Characterization of Mie Resonance-Based Dielectric Metamaterials Fabricated Using Directed Self-Assembly

Technical Presentation. IMECE2013-65332

Spencer Petersen, *University of Utah, Ogden, UT, United States*, **Bart Raeymaekers, Mathieu Francoeur**, *University of Utah, Salt Lake City, UT, United States*, **Soumyadipta Basu**, *Intel Corporation, Chandler, AZ, United States*

- 2:08pm Performance Analysis of In_{0.18}Ga_{0.82}Sb and GaSb Thermophotovoltaic Cells Paired With Tungsten and Drude Radiators via a Coupled Near-Field Thermal Radiation, Charge, and Heat Transport Model**

Technical Presentation. IMECE2013-65357

Michael Bernardi, Mathieu Francouer, *University of Utah, Salt Lake City, UT, United States*

- 2:25pm Flat-Plate Solar Collector in Transient Operation: Modeling and Measurements**

Technical Paper Publication. IMECE2013-62377

Ahmad M. Saleh, Donald W. Mueller, Jr., Hosni I. Abu-Mulaweh, *Indiana University-Purdue University Fort Wayne, Fort Wayne, IN, United States*

9-2 THEORY AND FUNDAMENTAL RESEARCH

9-2-4 Fundamentals of Nanoscale Heat Transfer

3rd Floor, Manchester Grand Hyatt, Ford B 1:00pm–2:45pm

Session Organizer: **Deyu Li**, *Vanderbilt University, Nashville, TN, United States*

Session Co-Organizer: **Thomas Beechem**, *Sandia National Laboratories, Albuquerque, NM, United States*, **Renkun Chen**, *University of California, San Diego, La Jolla, CA, United States*

- 1:00pm The Effects of Inclusion Clustering on the Effective Thermal Conductivity of a Bulk Composite**

Technical Presentation. IMECE2013-64391

Aaron P. Wemhoff, *Villanova University, Villanova, PA, United States*

- 1:17pm Diffusive Thermal Transport in a Ballistic Regime**

Technical Presentation. IMECE2013-64461

Juekuan Yang, Yunfei Chen, *Southeast University, Nanjing, China*, Deyu Li, *Vanderbilt University, Nashville, TN, United States*

- 1:34pm Visualization Study of Pool Boiling on Polished and Porous Coated Surfaces for Deionized Water and Al₂O₃-Water Nano-Fluids**

Technical Paper Publication. IMECE2013-62346

Gengwen Niu, Ji Li, *Chinese Academy of Sciences, Beijing, China*

- 1:51pm Lattice Boltzmann Modeling of Ultrafast Laser Heating on Metal Film**

Technical Paper Publication. IMECE2013-64797

Dadong Wang, Yanbao Ma, *University of California, Merced, Merced, CA, United States*

- 2:08pm A Numerical Investigation on Nanofluid Laminar Mixed Convection in Confined Impinging Jets**

Technical Paper Publication. IMECE2013-65915

Oronzio Manca, Daniele Ricci, Sergio Nardini, Salvatore Tamburrino, *Seconda Università degli Studi di Napoli, Aversa, Caserta, Italy*

- 2:25pm Numerical Analysis on Nanofluid Mixed Convection in Triangular Ducts Heated by a Constant Heat Flux**

Technical Paper Publication. IMECE2013-65916

Oronzio Manca, Daniele Ricci, Salvatore Tamburrino, *Seconda Università degli Studi di Napoli, Aversa, Caserta, Italy*

9-3 NANOSCALE THERMAL TRANSPORT

9-3-7 Nanostructured Carbon and Related Materials—I

3rd Floor, Manchester Grand Hyatt, Windsor B 1:00pm–2:45pm

Session Organizer: **Chris Dames**, *University of California, Berkeley, Berkeley, CA, United States*

Session Co-Organizer: **Ajit Roy**, *Air Force Research Lab, Dayton, OH, United States*

- 1:00pm Influence of Phonon-Phonon Interactions on the Joule Heating of Metallic Single Walled Carbon Nanotubes**

Technical Presentation. IMECE2013-62705

Pierre Gautreau, *University at Buffalo, Tonawanda, NY, United States*, Cemal Basaran, *University at Buffalo, State University of New York, Buffalo, NY, United States*

- 1:15pm Thermal Transport at Carbon Nanotube-Graphene Junction in Pillared Graphene Structure**

Technical Paper Publication. IMECE2013-66645

Jungkyu Park, Vikas Prakash, *Case Western Reserve University, Cleveland, OH, United States*

- 1:30pm Thermal Conductivity of Novel 2-Dimensional Materials (Graphene and Beyond) Under Different Strains**

Technical Presentation. IMECE2013-66441

Xiaokun Gu, Ronggui Yang, *University of Colorado Boulder, Boulder, CO, United States*, Yujie Wei, *Institute of Mechanics, Beijing, China*

- 1:45pm Phonon Transport in Graphite and Graphite Films (Invited)**

Invited Presentation. IMECE2013-67297

Yunfei Chen, *Southeast University, Nanjing, China*

- 2:15pm Phonon Scattering in Branched Carbon Nanotube**

Technical Presentation. IMECE2013-66648

Jungkyu Park, Vikas Prakash, *Case Western Reserve University, Cleveland, OH, United States*, Jonghoon Lee, *AFRL, Dayton, OH, United States*

9-5 BIOMASS & BIOFUELS

9-5-1 Utilization and Combustion of Biomass and Biofuels

3rd Floor, Manchester Grand Hyatt, Maggie 1:00pm–2:45pm

Session Organizer: **Matthew Oehlschlaeger**, *Rensselaer Polytechnic Institute, Troy, NY, United States*

Session Co-Organizer: **Qingang Xiong**, *Iowa State University, Ames, IA, United States*

- 1:00pm Emissions and Performance on a Jatropha Oil Methyl Ester Fueled Diesel Engine With Retarded Injection Timing**

Technical Paper Publication. IMECE2013-64302

Jiwak G. Suryawanshi, *Visvesvaraya National Institute of Technology, Nagpur, India*

TRACK 9 HEAT TRANSFER AND THERMAL ENGINEERING / TUESDAY, NOVEMBER 19

1:17pm Potential Utilization of Higher Alcohols in Unmodified Diesel Engine

Technical Paper Publication. IMECE2013-64618
Naveen Kumar, Vipul Vibhanshu, *Delhi Technological University, Delhi, India*, Sidharth Bansal, *MAIT, Delhi, India*

1:34pm Autoignition Variation for Biodiesels: Influence of Saturation

Technical Paper Publication. IMECE2013-64956
Weijing Wang, Sandeep Gowdagiri, Matthew Oehlschlaeger, *Rensselaer Polytechnic Institute, Troy, NY, United States*

1:51pm Ash Sintering in a Biomass Pellet Boiler

Technical Paper Publication. IMECE2013-65246
Pedro Ribeiro, Manuel Ferreira, José Carlos Teixeira, *University of Minho, Guimarães, Portugal*

2:08pm Temperature Dependent Solid Fuel Combustion Characterization and Fuel Ranking

Technical Paper Publication. IMECE2013-65615
Gaurav Agarwal, Gang Liu, Brian Lattimer, *Virginia Technology, Blacksburg, VA, United States*

2:25pm Numerical Modeling of Fuel NO_x Emissions Using Biomass-Derived Producer Gas

Technical Presentation. IMECE2013-66030
Sujith Sukumaran, Song-Chang Kong, *Iowa State University, Ames, IA, United States*

9-17 COMPUTATIONAL HEAT TRANSFER

9-17-1 Industrial Applications of Computational Heat Transfer

3rd Floor, Manchester Grand Hyatt, Ford A 1:00pm–2:45pm

Session Organizer: **Laila Guessous**, *Oakland University, Rochester, MI, United States*
Session Co-Organizers: **Jorge Alvarado**, *Texas A&M University, College Station, TX, United States*, **Gerard Jones**, *Villanova University, Villanova, PA, United States*

1:00pm Modeling the Temperature Distribution in the Contact Area of a Moving Object in the Case of Linear Friction Welding

Technical Paper Publication. IMECE2013-64343
Alexander Bikmeyev, Rafail Gazizov, Alfiya Yamileva, *Ufa State Aviation Technical University, Ufa, Russia*, Achilles Vairis, *Technological Educational Institute of Crete, Heraklion, Greece*

1:17pm Measured and Predicted Airflow in a Small Classroom

Technical Paper Publication. IMECE2013-64786
Ashley Emery, Chung-Lin Lee, *University of Washington, Seattle, WA, United States*

1:34pm Numerical Study of von Mises Stress During Continuous Casting of Multicrystalline Silicon With Large-Size Grains

Technical Paper Publication. IMECE2013-62182
Haisheng Fang, Changfu Li, Chaojie Zhao, Yangsu Xie, *Huazhong University of Science & Technology, Wuhan, Hubei, China*, Lili Zheng, *Tsinghua University, Beijing, China*

1:51pm Study of Heat Transfer in a Thermal Barrier Coatings System Using the Dual Phase Lag Model Based on Mean Value Finite Volume Method

Technical Paper Publication. IMECE2013-66060
Stephen Akwaboa, Yusuf Dag, *Southern University and A&M College, Baton Rouge, LA, United States*, Patrick Mensah, *Southern University, Baton Rouge, LA, United States*

2:08pm Evaluation Method of Thermal Comfort in Excavator Cabin

Technical Paper Publication. IMECE2013-62887
Ju Ho Hwang, Jae Seok Lee, Young Hyun Kim, Pan Young Kim, *Hyundai Heavy Industries, Ulsan, Korea (Republic)*

2:25pm Numerical Analysis of the Flow and Heat Transfer in the Sub-Channels of Supercritical Water

Technical Paper Publication. IMECE2013-66029
Krishna Pandey, Ajoy Debbarma, *National Institute of Technology, Silchar, Assam, India*

9-1 HEAT TRANSFER IN ENERGY SYSTEMS

9-1-2 Heat and Mass Transfer in Heating, Refrigeration, and Air Conditioning Systems

3rd Floor, Manchester Grand Hyatt, Windsor C 3:00pm–4:45pm

Session Organizer: **S.A. Sherif**, *University of Florida, Gainesville, FL, United States*
Session Co-Organizer: **Laura Schaefer**, *University of Pittsburgh, Pittsburgh, PA, United States*

3:00pm Dynamic Analysis of a Dual-Mode CO₂ Heat Pump With Both Hot and Cold Thermal Storage

Technical Paper Publication. IMECE2013-62894
Lars Houbak-Jensen, Anders Holten, Morten B. Blarke, *Aalborg University, Aalborg, Aalborg, Denmark*, Eckhard Groll, Ali Shakouri, Kazuaki Yazawa, *Purdue University, West Lafayette, IN, United States*

3:17pm Ammonia-Water Absorption Heat Pump for Residential Water Heating Applications

Technical Presentation. IMECE2013-63279
Christopher M. Keinath, Srinivas Garimella, *Georgia Institute of Technology, Atlanta, GA, United States*, Michael Garrabrant, *Stone Mountain Technologies, Inc., Unicoi, TN, United States*

3:34pm Multivariable Control of Vapor Compression Cycle With Transient Heat Flux

Technical Paper Publication. IMECE2013-63610
Zehao Yang, Daniel T. Pollock, John T. Wen, *Rensselaer Polytechnic Institute, Troy, NY, United States*

3:51pm Utilization of Microencapsulated Phase Change Material for the Optimization of Evaporative Cooling Technology

Technical Paper Publication. IMECE2013-66510
Jeet Shah, Nikhil Dhiman, Dereje Agonafer, *University of Texas at Arlington, Arlington, TX, United States*, Mike Kaler, James Hoverson, Naveen Kannan, *Mestex, A Division of Mestek Inc., Dallas, TX, United States*

4:08pm Performance Enhancement of Herringbone Wavy-Fin Round Tube Inclined Heat Exchangers With and Without Hydrophilic Coating Using Spray and Deluge Cooling

Technical Paper Publication. IMECE2013-62287
Sahil Popli, Yunho Hwang, Reinhard Radermacher, *University of Maryland, College Park, MD, United States*

4:25pm An Experimental Study of Heat Transfer Characteristics of Microencapsulated Phase Change Material Slurry in a Coil Heat Exchanger

Technical Paper Publication. IMECE2013-63319
Minsuk Kong, Jorge Alvarado, *Texas A&M University, College Station, TX, United States*, Ehsan Languri, *Applied Research Associates, Inc., Panama City, FL, United States*

9-2 THEORY AND FUNDAMENTAL RESEARCH

9-2-6 Interfacial Thermal Transport: Resolving the Roles of Temperature, Anharmonicity, Specularity, and Coherence

3rd Floor, Manchester Grand Hyatt, Ford B 3:00pm–4:45pm

Session Organizer: **John Duda**, *Seagate Technology, Bloomington, MN, United States*

Session Co-Organizer: **Alan McGaughey**, *Carnegie Mellon University, Pittsburgh, PA, United States*

9-3 NANOSCALE THERMAL TRANSPORT

9-3-8 Nanoscale Thermal Metrology—II

3rd Floor, Manchester Grand Hyatt, Windsor B 3:00pm–4:45pm

Session Organizer: **Ronggui Yang**, *University of Colorado Boulder, Boulder, United States*

Session Co-Organizer: **Satish Kandlikar**, *Rochester Institute of Technology, Rochester, NY, United States*

3:00pm Structure-Thermal Property Relationships of Electrospun Nylon-11 Nanofibers

Technical Presentation. IMECE2013-65340
Matthew Wingert, *University of California, San Diego, Dana Point, CA, United States*, Renkun Chen, *University of California, San Diego, La Jolla, CA, United States*, Zhang Jiang, Zhenxin Zhong, *Argonne National Laboratory, Argonne, IL, United States*

3:17pm Measurement of Thermal Conduction Through Single Nanostructures Using Bi-Material Microcantilevers

Technical Presentation. IMECE2013-64752
Carlo Canetta, Arvind Narayanaswamy, *Columbia University, New York, NY, United States*

3:34pm Coherent and Incoherent Heat Transfer in Response to a Single Heat Pulse

Technical Presentation. IMECE2013-65252
Yanbao Ma, *University of California, Merced, Merced, CA, United States*

3:51pm A Novel Platform to Probe Near-Field Radiative Heat Transfer Between Parallel Planar Surfaces at the Nanoscale

Technical Presentation. IMECE2013-66462
Bai Song, Yashar Ganjeh, Seid Sadat, Anthony R. Fiorino, Dakotah R. Thompson, Edgar Meyhofer, Pramod Reddy, *University of Michigan, Ann Arbor, MI, United States*

4:08pm Ultrahigh Resolution Heat Flow Calorimetry for Studying Heat Transport in Nanostructures

Technical Presentation. IMECE2013-66463
Seid Sadat, Sai P. Reddy, Dakotah R. Thompson, Arun K. Kota, Anish Tuteja, Edgar Meyhofer, Pramod Reddy, *University of Michigan, Ann Arbor, MI, United States*

4:25pm Minimum Thermal Conductivity Considerations in Aerogel Thin Films

Technical Presentation. IMECE2013-63863
Patrick Hopkins, *University of Virginia, Charlottesville, VA, United States*, Bryan Kaehr, Edward Piekos, C. Jeffrey Brinker, *Sandia National Laboratories, Albuquerque, NM, United States*, Darren Dunphy, *University of New Mexico, Albuquerque, NM, United States*

9-5 BIOMASS & BIOFUELS

9-5-2 Production and Utilization of Biomass and Biofuels

3rd Floor, Manchester Grand Hyatt, Maggie 3:00pm–4:45pm

Session Organizer: **Qingang Xiong**, *Iowa State University, Ames, IA, United States*

Session Co-Organizer: **Matthew Oehlschlaeger**, *Rensselaer Polytechnic Institute, Troy, United States*

3:00pm Heat Recovery From Bottom Ash in Waste Fired Boilers: Status of Technologies and Thermal Performance Modeling

Technical Paper Publication. IMECE2013-62798
Zakariya Kaneesamkandi, *King Saud University, Riyadh, Saudi Arabia*

3:17pm Numerical Simulation of Biodiesel Production Using Waste Cooking Oil

Technical Paper Publication. IMECE2013-63917
A.K.M. Mohiuddin, Nabeel A. Adeyemi, *International Islamic University Malaysia, Kuala Lumpur, Malaysia*

3:34pm Experimental and Computational Model Comparisons of Thermal Profiles Within a Column Photobioreactor

Technical Paper Publication. IMECE2013-64777
Ghazi Saiful Bari, Taylor Suess, Gary Anderson, Stephen P. Gent, *South Dakota State University, Brookings, SD, United States*

3:51pm Effects of Interphase Coefficients on Biomass Pyrolysis in Fluidized-Bed Reactors

Technical Presentation. IMECE2013-66020
Qingang Xiong, Song-Chang Kong, *Iowa State University, Ames, IA, United States*

TRACK 9 HEAT TRANSFER AND THERMAL ENGINEERING / TUESDAY, NOVEMBER 19

4:08pm Direct Numerical Simulation of Biomass Particles During Pyrolysis

Technical Presentation. IMECE2013-66249

Qingang Xiong, Song-Chang Kong, *Iowa State University, Ames, IA, United States*

4:25pm Modeling Thermal Radiation With Focus on Particle Radiation in Grate Fired Furnaces Combusting MSW or Biomass—A Parametric Study

Technical Paper Publication. IMECE2013-62882

Henrik Hofgren, Bengt Sunden, *Lund University, Lund, Sweden*

9-17 COMPUTATIONAL HEAT TRANSFER

9-17-2 Emerging Techniques in Computational Heat Transfer

3rd Floor, Manchester Grand Hyatt, Ford A 3:00pm–4:45pm

Session Organizer: **Ying Sun**, *Drexel University, Philadelphia, PA, United States*

Session Co-Organizer: **N. Anand, Sandip Mazumder**, *Ohio State University, Columbus, OH, United States*

3:00pm Lattice Boltzmann Method Simulation on Flow Patterns of Natural Convection in Horizontal Cylindrical Annulus

Technical Paper Publication. IMECE2013-62389

Mo Yang, Yuwei Zhou, Enjie Bian, Zheng Li, *University of Shanghai for Science and Technology, Shanghai, China*, Yuwen Zhang, *University of Missouri, Columbia, MO, United States*

3:17pm Meshless Local Petrov-Galerkin Method for Heat Transfer Analysis

Technical Paper Publication. IMECE2013-64554

Singiresu Rao, *University of Miami, Miami, FL, United States*

3:34pm Simulation of Multiple Confined Impinging Jets on a Heated Plate Using the Lattice Boltzmann Method

Technical Paper Publication. IMECE2013-64772

Masoud A. Al Rmah, Abdulmajeed Mohamad, *University of Calgary, Calgary, AB, Canada*

3:51pm Application of Artificial Neural Network for Single Horizontal Bare Tube and Bare Tube Bundles in Gas-Solid (Air-Solid) Fluidized Bed of Small and Large Particles: Heat Transfer Predictions

Technical Paper Publication. IMECE2013-66265

G. Ravindranath, *APS College of Engineering, Bangalore, India*, Savitha S, *Directorate of Social Security and Pensions, Karnataka Govt, Bangalore, Karnataka, India*

4:08pm Numerical Analysis of the Thermal Dissipation in Horizontal Isothermal Eccentrically Insulated Cylinders by Free Convection

Technical Paper Publication. IMECE2013-62680

Ezequiel C. Malateaux, Luiz F. Milanez, *University of Campinas - UNICAMP, Campinas, SP, Brazil*

4:25pm Natural Convection in Spherical Shells With Variable Radial Gravity

Technical Presentation. IMECE2013-65168

Ares Cabello Gonzalez, Ruben Avila, *Universidad Nacional Autónoma de México, Mexico D. F., Mexico*

9-1 HEAT TRANSFER IN ENERGY SYSTEMS

9-1-6 Heat and Mass Transfer in Energy Systems: Applications

3rd Floor, Manchester Grand Hyatt, Windsor C 5:00pm–6:45pm

Session Organizer: **Noam Lior**, *University of Pennsylvania, Philadelphia, PA, United States*

Session Co-Organizers: **Halil Berberoglu**, *University of Texas at Austin, Austin, TX, United States*, **Mitra Sexton**, *Clifton Park, NY, United States*

5:00pm A Case Study on the Performance of a Solar Chimney Natural Ventilation System in a Zero Energy Lab

Technical Presentation. IMECE2013-65605

Suraj Talele, Yong Tao, *University of North Texas, Denton, TX, United States*

5:17pm Heat Transfer Characteristics of Three-Dimensional Surface Roughness in Nuclear Fuel Rod Bundles

Technical Paper Publication. IMECE2013-64735

Umair Najeeb, Jamil A. Khan, *University of South Carolina, Columbia, SC, United States*, Leo Carrilho, *Westinghouse Electric Company, Hopkins, SC, United States*

5:34pm Application of Thermal Hydraulic and Severe Accident Code SOCRAT/V3 for Calculation of Air Ingress Experiment QUENCH-16

Technical Paper Publication. IMECE2013-65730

Alexander Vasiliev, *Nuclear Safety Institute (IBRAE), Moscow, Russia*

5:51pm Thermal and Coupled Electromagnetic-Mechanical Analyses for the Development of a Dry Type Current Limiting Reactor

Technical Paper Publication. IMECE2013-64277

Jang-un Choi, Sung Won Park, Yong-han Kim, *Hyundai Heavy Industries Co., Ltd., Yongin-si, Korea (Republic)*, Heui-weon Yang, *Hyundai Heavy Industries Co., Ltd., Ulsan-si, Korea (Republic)*

6:08pm Shell Side Flow and Heat Transfer Performances of Trisection Helical Baffle Heat Exchangers

Technical Paper Publication. IMECE2013-65697

Yaping Chen, Cong Dong, Jiafeng Wu, *Southeast University, Nanjing, Jiangsu, China*

6:25pm Thermomechanical Behavior of a Constrained Gel Interface for Heat and Moisture Management

Technical Presentation. IMECE2013-62625

J. Silva, R Geryak, P.A. Kottke, David Anderson, V.V. Tsukruk, Andrei Fedorov, *Georgia Institute of Technology, Atlanta, GA, United States*, R. Naik, *Air Force Research Laboratory, Wright Patterson AFB, OH, United States*

9-2 THEORY AND FUNDAMENTAL RESEARCH

9-2-7 Fundamentals of Natural and Mixed Convection—II

3rd Floor, Manchester Grand Hyatt, Ford B 5:00pm–6:45pm

Session Organizer: **Chris Kobus**, *Oakland University, Rochester, MI, United States*Session Co-Organizer: **Patrick Oosthuizen**, *Queen's University, Kingston, Canada*5:00pm **Numerical Studies of Oscillatory Flame Propagation in an Acoustic Field****Technical Presentation.** IMECE2013-63699Temistocle Grenga, Samuel Paolucci, *University of Notre Dame, Notre Dame, IN, United States*5:17pm **Laminar Mixed Convection Boundary Layer Flow Over Two-Dimensional and Axisymmetric Bodies****Technical Paper Publication.** IMECE2013-63447Sufianu Aliu, *University of Benin, Benin City, Edo State, Nigeria*, Richard Fagbenle, *University of Ibadan, Ibadan, Nigeria*5:34pm **Constructal Design for Efficiency: The Case of an Entropic Wall With Circulating Water****Technical Paper Publication.** IMECE2013-63466Michele Trancossi, Mauro Madonia, Antonio Dumas, *Università di Modena e Reggio Emilia, Reggio Emilia, RE, Italy*5:51pm **Thermal Tomography Using Experimental Measurement Data****Extended Abstract Publication.** IMECE2013-63511Jussi M. Toivanen, Ville Kolehmainen, Tanja Tarvainen, Janne Huttunen, Tuomo Savolainen, *University of Eastern Finland, Kuopio, Finland*, Helcio Orlando, *Federal University of Rio de Janeiro, Rio de Janeiro, Brazil*, Jari Kaipio, *University of Auckland, Auckland, New Zealand*6:08pm **Effective Temperature Jump Length and Influence of Axial Conduction for Thermal Transport Through Channels With Superhydrophobic Walls****Technical Paper Publication.** IMECE2013-63858Adam Cowley, Daniel Maynes, Julie Crockett, Brent Webb, *Brigham Young University, Provo, UT, United States*6:25pm **Natural Convection Through an Open Cavity Heated From the Side and Filled With Fluid and Discrete Solid Blocks****Technical Paper Publication.** IMECE2013-66796Admilson Franco, Leonardo Loyola, Fernando De Lai, Silvio Junqueira, *Federal University of Technology Parana, Curitiba, Parana, Brazil*, Marcelo Ganzarolli, *UNICAMP, Campinas, Sao Paulo, Brazil*, Jose Lage, *Southern Methodist University, Dallas, TX, United States*

9-3 NANOSCALE THERMAL TRANSPORT

9-3-9 Nanoparticles and Nanofluids

3rd Floor, Manchester Grand Hyatt, Windsor B 5:00pm–6:45pm

Session Organizer: **Yuwen Zhang**, *University of Missouri, Columbia, MO, United States*Session Co-Organizer: **Asegun Henry**5:00pm **Prediction of Thermal Conductivity and Viscosity of Water-Cu Nanofluids Using Equilibrium Molecular Dynamics****Technical Paper Publication.** IMECE2013-63558Tolga Akiner, Hakan Erturk, Kunt Atalik, *Bogazici University, Bebek, Istanbul, Turkey*5:17pm **Freezing Rates Affect Thermal and Electrical Conductivity in Frozen Nanofluids****Extended Abstract Presentation.** IMECE2013-65521Scott N. Schiffres, Jonathan A. Malen, *Carnegie Mellon University, Pittsburgh, PA, United States, United States*, Sivasankaran Harish, Junichiro Shiomi, *University of Tokyo, Tokyo, Japan*, Shigeo Maruyama, *University of Tokyo, Bunkyo-ku, Tokyo, Japan*5:34pm **Viscous Dissipation and Soret Effects on Non-Darcy Mixed Convective Flow Considering Nanofluids****Technical Paper Publication.** IMECE2013-62131Kameswara Kameswaran, Precious Sibanda, *University of KwaZulu-Natal, Pietermaritzburg, Kwazulu-Natal, South Africa*, A.S.N. Murti, *GITAM University, Visakhapatnam, India*5:51pm **Numerical Investigation to Evaluate the Performance of Helical Coiled Tube Heat Exchanger With and Without Using Nanofluid****Technical Paper Publication.** IMECE2013-62350Qasim Saleh, Sahar Abdulfatah, Firas Jumia, *Al-Mustansirya, Baghdad, Iraq*6:08pm **Numerical Analysis of Laminar Natural Convection in Rectangular Enclosures of Different Aspect Ratios With and Without Aerosol Nanofluid****Technical Paper Publication.** IMECE2013-65056Mosfequr Rahman, Andrew Hudson, Gustavo J. Molina, Valentin Soloiu, *Georgia Southern University, Statesboro, GA, United States*6:25pm **Experimental Measurements of the Thermal Conductivity of Nanoparticle Packed Beds****Technical Paper Publication.** IMECE2013-64979Kevin Clarke, Muftah Elshahati, Robert F. Richards, *Washington State University, Pullman, WA, United States*

TRACK 9 HEAT TRANSFER AND THERMAL ENGINEERING / TUESDAY, NOVEMBER 19

9-12 TRANSPORT PHENOMENA IN MANUFACTURING AND MATERIALS PROCESSING

9-12-1 Transport Phenomena in Manufacturing and Materials Processing

3rd Floor, Manchester Grand Hyatt, Maggie 5:00pm–6:45pm

Session Organizer: **Ying Sun**, *Drexel University, Philadelphia, PA, United States*

Session Co-Organizer: **Joyce Hu**

5:00pm **Transient Behavior of the Gallium Nitride Chemical Vapor Deposition Process**

Technical Paper Publication. IMECE2013-63236

Jiandong Meng, Yogesh Jaluria, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*

5:15pm **Comparison of Theoretical and Experimental Corn Drying Profiles Within a Cross-Flow Column Dryer**

Technical Paper Publication. IMECE2013-64557

Lars Mattison, Taylor Suess, Michael Twedt, Stephen P. Gent, *South Dakota State University, Brookings, SD, United States*

5:30pm **Transport Phenomena and Thermal Stress Formation in Hybrid Laser-MIG Welding**

Technical Paper Publication. IMECE2013-64503

Jun Zhou, Amir Khalilollahi, *Penn State Erie, The Behrend College, Erie, PA, United States*, Hai Lung Tsai, *Missouri University of Science and Technology, Rolla, MO, United States*

5:45pm **Role of Internal Radiation With or Without Melt Inclusions During Czochralski Sapphire Crystal Growth**

Technical Paper Publication. IMECE2013-62088

Haisheng Fang, Quanjiang Zhang, Mengjie Zhao, Jun Tian, *Huazhong University of Science & Technology, Wuhan, Hubei, China*, Lili Zheng, *Tsinghua University, Beijing, China*

6:00pm **Monitoring of Polymer Plastication in the Injection Moulding Process**

Technical Paper Publication. IMECE2013-64859

Jean-Yves Charneau, Yves Beraux, Thuy-Linh Pham, Jean Balcaen, *Sambor Chhay, INSA Lyon, Villeurbanne, France*

6:15pm **Heat Transfer and Thermal Balance Analysis of an Aluminum Electrolysis Cell Side Lines: A Heat Recovery Capability and Feasibility Study**

Extended Abstract Publication. IMECE2013-64358

Yaser Mollaei Barzi, Mohsen Assadi, *University of Stavanger, Stavanger, Norway*

6:30pm **Influence of Modeling Assumptions on the Simulated EDM Performance**

Technical Paper Publication. IMECE2013-65432

Agustín M-rquez Escobar, Dirk F. de Lange, Hugo Ivan Medellín Castillo, Francisco G. Pérez Gutiérrez, *Universidad Autonoma de San Luis Potosí, San Luis Potosí, San Luis Potosí, Mexico*

9-17 COMPUTATIONAL HEAT TRANSFER

9-17-3 Applications of Computational Heat Transfer

3rd Floor, Manchester Grand Hyatt, Ford A 5:00pm–6:45pm

Session Organizer: **M. Ruhul Amin**, *Montana State University, Bozeman, MT, United States*

Session Co-Organizer: **Robert Spall**, *Utah State University, Logan, UT, United States*

5:00pm **Numerical Study of Natural Convective Heat Transfer From a Very Short Isothermal Cylinder Mounted on a Flat Adiabatic Base**

Technical Paper Publication. IMECE2013-64558

Patrick Oosthuizen, *Queen's University, Kingston, Canada*

5:17pm **A Numerical Study of Unsteady Mixed Convection in a Square Cavity—Transition From Laminar to Turbulent Flow**

Technical Paper Publication. IMECE2013-65841

Kazim Akyuzlu, *University of New Orleans, New Orleans, LA, United States*

5:34pm **A Numerical Study of Conjugate Heat Transfer by Natural Convection and Surface Radiation in a Square Enclosure With Thick Adiabatic Walls**

Technical Paper Publication. IMECE2013-63668

Kenneth D. Blecker, *U.S. Army ARDEC, Picatinny Arsenal, NJ, United States*, Hamid Hadim, *Stevens Institute of Technology, Hoboken, NJ, United States*

5:51pm **Numerical Study of a New Heat Transfer Correlation for Turbulent Airflow in Noncircular Ducts With Variable Properties**

Technical Paper Publication. IMECE2013-62388

Mo Yang, Peng Wang, Zhiyun Wang, *University of Shanghai for Science and Technology, Shanghai, China*, Yuwen Zhang, *University of Missouri, Columbia, MO, United States*

6:08pm **Effect of the Oscillation of Left Heated Wall on Heat Transfer Enhancement for a Square Cavity Domain**

Technical Paper Publication. IMECE2013-62063

Ahmed Sowayan, *Al Imam Mohammad Ibn Saud Islamic University, Riyadh, Saudi Arabia*

6:25pm **Fully Developed Free Convective Flow of a Jeffrey Fluid in a Circular Pipe**

Technical Paper Publication. IMECE2013-62322

S. Sreenadh, E. Sudhakara, *Sri Venkateswara University, Tirupati, Andhra Pradesh, India*, P.V. Arunachalam, *Dravidian University, Tirupati, Andhra Pradesh, India*

WEDNESDAY, NOVEMBER 20

9-1 HEAT TRANSFER IN ENERGY SYSTEMS

9-1-3 Waste Heat Recovery and Thermal Storage

2nd Floor, Manchester Grand Hyatt, Betsy B 9:45am–11:30am

Session Organizer: **Cheng-xian Lin**, *Florida International University, Miami, FL, United States*Session Co-Organizer: **Ingrid Cotoros**, *Alexander Rattner, Georgia Institute of Technology, Atlanta, GA, United States*

9:45am Contact Glow Discharge Electrolysis as an Efficient Means of Generating Steam From Liquid Waste

Technical Paper Publication. IMECE2013-64062
Neeraj Sharma, Gerardo Diaz, *University of California Merced, Merced, CA, United States*

10:02am Integrated Wastewater Recovery and Reuse via Waste Heat Utilization

Technical Paper Publication. IMECE2013-66646
Yaroslav Chudnovsky, Aleksandr Kozlov, *Gas Technology Institute, Des Plaines, IL, United States*

10:19am Designing Waste Energy Recovery System for Automobile Engine Exhaust Gas and Coolant

Technical Presentation. IMECE2013-62454
Mohammed Mayeed, *Southern Polytechnic State University, Marietta, United States*, Mostafa Ghiaasiaan, *Georgia Institute of Technology, Atlanta, GA, United States*

10:36am Isothermal Efficiency of Hydraulically Charged Expanders Employed in Compressed Air Energy Storage Systems

Technical Presentation. IMECE2013-65629
Amirali Dolatabadi, Drazen Fabris, *Santa Clara University, Santa Clara, CA, United States*, Dean Samara-Rubio, *StorWatts Inc., San Jose, CA, United States*

10:53am Study to Reduce Heat Loss From Solar Thermal Collector by Diminishing Natural Convection With High-Porosity Porous Medium

Technical Paper Publication. IMECE2013-62150
Shigeki Hirasawa, Ryohei Tsubota, Tsuyoshi Kawanami, Katsuaki Shirai, *Kobe University, Kobe, Japan*

11:10am Flow and Heat Transfer Characteristics of a Novel Heat Exchangers

Technical Paper Publication. IMECE2013-62767
Haolin Ma, Alparslan Oztekin, *Lehigh University, Bethlehem, PA, United States*

9-3 NANOSCALE THERMAL TRANSPORT

9-3-10 Thermal Transport in Nanoscale Devices

2nd Floor, Manchester Grand Hyatt, Betsy A 9:45am–11:30am

Session Organizer: **Satish Kumar**, *Georgia Institute of Technology, Atlanta, GA, United States*Session Co-Organizer: **Xiulin Ruan**, *Purdue University, West Lafayette, IN, United States*

9:45am Effect of Charge Carriers on Gallium Nitride Thermal Transport

Technical Presentation. IMECE2013-66283
Thomas Beechem, Andrew Allerman, *Sandia National Laboratories, Albuquerque, NM, United States*, Patrick Hopkins, *University of Virginia, Charlottesville, VA, United States*

10:00am Effect of Substrate on Performance of Carbon Nanotube Network Thin Film Transistors

Technical Presentation. IMECE2013-66420
Man Prakash Gupta, Satish Kumar, *Georgia Institute of Technology, Atlanta, GA, United States*

10:15am Shuttling Heat via Time-Dependent Heat Bath Temperature (Invited)

Invited Presentation. IMECE2013-67296
Baowen Li, *National University of Singapore, Singapore, Singapore*

10:45am Frequency-Dependent Quasi-Ballistic Heat Transport in Nanostructured Devices

Technical Presentation. IMECE2013-64073
Giuseppe Romano, Jeffrey C. Grossman, *Massachusetts Institute of Technology, Cambridge, MA, United States*

11:00am Fractional Order Thermoelastic Waves of Cylindrical Nano-Beam

Technical Paper Publication. IMECE2013-62876
Hamdy Youssef, Khaled Elsibai, *Umm Al-Qura University, Makkah, Saudi Arabia*, Alaa El-Bary, *Arab Academy of Science and Technology, Alexandria, Egypt*

TRACK 9 HEAT TRANSFER AND THERMAL ENGINEERING / WEDNESDAY, NOVEMBER 20

9-17 COMPUTATIONAL HEAT TRANSFER

9-17-5 Inverse Problems and Optimization in Computational Heat Transfer

2nd Floor, Manchester Grand Hyatt, Betsy C 9:45am–11:30am

Session Organizer: **Keith Woodbury**, *University of Alabama, Tuscaloosa, AL, United States*

Session Co-Organizers: **Gerard Jones**, *Villanova University, Villanova, PA, United States*, **Kyle Daun**, *University of Waterloo, Waterloo, ON, Canada*

9:45am Inverse Heat Conduction Filter for Differential Flame Thermometer Applications

Technical Paper Publication. IMECE2013-64341

Hamid Najafi, *Keith Woodbury, University of Alabama, Tuscaloosa, AL, United States*, **Ned Keltner**, *F.I.R.E.S., Albuquerque, NM, United States*, **James Beck**, *Michigan State University, East Lansing, MI, United States*

10:02am A Distributed Source, Finite Absorption Model of a Pulsed Laser Diffusivity Measurement System

Technical Paper Publication. IMECE2013-64519

James Hall, *Raytheon, Provo, UT, United States*, **Matthew Jones**, **Jeremy LeFevre**, *Brigham Young University, Provo, UT, United States*, **Trevor Terrill**, *Texas A&M University, College Station, TX, United States*

10:19am An Inverse Radiation Model for Optical Determination of Temperature and CO₂ Concentration: Development and Validation

Technical Paper Publication. IMECE2013-64973

Tao Ren, **Todd A. Reeder**, **Michael Modest**, *University of California, Merced, Merced, CA, United States*

10:36am An Automated Approach to Developing Compact and Accurate Building Energy Models Utilizing an Inverse Heat Transfer Approach

Technical Paper Publication. IMECE2013-64430

Jason Hillary, *Stokes Institute, University of Limerick, Limerick, Co. Limerick, Ireland*, **Patrick Walsh**, *University of Limerick, Limerick Lb-003, Ireland*, **Edmond Walsh**, *University of Oxford, Oxford, United Kingdom*, **Amip Shah**, **Sergio Escobar**, *Hewlett Packard, Palo Alto, CA, United States*

10:53am Optimization of Conjugate Elliptical Cooling Channels With Internal Heat Generation

Technical Paper Publication. IMECE2013-66155

Olabode Thomas Olakoyejo, *University of Lagos, Lagos, Nigeria*, **Tunde Bello-Ochende**, *University of Cape Town, Cape Town, South Africa*, **Josua/J.P. Meyer**, *University of Pretoria, Pretoria, South Africa*

11:10am Optimization of the Angle of Attack of Delta-Winglet Vortex Generators Over a Bank of Elliptical-Tubes Heat Exchanger

Technical Paper Publication. IMECE2013-64179

Kiara Godazandeh, **Mohammad Hossein Ansari**, **Mehdi Ashjaee**, *University of Tehran, Tehran, Iran*, **Bardia Godazandeh**, *Sharif University of Technology, Tehran, Tehran, Iran*

9-1 HEAT TRANSFER IN ENERGY SYSTEMS

9-1-8 Clean Energy as the Building Mark of This Millennium

2nd Floor, Manchester Grand Hyatt, Betsy B 1:00pm–2:45pm

Session Organizer: **Nesrin Ozalp**, *Katholieke Universiteit Leuven, Leuven, Belgium*

1:00pm Clean Energy as the Building Mark of This Millennium Panel Presentation. IMECE2013-67413

Christian Sattler, *German Aerospace Center DLR, Cologne, Germany*

1:26pm Clean Energy as the Building Mark of This Millennium Panel Presentation. IMECE2013-67414

James Klausner, *University of Florida, Gainesville, FL, United States*

1:52pm Clean Energy as the Building Mark of This Millennium Panel Presentation. IMECE2013-67415

Arun Srinivasa, *Texas A&M University, College Station, TX, United States*

2:18pm Clean Energy as the Building Mark of This Millennium Panel Presentation. IMECE2013-67416

James Miller, *Sandia National Laboratories, Albuquerque, NM, United States*

9-3 NANOSCALE THERMAL TRANSPORT

9-3-11 Nanostructured Carbon and Related Materials—II

2nd Floor, Manchester Grand Hyatt, Betsy A 1:00pm–2:45pm

Session Organizer: **Ajit Roy**, *Air Force Research Lab, Dayton, OH, United States*Session Co-Organizer: **Ronggui Yang**, *University of Colorado Boulder, Boulder, CO, United States*

1:00pm Thermal Conductivity Characterization of Individual Boron Nanoribbons at High Temperature

Technical Presentation. IMECE2013-64146Juekuan Yang, Yunfei Chen, Zhonghua Ni, *Southeast University, Nanjing, China*, Xiaomeng Wang, Dongyan Xu, *Chinese University of Hong Kong, Hong Kong, China*, Yang Yang, Deyu Li, *Vanderbilt University, Nashville, TN, United States*, Terry Xu, *University of North Carolina at Charlotte, Charlotte, NC, United States*

1:15pm Comparison of Thermal Conductivity of Different Forms of Graphite Stacking Using Equilibrium Molecular Dynamics

Technical Presentation. IMECE2013-64788Masoud Khadem, Aaron P. Wemhoff, *Villanova University, Villanova, PA, United States*

1:30pm Study on Heat Transport in Nano Carbon Materials (Invited)

Invited Presentation. IMECE2013-67304DaWei Tang, *Chinese Academy of Science, Beijing, China*

2:00pm Graphene Works as a Mask Sheet at Thermal Interface

Technical Presentation. IMECE2013-65523Chunwei Zhang, Kedong Bi, Yunfei Chen, *Southeast University, Nanjing, China*

2:15pm Enhancing Interfacial Thermal Transport by Graphene Mediated Heterostructures

Technical Presentation. IMECE2013-62941Ming Hu, *RWTH Aachen University, Aachen, Germany*, Hua Bao, *Shanghai Jiao Tong University, Shanghai, China*

9-17 COMPUTATIONAL HEAT TRANSFER

9-17-6 Computational Heat Transfer in Multiphase Systems

2nd Floor, Manchester Grand Hyatt, Betsy C 1:00pm–2:45pm

Session Organizer: **Aaron P. Wemhoff**, *Villanova University, Villanova, PA, United States*Session Co-Organizer: **Cheng-xian Lin**, *Florida International University, Miami, FL, United States*

1:00pm Direct Numerical Simulation of Three-Dimensional Monolithic Catalytic Reactors With Complex Chemistry Using Multi-Level Parallelization on Desktop Computers

Technical Presentation. IMECE2013-66058Chekuri Choudary, *RNET Technologies Inc., Dayton, OH, United States*, Sandip Mazumder, *Ohio State University, Columbus, OH, United States*

1:17pm Simple Mechanistically Consistent Formulation for Volume-of-Fluid Based Computations of Condensing Flows

Technical Paper Publication. IMECE2013-63301Alexander Rattner, Srinivas Garimella, *Georgia Institute of Technology, Atlanta, GA, United States*

1:34pm Investigation Single Phase Models for Accurate Prediction of Pressure Drop in Nanofluid Flow in Circular Ducts

Technical Paper Publication. IMECE2013-63167Sinan Göktepe, Kunt Atalik, Hakan Erturk, *Bogazici University, Bebek, Istanbul, Turkey*

1:51pm Numerical Analysis on the Development of the Large-Scale Showerhead for Depositing AlGaN Films

Technical Paper Publication. IMECE2013-65515Chulsoo Byun, *Korea University of Technology & Education, Cheonan, Korea (Republic)*, Joo Kang Woo, Kim Dae Hyeon, Kim Kwang Sun, *Koreatech, Cheonan City, Korea (Republic)*

2:08pm Numerical Investigation of Fins Effect for Melting Process of Phase Change Materials

Technical Paper Publication. IMECE2013-64092Yasin Varol, *Firat University, Elazig, Turkey*, Turkey, Mutlu Okcu, *Ardahan University, Ardahan, Turkey*2:25pm Numerical Investigations of Flow and Heat Transfer Enhancement of Water-Based Al₂O₃ Nanofluids in a Sinusoidal-Wall Channel**Technical Paper Publication.** IMECE2013-66264Veli Ozbolat, Besir Sahin, *Cukurova University, Adana, Turkey*

TRACK 9 HEAT TRANSFER AND THERMAL ENGINEERING / WEDNESDAY, NOVEMBER 20**9-20 SYMPOSIUM TO CELEBRATE THE LIFE AND LEGACY OF NOVAK ZUBER****9-20-1 Symposium to Celebrate the Life and Legacy of Novak Zuber—I****3rd Floor, Manchester Grand Hyatt, Maggie 1:00pm–2:45pm**Session Organizer: **Jean-Marc Delhaye**, *Clemson University, Clemson, SC, United States*Session Co-Organizer: **Cila Herman**, *Johns Hopkins University, Baltimore, MD, United States*, **Jovica Riznic**, *Canadian Nuclear Safety Commission, Ottawa, ON, Canada***1:00pm Filtration of Particles by a Fiberglass Bed****Technical Paper Publication.** IMECE2013-62511
Graham Wallis, *Dartmouth College, Hanover, NH, United States***1:15pm An Advanced Frequency-Domain Code for BWR Stability Analysis and Design****Technical Paper Publication.** IMECE2013-65245
Behrooz Askari, *AF-Consult Switzerland Ltd., Baden, Switzerland*, George Yadigaroglu, *ETH-Zurich, Zurich, Switzerland***1:30pm The Drift Flux Model After Fifty Years—A Personal, Problem-Solving Survey****Technical Paper Publication.** IMECE2013-63084
Peter Toma, *P R Toma Consulting Ltd./University of Alberta, Saanichton, BC, Canada***1:45pm Local Axial Relative Velocity Measurements in Bubbly, Cap-Bubbly, and Slug Flows****Technical Paper Publication.** IMECE2013-66581
Ben Doup, Xinquan Zhou, Xiaodong Sun, *Ohio State University, Columbus, OH, United States***2:00pm Bubble Formation and Coalescence Under the Influence of Electric Fields****Extended Abstract Publication.** IMECE2013-64991
Cila Herman, *Johns Hopkins University, Baltimore, MD, United States***2:15pm Zuber-Type Parameter Distributions for Non-Equilibrium Two-Phase Flows: Generalization for Annular Channel and Rod Cluster Geometries****Technical Paper Publication.** IMECE2013-64755
Yuri Kornienko, *State Scientific Center-Institute for Power Physics and Engineering, Obninsk, Kaluga Region, Russia***2:30pm Application of Fourier-Galerkin Method to Volume Averaging Theory-Based Model of Heat Sinks****Technical Paper Publication.** IMECE2013-65244
Krsto Sbutega, Ivan Catton, *University of California, Los Angeles, Los Angeles, CA, United States***9-1 HEAT TRANSFER IN ENERGY SYSTEMS****9-1-4 Numerical Analysis and Performance Assessment of Energy Systems****2nd Floor, Manchester Grand Hyatt, Betsy B 3:00pm–4:45pm**Session Organizer: **Nesrin Ozalp**, *Katholieke Universiteit Leuven, Leuven, Belgium*Session Co-Organizers: **Mitra Sexton**, *Clifton Park, NY, United States*, **Yoon Jo Kim**, *Washington State University Vancouver, Vancouver, WA, United States***3:00pm Application of Phase Change Material in Sustainable Cooling of Data Centers****Technical Paper Publication.** IMECE2013-66515
Nikhil Dhiman, Jeet Shah, Dereje Agonafer, *University of Texas at Arlington, Arlington, TX, United States*, Naveen Kannan, James Hoverson, Mike Kaler, *Mestex, A Division of Mestek, Inc., Dallas, TX, United States***3:17pm Data Center Transient Flow Analysis Using Proper Orthogonal Decomposition****Technical Paper Publication.** IMECE2013-63286
Zhihang Song, *Binghamton University, Vestal, NY, United States*, Bruce Murray, Bahgat Sammakia, *Binghamton University, State University of New York, Binghamton, NY, United States***3:34pm Numerical Investigation of Metal-Foam Filled Liquid Piston Compressor Using a Two-Energy Equation Formulation Based on Experimentally Validated Models****Technical Paper Publication.** IMECE2013-63854
Chao Zhang, Jacob Wieberdink, Farzad A. Shirazi, Bo Yan, Terrence Simon, Perry Li, *University of Minnesota, Minneapolis, MN, United States***3:51pm Optimization of the Axial Porosity Distribution of Porous Inserts in a Liquid-Piston Air Compressor Using a One-Dimensional Formulation****Technical Paper Publication.** IMECE2013-63862
Chao Zhang, Terrence Simon, Perry Li, *University of Minnesota, Minneapolis, MN, United States***4:08pm Investigation of Using Dispersed Particle and Branching Heat Exchanger in Medium Temperature Thermal Energy Storage System to Achieve the Maximum Utilization of Solar Power****Technical Paper Publication.** IMECE2013-65646
A.M.M Hasib, Rambod Rayegan, Yong Tao, *University of North Texas, Denton, TX, United States***4:25pm Numerical Simulation of a Microencapsulated Phase Change Material Slurry Through Helical Coil Heat Exchanger****Technical Paper Publication.** IMECE2013-63509
Ehsan Languri, Aly Shaaban, *Applied Research Associates, Inc., Panama City, FL, United States*, Minsuk Kong, Jorge Alvarado, *Texas A&M University, College Station, TX, United States*

9-3 NANOSCALE THERMAL TRANSPORT

9-3-13 Multiscale Simulation and Modeling—II

2nd Floor, Manchester Grand Hyatt, Betsy A 3:00pm–4:45pm

Session Organizer: **Jun Liu**, *University of Colorado Boulder, Boulder, CO, United States*Session Co-Organizer: **Hadi Ghasemi**, *Massachusetts Institute of Technology, Cambridge, MA, United States*3:00pm **Adjoint-Based Methods for Accelerating Highly Resolved Monte Carlo Solutions of the Boltzmann Equation****Technical Presentation.** IMECE2013-66400Jean-Philippe Peraud, Nicolas Hadjiconstantinou, *Massachusetts Institute of Technology, Cambridge, MA, United States*3:17pm **Parallel Molecular Dynamics Simulations and Immersive Visualization of Thermal Barrier Coating Components: Thermally Growing Oxide and Yttria Stabilized Zirconia****Technical Paper Publication.** IMECE2013-66625Sanjay Kodiyalam, Michael Benissan, Stephen Akwaboa, Amitava Jana, Diola Bagayoko, *Southern University and A&M College, Baton Rouge, LA, United States*, Patrick Mensah, *Southern University, Baton Rouge, LA, United States*3:34pm **A Generalized Method for Computation of Exact Anharmonic Force Constants****Technical Presentation.** IMECE2013-66148Prabhakar Marepalli, Ajay Vadakkepatt, Sanjay R. Mathur, Jayathi Murthy, *The University of Texas at Austin, Austin, TX, United States*3:51pm **Electron and Phonon Contribution to Thermal Boundary Conductance at Graphene-Metal Interface****Technical Presentation.** IMECE2013-65930Liang Chen, Satish Kumar, *Georgia Institute of Technology, Atlanta, GA, United States*, Zhen Huang, *International Business Machine, Austin, TX, United States*4:08pm **A Study of Spatially Resolved Non-Equilibrium in Laser-Irradiated Graphene Using Boltzmann Transport Equation****Technical Paper Publication.** IMECE2013-66095Ajit Vallabhaneni, Dhruv Singh, Xiulin Ruan, *Purdue University, West Lafayette, IN, United States*, James Loy, *Purdue University, Bexley, IN, United States*, Jayathi Murthy, *University of Texas at Austin, Austin, TX, United States*4:25pm **Effect of Kapitza Resistance on the Thermal Properties of CNF/Epoxy Composites****Technical Presentation.** IMECE2013-66297Frank Gardea, Mohammad Naraghi, Dimitris Lagoudas, *Texas A&M University, College Station, TX, United States*

9-3-15 Coherent Phonons and Localization

2nd Floor, Manchester Grand Hyatt, Betsy C 3:00pm–4:45pm

Session Organizer: **Sanjiv Sinha**, *University of Illinois, Champaign, IL, United States*Session Co-Organizer: **John Cuffe**, *Massachusetts Institute of Technology, Boston, MA, United States*3:00pm **Thermal Transport Due to Quasi-Localization of Vibrations in Amorphous Silicon****Technical Presentation.** IMECE2013-64934Caroline S. Gorham, *University of Virginia, Charlottesville, VA, United States*3:21pm **Controlling Lattice Thermal Conductivity via Coherent Phonon Manipulation****Technical Paper Publication.** IMECE2013-65342Yaguo Wang, Yan Zhang, *University of Texas at Austin, Austin, United States*, Alan McGaughey, *Carnegie Mellon University, Pittsburgh, PA, United States*3:42pm **The Role of Anharmonicity in Thermal Transport Across Interfaces****Technical Presentation.** IMECE2013-66022Xufei Wu, Tengfei Luo, *University of Notre Dame, Notre Dame, IN, United States*4:03pm **Thermal Conductivity of Nanoscale Silicon Membranes****Technical Presentation.** IMECE2013-66251John Cuffe, *Massachusetts Institute of Technology, Boston, MA, United States*, Jeffrey K. Eliason, A. Maznev, Gang Chen, Keith A. Nelson, *Massachusetts Institute of Technology, Cambridge, MA, United States*, Jeremy Johnson, *Paul Scherrer Institute, Villigen, Switzerland*, Andrey Shchepetov, Mika Prunnila, Jouni Ahopelto, *VTT Technical Research Centre of Finland, Espoo, Finland*, Clivia M. Sotomayor Torres, *Catalan Institute of Nanotechnology, Bellaterra, Spain*4:24pm **Thermal Conductivity Reduction by Nanophononic Metamaterials****Technical Presentation.** IMECE2013-66686Mahmoud Hussein, Bruce Davis, *University of Colorado Boulder, Boulder, CO, United States*

TRACK 9 HEAT TRANSFER AND THERMAL ENGINEERING / WEDNESDAY, NOVEMBER 20

9-20 SYMPOSIUM TO CELEBRATE THE LIFE AND LEGACY OF NOVAK ZUBER

9-20-2 Symposium to Celebrate the Life and Legacy of Novak Zuber—II

3rd Floor, Manchester Grand Hyatt, Maggie 3:00pm–4:45pm

Session Organizer: **Cila Herman**, *Johns Hopkins University, Baltimore, MD, United States*

Session Co-Organizer: **Jovica Riznic**, *Canadian Nuclear Safety Commission, Ottawa, ON, Canada*, **Jean-Marc Delhaye**, *Clemson University, Clemson, SC, United States*

3:00pm Drop-on-Demand: A Scale Analysis

Technical Paper Publication. IMECE2013-64397

Jean-Marc Delhaye, Nicole Coutris, Leigh Herran, *Clemson University, Clemson, SC, United States*

3:15pm Modeling the Transient Behavior of Churn-Annular Flow in a Long Vertical Pipe

Technical Paper Publication. IMECE2013-64534

Marcus Vinicius Alves, *Federal University of Santa Catarina, Florianopolis, Santa Catarina, Brazil*, Jader Riso Barbosa Jr., *University of Santa Catarina, Florianopolis, Brazil*, P.J. Waltrich, *Louisiana State University, Baton Rouge, LA, United States*, Gioia Falcone, *Clausthal University of Technology, Institute of Petroleum Engineering, Clausthal-Zellerfeld, Germany*

3:30pm An Investigation of the Effect of Inclination on Critical Heat Flux of PF-5060 Dielectric Liquid on Microporous Copper Surfaces

Technical Paper Publication. IMECE2013-65503

Amir Ali, Mohamed El-Genk, *University of New Mexico, Albuquerque, NM, United States*

3:45pm Effects of Surface Roughness and Inclination Angle on Nucleate Boiling of PF-5060 Dielectric Liquid on Copper

Technical Paper Publication. IMECE2013-65512

Mohamed El-Genk, Amir Ali, *University of New Mexico, Albuquerque, NM, United States*, Arthur Suszko, *Institute for Space and Nuclear Power Studies, Albuquerque, NM, United States*

4:00pm Study on Heat Transfer From Hot Water to Cold Air With Evaporation

Technical Paper Publication. IMECE2013-65820

Tatsuya Yamaji, Tatsuya Hirota, Yasuo Koizumi, *Shimshu University, Ueda, Nagano, Japan*, Michio Murase, *Institute of Nuclear Safety Sys Inc., Mikata-gun, Fukui, Japan*

4:15pm Two Equation Two-Fluid Model Analysis for Stratified Flow Under Kinematic and Dynamic Instabilities

Technical Paper Publication. IMECE2013-66743

Martin A. Lopez de Bertodano, William Fullmer, *Purdue University, West Lafayette, IN, United States*

4:30pm Experimental and Theoretical Analysis of Subcooled Water Discharge Through Simulated Steam Generator Tube Cracks

Technical Paper Publication. IMECE2013-62470

Shripad Revankar, Ram Anand Vadlamani, *Purdue University, West Lafayette, IN, United States*, Jovica Riznic, *Canadian Nuclear Safety Commission, Ottawa, ON, Canada*

9-1 HEAT TRANSFER IN ENERGY SYSTEMS

9-1-7 Heat and Mass Transfer in Energy Systems Fundamentals

2nd Floor, Manchester Grand Hyatt, Betsy B 5:00pm–6:45pm

Session Organizer: **Timothy Fisher**, *Purdue University, West Lafayette, IN, United States*

Session Co-Organizers: **Ying Sun**, *Drexel University, Philadelphia, PA, United States*, **David Pratt**, **Robert Sayer**, *Sandia National Laboratories, Albuquerque, NM, United States*

5:00pm Numerical Investigation of Natural and Forced Convection of Ionic Liquids

Technical Paper Publication. IMECE2013-66380

Titan Paul, A.K.M.M. Morshed, Jamil A. Khan, *University of South Carolina, Columbia, SC, United States*, Elise B. Fox, Ann E. Visser, Nicholas J. Bridges, *Savannah River National Laboratory, Aiken, SC, United States*

5:21pm Effects of Suction and Free Stream on Hydromagnetic Flow and Heat Transfer in a Newtonian Fluid Due to a Stretching Sheet

Technical Paper Publication. IMECE2013-64088

Pradeep Siddheshwar, Meenakshi Nerolu, *Bangalore University, Bangalore, Karnataka State, India*

5:42pm Second Law Analysis of Heat Transfer in Taylor Couette Flow for Pseudoplastic Fluid

Technical Paper Publication. IMECE2013-62440

Abbas Hazbavi, *Islamic Azad University, Ahvaz Branch, Ahvaz, Iran*, Nariman Ashrafi, Mohammad Najafi, *Islamic Azad University, Science and Research Branch, Tehran, Iran*

6:03pm Steepest Entropy Ascent Models of the Boltzmann Equation: Comparisons With Hard-Sphere Dynamics and Relaxation-Time Models for Homogeneous Relaxation From Highly Non-Equilibrium States

Technical Paper Publication. IMECE2013-64905

Gian-Paolo Beretta, *University Brescia, Brescia, Italy*, Nicolas Hadjiconstantinou, *Massachusetts Institute of Technology, Cambridge, MA, United States*

6:24pm Intrinsic Quantum Thermodynamic Non-Equilibrium Modeling of Decoherence via Relaxation for a Composite System of Two Interacting Spin- $\frac{1}{2}$ -Systems

Technical Paper Publication. IMECE2013-63596

Sergio Cano-Andrade, Michael von Spakovsky, *Virginia Technology, Blacksburg, VA, United States*, Gian-Paolo Beretta, *University Brescia, Brescia, Italy*

9-3 NANOSCALE THERMAL TRANSPORT

9-3-12 Thin Films and Superlattices

3rd Floor, Manchester Grand Hyatt, Connaught 5:00pm–6:45pm

Session Organizer: **Thomas Beechem**, *Sandia National Laboratories, Albuquerque, NM, United States*

Session Co-Organizer: **Yongjie Hu**, *Massachusetts Institute of Technology, Cambridge, MA, United States*

5:00pm Phonon Transport Through Multiple Thin Films

Technical Presentation. IMECE2013-65079

Simon Lu, Alan McGaughey, *Carnegie Mellon University, Pittsburgh, PA, United States*

5:17pm An Anisotropic Model for the Minimum Thermal Conductivity

Extended Abstract Presentation. IMECE2013-67069

Zhen Chen, Chris Dames, *University of California, Berkeley, Berkeley, CA, United States*

5:34pm Thermal Conductivity Anisotropy of GaAs/AlAs Superlattices

Technical Presentation. IMECE2013-66099

Maria Luckyanova, Alexei A. Maznev, Jivtesh Garg, Adam Jandl, Mayank Bulsara, Eugene A. Fitzgerald, Keith A. Nelson, Gang Chen, *Massachusetts Institute of Technology, Cambridge, MA, United States*, Jeremy Johnson, *Paul Scherrer Institute, Villigen, Switzerland*

5:51pm Measurement of Anisotropic Thermal Conductivities in AllnAs-GalnAs Superlattices for Quantum Cascade Laser Applications

Technical Presentation. IMECE2013-66494

Joseph Katz, Aditya Sood, Takashi Kodama, Kenneth E. Goodson, *Stanford University, Stanford, CA, United States*

6:08pm Ab Initio Molecular Dynamics Study of Structural, Dynamic, and Vibrational Properties of Si/Ge Superlattices During Heat Transfer

Technical Paper Publication. IMECE2013-66782

Pengfei Ji, Yuwen Zhang, *University of Missouri, Columbia, MO, United States*

6:25pm Modeling of Thermal Rectification in Si and Ge Thin Films

Technical Paper Publication. IMECE2013-63613

Emigdio Chávez Ángel, Francesc Alzina, *Catalan Institute of Nanoscience and Nanotechnology, Barcelona, Barcelona, Spain*, Clivia M. Sotomayor Torres, *Catalan Institute of Nanotechnology, Bellaterra, Spain*

9-3-14 Nanoscale Phase-Change and Near-Field Heat Transfer

2nd Floor, Manchester Grand Hyatt, Betsy A 5:00pm–6:45pm

Session Organizer: **Debjyoti Banerjee**, *Texas A&M University, College Station, TX, United States*

Session Co-Organizers: **Nenad Miljkovic**, **Liping Wang**, *Arizona State University, Tempe, AZ, United States*

5:00pm Thermal Non-Equilibrium Entropy Density and Flux in Near-Field Thermal Radiation

Technical Presentation. IMECE2013-64857

Yi Zheng, Arvind Narayanaswamy, *Columbia University, New York, NY, United States*

5:17pm Relevance of Proximity Approximation for Near-Field Radiative Transfer Between Spherical Bodies

Technical Presentation. IMECE2013-65129

Karthik Sasihithlu, Arvind Narayanaswamy, *Columbia University, New York, NY, United States*

5:34pm Effect of Nanopatterns on Heterogeneous Nucleation of Water

Technical Presentation. IMECE2013-65448

Han Hu, Ying Sun, *Drexel University, Philadelphia, PA, United States*

5:51pm Examining the Role of Surface Forces on Heat Transfer Through Solid-Liquid Interfaces

Technical Presentation. IMECE2013-66535

Hari Hari Krishna, William Ducker, *Virginia Technology, Blacksburg, VA, United States*, Scott Huxtable, *Virginia Polytechnic Institute & State University, Blacksburg, VA, United States*

6:08pm Thermal Switching Effect Enabled by Near-Field Thermal Radiation With Phase Transition Materials

Technical Presentation. IMECE2013-63807

Yue Yang, Liping Wang, *Arizona State University, Tempe, AZ, United States*, Soumyadipta Basu, *Intel Corporation, Chandler, AZ, United States*

6:25pm Interfacial Oscillation of a Coupled Bubble-in-a-Drop System in AC Electrowetting

Technical Presentation. IMECE2013-66695

Yi Lu, Aritra Sur, Carmen Pascente, Paul Ruchhoeft, Dong Liu, *University of Houston, Houston, TX, United States*, Subramanyaravi Annapragada, *United Technologies Research Center, East Hartford, CT, United States*, Suresh V. Garimella, *Purdue University, West Lafayette, IN, United States*

TRACK 9 HEAT TRANSFER AND THERMAL ENGINEERING / WEDNESDAY, NOVEMBER 20

9-20 SYMPOSIUM TO CELEBRATE THE LIFE AND LEGACY OF NOVAK ZUBER

9-20-3 Symposium to Celebrate the Life and Legacy of Novak Zuber—III

3rd Floor, Manchester Grand Hyatt, Maggie 5:00pm–6:45pm

Session Organizer: **Jovica Riznic**, *Canadian Nuclear Safety Commission, Ottawa, ON, Canada*

Session Co-Organizers: **Jean-Marc Delhaye**, *Clemson University, Clemson, SC, United States*, **Cila Herman**, *Johns Hopkins University, Baltimore, MD, United States*

5:00pm Multiscale and Multiphase in Physics, Oceanology, and Economics

Extended Abstract Publication. IMECE2013-66737

Robert Nigmatulin, *P.P. Shirshov Institute of Oceanology, Russian Academy of Sciences, Moscow, Russia*

5:15pm Metastable Models of the Liquid Phase for Two-Phase Choked Flows Relevant to LOCA and Validation Experiments

Invited Presentation. IMECE2013-62755

Jean-Marie Seynhaeve, **Yann Bartosiewicz**, *Université catholique de Louvain, Louvain-la-Neuve, Belgium*

5:30pm Entrainment Into High Speed Air Jet Blowing Out From a Hole to Stagnant Water

Technical Paper Publication. IMECE2013-65822

Yasuo Koizumi, **Kohhei Nago**, *Shinshu University, Ueda, Nagano, Japan*, **Akihiro Uchibori**, **Hideki Kamide**, **Hiroyuki Ohshima**, *Japan Atomic Energy Agency, O-arai, Ibaraki, Japan*

5:45pm Lyon-Type Integral Forms of Wall Friction, Heat, and Mass Transfer Closure Relationships for Non-Equilibrium Two-Phase Flows. Generalization for Annular and Rod Cluster Geometries

Technical Paper Publication. IMECE2013-66044

Yuri Kornienko, *State Scientific Center–Institute for Power Physics and Engineering, Obninsk, Kaluga Region, Russia*

6:00pm Investigation of Thermal-Hydraulic Field in the Annular Channel Around the Heated Wall of the Fuel Rod

Technical Paper Publication. IMECE2013-64174

David Lavicka, **Jiri Polansky**, *University of West Bohemia, Plzen, Czech Republic*, **Yannick Knapp**, *Université d'Avignon et des Pays du Vaucluse, Avignon, France*

6:15pm Development of Mass-Conservative Phase-Change Model for Convective Boiling Simulations

Technical Paper Publication. IMECE2013-63607

Yohei Sato, **Bojan Niceno**, *Paul Scherrer Institute, Villigen, Aargau, Switzerland*, **Sreeyuth Lal**, *Swiss Federal Laboratories for Materials Science and Technology, Dübendorf, Zurich, Switzerland*

6:30pm Numerical Simulations of Forced Convection in Liquid Metal Condition

Invited Presentation. IMECE2013-62681

Yann Bartosiewicz, **Matthieu Duponcheel**, *Université Catholique de Louvain, Louvain-la-Neuve, Belgium*, **Moise Manconi**, *GDF-SUEZ, Woluwe Saint Lambert, Belgium*, **Laurent Bricteux**, *University of Mons, Mons, Belgium*

MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS**MONDAY, NOVEMBER 18****10-2 PLENARY SESSION IN MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS****10-2-1 Medalist Symposium****3rd Floor, Manchester Grand Hyatt, Mohsen A 9:45am–11:30am**Session Organizer: **Peter Wriggers**, *Leibniz University Hannover, Hannover, Germany***9:45am Mechanics of Stretchable Electronics.****Plenary Presentation.** IMECE2013-67392Yonggang Huang, *Northwestern University, Evanston, IL, United States***10:35am On Smoothed Finite Element Methods****Technical Paper Publication.** IMECE2013-62239Gui-Rong Liu, *University of Cincinnati, Cincinnati, OH, United States***11:00am Acoustic Fluid-Structure Interaction****Technical Paper Publication.** IMECE2013-63601Lothar Gaul, *University of Stuttgart, Stuttgart, BW, Germany***10-6 SYMPOSIUM ON MECHANICS OF INTEGRATED STRUCTURES AND MATERIALS IN ADVANCED TECHNOLOGIES****10-6-1 Mechanics and Materials in Flexible/Stretchable Electronics****3rd Floor, Manchester Grand Hyatt, Mohsen B 9:45am–11:30am**Session Organizer: **Nanshu Lu**, *University of Texas at Austin, Austin, TX, United States*Session Co-Organizer: **Yong Zhu**, *North Carolina State University, Raleigh, NC, United States***9:45am Keynote Presentation I: Rigid Device on Flexible Substrates****Technical Presentation.** IMECE2013-65287Hanqing Jiang, *Arizona State University, Tempe, AZ, United States***10:02am Keynote Presentation II: Rigid Device on Flexible Substrates****Technical Presentation.** IMECE2013-65289Hanqing Jiang, *Arizona State University, Tempe, AZ, United States***10:19am One-Dimensional Nanostructures for Flexible and Stretchable Electronics****Technical Presentation.** IMECE2013-65606Shanshan Yao, Amanda Myers, Yong Zhu, *North Carolina State University, Raleigh, NC, United States***10:36am Time and Temperature-Dependent Wrinkling of Stiff Thin Films on Shape Memory Polymers****Technical Presentation.** IMECE2013-65525Yu Wang, Jianliang Xiao, Kai Yu, Hang Qi, *University of Colorado Boulder, Boulder, CO, United States***10:53am 3-D Monolithic Flexible Glass Photonics****Technical Presentation.** IMECE2013-62777Shutao Qiao, Nanshu Lu, *University of Texas at Austin, Austin, TX, United States*, Juejun Hu, *University of Delaware, Newark, DE, United States***11:10am Stretchability of Polymer-Supported ITO Serpentine Thin Films****Technical Presentation.** IMECE2013-64662Nanshu Lu, *University of Texas at Austin, Austin, TX, United States***10-8 COMPOSITE MATERIALS FOR RENEWABLE ENERGY SYSTEMS****10-8-1 Composite Materials for Renewable Energy Systems****3rd Floor, Manchester Grand Hyatt, Del Mar B 9:45am–11:30am**Session Organizer: **Hassan Mahfuz**, *Florida Atlantic University, Boca Raton, FL, United States***9:45am Shear Modulus Degradation in Fiber Reinforced Laminates****Technical Paper Publication.** IMECE2013-63035Mohammedmahdi Salavatian, Lloyd Smith, *Washington State University, Pullman, WA, United States***10:02am Residual Stresses in Inorganic Thin Film Photovoltaics Integrated on Composite Laminates****Technical Presentation.** IMECE2013-65146Dimitrios Antartis, Ioannis Chasiotis, *University of Illinois at Urbana-Champaign, Urbana, IL, United States***10:19am Effect of Externally Applied Stresses on the Moisture Diffusion Characteristics of Epoxy Glass Composites****Technical Paper Publication.** IMECE2013-65638Mark Stoffels, David Miller, *Montana State University, Bozeman, MT, United States***10:36am Numeric Investigation of Fluid Solid Interaction on Wind Turbine Blade****Technical Paper Publication.** IMECE2013-65647Mohammad A. Hossain, *University of Texas at El Paso, El Paso, TX, United States*, Kyoungsoo Lee, Raghava R. Kommalapati, *Prairie View A&M University, Prairie View, TX, United States*, Ziaul Huque, *Prairie View A&M University, Houston, TX, United States***10:53am A Numerical Analysis of the Solar Panel Support Structure on the Weak Ground****Technical Paper Publication.** IMECE2013-65549Joo Kang Woo, Kim Jun Young, Kim Kwang Sun, *Koreatech, Cheonan, Korea (Republic)*, Park Kyu Tae, *Toptec, Gumi, Korea (Republic)*

TRACK 10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS / MONDAY, NOVEMBER 18

11:10am A High-Efficient Energy Dissipation System Based on Buckyball Nanostructure

Technical Presentation. IMECE2013-65906

Jun Xu, Xi Chen, *Columbia University, New York, NY, United States*

10-10 MULTI-FIELD STUDIES IN HETEROGENEOUS MATERIALS: EXPERIMENTAL, THEORETICAL, AND NUMERICAL APPROACHES

10-10-1 Degradation and Environmental Effects

3rd Floor, Manchester Grand Hyatt, Del Mar A 9:45am–11:30am

Session Organizer: Rani Elhajjar, *University of Wisconsin–Milwaukee, Milwaukee, WI, United States*

9:45am Experimental Study on the Thermomechanical Behavior of Spray-On Nanocomposite Sensors

Technical Presentation. IMECE2013-62478

Wahyu Lestari, Alexander Winton, *Embry-Riddle Aeronautical University, Prescott, AZ, United States*, Siavash Peiday Saheli, Steve Kern, Lars Mortensen, Valeria La Saponara, Kenneth Loh, *University of California, Davis, Davis, CA, United States*

10:02am Influence of Absorbed Moisture on Dielectric Properties of Quartz-Reinforced Bismaleimide at X-Band

Technical Presentation. IMECE2013-63003

Landon Grace, *University of Miami, Coral Gables, FL, United States*

10:19am Tailored Polyurea-Glass Interfaces and the Characterization by the Single-Fiber Fragmentation

Extended Abstract Publication. IMECE2013-63736

Zhanzhan Jia, Ravish Rawal, Jon Isaacs, Siavouche Nemat-Nasser, *University of California, San Diego, La Jolla, CA, United States*

10:36am Durability of Polymers and Polymeric Composites Under Coupled Hygrothermal Effect and Mechanical Loadings

Technical Presentation. IMECE2013-65995

Luciana Arronche, Serena Ferraro, Valeria La Saponara, *University of California, Davis, Davis, CA, United States*, Jaehyeuk Jeon, Anastasia Muliana, *Texas A&M University, College Station, TX, United States*

10:53am Experimental Characterization and Numerical Simulation of Thermal Properties of BaTiO₃/Ag Composites Undergoing Phase Transformation Due to Temperature Changes

Technical Presentation. IMECE2013-66046

Junwei Xing, Alex Jang, Miladin Radovic, Anastasia Muliana, *Texas A&M University, College Station, TX, United States*

11:10am A Combined Extended Finite Element and Level-Set Method for Simulating Precipitate Evolution in Alloys

Invited Presentation. IMECE2013-66851

Ravindra Duddu, *Vanderbilt University, Nashville, TN, United States*

10-11 MATERIALS & META-MATERIALS AT VARYING LENGTH SCALES & FREQUENCY RANGES

10-11-1 Materials & Meta-Materials at Varying Length Scales & Frequency Ranges

4th Floor, Manchester Grand Hyatt, Gibbons 9:45am–11:30am

Session Organizer: Emmanuel Ayorinde, *Wayne State University, Detroit, MI, United States*

9:45am Investigating the Effects of Friction Coefficient and Tool Geometry on the Cup Thickness in the Deep Drawing Process of SPX1250 Alloy

Technical Paper Publication. IMECE2013-63992

Iman Rostamsowlat, *University of Western Australia, Perth, Western Australia, Australia*, Ahmad Afsari, *Islamic Azad University, Shiraz, Iran*, Maziar Janghorban, *Shiraz University, Shiraz, Iran*

10:00am A Lattice Boltzmann Approach for Directional Transporting of Droplets Using Heterogeneous Surface Roughness

Technical Paper Publication. IMECE2013-65533

Jung Shin Lee, Joon Sang Lee, *Yonsei University, Seoul, Korea (Republic)*

10:15am Understanding the Mechanics of Nanoscale Structural Metamaterials

Technical Presentation. IMECE2013-65678

Dennis M. Kochmann, Jeffrey S. Amelang, Gabriela N. Venturini, *California Institute of Technology, Pasadena, CA, United States*

10:30am Investigation of Some Circular Membrane-Patch Acoustic Meta-Materials

Technical Paper Publication. IMECE2013-66720

Emmanuel Ayorinde, Mohammad AL Zubi, Mehmet Akif Dundar, *Wayne State University, Detroit, MI, United States*, Fouad Mohammad, *Wayne State University, Windsor, ON, Canada*

10:45am Plate Vibration and Geometry Study of Impact-Control ABS

Technical Paper Publication. IMECE2013-66722

Mehmet Akif Dundar, Emmanuel Ayorinde, *Wayne State University, Detroit, MI, United States*

11:00am Energy Absorption of Hierarchical Microlattice Structures

Technical Presentation. IMECE2013-66038

Yilun Liu, Xi Chen, *Columbia University, New York, NY, United States*

11:15am Topology Optimization for the Single Phase Flow Using Two Point Flux Approximation Model

Technical Paper Publication. IMECE2013-65475

Guang Dong, Yulan Song, *Huabei Oilfield Company, Hejian, China*

10-29 INSTABILITY IN SOLIDS AND STRUCTURES**10-29-2 Instability in Solids and Structures—II****4th Floor, Manchester Grand Hyatt, Cunningham C9:45am–11:30am**Session Organizer: **Stelios Kyriakides**, *University of Texas, Austin, TX, United States*Session Co-Organizer: **Kaushik Dayal**, *Carnegie Mellon University, Pittsburgh, PA, United States***9:45am Formation of Three Ordered Patterns by Two-Step Bifurcation of Geometrically Frustrated Cellular Structures****Technical Presentation.** IMECE2013-63199Sung Kang, Sicong Shan, Katia Bertoldi, *Harvard University, Cambridge, MA, United States***10:02am Buckling of Rectangular and Hexagonal Honeycomb Under Combined Axial Compression and Transverse Shear****Technical Presentation.** IMECE2013-63218Francisco Lopez Jimenez, Nicolas Triantafyllidis, *École Polytechnique, Palaiseau, France***10:19am Post-Bifurcation Analysis of a Regular Honeycomb Structure Under Bi-Axial Loading****Technical Presentation.** IMECE2013-66031Pierre Henry, *University of Minnesota, Minneapolis, MN, United States*, Ryan Elliott, *University of Minnesota, Saint Paul, MN, United States***10:36am Impact and Shock Propagation in Aluminum Open-Cell Foams****Technical Presentation.** IMECE2013-66933Stavros Gaitanaros, Andrew Barnes, Stelios Kyriakides, Krishnaswamy Ravi-Chandar, *University of Texas at Austin, Austin, TX, United States***10:53am Tensile Cracking in Particle Reinforced Coatings****Technical Presentation.** IMECE2013-62338Henrik M. Jensen, Soeren Steffensen, Rasmus Lynge, *Aarhus University, Aarhus, Aarhus C, Denmark***11:10am Investigation of the Dynamic Behavior of Curved Metal and Composite Stringer Stiffened Panels Under Axial Compression****Technical Presentation.** IMECE2013-62911Haim Abramovich, *Technion, I.I.T., Haifa, Israel***10-4 DRUCKER MEDALIST SYMPOSIUM****10-4-1 Drucker Medalist Symposium****3rd Floor, Manchester Grand Hyatt, Mohsen A 1:00pm–2:45pm**Session Organizer: **Pradeep Sharma**, *University of Houston, Houston, TX, United States***1:00pm Mechanics of Cellular Uptake of One- and Two-Dimensional Nanomaterials****Technical Presentation.** IMECE2013-67366Huajian Gao, *Brown University, Providence, RI, United States***1:25pm Stretchable Ionic Conductors as Artificial Neurons for Soft Machines****Technical Presentation.** IMECE2013-67372Zhigang Suo, *Harvard University, Cambridge, MA, United States***1:50pm Computational Modeling of Ductile Fracture Toughness and Roughness****Technical Presentation.** IMECE2013-67377Alan Needleman, *University of North Texas, Denton, United States***2:15pm Analogue Earthquakes: Reproducing the 2002, Mw7.9, Denali Supershear Earthquake in the Laboratory****Technical Presentation.** IMECE2013-67379Ares Rosakis, Hiroo Kanamori, *California Institute of Technology, Pasadena, CA, United States*, Michael Mello, *Georgia Institute of Technology, Atlanta, GA, United States*, Harsha Bhat, *Institut de Physique du Globe de Paris, Paris, France*

TRACK 10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS / MONDAY, NOVEMBER 18

10-6 SYMPOSIUM ON MECHANICS OF INTEGRATED STRUCTURES AND MATERIALS IN ADVANCED TECHNOLOGIES

10-6-2 Mechanics in Lithium Ion Batteries

3rd Floor, Manchester Grand Hyatt, Mohsen B 1:00pm–2:45pm

Session Co-Organizer: Zhen Zhang

1:00pm Kinetics of Lithiation of Crystalline Silicon Electrodes of Lithium-Ion Batteries—Theory and Experiments

Technical Presentation. IMECE2013-65878

Kejie Zhao, *Massachusetts Institute of Technology, Cambridge, MA, United States*, Matt Pharr, Joost Vlassak, Zhigang Suo, *Harvard University, Cambridge, MA, United States*

1:17pm Brittle to Ductile Transition for Amorphous Silicon Electrodes

Technical Presentation. IMECE2013-63861

Chao Chen, *Harvard University, Brighton, MA, United States*, Zhigang Suo, Weili Wang, Efthimos Kaxiras, *Harvard University, Cambridge, MA, United States*

1:34pm Fracture, Interfacial Delamination, and Fatigue in Patterned Silicon Thin Film Electrodes Induced by Lithium Cycling

Technical Presentation. IMECE2013-63395

Hamed Haftbaradaran, Huajian Gao, *Brown University, Providence, RI, United States*, Xingcheng Xiao, *General Motors, Warren, MI, United States*

1:51pm A Comprehensive Capacity Fade Model and Capacity Fade Analysis for Li-Ion Batteries

Technical Presentation. IMECE2013-66554

Xianke Lin, Jonghyun Park, Yoonkoo Lee, *Wei Lu, University of Michigan, Ann Arbor, MI, United States*, Lin Liu, *University of Kansas, Lawrence, KS, United States*

2:08pm Virtual Crack Closure Technique for Fatigue Analysis of Lithium-Ion Battery Materials

Technical Presentation. IMECE2013-62958

Michael Stamps, Hsiao-Ying Shadow Huang, *North Carolina State University, Raleigh, NC, United States*

2:25pm The Mechanics of a Molten Electrolyte Battery Separator Material

Technical Presentation. IMECE2013-66671

Kevin Long, Christine Roberts, Scott Roberts, Anne Grillet, *Sandia National Laboratories, Albuquerque, NM, United States*

10-9 MECHANICS AND DESIGN OF CELLULAR MATERIALS

10-9-1 Mechanics and Design of Cellular Materials I

3rd Floor, Manchester Grand Hyatt, Del Mar B 1:00pm–2:45pm

Session Organizer: Jaehyung Ju, *University of North Texas, Denton, TX, United States*

1:00pm Study of Impact Properties of a Fluid-Filled Honeycomb Structure

Technical Paper Publication. IMECE2013-62113

Muhammad Ali, *Ohio University, Athens, OH, United States*, Jeffrey A. Hoffman, Jacob Clark, Jacob Schultz, Sean Jenson, Shawn Takak, *University of Alaska Anchorage, Anchorage, AK, United States*, Tessa Matthews, *United States Patent and Trademark Office, Washington, DC, United States*

1:17pm Cellular Materials With Extremely High and Low Poisson's Ratios: A Mechanism Based Material Design

Technical Paper Publication. IMECE2013-63598

Kwangwon Kim, *Korean Aerospace University, Goyang-city, Korea (Republic)*, Jaehyung Ju, *University of North Texas, Denton, TX, United States*, Doo-Man Kim, *Korea Aerospace University, Goyang-City, Gyeonggi-Do, Gyeonggi, Korea (Republic)*

1:34pm Micromechanical Modeling of Two-Dimensional Periodic Cellular Materials

Technical Paper Publication. IMECE2013-64190

Khalid Alzebeleh, Abdullah Al-Shabibi, Tasneem Pervez, *Sultan Qaboos University, Al-Khoud, Oman*

1:51pm An Experimental Study on the Mode I Fracture of Hexagonal Honeycombs

Technical Paper Publication. IMECE2013-64914

Md Salah Uddin, Jaehyung Ju, Nandika D'Souza, *University of North Texas, Denton, TX, United States*

2:08pm Elastoplastic and Nonlinear Elastic Response of Chiral, Anti-Chiral, and Hierarchical Lattice Structures

Technical Presentation. IMECE2013-65185

Davood Mousanezhad, Babak Haghpanah, Ashkan Vaziri, *Northeastern University, Boston, MA, United States*

2:25pm Active Programmable Shape Memory Polymer-Based Cellular Materials

Technical Presentation. IMECE2013-65473

David Restrepo, Pablo Zavattieri, *Purdue University, West Lafayette, IN, United States*, Nilesh Mankame, *General Motors Global Research & Development, Warren, MI, United States*

10-10 MULTI-FIELD STUDIES IN HETEROGENEOUS MATERIALS: EXPERIMENTAL, THEORETICAL, AND NUMERICAL APPROACHES

10-10-2 Micromechanics and Multiscale Studies

3rd Floor, Manchester Grand Hyatt, Del Mar A 1:00pm–2:45pm

Session Organizer: **Valeria La Saponara**, *University of California, Davis, Davis, CA, United States*

1:00pm Rate-Dependent Electro-Mechanical Coupling Response of Active Composites

Technical Presentation. IMECE2013-63640

Chien-Hong Lin, Anastasia Muliana, *Texas A&M University, College Station, TX, United States*

1:17pm Multiscale Deformation Heterogeneities in Twinning Magnesium With In Situ Digital Image Correlation

Technical Presentation. IMECE2013-64854

C. Can Aydiner, M. Ayca Telemez, *Bogazici University, Istanbul, Turkey*

1:34pm A Hierarchical Model for Kevlar Fiber Failure

Technical Paper Publication. IMECE2013-66344

Stephen Recchia, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*, Assimina Pelegri, *Rutgers, The State University of New Jersey, East Brunswick, United States*, Ioannis Chasiotis, Jan K. Clawson, Korhan Sahin, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*, James Zheng, *United States Army, Ft. Belvoir, VA, United States*

1:51pm Improvement on the Analysis of a Finite Element Composites Model

Technical Paper Publication. IMECE2013-63282

Atanas Atanasov, Thomas J. Wright, John Parmigiani, *Oregon State University, Corvallis, OR, United States*

2:08pm An Extended Finite Element/Level Set Modeling of Diffusional Phase Transformation in Elastically Stressed Solids

Technical Presentation. IMECE2013-64510

Xujun Zhao, Jianmin Qu, *Northwestern University, Evanston, IL, United States*

2:25pm Experimental and Numerical Techniques to Characterize Structural Properties of Fresh Concrete

Technical Paper Publication. IMECE2013-63993

Tony Di Carlo, *Boeing, Long Beach, CA, United States*, Behrokh Khoshnevis, Anders Carlson, *University of Southern California, Los Angeles, CA, United States*

10-21 SYMPOSIUM ON APPLICATIONS AND CHALLENGES IN FULL-FIELD EXPERIMENTAL METHODS

10-21-1 Applications and Challenges in Full-Field Experimental Mechanics

4th Floor, Manchester Grand Hyatt, Gibbons 1:00pm–2:45pm

Session Organizer: **Michael Mello**, *Georgia Institute of Technology, Atlanta, GA, United States*

Session Co-Organizer: **Rani Elhajjar**, *University of Wisconsin–Milwaukee, Milwaukee, WI, United States*

1:00pm Buckling Measurement of Cylindrical Shells by Digital Image Correlation Method

Technical Paper Publication. IMECE2013-62332

Tzu-Yu Kuo, Wei-Chung Wang, Chun-I Chu, Jia-He Chen, Te-Heng Hung, Jen-Yuan (James) Chang, *National Tsing Hua University, Hsinchu, Taiwan*

1:17pm Experimental Methods for Validation of Multiscale Plasticity Models

Technical Presentation. IMECE2013-63671

Laurence Bodelot, *École Polytechnique, Palaiseau, France*, Andrew Richards, Bo Li, Guruswami Ravichandran, Kaushik Bhattacharya, *California Institute of Technology, Pasadena, CA, United States*

1:34pm Investigation of Strain Fields and Deformation Responses in Fillet and Plug Welds

Technical Presentation. IMECE2013-64500

Kil Won Song, *Hyundai Motor Company, Gyeonggi-do, Korea (Republic)*, David Roehrich, Rani Elhajjar, *University of Wisconsin–Milwaukee, Milwaukee, WI, United States*

1:51pm Computation of Elastic Constants of Functionally Graded Materials Using the Eigenfunction Virtual Fields Method

Technical Paper Publication. IMECE2013-64584

Nigamaa Nayakanti, Sankara Subramanian, *Indian Institute of Technology Madras, Chennai, India*

2:08pm A Novel 3D Optical Microscope for Multiscale Deformation and Shape Measurement

Technical Presentation. IMECE2013-65449

Shuman Xia, *Georgia Institute of Technology, Atlanta, GA, United States*

2:25pm Effect of Polyurethane Surface Treatment on Basalt Fiber Composite

Technical Paper Publication. IMECE2013-63512

Ting Yang, Yuqiu Yang, *Donghua University, Shanghai, China*, Mengyuan Liao, Zhenjin Cui, *Kyoto Institute of Technology, Kyoto, Japan*

TRACK 10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS / MONDAY, NOVEMBER 18

10-29 INSTABILITY IN SOLIDS AND STRUCTURES

10-29-3 Instability in Solids and Structures—III

4th Floor, Manchester Grand Hyatt, Cunningham C 1:00pm–2:45pm

Session Organizer: **Ryan Elliott**, *University of Minnesota, Saint Paul, MN, United States*

Session Co-Organizer: **Krishnaswamy Ravi Chandar**, *University of Texas at Austin, Austin, TX, United States*

1:00pm On the Stability of MRE Layers Resting on Soft Substrates and Subjected to Combined Magnetic and Mechanical Loading

Technical Presentation. IMECE2013-62889

Kostas Danas, Nicolas Triantafyllidis, *École Polytechnique, Palaiseau, France*

1:17pm Three-Dimensional Curling of Pre-Strained Elastomeric Strips: From Hemi-helices to Helices

Technical Presentation. IMECE2013-64023

Jia Liu, Jiangshui Huang, Tianxiang Su, David Clarke, *Harvard University, Cambridge, MA, United States*

1:34pm Diffusion-Induced Wrinkling Instability

Technical Presentation. IMECE2013-66399

Shengqiang Cai, *University of California, San Diego, La Jolla, CA, United States*

1:51pm Bifurcation Instability in Substrate-Supported Metal Layers Under Biaxial Loading

Poster Presentation. IMECE2013-66487

Teng Li, Zheng Jia, *University of Maryland, College Park, MD, United States*

2:08pm Determination of the Material Response for Lüders-Like Instabilities

Technical Presentation. IMECE2013-66901

Julian Hallai, Stelios Kyriakides, *University of Texas at Austin, Austin, TX, United States*

2:25pm Extraction of Material Properties From 3-D Deformation Measurements

Technical Presentation. IMECE2013-66931

Andrew Gross, Krishnaswamy Ravi-Chandar, *University of Texas at Austin, Austin, TX, United States*

10-1 GENERAL

10-1-1 Engineering Problems in Mechanics

4th Floor, Manchester Grand Hyatt, Gibbons

3:00pm–4:45pm

Session Organizer: **Peter Wriggers**, *Leibniz University Hannover, Hannover, Germany*

3:00pm Elastoplastic Analysis of a Cantilever Beam Under Combined Compressive and Bending Load

Technical Paper Publication. IMECE2013-65396

Julio A. Boix Salazar, Dirk F. de Lange, Alberto Torres Cruz, Hugo Ivan Medellin Castillo, Gilberto Mejia-Rodriguez, *Universidad Autónoma de San Luis Potosí, San Luis Potosí, San Luis Potosí, Mexico*

3:17pm Analysis of a Short Bi-Material Cantilever Beam

Technical Presentation. IMECE2013-65511

Ephraim Suhir, *University of California, Santa Cruz, Santa Cruz, CA, United States*, Johann Nicolics, *Technical University, Vienna, Austria*

3:34pm Deployment Driving Analysis of Deployable Structure Considering Imperfections

Technical Paper Publication. IMECE2013-66146

Hongwei Guo, Rongqiang Liu, Zongquan Deng, *Harbin Institute of Technology, Harbin, China*

3:51pm Stress-Function Variational Method for Interfacial Stress Analysis of Adhesively Bonded Joints Subjected to Mechanical and Thermomechanical Loads

Technical Presentation. IMECE2013-62650

Xiangfa Wu, Youhao Zhao, Robert Jensen, *North Dakota State University, Fargo, ND, United States*

4:08pm Free Vibration Analysis of Rotating Structures by One-Dimensional, Variable Kinematic Theories

Technical Paper Publication. IMECE2013-63183

Erasmus Carrera, Matteo Filippi, Enrico Zappino, *Politecnico di Torino, Torino, Italy*

4:25pm Dynamic Stability and Natural Frequency of Composite Corrugated Bellow Expansion Joint

Technical Paper Publication. IMECE2013-64787

Sujana Rao Nakkanti, *Sai Spurthi Institute of Technology, Khammam, Andhra Pradesh, Anghra Pradesh, India, M. Radhakrishna, CSIR-Indian Institute of Chemical Technology, Hyderabad, Andhra Pradesh, India, A.M.K. Prasad, Osmania University, Hyderabad, Andhra Pradesh, India*

10-4-2 Drucker Medalist Symposium**3rd Floor, Manchester Grand Hyatt, Del Mar A, 3:00pm–4:45pm**Session Organizer: **Pradeep Sharma**, *University of Houston***2:00pm On Rock Failure Under True Triaxial Conditions****Technical Presentation.** IMECE2013-67371John Rudnicki, *Northwestern University, Evanston, IL, United States***2:15pm How Repulsive are Biological Membranes?****Technical Presentation.** IMECE2013-67368Yuranan Hanlomyuang, Pradeep Sharma, *University of Houston, Houston, TX, United States*, Liping Liu, *Rutgers University, Piscataway, NJ, United States***2:30pm Modeling the Distribution of Misfitting Solutes in a Stressed Solid: Remembering History and Learning lessons about the Use of Continuum Methods for Atomically Discrete Problems****Invited Presentation.** IMECE2013-67375William Nix, *Stanford University, Sunnyvale, CA, United States*, Wei Cai, Ryan B. Sills, David M. Barnett, *Stanford University, Stanford, CA, United States***4:15 Statistical Distribution and Size Effect of Residual Strength after a Period of Sustained Constant Load.****Technical Presentation.** IMECE2013-67365Zdenek Bazant, Marco Salviato, Kedar Kirane, *Northwestern University, Evanston, IL, United States, United States***10-6 SYMPOSIUM ON MECHANICS OF INTEGRATED STRUCTURES AND MATERIALS IN ADVANCED TECHNOLOGIES****10-6-3 Nanomaterials in Li-Ion Batteries and Flexible Electronics****3rd Floor, Manchester Grand Hyatt, Mohsen B 3:00pm–4:45pm**Session Organizer: **Kejie Zhao**, *Massachusetts Institute of Technology, Cambridge, MA, United States*Session Co-Organizer: **Nanshu Lu**, *University of Texas at Austin, Austin, TX, United States***3:00pm Electrochemically Driven Mechanical Degradation of Nanostructured Materials for Lithium-Ion Batteries****Technical Presentation.** IMECE2013-65452Sulin Zhang, *Pennsylvania State University, University Park, PA, United States***3:17pm Electrochemically Driven Mechanical Degradation of Nanostructured Materials for Lithium-Ion Batteries****Technical Presentation.** IMECE2013-65456Sulin Zhang, *Pennsylvania State University, University Park, PA, United States***3:34pm Stretchable Batteries With Self-Similar Serpentine Interconnects and Integrated Wireless Recharging Systems****Technical Presentation.** IMECE2013-63782Young Huang, *Northwestern University, Evanston, IL, United States***3:51pm Silicon Nanowall Anodes for Lithium-Ion Batteries****Technical Presentation.** IMECE2013-66493Teng Li, Zheng Jia, *University of Maryland, College Park, MD, United States***4:08pm Numerical Analysis of Circular Graphene Bubbles****Technical Presentation.** IMECE2013-65808Peng Wang, Wei Gao, Zhiyi Cao, Kenneth Liechti, Rui Huang, *University of Texas at Austin, Austin, TX, United States***4:25pm Highly Compliant and Stretchable Patterned Graphene****Technical Presentation.** IMECE2013-66074Shuze Zhu, Teng Li, *University of Maryland, College Park, MD, United States***10-9 MECHANICS AND DESIGN OF CELLULAR MATERIALS****10-9-2 Mechanics and Design of Cellular Materials II****3rd Floor, Manchester Grand Hyatt, Del Mar B 3:00pm–4:45pm**Session Organizer: **Jaehyung Ju**, *University of North Texas, Denton, TX, United States***3:00pm Optimum Design of Cellular Wheels for Lunar Rovers****Technical Paper Publication.** IMECE2013-64467Michele Faragalli, Peter Radziszewski, Damiano Pasini, *McGill University, Montreal, Canada***3:17pm Yield Behavior of Solid Foams: Pressure Dependence****Technical Presentation.** IMECE2013-64742Ravi Sastri Ayyagari, Murat Vural, *Illinois Institute of Technology, Chicago, IL, United States***3:34pm Confined Compression of Rigid Foams—Experiment****Technical Presentation.** IMECE2013-65088Wei-Yang Lu, Kevin Connelly, *Sandia National Laboratories, Livermore, CA, United States***3:51pm The Role of Water in the Hygro-Thermo-Mechanical Behavior of Wood****Extended Abstract Publication.** IMECE2013-65101Dominique Derome, Alessandra Patera, Ahmad Rafsanjani, Saeed Abbasion, *Empa, Duebendorf, Switzerland*, Jan Carmeliet, *ETHZ, Zurich, Switzerland***4:08pm Confined Compression of Rigid Foams—Analysis****Technical Presentation.** IMECE2013-65900Shivonne Haniff, Terry Hinnerichs, *Sandia National Laboratories, Albuquerque, NM, United States*, Michael Neilsen, *Sandia National Laboratories, Lawrence, KS, United States***4:25pm Evaluation of Mechanical Properties of Paper Tubes****Technical Paper Publication.** IMECE2013-66684Takanori Kitamura, Kanta Ito, *Daiwa Itagami Co. Ltd., Japan, Osaka, Japan*, Suguru Teramura, *Daiwa Itagami Co. Ltd., Japan, Kashiwara, Japan*, Zhiyuan Zhang, Hiroyuki Hamada, *Kyoto Institute of Technology, Kyoto, Japan*, Mitsunori Suda, *Daisan Kougyou Co. Ltd., Yao-city, Osaka, Japan*

TRACK 10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS / MONDAY, NOVEMBER 18

10-27 MECHANICS OF SOFT MATERIALS

10-27-1 Gels

3rd Floor, Manchester Grand Hyatt, Mohsen A 3:00pm–4:45pm

Session Organizer: **Shawn Chester**, *New Jersey Institute of Technology, Newark, NJ, United States*

Session Co-Organizer: **Zishun Liu**, *Xi'an Jiaotong University, Xi'an, China*

3:00pm Theory and Experiments on the Poroelasticity and Viscoelasticity of Elastomeric Hydrogels. Part I

Technical Presentation. IMECE2013-62759

Zhigang Suo, *Harvard University, Cambridge, MA, United States*

3:17pm Theory and Experiments on the Poroelasticity and Viscoelasticity of Elastomeric Hydrogels. Part II

Technical Presentation. IMECE2013-62760

Zhigang Suo, *Harvard University, Cambridge, MA, United States*

3:34pm Large Deformation Kinetics of Polymeric Gel

Technical Presentation. IMECE2013-62862

Zishun Liu, Jianying Hu, *Xi'an Jiaotong University, Xi'an, China*

3:51pm Swell Induced Wrinkling and Creasing on the Surface of Hydrogel Bilayers

Technical Presentation. IMECE2013-65816

Nikolaos Bouklas, Rui Huang, *University of Texas at Austin, Austin, TX, United States*, Zhigen Wu, *Hefei University of Technology, Hefei, Anhui, China*

4:08pm Programmable Morphologies of Chemical Gel-Physical Gel Hybrids

Technical Presentation. IMECE2013-66501

Teng Li, Zheng Jia, *University of Maryland, College Park, MD, United States*

4:25pm Constitutive Modeling of Polymeric Gels

Technical Presentation. IMECE2013-63762

Shawn Chester, *New Jersey Institute of Technology, Newark, NJ, United States*

10-29 INSTABILITY IN SOLIDS AND STRUCTURES

10-29-4 Instability in Solids and Structures—IV

4th Floor, Manchester Grand Hyatt, Cunningham C 3:00pm–4:45pm

Session Organizer: **Kostas Danas**, *Ecole Polytechnique, Palaiseau, France*

Session Co-Organizer: **Ryan Elliott**, *University of Minnesota, Saint Paul, MN, United States*

3:00pm Numerical Simulations of the Combined Bending, Stretching, and Wrinkling of Thin Sheets

Technical Presentation. IMECE2013-63975

Katia Bertoldi, Michael Taylor, *Harvard University, Cambridge, MA, United States*, David Steigman, *University of California, Berkeley, Berkeley, CA, United States*

3:17pm Dynamic Stability of Externally Pressurized Elastic Rings Subjected to High Rates of Loading

Technical Presentation. IMECE2013-64486

Thibaut Putelat, *Laboratoire de Mécanique des Solides, Palaiseau, France*, Nicolas Triantafyllidis, *École Polytechnique, Palaiseau, France*

3:34pm Equilibria and Instabilities of Naturally Curved Filaments Under Large Deformations

Technical Presentation. IMECE2013-65242

Pedro Reis, *Massachusetts Institute of Technology, Cambridge, MA, United States*

3:51pm Response of Circular Metal Plates Under Impulsive Loading: Experiments and Numerical Simulations

Technical Presentation. IMECE2013-65564

Edmundo Corona, Kimberly Haulenbeek, Jeffrey Gruda, Kenneth Gwinn, Phillip Reu, James Phelan, *Sandia National Laboratories, Albuquerque, NM, United States*, Wei-Yang Lu, *Sandia National Laboratories, Livermore, CA, United States*

4:08pm Stretch-induced Wrinkling of Thin Sheets: Experiments and Modeling

Technical Presentation. IMECE2013-65809

Vishal Nayyar, Krishnaswamy Ravi Chandar, Rui Huang, *University of Texas at Austin, Austin, TX, United States*

4:25pm Liner Buckling and Collapse of Bi-Material Tubes Under Bending

Technical Presentation. IMECE2013-66900

Lin Yuan, Stelios Kyriakides, *University of Texas at Austin, Austin, TX, United States*

TUESDAY, NOVEMBER 19

10-6 SYMPOSIUM ON MECHANICS OF INTEGRATED STRUCTURES AND MATERIALS IN ADVANCED TECHNOLOGIES

10-6-4 Mechanics and Materials in the Oilfield

3rd Floor, Manchester Grand Hyatt, Madeleine A 9:45am–11:30am

Session Organizer: **Nathan Wicks**, Schlumberger, Cambridge, MA, United StatesSession Co-Organizer: **Yucun Lou**, Schlumberger-Doll Research, Cambridge, MA, United States

9:45am Keynote Address—Mechanics and Materials Challenges in the Oilfield

Technical Presentation. IMECE2013-66909

J. David Rowatt, Schlumberger Doll Research, Cambridge, MA, United States

10:02am Keynote Address—Mechanics and Materials Challenges in the Oilfield

Technical Presentation. IMECE2013-66910

J. David Rowatt, Schlumberger Doll Research, Cambridge, MA, United States

10:19am Buckling of an Elastic Rod Being Injected Into a Cylindrical Channel

Technical Presentation. IMECE2013-66086

Tianxiang Su, Harvard University, Somerville, MA, United States, James Miller, Pedro Reis, Massachusetts Institute of Technology, Cambridge, MA, United States, Nathan Wicks, Jahir Pabon, Schlumberger, Cambridge, MA, United States

10:36am Investigation of Frictional Effects on Buckling Behavior of Drill String

Technical Paper Publication. IMECE2013-64849

Jamil Abdo, Danish Haneef, Sultan Qaboos University, Muscat, Oman, Khalid Alzebeid, Sultan Qaboos University, Al-Khod, Oman, Hamed Al-Sharji, Petroleum Development Oman, Muscat, Oman

10:53am Intervention in Extended Reach Wells Using Axial Vibrations: Modeling and Experiments

Technical Presentation. IMECE2013-64869

Nathaniel Wicks, Schlumberger, Somerville, MA, United States, Jahir Pabon, Francois Auzerais, Roman Kats, Matthew Godfrey, Schlumberger, Cambridge, MA, United States, Yong Chang, Schlumberger, Sugar Land, TX, United States, Shunfeng Zheng, Schlumberger, Katy, TX, United States

11:10am Deployable Structures and Compliant Mechanisms: Enabling Down Hole Zonal Isolation

Technical Presentation. IMECE2013-65212

Julio Guerrero, Draper, Cambridge, MA, United States

10-12 MULTIFUNCTIONAL AND MICRO-/NANOSTRUCTURED MATERIALS—MODELING AND CHARACTERIZATION

10-12-1 Multifunctional and Micro-/Nanostructured Materials—I

3rd Floor, Manchester Grand Hyatt, Madeleine B 9:45am–11:30am

Session Organizer: **Xin-Lin Gao**, University of Texas at Dallas, Richardson, TX, United StatesSession Co-Organizer: **Oscar Lopez-Pamies**, University of Illinois at Urbana-Champaign, Urbana, IL, United States

9:45am Closed-Form Solutions for the Overall Response of Piezoelectric Composites With Random and Periodic Particulate Microstructures

Technical Presentation. IMECE2013-65450

Oscar Lopez-Pamies, Stephen Spinelli, University of Illinois at Urbana-Champaign, Urbana, IL, United States

10:02am Strain Gradient Solution of the Eshelby-Type Anti-Plane Strain Polygonal Inclusion Problem

Technical Presentation. IMECE2013-63372

Xin-Lin Gao, University of Texas at Dallas, Richardson, TX, United States, Mengqi Liu, T-Rex Engineering & Construction, LC, Houston, TX, United States

10:19am Reverse Analysis for Indentation of Isotropic Materials

Technical Presentation. IMECE2013-66008

Jayanta Kumar Phadikar, T.A. Bogetti, University of Delaware, Newark, DE, United States, Anette M. Karlsson, Cleveland State University, Cleveland, OH, United States

10:36am Compliant Multifunctional Wing Structures for Flapping Wing MAVs

Technical Presentation. IMECE2013-64810

Hugh Bruck, University of Maryland, College Park, MD, United States

10:53am Multiscale Analysis of Multifunctional Composite Structures

Technical Paper Publication. IMECE2013-62427

Yehia Bahei-El-Din, Amany Micheal, British University in Egypt, El-Shorouk City, Egypt

11:10am Prediction of Tensile Modulus of CNT/Polypropylene Composites Through Finite Element Modeling

Technical Presentation. IMECE2013-63757

Md Bhuiyan, Johnny Worthy, Raghuram Pucha, Mehdi Karevan, Kyriaki Kalaitzidou, Georgia Institute of Technology, Atlanta, GA, United States

TRACK 10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS / TUESDAY, NOVEMBER 19**10-14 HIERARCHICAL NANOCOMPOSITES****10-14-1 Hierarchical Nanocomposites—I****3rd Floor, Manchester Grand Hyatt, Del Mar A 9:45am–11:30am**Session Organizer: **Davood Askari**, *Wichita State University, Wichita, KS, United States*Session Co-Organizer: **Mohammad Naraghi**, *Texas A&M University, College Station, TX, United States***9:45am Investigating the Integration of Carbon Nanotubes to a Glass Fiber Reinforced Polymer Composite and Its Effects on Electromagnetic Shielding and Mechanical Properties****Technical Paper Publication.** IMECE2013-65202Mehran Tehrani, Majid Manteghi, *Virginia Polytechnic Institute & State University, Blacksburg, VA, United States*, Ayoub Boroujeni, Marwan Al-Haik, *Virginia Technology, Blacksburg, VA, United States*, Zhixian Zhou, *Wayne State University, Detroit, MI, United States***10:02am High-Performance Carbon Nanotube-Carbon Composite Fibers****Technical Presentation.** IMECE2013-65493Korhan Sahin, Nicholas A. Fasanella, Ioannis Chasiotis, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*, Manjeshwar G. Kamath, Han G. Chae, Satish Kumar, *Georgia Institute of Technology, Atlanta, GA, United States***10:19am Effect of Hot-Drawing on the Molecular Alignment and Mechanical Properties of Carbon Nanofiber Yarns****Technical Presentation.** IMECE2013-62567Sneha Chawla, Mohammad Naraghi, *Texas A&M University, College Station, TX, United States***10:36am Quasi-Static and Dynamic Compressive Deformation Response of a Cu-Ag Hierarchical Nanolayered Material****Technical Presentation.** IMECE2013-62628Owen Kingstedt, Ben Eftink, Ian Robertson, John Lambros, *University of Illinois at Urbana-Champaign, Urbana, United States***10:53am Large-Scale Microstructural Three-Dimensional Finite Element Modeling of Carbon Nanotubes/Nanofibers Polymer Composites****Technical Presentation.** IMECE2013-64762Rashid K. Abu Al-Rub, *Masdar Institute of Science and Technology, Abu Dhabi, United Arab Emir.*, Ardeshir Tehrani, *Texas A&M University, College Station, TX, United States***11:10am A Study on the Structure-Property Relationships in Macroscopic Carbon Nanotube Fibers****Technical Presentation.** IMECE2013-65297Allison Beese, *Pennsylvania State University, University Park, PA, United States*, Graham Bratzel, Markus Buehler, *Massachusetts Institute of Technology, Cambridge, MA, United States*, Sourangsu Sarker, SonBinh Nguyen, Horacio Espinosa, *Northwestern University, Evanston, IL, United States*, Alexander Moravsky, Raouf Loutfy, *MER Corporation, Tucson, AZ, United States***10-18 DURABILITY AND LIFE PREDICTION OF ADVANCED COMPOSITE MATERIALS****10-18-1 Durability and Life Prediction of Advanced Composite Materials—I****3rd Floor, Manchester Grand Hyatt, Del Mar B 9:45am–11:30am**Session Organizer: **Mohammad Hossain**, *Tuskegee University, Tuskegee, AL, United States*Session Co-Organizer: **Mahbub Ahmed**, *Southern Arkansas University, Magnolia, AR, United States***9:45am Environmental Durability of Natural Fiber Reinforced Unsaturated Polyester Composite****Technical Paper Publication.** IMECE2013-63415Mengyuan Liao, Hiroyuki Hamada, *Kyoto Institute of Technology, Kyoto, Japan*, U.S. Ishiaku, *Ahmadu Bello University, Zaria, Nigeria*, Z.A.M. Ishak, *Universiti Sains Malaysia, Penang, Malaysia*, Guijun Xian, *Harbin Institute of Technology, Harbin, China***10:06am Mechanical Property and Degradation in Hot Water of Injection Molded Glass Short Fiber/Wood Powder/Polypropylene Hybrid Composites****Technical Paper Publication.** IMECE2013-64475Xujie Kong, Yuqiu Yang, *Donghua University, Shanghai, China*, Mengyuan Liao, Ying Yu, *Kyoto Institute of Technology, Kyoto, Japan*, Manabu Nomura, *Green Plaisir, Osaka, Japan*, Jungang Li, *Taian Jinfeihong Weaving Co., Ltd., Taian, China***10:27am Durability Study of Low Velocity Impact Responses of Conventional and Nanophased CFRP Composites Exposed to Seawater****Technical Paper Publication.** IMECE2013-65671Mohammad Hossain, Md. Mahmudur Rahman Chowdhury, Mahmud Salam, Kazi Imran, Mahesh Hosur, Shaik Jeelani, *Tuskegee University, Tuskegee, AL, United States***10:48am Recovery of Low-Velocity Impact Properties of Glass Fiber Reinforced Composites Through Self-Healing Technique****Technical Paper Publication.** IMECE2013-66771Shaik Zainuddin, Arifin Tauhid, Mahesh Hosur, Shaik Jeelani, *Tuskegee University, Tuskegee, AL, United States*, Ashok Kumar, *U.S. Army Engineer Research and Development Center, Champaign, IL, United States***11:09am Numerical Simulation of Fatigue Crack Propagation in Cellular Structures Based on the Plastically Dissipated Energy****Technical Presentation.** IMECE2013-62469Parag Nittur, *University of Delaware, Newark, DE, United States*, Anette M. Karlsson, *Cleveland State University, Cleveland, OH, United States*

10-20 SYMPOSIUM ON MECHANICS OF ADHESION AND FRICTION**10-20-4 Mechanics of Adhesion and Friction IV****3rd Floor, Manchester Grand Hyatt, Madeleine C 9:45am–11:30am**Session Organizer: **Demirkan Coker**, *Middle East Technical University, Ankara, Turkey***9:45am Liquid Slip Determined by Molecular Structure and Flexibility****Technical Presentation.** IMECE2013-65898
Ashlie Martini, *University of California, Merced, Merced, CA, United States*, Seth Lichter, *Northwestern University, Evanston, IL, United States***10:02am Liquid Slip Determined by Molecular Structure and Flexibility****Technical Presentation.** IMECE2013-65897
Ashlie Martini, *University of California, Merced, Merced, CA, United States*, Seth Lichter, *Northwestern University, Evanston, IL, United States***10:19am A Systematized Study of Structures With Heterogeneous Interfaces****Technical Presentation.** IMECE2013-62341
Michal K. Budzik, Henrik Myhre Jensen, *Aarhus University, Aarhus, Denmark***10:36am The Influence of the Roughness Parameters on the EHL Line Contact Using the Free Volume Model****Technical Paper Publication.** IMECE2013-64324
Vincenzo Petrone, *Università di Salerno, Salerno, Italy*, Vincenzo D'Agostino, Adolfo Senatore, *University of Salerno, Fisciano-Salerno, Italy***10:53am A Virtual Tool for Wear Simulation of Plastic Gear Pairs****Technical Paper Publication.** IMECE2013-65254
Fatih Karpaz, Celalettin Yüce, Esin Karpaz, *Uludağ University, Bursa, Turkey*, Stephen Ekwaro-Osire, *Texas Tech University, Lubbock, TX, United States***11:10am Experimental Investigation of Dynamic Slip Initiation and Propagation Between Polycarbonate Plates****Technical Presentation.** IMECE2013-66409
Demirkan Coker, Basar Kutukoglu, Denizhan Yavas, *Middle East Technical University, Ankara, Turkey***10-22 MODELING AND EXPERIMENTS IN NANOMECHANICS AND NANOMATERIALS****10-22-1 Modeling and Experiments in Nanomechanics and Nanomaterials 1****3rd Floor, Manchester Grand Hyatt, Ford C 9:45am–11:30am**Session Organizer: **Yozo Mikata**, *Bechtel, Niskayuna, NY, United States*Session Co-Organizer: **Jeffrey Kysar**, *Columbia University, New York, NY, United States*Session Chair: **Cemal Basaran**, *University at Buffalo, State University of New York, Buffalo, NY, United States*Session Co-Chair: **Scott Price**, *GE Global Research, Niskayuna, NY, United States***9:45am Analytical Solutions to a CNT Self-Folding Problem Using an Exact Approach****Technical Presentation.** IMECE2013-65835
Yozo Mikata, *Bechtel, Niskayuna, NY, United States***10:02am Nanomechanical Cutting of Individual Boron Nitride Nanotubes****Technical Presentation.** IMECE2013-65957
Meng Zheng, Xiaoming Chen, Changhong Ke, *State University of New York, Binghamton, NY, United States*, Cheol Park, *National Institute of Aerospace, Hampton, VA, United States***10:19am Molecular Dynamics Simulations of Graphene: Effects of Temperature and Size****Technical Presentation.** IMECE2013-65815
Wei Gao, Rui Huang, *University of Texas at Austin, TX, Austin, United States***10:36am Understanding {112} Slip in Tantalum****Technical Presentation.** IMECE2013-62486
Jonathan Zimmerman, Lucas M. Hale, *Sandia National Laboratories, Livermore, CA, United States*, Christopher Weinberger, *Sandia National Laboratories, Albuquerque, NM, United States***10:53am Anisotropic Elastic Underpinnings for Atomistic Study of Periodic Dislocations****Technical Presentation.** IMECE2013-65436
Yuranan Hanlunmyuang, Dengke Chen, *University of Houston, Houston, TX, United States***11:10am A Molecular Dynamics Study on Mechanical Behavior of Silica Aerogels****Technical Presentation.** IMECE2013-63988
Zishun Liu, Jincheng Lei, *Xi'an Jiaotong University, Xi'an, China*

TRACK 10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS / TUESDAY, NOVEMBER 19

10-25 NANOENGINEERED, HIERARCHICAL, AND MULTISCALE MATERIALS

10-25-1 Nanoengineered, Hierarchical, and Multiscale Materials

3rd Floor, Manchester Grand Hyatt, Madeleine D 9:45am–11:30am

Session Organizer: **Ram V. Mohan**, *Joint School of Nanoscience and Nanoengineering, Greensboro, NC, United States*

9:45am **Three-Dimensional Mixed Mode I+II+III Singular Stress Field at the Front of a (111)[-1,-1,2]0[1,-1,0] Crack Weakening a Diamond Cubic Mono-Crystalline Plate With Crack Turning and Step/Ridge Formation**

Technical Presentation. IMECE2013-64122

Reaz Chaudhurl, *University of Utah, Salt Lake City, UT, United States*

10:00am **Thermal Conductivity Measurements of Individual Carbon Nanotubes and Carbon Nanotube Fibers**

Technical Presentation. IMECE2013-66788

Eric Mayhew, *Case Western Reserve University, Beavercreek Township, OH, United States*, Vikas Prakash, *Case Western Reserve University, Cleveland, OH, United States*

10:15am **A Bioinspired Model Material System With High Stiffness and High Toughness**

Technical Presentation. IMECE2013-64704

Thomas Siegmund, Somesh Khandelwal, *Purdue University, West Lafayette, IN, United States*

10:30am **Multiscale Modeling of Nano-Reinforced Structural Adhesive Bonds**

Technical Paper Publication. IMECE2013-64978

Jacob Wernik, Shaker Meguid, *University of Toronto, Toronto, ON, Canada*

10:45am **Heterogeneous Nanoparticles Structures With Gradient Material Properties by Self-Assmbly**

Technical Presentation. IMECE2013-66569

Jonghyun Park, Wei Lu, *University of Michigan, Ann Arbor, MI, United States*

11:00am **Microstructural Modeling of Failure Modes in Energetic Materials**

Technical Presentation. IMECE2013-66666

Darrell Labarbera, Judith Brown, Mohammed Zikry, *North Carolina State University, Raleigh, NC, United States*

11:15am **Computational Material Modeling and Characterization of Cementitious Materials**

Extended Abstract Presentation. IMECE2013-67417

Ram V. Mohan, *Joint School of Nanoscience and Nanoengineering, Greensboro, NC, United States*

10-27 MECHANICS OF SOFT MATERIALS

10-27-2 Bio Polymers

3rd Floor, Manchester Grand Hyatt, Ford A

9:45am–11:30am

Session Organizer: **Sinan Keten**, *Northwestern University, Evanston, IL, United States*

Session Co-Organizer: **Shiqing Huang**

9:45am **Biomimetic Design of Dynamic and Self-Healing Polymers (Part II)**

Technical Presentation. IMECE2013-65806

Zhibin Guan, *University of California, Irvine, Irvine, CA, United States*

10:02am **Biomimetic Design of Dynamic and Self-Healing Polymers (Part II)**

Technical Presentation. IMECE2013-65807

Zhibin Guan, *University of California, Irvine, Irvine, CA, United States*

10:19am **Self-Assembly and Mechanics Interplay of Cyclic Peptide Nanotubes**

Technical Presentation. IMECE2013-65394

Luis Ruiz, Sinan Keten, *Northwestern University, Evanston, IL, United States*

10:36am **Material and Structural Synergism of Spider Silk Anchorages**

Technical Presentation. IMECE2013-65945

Steven Cranford, *Northeastern University, Boston, MA, United States*

10:53am **Viscoelastic Properties of Polyurea Under Pressure**

Technical Presentation. IMECE2013-64147

Wiroj Nantasetphong, Alireza V. Amirkhizi, Siavouche Nemat-Nasser, *University of California, San Diego, La Jolla, CA, United States*

11:10am **Biomimetic Design of Dynamic and Self-Healing Polymers**

Technical Presentation. IMECE2013-64897

Zhibin Guan, *University of California, Irvine, Irvine, CA, United States*

10-30 MECHANICS IN BIOLOGY AND MEDICINE

10-30-1 Membrane Mechanics

3rd Floor, Manchester Grand Hyatt, Mohsen B

9:45am–11:30am

Session Organizer: **Sulin Zhang**, *Pennsylvania State University, University Park, PA, United States*

9:45pm **Keynote: Mechanotransduction in Vascular Cells in Health and Disease**

Invited Presentation. IMECE2013-66932

Shu Chien, *University of California, San Diego, La Jolla, CA, United States*

10:19am Elastic Anisotropy and Heterogeneity of Onion Outer Epidermal Cell Wall Fragment**Technical Presentation.** IMECE2013-65328Baoming Wang, Shafayet Zamil, Keekyoung Kim, Hojae Yi, Virendra Puri, Md Haque, *Pennsylvania State University, University Park, PA, United States***10:36am Modeling of Defective Erythrocyte Membrane****Technical Presentation.** IMECE2013-66246He Li, George Lykotrafitis, *University of Connecticut, Storrs, CT, United States***10:53am Thermal Fluctuations of Lipid Bilayer Membranes and Electromechanical Coupling****Technical Presentation.** IMECE2013-66450Fatemeh Ahmadpoor, Pradeep Sharma, *University of Houston, Houston, TX, United States*, Liping Liu, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States***11:10am Tissue- and Cell-Level Stress Distributions of the Heart Valve Tissue During Diastole****Technical Paper Publication.** IMECE2013-63229Siyao Huang, Hsiao-Ying Shadow Huang, *North Carolina State University, Raleigh, NC, United States***10-32 HYBRID MULTIFUNCTIONAL COMPOSITE MATERIALS****10-32-1 Hybrid Multifunctional Composite Materials****4th Floor, Manchester Grand Hyatt, Randle B 9:45am–11:30am**Session Organizer: **Marwan al-Haik**, *Virginia Technology, Blacksburg, VA, United States*Session Co-Organizers: **Henry Sodano**, *University of Florida, Gainesville, FL, United States*, **Mehran Tehrani**, *Virginia Polytechnic Institute & State University, Blacksburg, VA, United States*, **M. Youssuf Hussaini**, *Florida State University, Tallahassee, FL, United States***9:45am Hybrid Multiscale High-Strength Carbon-Fiber/Epoxy Composites Reinforced With Self-Repairing Core-Shell Nanofibers at Interfaces****Technical Presentation.** IMECE2013-62648Xiangfa Wu, Zhengping Zhou, Youhao Zhao, Arifur Rahman, *North Dakota State University, Fargo, ND, United States***9:58am Multiobjective Optimization of Axial Crush Performance of Metal/Composite Hybrid Square Tubes****Technical Paper Publication.** IMECE2013-63071Roozbeh Kalhor, Scott Case, *Virginia Technology, Blacksburg, VA, United States*, Hossein Akbarshahi, *Amirkabir University of Technology, Tehran, Iran***10:11am Temperature-Dependent Viscoelastic Behavior of FRP/ZnO Nano-Rods Hybrid Nanocomposites****Technical Paper Publication.** IMECE2013-63326Amir Alipour Skandani, *Virginia Polytechnic and State University, Blacksburg, VA, United States*, Ayoub Boroujeni, *Marwan al-Haik, Virginia Technology, Blacksburg, VA, United States***10:24am Dynamic Structure Determination of Nanoparticles in Heterogeneous Ensembles Using High Throughput Fluctuation X-Ray Scattering****Technical Presentation.** IMECE2013-63915Dongsheng Li, *Pacific Northwest National Laboratory, Richland, WA, United States***10:37am Optimal Design of Functionally Graded Structures Considering Dynamical Analysis****Technical Presentation.** IMECE2013-64048Wilfredo Montealegre, *Universidad Nacional de Colombia, Colombia*, Emilio C.N. Silva, *University of Sao Paulo, Sao Paulo, Brazil***10:50am Vibration Damping Enhancement of Fiber Reinforced Polymer Composites With Surface Grown Zinc Oxide Nanorods****Technical Paper Publication.** IMECE2013-65791Nejib Masghouni, Marwan al-Haik, *Virginia Technology, Blacksburg, VA, United States***11:03am Effect of Zinc Oxide Nanowire Length on the Interfacial Strength of Carbon Fiber Composites****Technical Paper Publication.** IMECE2013-66509Brendan Patterson, Henry Sodano, *University of Florida, Gainesville, FL, United States***11:16am Mechanical Characterization of a Hybrid Carbon Nanotube/Carbon Fiber Reinforced Composite****Technical Paper Publication.** IMECE2013-62251Mehran Tehrani, Ramez Hajji, *Virginia Polytechnic Institute & State University, Blacksburg, VA, United States*, Ayoub Boroujeni, *Marwan al-Haik, Virginia Technology, Blacksburg, VA, United States***10-40 MODELING OF MULTIFUNCTIONAL MATERIALS****10-40-1 Modeling of Multifunctional Materials****4th Floor, Manchester Grand Hyatt, Randle D 9:45am–11:30am**Session Organizer: **Ling Liu**, *Utah State University, Logan, UT, United States*Session Co-Organizers: **Zhenhai Xia**, *University of North Texas, Denton, TX, United States*, **Xin-Lin Gao**, *University of Texas at Dallas, Richardson, TX, United States*, **Xiangfa Wu**, *North Dakota State University, Fargo, ND, United States***9:45am Thermal Analysis of a Multilayered Composite With Electrically Tunable Rigidity****Technical Presentation.** IMECE2013-66390Wanliang Shan, Tong Lv, Carmel Majidi, *Carnegie Mellon University, Pittsburgh, PA, United States***10:06am Nonlinear Dynamic Magneto Electric Effects in Ferromagnetic-Ferroelectric-Two Layer Composites****Technical Paper Publication.** IMECE2013-66451Satenik Harutyunyan, *Bechtel National Inc., Richland, WA, United States*, Davresh J. Hasanyan, *Virginia Technology, Blacksburg, VA, United States*

TRACK 10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS / TUESDAY, NOVEMBER 19**10:27am Growth Mechanism and Mechanical Properties of Carbon Nanotube-Graphene Junctions****Technical Presentation.** IMECE2013-66467Jianbing Niu, Mingtao Li, Zhenhai Xia, *University of North Texas, Denton, TX, United States***10:48am Failure Analysis of MEMS Based Piezo Resistive Fingerprint Sensor****Technical Paper Publication.** IMECE2013-66763Adarsh Venkataraman Ganesan, Sundaram Swaminathan, *Birla Institute of Technology and Science Pilani, Dubai Campus, Dubai, United Arab Emir.***11:09am Hydrogen Bonding-Assisted Thermal Conduction in Spider Silk Protein****Extended Abstract Presentation.** IMECE2013-67405Ling Liu, *Utah State University, Logan, UT, United States***10-43 FAILURE MECHANICS OF ADVANCED MATERIALS AND STRUCTURES****10-43-1 Dynamic Failure Mechanics—I****3rd Floor, Manchester Grand Hyatt, Ford B 9:45am–11:30am**Session Organizer: **Hareesh Tippur**, *Auburn University, Auburn, AL, United States*Session Co-Organizer: **Larry Russell**, *U.S. Army, Whitsett, NC, United States*, **Veronica Eliasson**, *University of Southern California, Los Angeles, CA, United States***9:45am The Ballistic Damage Analysis of Mg Alloy AZ31B****Technical Presentation.** IMECE2013-66014Tyrone Jones, *U.S. Army Research Laboratory, APG, Adelphi, MD, United States***10:02am Integrated Ultra-High Speed 3D Computer Vision for Dynamic Fracture of Functionally Graded Materials****Technical Presentation.** IMECE2013-66135Addis Kidane, *University of South Carolina, Columbia, SC, United States***10:19am Shock Focusing in Water-Filled Convergent Structures and Material Effects****Technical Presentation.** IMECE2013-66137Chuanxi Wang, Shi Qiu, Veronica Eliasson, *University of Southern California, Los Angeles, California, CA, United States***10:36am Measurement of Transient Crack-Tip Deformations in Transparent Sheets Using a Digital Gradient Sensor****Technical Presentation.** IMECE2013-66243Hareesh Tippur, Chandru Periasamy, *Auburn University, Auburn, AL, United States***10:53am Monitoring Microstructural Evolution in Materials Under Dynamic Deformation—Part I****Technical Presentation.** IMECE2013-66464Weinong W. Chen, *Purdue University, West Lafayette, IN, United States***11:10am Monitoring Microstructural Evolution in Materials Under Dynamic Deformation—Part II****Technical Presentation.** IMECE2013-66466Weinong W. Chen, *Purdue University, West Lafayette, IN, United States***10-6 SYMPOSIUM ON MECHANICS OF INTEGRATED STRUCTURES AND MATERIALS IN ADVANCED TECHNOLOGIES****10-6-5 Mechanics in Microelectronics and MEMS****3rd Floor, Manchester Grand Hyatt, Madeleine A 1:00pm–2:45pm**Session Organizer: **Rui Huang**, *University of Texas at Austin, Austin, TX, United States***1:00pm Keynote Talk: Metallization Reliability at the 20nm Node and Beyond: Selected Challenges****Technical Presentation.** IMECE2013-65266Christian Witt, *Globalfoundries, Yorktown Heights, NY, United States***1:21pm Keynote Talk: Metallization Reliability at the 20nm Node and Beyond: Selected Challenges****Technical Presentation.** IMECE2013-65267Christian Witt, *Globalfoundries, Yorktown Heights, NY, United States***1:42pm 3D IC Design and Reliability Optimization With Accurate Modeling of Bump and Underfill****Technical Presentation.** IMECE2013-62875Karthik Guda Vishnu, *Synopsys India Pvt. Ltd., Hyderabad, Andhra Pradesh, India*, Xiaopeng Xu, Karim El Sayed, Ibrahim Avci, Vikas Chawla, Bikash Mishra, Andrey Kucherov, Weixing Zhou, Mark Johnson, Pratheep Balasingam, *Synopsys, Inc., Mountain View, CA, United States***2:03pm A Finite Weakest Link Model of Failure Statistics of Polycrystalline Silicon MEMS Devices****Technical Presentation.** IMECE2013-64614Jia-Liang Le, Roberto Ballarini, *University of Minnesota, Minneapolis, MN, United States***2:24pm Interface Roughness for a Molecularly Derived Mesoscale Model of an Epoxy/Cu Interface****Technical Presentation.** IMECE2013-63536Nancy Iwamoto, *Honeywell Performance Materials and Technologies, Ramona, CA, United States*

10-12 MULTIFUNCTIONAL AND MICRO-/NANOSTRUCTURED MATERIALS—MODELING AND CHARACTERIZATION

10-12-2 Multifunctional and Micro-/Nanostructured Materials—II

3rd Floor, Manchester Grand Hyatt, Madeleine B 1:00pm–2:45pm

Session Organizer: **Xin-Lin Gao**, *University of Texas at Dallas, Richardson, TX, United States*

Session Co-Organizers: **Vinu Unnikrishnan**, *University of Alabama, Tuscaloosa, AL, United States*, **Lifeng Wang**, *Clarkson University, Potsdam, NY, United States*

1:00pm Biomechanical Characterization of Tissues Associated With Pelvic Organ Prolapse: A Theoretical Model

Technical Presentation. IMECE2013-66141

Vinu Unnikrishnan, Samit Roy, *University of Alabama, Tuscaloosa, AL, United States*, Holly E. Richter, *University of Alabama at Birmingham, Birmingham, AL, United States*

1:17pm Ultralight Hollow Microlattices With Unique Combinations of Strength, Elastic Recovering, and Damping

Technical Presentation. IMECE2013-63703

Lorenzo Valdevit, *University of California, Irvine, Irvine, CA, United States*

1:34pm Mitigating Intense Stress Waves Using Nanofoams

Technical Presentation. IMECE2013-64616

Yu Qiao, Cang Zhao, Weiyi Lu, Taewan Kim, *University of California, San Diego, La Jolla, CA, United States*

1:51pm Modeling of Blast-Induced Traumatic Brain Injury: Effects of Brain Tissue Constitutive Relation, Blast Direction, and Skull Stiffness

Technical Presentation. IMECE2013-64036

Sahil Kulkarni, *Texas A&M University, College Station, TX, United States*, Xin-Lin Gao, *University of Texas at Dallas, Richardson, United States*

2:08pm Nonlinear Structural Behavior of Systems With Biomimetic Scales

Technical Presentation. IMECE2013-64845

Ranajay Ghosh, Ashkan Vaziri, *Northeastern University, Boston, MA, United States*

2:25pm Mechanical Behaviors of Carbon Nanotube Networks and Their Composites

Technical Presentation. IMECE2013-63016

Lifeng Wang, *Clarkson University, Potsdam, NY, United States*, Chao Wang, Zhiping Xu, *Tsinghua University, Beijing, China*

10-14 HIERARCHICAL NANOCOMPOSITES

10-14-2 Hierarchical Nanocomposites—II

3rd Floor, Manchester Grand Hyatt, Del Mar A 1:00pm–2:45pm

Session Organizer: **Davood Askari**, *Wichita State University, Wichita, KS, United States*

Session Co-Organizer: **Mohammad Hossain**, *Tuskegee University, Tuskegee, AL, United States*

1:00pm Multifunctional Hierarchical Nanocomposites—A Review

Technical Paper Publication. IMECE2013-65599

Mehrdad N. Ghasemi Nejad, *University of Hawaii at Manoa, Honolulu, HI, United States*

1:17pm Effect of an Interphase on the Mechanical Response of a Polymer Composite With Nanoscale Reinforcement

Technical Presentation. IMECE2013-65870

Alan Needleman, *University of North Texas, Denton, TX, United States*

1:34pm AC Electrothermal pumping Improvement by Biocompatible Nanocomposite Surface Modification

Extended Abstract Publication. IMECE2013-65119

Nazmul Islam, *University of Texas at Brownsville, Brownsville, TX, United States*, Davood Askari, *Wichita State University, Wichita, KS, United States*

1:51pm Tensile Properties Evaluation of Chemically Treated/Untreated Single Sugarcane Fiber

Technical Paper Publication. IMECE2013-65664

Mohammad Hossain, Mohammad Rezaul Karim, Md. Mahmudur Rahman Chowdhury, Muhammad Imam, Mahesh Hosur, Shaik Jeelani, *Tuskegee University, Tuskegee, AL, United States*, Ramsis Farag, *Auburn University, Auburn, AL, United States*

2:08pm Prediction of Elastic Modulus of Glass Short Fiber/Wood Powder/Polypropylene Hybrid Composites

Technical Paper Publication. IMECE2013-66679

Ying Yu, Hiroyuki Hamada, *Kyoto Institute of Technology, Kyoto, Japan*, Manabu Nomura, *Green Plaisir, Osaka, Japan*

2:25pm Homogenization and Localization for Nanoscale Heterogeneous Systems—Applications to Cementitious Materials

Technical Presentation. IMECE2013-66962

John Rivas Murillo, *North Carolina A&T State University, Greensboro, NC, United States*, Ram V. Mohan, *Joint School of Nanoscience and Nanoengineering, Greensboro, NC, United States*

TRACK 10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS / TUESDAY, NOVEMBER 19

10-18 DURABILITY AND LIFE PREDICTION OF ADVANCED COMPOSITE MATERIALS

10-18-2 Durability and Life Prediction of Advanced Composite Materials—II

3rd Floor, Manchester Grand Hyatt, Del Mar B 1:00pm–2:45pm

Session Organizer: **Mohammad Hossain**, *Tuskegee University, Tuskegee, AL, United States*

Session Co-Organizer: **Mahbub Ahmed**, *Southern Arkansas University, Magnolia, AR, United States*

1:00pm Flow Accelerated Degradation of Corrosion Protective Organic Coatings

Technical Paper Publication. IMECE2013-63727
Qixin Zhou, Yechun Wang, *North Dakota State University, Fargo, ND, United States*

1:21pm A New Approach in Kinetic Modeling Using Thermodynamic Framework for Chemically Reacting Systems and Oxidative Ageing in Polymer Composites

Technical Paper Publication. IMECE2013-64436
Mohankumar V. Kambapalli, Krishna Kannan, *Indian Institute of Technology Madras, Chennai, Tamilnadu, India*

1:42pm Geometric Nonlinearity Effects in Multimaterial Systems

Technical Presentation. IMECE2013-65102
Jeffrey Eischen, *North Carolina State University, Raleigh, NC, United States*

2:03pm A Novel Co-Simulation Toolkit for Delamination and Matrix Cracking in Fiber Metal Laminated Structures Under Fatigue Loading

Technical Presentation. IMECE2013-65464
Eugene Fang, Jim Lua, Michael Stuebner, *Global Engineering and Materials, Inc., Princeton, NJ, United States*

2:24pm Modeling Mechanical Response of Concrete Designed With Multiscale Packing Algorithm

Technical Presentation. IMECE2013-65025
Mir Shams, Andrew Hastert, Konstantin Sobolev, Ilya Avdeev, *University of Wisconsin–Milwaukee, Milwaukee, United States*,
Adil Amirjanov, *Near East University, Nicosia, TRNC, Turkey*

10-22 MODELING AND EXPERIMENTS IN NANOMECHANICS AND NANOMATERIALS

10-22-2 Modeling and Experiments in Nanomechanics and Nanomaterials 2

3rd Floor, Manchester Grand Hyatt, Ford C 1:00pm–2:45pm

Session Organizer: **Yozo Mikata**, *Bechtel, Niskayuna, NY, United States*

Session Co-Organizer: **Jeffrey Kysar**, *Columbia University, New York, NY, United States*

Session Chair: **Rui Huang**, *University of Texas at Austin, Austin, TX, United States*

Session Co-Chair: **Changhong Ke**, *State University of New York, Binghamton, NY, United States*

1:00pm Iterative Scheme for a 1D Heat Transfer Problem Coupled With Field Emission: CNT as an Electron Emitter

Technical Presentation. IMECE2013-65819
Yozo Mikata, *Bechtel, Niskayuna, NY, United States*, Scott Price, *GE Global Research, Niskayuna, NY, United States*

1:17pm Electron Emitter Lifetime

Technical Presentation. IMECE2013-66065
Scott Price, *GE Research Center, Niskayuna, NY, United States*,
Yozo Mikata, *Bechtel, Niskayuna, NY, United States*

1:34pm Effects of Edge Scattering on Joule Heating and Wind Force in Graphene Nanoribbon

Technical Presentation. IMECE2013-62565
Yanbiao Chu, Cemal Basaran, *University at Buffalo, State University of New York, Buffalo, NY, United States*

1:51pm Modeling the Mechanical Molecular Unravelling in Carbon Nanotubes During Field Emission

Technical Presentation. IMECE2013-63431
Tarek Ragab, *University of Tabuk, Buffalo, NY, United States*,
Cemal Basaran, *University at Buffalo, State University of New York, Buffalo, NY, United States*

2:08pm Tensile and Bending Strength of Single-Crystal Silicon Theta Specimens

Technical Presentation. IMECE2013-64708
Frank DelRio, Rebecca Kirkpatrick, William A. Osborn, Michael S. Gaither, Richard Gates, Robert F. Cook, *National Institute of Standards and Technology, Gaithersburg, MD, United States*

2:25pm Elucidating the Kinetics of Twin Boundaries From Thermal Fluctuations

Technical Presentation. IMECE2013-66621
Dengke Chen, Yashashree Kulkarni, *University of Houston, Houston, TX, United States*

10-23 MECHANICS OF ELECTROCHEMICAL ENERGY STORAGE MATERIALS

10-23-2 Mechanics of Electrochemical Energy Storage Materials—II

3rd Floor, Manchester Grand Hyatt, Mohsen A 1:00pm–2:45pm

Session Organizer: **Ting Zhu**, *Woodruff School of Mechanical Engineering, Atlanta, GA, United States*

Session Co-Organizer: **Shuman Xia**, *Georgia Institute of Technology, Atlanta, GA, United States*

1:00pm **Calculating Fracture Toughness of Li-Si Alloys Using Molecular Dynamic Simulations**

Invited Presentation. IMECE2013-62534

Feng Gao, Zhiwei Cui, Jianmin Qu, *Northwestern University, Evanston, IL, United States*

1:40pm **Chemo-Mechanics of High-Capacity Electrode Materials for Li-Ion Batteries**

Technical Presentation. IMECE2013-65481

Claudio Di Leo, Lallit Anand, *Massachusetts Institute of Technology, Cambridge, MA, United States*

2:00pm **Atomistic Characterization of Li-Si Alloys at Experimental Strain Rates**

Technical Presentation. IMECE2013-66490

Xin Yan, Pradeep Sharma, *University of Houston, Houston, TX, United States*

2:20pm **Simulation of Intercalation Induced Stresses by a Phase-Field Model**

Technical Presentation. IMECE2013-62950

Magalie Huttin, Ann-Christin Walk, Marc Kamlah, *Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany*

10-30 MECHANICS IN BIOLOGY AND MEDICINE

10-30-2 Subcellular and Cellular Mechanics

3rd Floor, Manchester Grand Hyatt, Mohsen B 1:00pm–2:45pm

Session Organizer: **Sulin Zhang**, *Pennsylvania State University, University Park, PA, United States*

1:00pm **Numerical Modeling and Experimental Validation of Intervertebral Discs**

Technical Paper Publication. IMECE2013-63534

Marzieh Azarnoosh, Marcus Stoffel, Dieter Weichert, *Institute of General Mechanics, RWTH Aachen, Aachen, Germany*

1:17pm **Predicting Macroscopic Colloidal Deposition and Transportation Based on Dimensionless Tabors Parameter**

Technical Presentation. IMECE2013-63684

Xin Wang, April Gu, Kai Tak Wan, *Northeastern University, Boston, MA, United States*

1:34pm **Bioreactor Development for Cultivating Tenocytes on Collagen Foils Supported by Constitutive Modeling**

Technical Paper Publication. IMECE2013-64498

Wolfgang Willenberg, Marcus Stoffel, Dieter Weichert, *Institute of General Mechanics, RWTH Aachen, Aachen, Germany*

1:51pm **Interfacial Biomechanics of Material Interfaces in Tropocollagen and Chitin Based Materials**

Technical Presentation. IMECE2013-64836

Tao Qu, Vikas Tomar, *Purdue University, West Lafayette, IN, United States*

2:08pm **Interaction Effects of Organic and Mineral Phases in the Mechanical Properties of Biomineralized Materials**

Technical Presentation. IMECE2013-65393

Enrique Escobar de Obaldia, Chanhue Jeong, Pablo Zavattieri, *Purdue University, West Lafayette, IN, United States*

2:25pm **A Multiscale Model to Determine the Stiffness of Collenchyma Tissue in Rheum Rhabarbarum**

Technical Paper Publication. IMECE2013-63691

Tanvir Faisal, Nicolay Hristozov, Tamara Western, Alejandro Rey, Damiano Pasini, *McGill University, Montreal, QC, Canada*

10-12 MULTIFUNCTIONAL AND MICRO-/NANOSTRUCTURED MATERIALS—MODELING AND CHARACTERIZATION

10-12-3 Multifunctional and Micro-/Nanostructured Materials—III

3rd Floor, Manchester Grand Hyatt, Madeleine B 3:00pm–4:45pm

Session Organizer: **Xin-Lin Gao**, *University of Texas at Dallas, Richardson, TX, United States*

Session Co-Organizer: **Rashid K. Abu Al-Rub**, *Masdar Institute of Science and Technology, Abu Dhabi, United Arab Emir.*

3:00pm **Electrical-Driven Transport of Endohedral Fullerene Encapsulating a Single Water Molecule**

Technical Presentation. IMECE2013-65467

Baoxing Xu, *University of Illinois at Urbana-Champaign, Champaign, IL, United States*, Xi Chen, *Columbia University, New York, NY, United States*

3:17pm **Structural Transformations and Deformation Mechanism in Titanium Nanowires**

Technical Presentation. IMECE2013-65500

Dong Qian, *University of Texas at Dallas, Richardson, TX, United States*, Raghavender Cheerkapally, *University of Cincinnati, Cincinnati, OH, United States*

3:34pm **Higher-Order Gradient Plasticity-Damage Theory for Exploring Nanostructured Dual-Phase Steels**

Technical Presentation. IMECE2013-64423

Rashid K. Abu Al-Rub, *Masdar Institute of Science and Technology, Abu Dhabi, United Arab Emir.*, Mahmood Ettehad, *Texas A&M University, College Station, TX, United States*

3:51pm **Bernoulli-Euler Beam Model Considering Microstructure and Surface Energy Effects**

Technical Presentation. IMECE2013-63220

Xin-Lin Gao, *University of Texas at Dallas, Richardson, TX, United States*, Faten Mahmoud, *Zagazig University, Heliopolis Cairo, Egypt*

TRACK 10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS / TUESDAY, NOVEMBER 19

4:08pm Analysis of Singular Stress Fields at Anisotropic Bonded Wedges Considering Interface Stress and Elasticity

Technical Presentation. IMECE2013-64182
Hideo Koguchi, Nobuyasu Suzuki, *Nagaoka University of Technology, Nagaoka, Niigata, Japan*

4:25pm Using Finite Element Analysis to Investigate the Influence of Percolating Nano-Additive Networks on Composite Conductive Thermal Transport

Technical Presentation. IMECE2013-66918
Anthony J. Webb, Aaron P. Wemhoff, *Villanova University, Villanova, PA, United States*

10-13 NANOCOMPOSITES SYNTHESIS AND PERFORMANCE

10-13-1 Nanocomposites Synthesis and Performance—I

3rd Floor, Manchester Grand Hyatt, Madeleine C 3:00pm–4:45pm

Session Organizer: **Hassan Mahfuz**, *Florida Atlantic University, Boca Raton, FL, United States*

Session Co-Organizers: **Davood Askari**, *Wichita State University, Wichita, KS, United States*, **Kyriaki Kalaitzidou**, *Georgia Institute of Technology, Atlanta, GA, United States*

3:00pm Analytical Modeling of Mechanical Properties and Behavior of Nanotube-Based Nanocomposites

Technical Paper Publication. IMECE2013-65060
Davood Askari, *Wichita State University, Wichita, KS, United States*, Mehرداد N. Ghasemi Nejjhad, *University of Hawaii at Manoa, Honolulu, HI, United States*, Alexander Kalamkarov, *Dalhousie University, Halifax, NS, Canada*

3:15pm Cross-Linked Superlattice Nanocomposites for Shock-Wave Management

Technical Presentation. IMECE2013-65248
Kristin Holzworth, Siavouche Nemat-Nasser, *University of California, San Diego, La Jolla, CA, United States*, Olivia Cromwell, Gregory Williams, Zhibin Guan, *University of California, Irvine, Irvine, CA, United States*

3:30pm Advanced Aramid Nanofiber/Gold Nanoparticle Composites

Technical Presentation. IMECE2013-65505
Keqin Cao, Carlos Pons Sipermann, Bongjun Yeom, Nicholas Kotov, Michael Thouless, Ellen Arruda, *University of Michigan, Ann Arbor, MI, United States*

3:45pm Investigation of Mechanical Properties of Nano Clay Incorporated RTV Silicone Foams

Technical Presentation. IMECE2013-65879
Mrinal Saha, Kaji Md Hasibur Fuad, Bipul Barua, *University of Oklahoma, Norman, OK, United States*, Thomas Robison, *National Nuclear Security Administration, Kansas City, MO, United States*, Sabrina Wells, *Federal Manufacturing & Technologies, Kansas City, MO, United States*

4:00pm Effect of Sizing and POSS Coating on the Surface Morphology and Mechanical Properties of Carbon Fiber Epoxy Composites

Technical Paper Publication. IMECE2013-66410
Mrinal Saha, M. Cengiz Altan, Fariz Afzal, *University of Oklahoma, Norman, OK, United States*

4:15pm Development of Novel Duplex Co-Coated Nanostructured HVOF WC-17Ni(80/20)Cr Coatings for Severe Wear Applications

Technical Paper Publication. IMECE2013-64946
Gobinda C. Saha, *Westpower Equipment Ltd./University of Calgary, Calgary, AB, Canada*, Tarek A. ben Mahmud, Tahir I. Khan, *University of Calgary, Calgary, AB, Canada*

4:30pm The Effect of Nanoparticle Type and Concentration on Curing Properties of PMMA Bone Cement

Poster Presentation. IMECE2013-66926
Zhaotong Meng, Morshed Khandaker, *University of Central Oklahoma, Edmond, OK, United States*

10-22 MODELING AND EXPERIMENTS IN NANOMECHANICS AND NANOMATERIALS

10-22-3 Modeling and Experiments in Nanomechanics and Nanomaterials 3

3rd Floor, Manchester Grand Hyatt, Ford C 3:00pm–4:45pm

Session Organizer: **Yozo Mikata**, *Bechtel, Niskayuna, NY, United States*

Session Co-Organizer: **Jeffrey Kysar**, *Columbia University, New York, NY, United States*

Session Chair: **Dennis M. Kochmann**, *California Institute of Technology, Pasadena, CA, United States*

Session Co-Chair: **George Voyiadjis**, *Louisiana State University, Baton Rouge, LA, United States*

3:00pm The Mechanical Behavior During Nanoindentation Near the Grain Boundary in a Bicrystal FCC Metal

Technical Presentation. IMECE2013-64706
George Voyiadjis, Cheng Zhang, *Louisiana State University, Baton Rouge, LA, United States*, Jeffrey Kysar, *Columbia University, New York, NY, United States*

3:17pm Experiments on Thermally Activated Deformation Mechanisms in Nanocrystalline Au Films

Technical Presentation. IMECE2013-65165
Nikhil Karanjgaokar, Ioannis Chasiotis, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

3:34pm A Phase-Field Model for the Plasticity-Twinning Interaction in Magnesium

Technical Presentation. IMECE2013-65687
Dennis M. Kochmann, Yingrui Chang, *California Institute of Technology, Pasadena, CA, United States*

3:51pm The Mechanism Underpinning Biological Ferroelectricity

Technical Presentation. IMECE2013-66455
Matthew Zelisko, Pradeep Sharma, *University of Houston, Houston, TX, United States*, Jiangyu Li, *University of Washington, Seattle, WA, United States*

4:08pm **Scale and Temperature Dependent Mechanical Behavior of Ti/Ni Multilayer Thin Films**

Technical Presentation. IMECE2013-66747

Zhou Yang, Junlan Wang, *University of Washington, Seattle, WA, United States*

4:25pm **High Strain Rate Behavior of Cementitious Materials via Molecular Dynamics Simulations**

Technical Presentation. IMECE2013-66961

Ahmed Mohamed, John Rivas Murillo, *North Carolina A&T State University, Greensboro, NC, United States, Ram V. Mohan, Joint School of Nanoscience and Nanoengineering, Greensboro, NC, United States*

10-23 MECHANICS OF ELECTROCHEMICAL ENERGY STORAGE MATERIALS

10-23-3 Mechanics of Electrochemical Energy Storage Materials—III

3rd Floor, Manchester Grand Hyatt, Mohsen A 3:00pm–4:45pm

Session Organizer: **Shuman Xia**, *Georgia Institute of Technology, Atlanta, GA, United States*

3:00pm **Experimental Characterization of Deformation and Failure of Silicon Anodes in Lithium-Ion Batteries**

Technical Presentation. IMECE2013-65029

Ali Ghahremaninezhad, *University of Miami, Coral Gables, FL, United States*

3:21pm **Reactive Flow in Silicon Electrodes Assisted by the Insertion of Lithium**

Technical Presentation. IMECE2013-62552

Kejie Zhao, *Massachusetts Institute of Technology, Cambridge, MA, United States*, Zhigang Suo, Joost Vlassak, Efthimios Kaxiras, *Harvard University, Cambridge, MA, United States*

3:42pm **Delamination Growth in Thin Film Electrodes Driven by Li-Ion Diffusion**

Technical Presentation. IMECE2013-62605

Junqian Zhang, Bo Lu, Yicheng Song, *Shanghai University, Shanghai, China*

4:03pm **In Situ TEM Study on Mechanical Behaviors of Tin-Based Nanostructured Anodes for Lithium Ion Battery**

Technical Presentation. IMECE2013-62546

Qianqian Li, Hongtao Wang, *Zhejiang University, Hangzhou, China*

4:24pm **Microstructural and Mechanical Property Evolution of Silicon Electrode for Advanced Lithium-Ion Batteries**

Technical Presentation. IMECE2013-65572

Shuman Xia, Xueju Wang, *Georgia Institute of Technology, Atlanta, GA, United States*, Zihao Wang, Wei Guo, *Rochester Institute of Technology, Rochester, NY, United States*

10-27 MECHANICS OF SOFT MATERIALS

10-27-3 Active Soft Materials

3rd Floor, Manchester Grand Hyatt, Madeleine A 3:00pm–4:45pm

Session Organizer: **Xuanhe Zhao**, *Duke University, Durham, NC, United States*

Session Co-Organizer: **Qingmin Yu**, *Northwestern Polytechnical University, Xi'an, Shaanxi, China*

3:00pm **Elastic Dielectric Composites: Theory and Application to Particle-Filled Ideal Dielectrics**

Technical Presentation. IMECE2013-65443

Oscar Lopez-Pamies, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

3:17pm **The Mechanics of Amorphous Thermosets With Diels-Alder Linkages**

Technical Presentation. IMECE2013-66669

Kevin Long, *Sandia National Laboratories, Albuquerque, NM, United States*

3:34pm **Giant Tunable Stiffness of Electrorheological and Magnetorheological Elastomers by Designing Mesostructures**

Technical Presentation. IMECE2013-63337

Xuanhe Zhao, Changyong Cao, *Duke University, Durham, NC, United States*

3:51pm **Magneto-Active Elastomers: Macroscopic Response, Microstructure Evolution, and Instabilities**

Technical Presentation. IMECE2013-64621

Evan Galipeau, Pedro Ponte-Castaneda, *University of Pennsylvania, Philadelphia, PA, United States*

4:08pm **Theory and Simulation of Light Responsive Liquid Crystal Polymer Networks**

Technical Presentation. IMECE2013-65412

Jonghoon Bin, William Oates, *Florida State University, Tallahassee, FL, United States*

4:25pm **Viscoelastic Effect in Shear-Enhanced Transfer Printing**

Technical Presentation. IMECE2013-63050

Qingmin Yu, *Northwestern Polytechnical University, Xi'an, Shaanxi, China*, Young Huang, *Northwestern University, Evanston, IL, United States*, John A. Rogers, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

10-30 MECHANICS IN BIOLOGY AND MEDICINE

10-30-4 Cell-Nanomaterial Interactions

3rd Floor, Manchester Grand Hyatt, Mohsen B 3:00pm–4:45pm

Session Organizer: **Sulin Zhang**, *Pennsylvania State University, University Park, PA, United States*

3:00pm **Shock and Multiorgan Failure: Biomechanical Mechanisms to Prevent Autodigestion**

Plenary Presentation. IMECE2013-66522

Geert Schmid-Schoenbein, *University of California, San Diego, CA, United States*

TRACK 10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS / TUESDAY, NOVEMBER 19**3:17pm Detecting Solid Masses in Phantom Breast Using Mechanical Indentation****Technical Presentation.** IMECE2013-63702Lyda Sallaway, Sienna Magee, Jiayi Shi, Fernando Quivira, Kristen Tgavalekos, Dana Brooks, Sinan Muftu, Waleed Meleis, Kai Tak Wan, *Northeastern University, Boston, MA, United States*, Richard Moore, *Harvard Medical School, Boston, MA, United States*, Daniel Kopans, *Massachusetts General Hospital, Boston, MA, United States***3:34pm Controlling the Localization and Transport of Human Mesenchymal Stem Cells With Iron Oxide Nanoparticles and Applied Magnetic Force****Technical Presentation.** IMECE2013-64383Gang Bao, *Georgia Institute of Technology, Atlanta, GA, United States***3:51pm Indentation of a Cell: Spherical Shell or Solid?****Technical Presentation.** IMECE2013-64758Jiayi Shi, Kai Tak Wan, *Northeastern University, Boston, MA, United States*, Xinyu Liu, *McGill University, Montreal, QC, Canada*, Yu Sun, *University of Toronto, Toronto, ON, Canada***4:08pm Mechanics of Clathrin-Mediated Endocytosis****Technical Presentation.** IMECE2013-66449Nikhil Walani, *University of Houston, Houston, TX, United States*, Ashutosh Agrawal, *University of Houston, Sugar Land, TX, United States***4:25pm A Biomechanical Study of Directional Mechanical Properties of Porcine Skin Tissues****Technical Paper Publication.** IMECE2013-63829Hsiao-Ying Shadow Huang, Siyao Huang, Taylor Gettys, Peter Prim, Ola Harrysson, *North Carolina State University, Raleigh, NC, United States***10-36 FATIGUE AND FRACTURE OF ENGINEERING MATERIALS AND STRUCTURES****10-36-1 Fatigue Failure I****3rd Floor, Manchester Grand Hyatt, Del Mar B 3:00pm–4:45pm**Session Organizer: **Olanrewaju Aluko**, *University of Michigan-Flint, Flint, MI, United States***3:00pm Scaling of Fatigue Crack Growth in Quasibrittle Structures****Technical Presentation.** IMECE2013-64012Jia-Liang Le, Jonathan Manning, Joseph Labuz, *University of Minnesota, Minneapolis, MN, United States***3:17pm Functionally Graded Particle Reinforced Composites for Transducer Backings****Technical Presentation.** IMECE2013-64722Addis Kidane, Jaesang Yu, *University of South Carolina, Columbia, SC, United States***3:34pm Maximizing Strength of Bimaterial Interfaces****Technical Paper Publication.** IMECE2013-65388Pouyan Nasiri, Gary F. Dargush, *University at Buffalo, Buffalo, NY, United States***3:51pm Modeling of Post-Peak Response Behavior by Coupling Softening Elastoplasticity With Discontinuous XFEM Techniques****Technical Presentation.** IMECE2013-66427Shahriyar Beizae, *University of Houston, Los Angeles, CA, United States*, Giovanna Xotta, Mir Mohammad Reza Mousavi, Kaspar J. Willam, *University of Houston, Houston, TX, United States***4:08pm Application of Dang Van Criterion to Inclusions Subjected to a Rolling Contact Stress History****Technical Presentation.** IMECE2013-63623Michele Cerullo, *Technical University of Denmark, Kgs. Lyngby, Denmark***4:25pm Fatigue Life of Solder Joints in a Printed Circuit Board as a Function of the Cracking Energy Density, Temperature, and Frequency****Technical Presentation.** IMECE2013-64027Seung Hwan Lee, Hyun-Yong Jeong, *Sogang University, Seoul, Korea (Republic)***10-43 FAILURE MECHANICS OF ADVANCED MATERIALS AND STRUCTURES****10-43-2 Modeling and Simulation of Failure Mechanics—I****3rd Floor, Manchester Grand Hyatt, Del Mar A 3:00pm–4:45pm**Session Organizer: **Ertugrul Taciroglu**, *University of California, Los Angeles, Los Angeles, CA, United States*Session Co-Organizer: **H. Eliot Fang**, *Sandia National Laboratories, Albuquerque, NM, United States***3:00pm Application of Indentation Fracture Study With Cohesive Element Simulation****Technical Presentation.** IMECE2013-63501Akio Yonezu, Michihiro Niwa, *Chuo University, Tokyo, Japan***3:17pm A Dynamic Stability Study of Steady-State Crack Growth as Modeled by the Phase-Field Fracture Formulation****Technical Presentation.** IMECE2013-65966Zachary Wilson, Chad Landis, *University of Texas at Austin, Austin, TX, United States***3:34pm Monolithic, Mesh Insensitive Formulation for Shearbands With Diffusive Regularization****Technical Presentation.** IMECE2013-66053Haim Waisman, Colin McAuliffe, *Columbia University, New York, NY, United States***3:51pm Keynote Presentation: Fracture Mechanics and Damage Mechanics Based Computational Methods for Modeling Failure Processes in Materials and Solids, Part I****Technical Presentation.** IMECE2013-66350Jiun-shyan Chen, Shih-Po Lin, *University of California, Los Angeles, Los Angeles, CA, United States*, Sheng-Wei Chi, *University of Illinois at Chicago, Chicago, IL, United States*

4:08pm Keynote Presentation: Fracture Mechanics and Damage Mechanics Based Computational Methods for Modeling Failure Processes in Materials and Solids, Part II

Technical Presentation. IMECE2013-66352

Jiun-shyan Chen, Shih-Po Lin, *University of California, Los Angeles, Los Angeles, CA, United States*, Sheng-Wei Chi, *University of Illinois at Chicago, Chicago, IL, United States*

4:25pm Multiscale Modeling of Defect Motion

Technical Presentation. IMECE2013-66819

Kaushik Dayal, Vaibhav Agrawal, *Carnegie Mellon University, Pittsburgh, PA, United States*

10-3 KOITER LECTURE

10-3-1 Koiter Lecture

3rd Floor, Manchester Grand Hyatt, Elizabeth H 5:00pm–6:45pm

Session Organizer: **Peter Wriggers**, *Leibniz University Hannover, Hannover, Germany*

5:00pm Title to be announced.

Plenary Presentation. IMECE2013-67391

Norman Fleck, *Cambridge University, Cambridge, Cambs, United Kingdom*

10-12 MULTIFUNCTIONAL AND MICRO-/NANOSTRUCTURED MATERIALS—MODELING AND CHARACTERIZATION

10-12-4 Multifunctional and Micro-/Nanostructured Materials—IV

3rd Floor, Manchester Grand Hyatt, Madeleine B 5:00pm–6:45pm

Session Organizer: **Xin-Lin Gao**, *University of Texas at Dallas, Richardson, TX, United States*

Session Co-Organizer: **Haifeng Zhao**, *Baker Hughes Inc., Houston, TX, United States*

5:00pm Mechanical Characterization of Healable Cross-Ply Composites

Extended Abstract Publication. IMECE2013-63843

Christian Nielsen, Siavouche Nemat-Nasser, *University of California, San Diego, La Jolla, CA, United States*

5:17pm In-Plane Shear Response of Ceramic Matrix Composites: Modeling and Experiment

Technical Presentation. IMECE2013-65407

Varun P. Rajan, Frank W. Zok, *University of California, Santa Barbara, Santa Barbara, CA, United States*

5:34pm Mechanical and Electrical Characteristics of Exfoliated Graphite Nanoplatelets/Polyamide12 Multifunctional Polymer Nanocomposites Processed by Selective Laser Sintering

Technical Presentation. IMECE2013-63763

Mehdi Karevan, Shaun Eshraghi, Suman Das, Kyriaki Kalaitzidou, *Georgia Institute of Technology, Atlanta, GA, United States*

5:51pm Study of Microstructure and Mechanical Properties of Yttrium Stabilized Zirconia Coating Deposited by Air Plasma Spray

Technical Paper Publication. IMECE2013-63744

Christopher Leither, Lauren Roy, Fardad Azarmi, Annie Tangpong, *North Dakota State University, Fargo, ND, United States*

6:08pm A Numerical Model to Study the Effect of Temperature on Electrical Conductivity of Polymer-CNT Nanocomposites

Technical Paper Publication. IMECE2013-62602

Amirhossein Biabangard Oskouyi, Pierre Mertiny, *University of Alberta, Edmonton, AB, Canada*, Uttandaraman Sundararaj, *University of Calgary, Calgary, AB, Canada*

6:25pm Functionally Graded Shape Memory Alloys an Overview

Technical Presentation. IMECE2013-62938

Bashir Samsam Shariat, *University of Western Australia, Perth, Western Australia, Australia*

10-27 MECHANICS OF SOFT MATERIALS

10-27-4 Shape Memory Polymers

3rd Floor, Manchester Grand Hyatt, Madeleine A 5:00pm–6:45pm

Session Organizer: **Thao Nguyen**, *Johns Hopkins University, Baltimore, MD, United States*

Session Co-Organizer: **Sinan Keten**, *Northwestern University, Evanston, IL, United States*

5:00pm Keynote Presentation: Shape Memory Polymer Based Biomedical Implant Devices

Technical Presentation. IMECE2013-64840

Duncan J. Maitland, Wonjun Hwang, Brent L. Volk, Keith Hearon, Landon Nash, Tony Boyle, Pooja Singhal, *Texas A&M University, College Station, TX, United States*, Thomas S. Wilson, Jason M. Ortega, *Lawrence Livermore National Laboratory, Livermore, CA, United States*

5:21pm Coarse-Grained Simulation of Molecular Mechanisms of Recovery in Thermally Activated Shape-Memory Polymers

Technical Presentation. IMECE2013-65409

Brendan Abberton, Wing Liu, Sinan Keten, *Northwestern University, Evanston, IL, United States*

5:42pm Predicting Shape Fixity and Recovery of Shape Memory Polymers

Technical Presentation. IMECE2013-65132

Kai Yu, Qi Ge, Hang Qi, *University of Colorado Boulder, Boulder, CO, United States*

6:03pm Modeling Solvent-Driven Shape-Memory Behavior in Amorphous Polymer

Technical Presentation. IMECE2013-65587

Thao Nguyen, Rui Xiao, *Johns Hopkins University, Baltimore, MD, United States*

TRACK 10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS / TUESDAY, NOVEMBER 19

6:24pm Electron Beam Crosslinked Polyurethane Shape Memory Polymers With Novel Processing Capabilities and Tunable Mechanical Properties

Technical Presentation. IMECE2013-63673

Keith Hearon, Tony Boyle, Mark Wierzbicki, Landon Nash, Duncan J. Maitland, *Texas A&M University, College Station, TX, United States*, Taylor Ware, Walter Voit, *University of Texas at Dallas, Richardson, TX, United States*, Thomas S. Wilson, *Lawrence Livermore National Laboratory, Livermore, TX, United States*

10-29 INSTABILITY IN SOLIDS AND STRUCTURES

10-29-1 Instability in Solids and Structures—I

3rd Floor, Manchester Grand Hyatt, Ford C 5:00pm–6:45pm

Session Organizer: **Nicolas Triantafyllidis**, *Ecole Polytechnique, Palaiseau, France*

Session Co-Organizer: **Edmundo Corona**, *Sandia National Laboratories, Albuquerque, NM, United States*

5:00pm Structural Instability in Atomistic Level: Analysis of Ideal Strength and Global Instability Mode

Technical Presentation. IMECE2013-63396

Yoshitaka Umeno, Albert M. Iskandarov, *University of Tokyo, Tokyo, Japan*, Wolfram Noehring, Erik Bitzek, *University of Erlangen-Nuremberg, Erlangen, Germany*

5:15pm Shear Band Instabilities in Nematic Elastomers and Post-Bifurcation Macroscopic Response

Technical Presentation. IMECE2013-64600

Reza Avazmohammadi, Pedro Ponte-Castaneda, *University of Pennsylvania, Philadelphia, PA, United States*

5:30pm A Helical Cauchy-Born Rule for Finite Crystal Elasticity of Continuum and Nano Rods

Technical Presentation. IMECE2013-64697

Ajeet Kumar, Siddhant Kumar, *Indian Institute of Technology Delhi, New Delhi, Delhi, India*

5:45pm Multiscale Experimental Investigation of Deformation and Failure in Polycrystalline Alloys Under Shear Loading

Technical Presentation. IMECE2013-65005

Ali Ghahremaninezhad, *University of Miami, Coral Gables, FL, United States*, Krishnaswamy Ravi-Chandar, *University of Texas at Austin, Austin, TX, United States*

6:00pm A New Framework for the Interpretation of Modulated Martensites in Shape Memory Alloys

Technical Presentation. IMECE2013-66033

Vincent Jusuf, *University of Minnesota, Minneapolis, MN, United States*, Ryan Elliott, *University of Minnesota, Saint Paul, MN, United States*

6:15pm Symmetry-Adapted Phonon Analysis of Nanotubes

Technical Presentation. IMECE2013-66821

Kaushik Dayal, *Carnegie Mellon University, Pittsburgh, PA, United States*

6:30pm Mechanics Without Muscles: Fast Motion of Plants and Bio-Mimetic Structures

Technical Presentation. IMECE2013-65395

Zi Chen, Larry Taber, *Washington University in St. Louis, Saint Louis, MO, United States*, Qiaohang Guo, Guiping Su, Junjie Lin, Wenzhe Chen, *Fujian University of Technology, Fuzhou, China*, Huang Zheng, *Fujian Radio and Television University, Fuzhou, China*, Wei Li, *Fuzhou University, Fuzhou, China*, Yiting Ding, *Tsinghua University, Beijing, China*, Yuxin Liu, *Wuhan Foreign Languages School, Wuhan, China*

10-30 MECHANICS IN BIOLOGY AND MEDICINE

10-30-5 Mechanotransduction

3rd Floor, Manchester Grand Hyatt, Mohsen B 5:00pm–6:45pm

Session Organizer: **Sulin Zhang**, *Pennsylvania State University, University Park, PA, United States*

5:00pm Mechanical Characterization of Contact Lenses With Range of Optical Power

Technical Presentation. IMECE2013-63832

Michael Robitaille, Jiayi Shi, Shannon McBride, Kai Tak Wan, *Northeastern University, Boston, MA, United States*

5:17pm Mechanics and Spiral Formation in Mouse Corneas

Technical Presentation. IMECE2013-66121

Craig Foster, Talisa Mohammad Nejad, *University of Illinois at Chicago, Chicago, IL, United States*, Jerry Rhee, Philip Iannaccone, Steven Iannaccone, *Northwestern University Feinberg School of Medicine, Chicago, IL, United States*

5:34pm Physical Environment Regulates Cellular Uptake of Nanoparticles

Technical Presentation. IMECE2013-66366

Changjin Huang, Sulin Zhang, *Pennsylvania State University, University Park, PA, United States*

5:51pm Origin of Tension in Neurons

Technical Presentation. IMECE2013-66583

Taher Saif, Alireza Tofangchi, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

6:08pm Sociable Guests Who Overstay Their Welcome: Modeling of Myofibroblasts in Fibrotic Myocardium

Technical Presentation. IMECE2013-66713

Teresa M. Abney, Ali Nekouzadeh, Guy Genin, *Washington University in St. Louis, St. Louis, United States*, Kenneth M. Pryse, William B. McConnaughey, Elliot L. Elson, *Washington University School of Medicine, St. Louis, MO, United States*

6:25pm Axisymmetric Model of an Intracranial Saccular Aneurysm: Theory and Computation

Technical Paper Publication. IMECE2013-66383

Colin W. Curtis, Michael L. Calvisi, *University of Colorado, Colorado Springs, Colorado Springs, CO, United States*

10-33 MULTI-PHYSICS SIMULATIONS AND EXPERIMENTS FOR SOLIDS**10-33-1 Multi-physics Experiments and Associated Modeling Approach****3rd Floor, Manchester Grand Hyatt, Mohsen A 5:00pm–6:45pm**Session Organizer: **Yong Zhu**, *North Carolina State University, Raleigh, NC, United States*Session Co-Organizer: **Tarek Alam**, *Pennsylvania State University, State College, PA, United States***5:00pm Nanofountain Probe Electroporation of Single Cells—Part 1****Technical Presentation.** IMECE2013-65158Horacio Espinosa, Won Mo Kang, Fazel Yavari, Juan Giraldo, Asmahan Safi, Rebecca McNaughton, *Northwestern University, Evanston, IL, United States*, Majid Minary, *University of Texas at Dallas, Richardson, TX, United States***5:17pm Nanofountain Probe Electroporation of Single Cells—Part 2****Technical Presentation.** IMECE2013-66231Horacio Espinosa, Won Mo Kang, Fazel Yavari, Juan Giraldo, Asmahan Safi, Rebecca McNaughton, *Northwestern University, Evanston, IL, United States*, Majid Minary, *University of Texas At Dallas, Richardson, TX, United States***5:34pm Tuning Thermal and Optical Properties of Amorphous Silicon With Strain****Technical Presentation.** IMECE2013-64889Tarek Alam, Md Haque, *Pennsylvania State University, University Park, PA, United States***5:51pm Photoelasticity and Photoluminescence Characterization of Silicon Photovoltaic Wafers****Technical Presentation.** IMECE2013-65516Harley Johnson, T.-W. Lin, G.P. Horn, *University of Illinois at Urbana-Champaign, Urbana, IL, United States***6:08pm Size Effects on Mechanical Properties of Silver Nanowires****Technical Presentation.** IMECE2013-66140Yong Zhu, *North Carolina State University, Raleigh, NC, United States***6:25pm MEMS-Based Four-Point Characterization of Electromechanical Properties in Semiconducting and Metallic Nanowires****Technical Presentation.** IMECE2013-65314Rodrigo Bernal, Kwonnam Sohn, Jiaying Huang, Justin Connel, Lincoln Lauhon, Horacio Espinosa, *Northwestern University, Evanston, IL, United States*, Tobin Filleter, *University of Toronto, Toronto, ON, Canada***10-36 FATIGUE AND FRACTURE OF ENGINEERING MATERIALS AND STRUCTURES****10-36-2 Fracture Mechanics****3rd Floor, Manchester Grand Hyatt, Del Mar B 5:00pm–6:45pm**Session Organizer: **Gbadebo Owolabi**, *Howard University, Washington, DC, United States***5:00pm Fatigue Crack Growth in a Mild Steel Plate Welded by Friction Stir Welding (FSW)****Technical Paper Publication.** IMECE2013-63163K.N. Pandey, Saurabh Kumar Gupta, *Motilal Nehru National Institute of Technology, Allahabad, U.P., India***5:17pm Use of a Simple Lattice-Spring Model to Determine the Direction of Crack Growth Under Mixed Mode Loading****Technical Presentation.** IMECE2013-63253Gaurav Singh, Robert W. Zimmerman, *Imperial College London, London, United Kingdom***5:34pm Hybrid Crack Characterization and Front Tracking for Fracture and Fatigue Life Prediction of Metallic Structures****Technical Presentation.** IMECE2013-65479Jim Lua, Michael Stuebner, Eugene Fang, Neethi Simon, Phillips Liu, *Global Engineering and Materials, Inc., Princeton, NJ, United States***5:51pm Experimental and Numerical Investigation of Plasticity-Induced Fatigue Crack Closure in Overmatched Welds****Technical Paper Publication.** IMECE2013-66076Diego F.B. Sarzosa, Claudio Ruggieri, *University of Sao Paulo, Sao Paulo, Sao Paulo, Brazil***6:08pm Numerical and Experimental Investigation of Cracks in Curved Interfaces Between Identical Materials****Technical Presentation.** IMECE2013-66406Demirkan Coker, Aydin Amireghbali, Denizhan Yavas, *Middle East Technical University, Ankara, Turkey***6:25pm A Study of Creep Crack Incubation in Heat-Resistant Steels Using Finite Element Method and Strip-Yield Modeling****Technical Presentation.** IMECE2013-66557Mehdi Basirat, Gabriel Potirniche, *University of Idaho, Moscow, ID, United States*

TRACK 10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS / TUESDAY, NOVEMBER 19

10-39 MULTISCALE MODELING OF FATIGUE DAMAGE AND FAILURE MECHANICS

10-39-1 Multiscale Modeling of Fatigue Damage and Failure Mechanics I

3rd Floor, Manchester Grand Hyatt, Madeleine D 5:00pm–6:45pm

Session Organizer: **Mark Tschopp**, *Army Research Laboratory, Aberdeen Proving Ground, MD, United States*

Session Co-Organizer: **Kiran Solanki**, *Arizona State University, Tempe, AZ, United States*

5:00pm Mesoscopic Modeling Fatigue Crack Formation and Early Growth in 3D Polycrystalline Microstructures

Invited Presentation. IMECE2013-66858

David McDowell, *Georgia Institute of Technology, Atlanta, GA, United States*

5:21pm Mesoscopic Modeling Fatigue Crack Formation and Early Growth in 3D Polycrystalline Microstructures

Invited Presentation. IMECE2013-66859

David McDowell, *Georgia Institute of Technology, Atlanta, GA, United States*

5:42pm Atomistic Simulation of Fatigue Crack Growth in Single Crystal Aluminum

Extended Abstract Publication. IMECE2013-66084

Enqiang Lin, Yongming Liu, *Arizona State University, Tempe, AZ, United States*

6:03pm Evolution of Hardened and Softened Zones During Rolling Contact Fatigue (RCF) of M50NiL Steel Rods

Invited Presentation. IMECE2013-66847

Ghatu Subhash, *University of Florida, Gainesville, Gainesville, FL, United States*

6:24pm Understanding the Processing-Structure-Property Relationships in Single Crystal Nickel-Based Superalloys

Invited Presentation. IMECE2013-67360

Mark Tschopp, *Army Research Laboratory, Aberdeen Proving Ground, MD, United States*

10-43 FAILURE MECHANICS OF ADVANCED MATERIALS AND STRUCTURES

10-43-3 Failure of Composites and Heterogeneous Materials—I

3rd Floor, Manchester Grand Hyatt, Del Mar A 5:00pm–6:45pm

Session Organizer: **L. Roy Xu**, *New Mexico State University, Las Cruces, TX, United States*

Session Co-Organizer: **Demirkan Coker**, *Middle East Technical University, (METU-Ankara), Ankara, Turkey*

5:00pm Using Nanoindentation Technique to Predict Impact Force and Failure of Polymers and Composites

Technical Presentation. IMECE2013-65986

L. Roy Xu, *New Mexico State University, Las Cruces, TX, United States*

5:00pm Using Nanoindentation Technique to Predict Impact Force and Failure of Polymers and Composites

Technical Presentation. IMECE2013-65986

L. Roy Xu, *New Mexico State University, Las Cruces, TX, United States*

5:17pm Damage Monitoring in Advanced Composite Structures

Technical Presentation. IMECE2013-66378

Ajit Mal, Himadri Samajder, *University of California, Los Angeles, CA, United States*, Fabrizio Ricci, *University of Naples Federico II, Naples, Italy*, Harsh Baid, *AlphaSTAR Corporation, Long Beach, CA, United States*

5:34pm Stochastic Multiscale Modeling and Damage Progression for Composite Materials

Technical Presentation. IMECE2013-66566

Joel Johnston, Aditi Chattopadhyay, *Arizona State University, Tempe, AZ, United States*

5:51pm Effect of Thickness and Crack Size on the Dynamic Delamination of L-Shaped Unidirectional Composite Laminates

Technical Presentation. IMECE2013-66597

Demirkan Coker, Denizhan Yavas, MRAY Arca, Imren Uyar, *Middle East Technical University (METU-Ankara), Ankara, Turkey*, Burak Gozluclu, *Turkish Aerospace Industries (TAI), Ankara, Turkey*

6:08pm Damage and Failure Modeling of Textile Composite Structures - Part I

Invited Presentation. IMECE2013-66683

Anthony Waas, *University of Michigan, Ann Arbor, MI, United States*

6:25pm Damage and Failure Modeling of Textile Composite Structures - Part II

Invited Presentation. IMECE2013-66685

Anthony Waas, *University of Michigan, Ann Arbor, MI, United States*

WEDNESDAY, NOVEMBER 20

10-17 EFFECTS OF DEFECTS, DAMAGE TOLERANCE,
AND REPAIR OF COMPOSITES10-17-1 Effects of Defects, Damage Tolerance, and
Repair of Composites

4th Floor, Manchester Grand Hyatt, Randle A 9:45am–11:30am

Session Organizer: **Rani Elhajjar**, *University of Wisconsin–Milwaukee, Milwaukee, WI, United States*Session Co-Organizers: **Naveen Rastogi**, *Gulfstream Aerospace Corporation, Savannah, GA, United States*, **Gobinda C. Saha**, *Westpower Equipment Ltd./University of Calgary, Calgary, AB, Canada*9:45am Three-Dimensional Singular Antiplane Shear
Stress/Residual Stress Fields at Crack/Anticrack
Fronts in Off-Axis Unidirectional Composite Plates**Technical Presentation.** IMECE2013-62420Reaz Chaudhuri, *University of Utah, Salt Lake City, UT, United States*10:02am Three-Dimensional Singular Antiplane Shear Stress
Fields at the Fronts of Interfacial
Crack/Anticrack/Contact Type Discontinuities in
Tricrystal Anisotropic Plates**Technical Presentation.** IMECE2013-62475Reaz Chaudhuri, Jinyong Yoon, *University of Utah, Salt Lake City, UT, United States*10:19am Experimental and Computational Characterization of
Damage in Composite Materials**Technical Presentation.** IMECE2013-62560Paul Bauman, Tinsley Oden, Ernesto Prudencio, *Institute for Computational Engineering and Sciences, University of Texas at Austin, Austin, TX, United States*, Danial Faghghi, Krishnaswamy Ravi-Chandar, *University of Texas at Austin, Austin, TX, United States*10:36am Effective Spring Stiffness for a Periodic Array of
Interacting Coplanar Penny-Shaped Cracks at an
Interface Between Two Dissimilar Isotropic Materials**Technical Presentation.** IMECE2013-63188Huseyin Lekesiz, *Bursa Technical University, Bursa, Turkey*, Noriko Katsube, Stanislav Rokhlin, Robert Seghi, *Ohio State University, Columbus, OH, United States*10:53am Repair of Gouge and Scratch Damage in Laminated
and Sandwich Composite Structures**Technical Presentation.** IMECE2013-64492Rani Elhajjar, Sadegh Shams, *University of Wisconsin–Milwaukee, Milwaukee, WI, United States*11:10am A Hybrid Diffuse and Discrete Damage Prediction of
Composite Bonded Structures**Technical Presentation.** IMECE2013-65471Jim Lua, Eugene Fang, Tingting Zhang, *Global Engineering and Materials, Inc., Princeton, NJ, United States*10-20 SYMPOSIUM ON MECHANICS OF ADHESION
AND FRICTION

10-20-1 Mechanics of Adhesion and Friction I

3rd Floor, Manchester Grand Hyatt, Del Mar A 9:45am–11:30am

Session Organizer: **Jianliang Xiao**, *University of Colorado Boulder, Boulder, CO, United States*Session Co-Organizer: **Kenneth Liechti**, *University of Texas, Austin, TX, United States*

9:45am Nanoscale Friction and Adhesion on Graphene

Technical Presentation. IMECE2013-63872Rachel Cannara, *National Institute of Standards & Technology, Gaithersburg, MD, United States*

10:02am Nanoscale Friction and Adhesion on Graphene

Technical Presentation. IMECE2013-64452Rachel Cannara, *National Institute of Standards & Technology, Gaithersburg, MD, United States*10:19am Boundary Element Analysis of Adhesion Considering
van der Waals Force**Technical Paper Publication.** IMECE2013-64166Hideo Koguchi, Kyohei Seki, *Nagaoka University of Technology, Nagaoka, Niigata, Japan*

10:36am Mechanics of Self-Folding of Graphene

Technical Presentation. IMECE2013-65535Jianliang Xiao, *University of Colorado Boulder, Boulder, CO, United States*, Xianhong Meng, *Beihang University, Beijing, China*, Ming Li, *Dalian University of Technology, Dalian, China*

10:53am Adhesion Measurements for Large Area-Graphene

Technical Presentation. IMECE2013-65735Kenneth Liechti, Zhiyi Cao, Seung-Ryul Na, Wei Gao, Peng Wang, Ji Won Suk, Rui Huang, Rod Ruoff, *University of Texas at Austin, Austin, TX, United States*11:10am Atomically Tailored Functional Surfaces Using Self-
Assembled Monolayers**Technical Presentation.** IMECE2013-66781Amnaya Awasthi, Philippe Geubelle, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

TRACK 10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS / WEDNESDAY, NOVEMBER 20

10-24 SYMPOSIUM ON FRACTURE AND LIFETIME OF MATERIALS IN HONOR OF A. CHUDNOVSKY 75TH BIRTHDAY

10-24-1 Chudnovsky Symposium—1

3rd Floor, Manchester Grand Hyatt, Del Mar B 9:45am–11:30am

Session Organizer: **Clive Bosnyak**, *Molecular Rebar Design, Austin, TX, United States*

Session Co-Organizer: **Alexander B. Freidin**, *Institute for Problems in Mechanical Engineering, Russian Academy of Sciences, St. Petersburg, Russia*

9:45am **Fracture Mechanics: Past, Present, and Future Technical Presentation.** IMECE2013-62992
Alexander Chudnovsky, *University of Illinois at Chicago, Chicago, IL, United States*

10:11am **Chemical Affinity Tensor and Stress-Assist Chemical Reactions Front Propagation in Solids Technical Paper Publication.** IMECE2013-64957
Alexander B. Freidin, *Institute for Problems in Mechanical Engineering, Russian Academy of Sciences, St. Petersburg, Russia*

10:37am **Observation of Stress Corrosion Cracking in Engineering Materials (Field Failure Analysis) Technical Presentation.** IMECE2013-62710
Zhenwen Zhou, Alexander Chudnovsky, *University of Illinois at Chicago, Chicago, IL, United States*

11:03am **Reliability of Vibration Welded Polyamide 6 Joints Subject to Creep and Fatigue Loading Technical Presentation.** IMECE2013-66059
Haiying Zhang, Alexander Chudnovsky, Zhenwen Zhou, *University of Illinois at Chicago, Chicago, IL, United States*, Prasanna Kondapalli, *BASF Corporation, Ypsilanti, MI, United States*, William McMaster, Ankur Bhosale, Douglas Shearin, *BASF Corporation, Wyandotte, MI, United States*

10-26 HIGH STRAIN-RATE PHENOMENA: MODELING AND EXPERIMENT

10-26-1 High Strain Rate Phenomena and Durability and Lifetime Prediction I

3rd Floor, Manchester Grand Hyatt, Oxford 9:45am–11:30am

Session Organizer: **Tarek Hatem**, *British University in Egypt, El Shorouk City, Egypt*

Session Co-Organizer: **Yehia Bahei-El-Din**, *British University in Egypt, El Shorouk City, Egypt*

9:45am **Dynamic Comminution of Quasibrittle Solids at High-Rate Shear Under Impact and Analogy With Turbulence Invited Presentation.** IMECE2013-63808
Zdenek Bazant, *Northwestern University, Evanston, IL, United States*, Ferhun C. Caner, *Institute of Energy Technologies, Barcelona, Spain*

10:02am **Damage Evolution From Impact on Brittle Multi-Layered Targets Modeled With Peridynamics Technical Presentation.** IMECE2013-63634
Florin Bobaru, Yenan Wang, *University of Nebraska–Lincoln, Lincoln, NE, United States*, Jian Yu, Chian-Fong Yen, *U.S. Army Research Laboratory, Aberdeen Proving Ground, MD, United States*

10:19am **3-D Characterization of Global and Local Microstructural Effects on Spall Damage in Shock Loaded FCC Metals: Experiments and Modeling Technical Paper Publication.** IMECE2013-65642
Andrew Brown, Kapil Krishnan, Pedro Peralta, *Arizona State University, Tempe, AZ, United States*, Leda Wayne, *Arizona State University, Chandler, AZ, United States*, Sheng N. Luo, *The Peac Institute of Multiscale Sciences, Chengdu, Sichuan, China*, Darrin Byler, Brian Patterson, *Los Alamos National Lab, Los Alamos, NM, United States*

10:36am **Shock Initiated Implosion of a Tube within a Closed Tube: Experiments and Computational Simulations Technical Presentation.** IMECE2013-63765
Sachin Gupta, Arun Shukla, *University of Rhode Island, Kingston, RI, United States*, James LeBlanc, *Naval Undersea Warfare Center, Newport, RI, United States*

10:53am **Dynamic Response of Corrugated Sandwich Plates Under Shock Tube Loading Technical Paper Publication.** IMECE2013-63522
Jeong-ho Kim, Rainer Hebert, *University of Connecticut, Storrs, CT, United States*, Linhui Zhang, *Electro-Motive Diesel, Inc., LaGrange, United States*, Jefferson T. Wright, *University of Rhode Island, Kingstown, RI, United States*, Arun Shukla, *University of Rhode Island, Kingston, RI, United States*

11:10am **Ultraviolet Radiation Effect on the Mechanical Properties of Polyurea Technical Presentation.** IMECE2013-63646
Joseph Brinson, *California State University, Northridge, Valencia, CA, United States*, George Youssef, *California State University, Northridge, Northridge, CA, United States*

10-27 MECHANICS OF SOFT MATERIALS**10-27-5 Instability of Soft Materials I****4th Floor, Manchester Grand Hyatt, Randle B 9:45am–11:30am**Session Organizer: **Katia Bertoldi**, *Harvard University, Cambridge, MA, United States*Session Co-Organizer: **Xiangfa Wu**, *North Dakota State University, Fargo, ND, United States***9:45am Instabilities in Compressed Film-Substrate Systems: Wrinkling, Creasing, Delaminated Duckling, and Advanced Modes****Technical Presentation.** IMECE2013-63707Qiming Wang, Xuanhe Zhao, *Duke University, Durham, NC, United States***10:02am Topology Optimization of Nonlinear Periodic Structures****Technical Presentation.** IMECE2013-64047Johannes T.B. Overvelde, Katia Bertoldi, *Harvard University, Cambridge, MA, United States***10:19am Creases Formed at the Interface Between Two Soft Materials****Technical Presentation.** IMECE2013-65598Lihua Jin, Zhigang Suo, *Harvard University, Cambridge, MA, United States*, Dayong Chen, Ryan C. Hayward, *University of Massachusetts Amherst, Amherst, MA, United States***10:36am How the Double-Eyelid Forms: A Mechanical Interpretation****Technical Presentation.** IMECE2013-65890Xi Chen, Junfeng Xiao, *Columbia University, New York, NY, United States***10:53am Deterministic Surface Micro-Topography Through Sequential Wrinkling****Technical Presentation.** IMECE2013-66629Jie Yin, *Temple University, Philadelphia, PA, United States*, Jose L. Yague, *Massachusetts Institute of Technology, Cambridge, MA, United States***11:10am Instabilities in Electrospinning and Electrospun Nanofibers****Technical Presentation.** IMECE2013-62646Xiangfa Wu, Zhengping Zhou, Youhao Zhao, Meng Yu, *North Dakota State University, Fargo, ND, United States***10-27-9 Polymers I****4th Floor, Manchester Grand Hyatt, Randle D 9:45am–11:30am**Session Organizer: **Meredith Silberstein**, *Cornell University, Ithaca, NY, United States***9:45am Generalizing Polymer Nonwoven Mechanics****Technical Presentation.** IMECE2013-63831Meredith Silberstein, Naigeng Chen, *Cornell University, Ithaca, NY, United States***10:02am Mechanics of Air-Inflated Drop Stitch Fabric Panels Subject to Bending Loads****Technical Paper Publication.** IMECE2013-63839Paul Cavallaro, *Naval Undersea Warfare Center, Newport, RI, United States*, Christopher Hart, *Navatek Ltd., Fulton, MD, United States*, Ali Sadegh, *City University of New York, New York, NY, United States***10:19am Acoustic Properties of Ultraviolet-Exposed Polyurea****Technical Presentation.** IMECE2013-63906Ian Whitten, George Youssef, *California State University, Northridge, Northridge, CA, United States***10:36am Environmental Effects on Flexural Over-Strength Factor of Epoxy Resin Materials****Technical Paper Publication.** IMECE2013-64014Masoud Yekani Fard, Aditi Chattopadhyay, *Arizona State University, Tempe, AZ, United States*, Brian Raji, *Pipe Reconstruction Inc., Phoenix, AZ, United States***10:53am Effect of Swelling Behavior on Elastomeric Materials: Experimental and Numerical Investigation****Technical Paper Publication.** IMECE2013-64344Sayyad Zahid Qamar, Maaz Akhtar, Moosa S.M. Al-Kharusi, *Sultan Qaboos University, Al-Khodh, Muscat, Oman***11:10am Molecular Confinement Control of Large Deformation Response in Glassy Nanostructures****Technical Presentation.** IMECE2013-66802Pavan Kolluru, Ioannis Chasiotis, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

TRACK 10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS / WEDNESDAY, NOVEMBER 20

10-28 SIZE SCALE EFFECTS IN FRACTURE PROCESS

10-28-1 Size Scale Effects in Fracture Process

4th Floor, Manchester Grand Hyatt, Randle E 9:45am–11:30am

Session Organizer: **Raghu V. Prakash**, *Indian Institute of Technology Madras, Chennai, India*

Session Co-Organizer: **C.T. Sun**, *Purdue University, West Lafayette, IN, United States*

9:45am Investigation of Scaling Effects on Post-Fatigue Residual Strength of Nanoclay Added GFRP Composites

Technical Paper Publication. IMECE2013-62916
N.S. Kavitha, Raghu V. Prakash, *Indian Institute of Technology Madras, Chennai, India*

10:11am Material Characterization and Fracture Mechanics of Laser Machined Sapphire for High Temperature Pressure Sensors

Technical Presentation. IMECE2013-63965
Justin Collins, William Oates, *Florida State University, Tallahassee, FL, United States*, David Mills, Daniel Blood, Mark Sheplak, *University of Florida, Gainesville, FL, United States*

10:37am Fracture Toughness Variation Induced by Geometric Confinement in Nanostructures

Technical Paper Publication. IMECE2013-64976
Shao-Huan Cheng, C.T. Sun, *Purdue University, West Lafayette, IN, United States*

11:03am Microstructural Modeling of Dynamic Intergranular and Transgranular Failure Modes in Crystalline Alloys

Extended Abstract Presentation. IMECE2013-66702
Qifeng Wu, Shoayb Ziaei, Mohammed Zikry, *North Carolina State University, Raleigh, NC, United States*

10-33 MULTI-PHYSICS SIMULATIONS AND EXPERIMENTS FOR SOLIDS

10-33-2 Multi-Physics Coupling with Diffusion and Transport

3rd Floor, Manchester Grand Hyatt, Ford C 9:45am–11:30am

Session Organizer: **Caglar Oskay**, *Vanderbilt University, Nashville, TN, United States*

Session Co-Organizer: **Hanqing Jiang**, *Arizona State University, Tempe, AZ, United States*

9:45am A Physically Transient Form of Silicon Electronics—Part I

Technical Presentation. IMECE2013-63783
Young Huang, *Northwestern University, Evanston, IL, United States*

10:06am A Physically Transient Form of Silicon Electronics—Part II

Technical Presentation. IMECE2013-63784
Young Huang, *Northwestern University, Evanston, IL, United States*

10:27am Study for Time-Dependent Dielectrophoretic Concentration of Viral Particles for Highly Sensitive Sensors

Technical Presentation. IMECE2013-64953
Hyun-Boo Lee, Jong-Hoon Kim, Jae-hyun Chung, *University of Washington, Seattle, WA, United States*, Woon-Hong Yeo, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*, Kyong-Hoon Lee, *NanoFactory, Inc., Bellevue, WA, United States*

10:48am A Three-Field (Displacement-Pressure-Concentration) Formulation for Coupled Transport-Deformation Problems

Technical Presentation. IMECE2013-63603
Caglar Oskay, Hao Yan, *Vanderbilt University, Nashville, TN, United States*

11:09am Phase Field Simulations on the Concurrent Plastic Large Deformation and Diffusion

Technical Presentation. IMECE2013-65290
Yonghao An, Hanqing Jiang, *Arizona State University, Tempe, AZ, United States*, Ming Tang, *Lawrence Livermore National Laboratory, Livermore, CA, United States*

10-35 WAVE TAILORING MATERIALS AND ACOUSTIC META-MATERIALS

10-35-1 Wave Tailoring Materials and Acoustic Meta-Materials

3rd Floor, Manchester Grand Hyatt, Ford A 9:45am–11:30am

Session Organizer: **John Lambros**, *University of Illinois, Urbana, United States*

9:45am A Dispersive/Dissipative Multiscale Computational Model for Viscoelastic Composites

Technical Presentation. IMECE2013-63609
Tong Hui, Caglar Oskay, *Vanderbilt University, Nashville, TN, United States*

9:58am Strain-Rate Dependent Contact Law for Elastic-Perfectly Plastic Spheres Excited by an Impact

Technical Presentation. IMECE2013-64838
Hayden Burgoyne, Christian Kettenbeil, Guruswami Ravichandran, *Caltech, Pasadena, CA, United States*, Chiara Daraio, *ETH Zurich, Zurich, Switzerland*

10:11am Elasto-Plastic Wave Propagation in 2-D Ordered Granular Packings

Technical Presentation. IMECE2013-64870
Erheng Wang, Amnaya Awasthi, Robert Waymel, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*, Philippe Geubelle, John Lambros, *University of Illinois, Urbana, IL, United States*

10:24am Wave Propagation in Ordered 2D Arrays of Disks

Technical Presentation. IMECE2013-64879
Robert Waymel, Raj Kumar Pal, Erheng Wang, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*, Philippe Geubelle, John Lambros, *University of Illinois, Urbana, IL, United States*

10:37am Computational Simulations of Wave Propagation in Microcrack-Damaged Media Under Prestress**Technical Presentation.** IMECE2013-64984Dattatraya Sahane, Michael H. Santare, *University of Delaware, Newark, DE, United States*, George A. Gazonas, *U.S. Army Research Laboratory, Aberdeen Proving Ground, MD, United States***10:50am Wave Propagation in Multistable Hexagonal Lattices****Technical Presentation.** IMECE2013-65174Julian Rimoli, Massimo Ruzzene, *Georgia Institute of Technology, Atlanta, GA, United States***11:03am Plane Wave Propagation in Periodic Granular Media****Technical Presentation.** IMECE2013-65336Mohith Manjunath, Amnaya Awasthi, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*, Philippe Geubelle, *University of Illinois, Urbana, IL, United States***11:16am Pre-Conditioning as a Means for Achieving High Amplitude Wave Propagation in 1D Chains and for Creating Force Chains in 2D Granular Media****Technical Presentation.** IMECE2013-65341Amnaya Awasthi, Raj Kumar Pal, Mohith Manjunath, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*, Philippe Geubelle, *University of Illinois, Urbana, IL, United States***10-36 FATIGUE AND FRACTURE OF ENGINEERING MATERIALS AND STRUCTURES****10-36-3 Fatigue Failure II****3rd Floor, Manchester Grand Hyatt, Ford B 9:45am–11:30am**Session Organizer: **Olanrewaju Aluko**, *University of Michigan-Flint, Flint, MI, United States***9:45am Effects of Nonmetallic Inclusions on the Fatigue Notch Factor of Polycrystalline Nickel-Base Superalloy****Technical Presentation.** IMECE2013-63230Oluwamayowa Okeyoyin, Gbadebo Owolabi, *Howard University, Washington, DC, United States***10:00am Fatigue Behavior of PT-20%IR Coils Used As Implanted Electrodes in Medical Device****Technical Paper Publication.** IMECE2013-63779Haitao Zhang, Bernard Q. Li, *Medtronic Corporation, Minneapolis, MN, United States***10:15am Effect of Alloying Elements on Creep and Fatigue Damage of Ni-base Superalloy Caused by Strain-Induced Anisotropic Diffusion****Technical Paper Publication.** IMECE2013-64314Ken Suzuki, Tomohiro Sano, Hideo Miura, *Tohoku University, Sendai, Japan***10:30am Incorporating Micro-Thermo-Mechanical Damage Model in Life Prediction Analysis of a Turbine Engine Blade to Disk Attachment****Technical Paper Publication.** IMECE2013-65583Sam Naboulsi, *Wright-Patterson Air Force Base, WPAFB, OH, United States***10:45am Transition From Low Cycle to High Cycle in Uniaxial Fatigue****Technical Paper Publication.** IMECE2013-66202Mohamed El-Sayed, *Kettering University, Flint, MI, United States***11:00am A Novel Nonlocal Particle Model for Elasticity and Plasticity Analysis****Technical Presentation.** IMECE2013-64061Hailong Chen, Yongming Liu, *Arizona State University, Tempe, AZ, United States***11:15am A Parametric Study on Failure of Pin-Loaded Unidirectional-Woven Composite Joints****Technical Paper Publication.** IMECE2013-63961Olanrewaju Aluko, *University of Michigan-Flint, Flint, MI, United States***10-20 SYMPOSIUM ON MECHANICS OF ADHESION AND FRICTION****10-20-2 Mechanics of Adhesion and Friction II****3rd Floor, Manchester Grand Hyatt, Del Mar A 1:00pm–2:45pm**Session Organizer: **Frank DelRio**, *National Institute of Standards and Technology, Gaithersburg, MD, United States*Session Co-Organizer: **Jianliang Xiao**, *University of Colorado Boulder, Boulder, CO, United States***1:00pm Adhesion of Membranes and Shells: Applications in Biological and Electronic Structures (I)****Technical Presentation.** IMECE2013-64896Kai Tak Wan, Jiayi Shi, Xin Wang, Sinan Muftu, April Gu, *Northeastern University, Boston, MA, United States***1:15pm Adhesion of Membranes and Shells: Applications in Biological and Electronic Structures (II)****Technical Presentation.** IMECE2013-64900Kai Tak Wan, *Northeastern University, Boston, MA, United States***1:30pm Eliminating Peel Stress in Adhesive Lap Joints****Technical Presentation.** IMECE2013-65040Hamed Abdi, Jim Papadopoulos, Ashkan Vaziri, *Northeastern University, Boston, MA, United States***1:45pm A Viscoelastic Asperity Model for Rate and State Friction****Technical Presentation.** IMECE2013-65327Srivatsan Hulikal, Nadia Lapusta, Kaushik Bhattacharya, *California Institute of Technology, Pasadena, CA, United States***2:00pm Relating Local Surface Interactions to Macroscopic Sliding****Technical Presentation.** IMECE2013-65560Jeffrey Streator, *Georgia Institute of Technology, Atlanta, GA, United States***2:15pm Experimental Evidence of Micromechanical Mechanisms Controlling the Onset of Slip-Stick Instability****Technical Paper Publication.** IMECE2013-65783Paul Selvadurai, Steven D. Glaser, *University of California, Berkeley, Berkeley, CA, United States*

TRACK 10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS / WEDNESDAY, NOVEMBER 20

2:30pm Multiscale Simulation Dynamic Wetting, Droplet Spreading, and Cell Motility

Technical Presentation. IMECE2013-66810

Shaofan Li, *University of California, Berkeley, Berkeley, CA, United States*

10-24 SYMPOSIUM ON FRACTURE AND LIFETIME OF MATERIALS IN HONOR OF A. CHUDNOVSKY 75TH BIRTHDAY

10-24-2 Chudnovsky Symposium—2

3rd Floor, Manchester Grand Hyatt, Del Mar B 1:00pm–2:45pm

Session Organizer: **Andrej Cherkaev**, *University of Utah, Salt Lake City, Utah, United States*

1:00pm On Foundations of Astrophysics and Cosmology

Technical Presentation. IMECE2013-65969

Samvel Grigorian, *Moscow University, Moscow, Russia*

1:21pm Pre-Yield Shear in Glasses

Technical Paper Publication. IMECE2013-62299

Alexander Patashinski, *Northwestern University, Evanston, IL, United States*

1:42pm Spectral Modeling and Characterization of Microdamage in Composites

Technical Presentation. IMECE2013-65361

Elena Cherkaev, *University of Utah, Salt Lake City, UT, United States*

2:03pm Maxwell Homogenization Scheme for Elastic Material Containing Inhomogeneities of Non-Ellipsoidal Shape

Technical Presentation. IMECE2013-65658

Igor Sevostianov, *New Mexico State University, Las Cruces, NM, United States*

2:24pm Beyond Classical Thermodynamics: An Update

Technical Presentation. IMECE2013-65360

Victor Berdichevsky, *Wayne State University, Detroit, MI, United States*

10-27 MECHANICS OF SOFT MATERIALS

10-27-6 Instability of Soft Materials II

4th Floor, Manchester Grand Hyatt, Randle B 1:00pm–2:45pm

Session Organizer: **Nanshu Lu**, *University of Texas at Austin, Austin, TX, United States*

Session Co-Organizer: **Katia Bertoldi**, *Harvard University, Cambridge, MA, United States*

1:00pm Exploiting Instability to Design 3D Soft Metamaterials

Technical Presentation. IMECE2013-65257

Sahab Babaee, Jongmin Shim, Pai Wang, James Weaver, Nikita Patel, Elithabeth Chen, Katia Bertoldi, *Harvard University, Cambridge, MA, United States*

1:17pm Geometry and Mechanics in Bioinspired Multistable Structures

Technical Presentation. IMECE2013-64834

Zi Chen, *Washington University in St. Louis, Saint Louis, MO, United States*, Qiaohang Guo, *Fujian Institute of Technology, Fuzhou, China*, Steven Shillig, *Douglas Holmes, Virginia Technology, Blacksburg, VA, United States*, Kevin Chu, *Serendipity Research, Mountain View, CA, United States*, Chi Li, *Stony Brook, State University of New York, Fire Island, NY, United States*

1:34pm Wrinkling of PDMS Films on Ecoflex Substrates

Technical Presentation. IMECE2013-64666

Nanshu Lu, *University of Texas at Austin, Austin, TX, United States*

1:51pm Buckling Patterns of Core/Shell Structures With Fluid Core and Solid Shell

Technical Presentation. IMECE2013-66122

Junfeng Xiao, Xi Chen, *Columbia University, New York, NY, United States*

2:08pm Magnetoactive Elastomers in Finite Deformations: Actuation and Instabilities

Technical Presentation. IMECE2013-66357

Stephan Rudykh, *Massachusetts Institute of Technology, Cambridge, MA, United States*

2:25pm Local-Nonlocal Electromechanical Instability Transition

Technical Presentation. IMECE2013-63708

Qiming Wang, Xuanhe Zhao, *Duke University, Durham, NC, United States*

10-27-10 Polymers II

4th Floor, Manchester Grand Hyatt, Randle D 1:00pm–2:45pm

Session Organizer: **Sinan Keten**, *Northwestern University, Evanston, IL, United States*

1:00pm The Free Energy Landscape of Cellulose Nanocrystals and Its Effect on Composite Strength

Technical Presentation. IMECE2013-65403

Shawn Mishra, Sinan Keten, *Northwestern University, Evanston, IL, United States*

1:17pm The Maximal Advance Path Constraint for the Homogenization of Soft Matter Materials

Technical Presentation. IMECE2013-66979

Christian Linder, *Stanford University, Stanford, CA, United States*

1:34pm Modeling Nanoindentation Behavior of Viscoelastic Material

Technical Paper Publication. IMECE2013-65578

Hasan Faisal, Mohammad Hossain, Rafiqul A. Tarefder, *University of New Mexico, Albuquerque, NM, United States*

1:51pm Theory of Hydrogel Lubrication

Technical Presentation. IMECE2013-64929

Jeffrey Sokoloff, *Northeastern University, Boston, MA, United States*

2:08pm Effect of Geometry on Performance of Swellable Elastomeric Seals for Oil and Gas Applications**Technical Presentation.** IMECE2013-65960Benjamin Druecke, A.E. Hosoi, *Massachusetts Institute of Technology, Cambridge, MA, United States*, E.B. Dussan V., *Schlumberger-Doll Research, Cambridge, MA, United States*, Nathan Wicks, *Schlumberger, Cambridge, MA, United States***2:25pm Swellable Elastomer for Zonal-Isolation in Oilfield****Technical Presentation.** IMECE2013-63612Yucun Lou, *Schlumberger-Doll Research, Cambridge, MA, United States***10-33 MULTI-PHYSICS SIMULATIONS AND EXPERIMENTS FOR SOLIDS****10-33-3 Soft Materials****4th Floor, Manchester Grand Hyatt, Randle A 1:00pm–2:45pm**Session Organizer: **Lingyu Sun**, *Beihang University, Beijing, China*Session Co-Organizer: **Huanyu Cheng**, *Northwestern University, Evanston, IL, United States***1:00pm Rheology of Creasesrecent Computation and Experiment – Part I****Technical Presentation.** IMECE2013-62756Zhigang Suo, *Harvard University, Cambridge, MA, United States***1:17pm Rheology of Creasesrecent Computation and Experiment – Part II****Technical Presentation.** IMECE2013-62757Zhigang Suo, *Harvard University, Cambridge, MA, United States***1:34pm Epidermal Differential Impedance Sensor for Conformal Skin Hydration Monitoring****Technical Presentation.** IMECE2013-63760Xian Huang, John Rogers, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*, Huanyu Cheng, Young Huang, *Northwestern University, Evanston, IL, United States***1:51pm Investigation on Field-Response Performance of Magnetic-Sensitive Rubber by Impact Experiments With Adjustable Magnetic Fields****Technical Paper Publication.** IMECE2013-62918Yi Cheng, Lingyu Sun, Weiwei Chen, Dingxin Leng, Zhongheng Guo, *Beihang University, Beijing, Beijing, China*, Dengfeng Wang, *State Key Laboratory of Automotive Simulation and Control, Changchun, Jilin, China***2:08pm Modeling the Circular Shear in Light Activated Shape Memory Polymers With Three Networks****Technical Paper Publication.** IMECE2013-65048Fangda Cui, *New Jersey Institute of Technology, Harrison, NJ, United States*, I. Joga Rao, *New Jersey Institute of Technology, Newark, NJ, United States***2:25pm Modeling and Simulation of the Nanomechanics of Collagen Microfibrils****Technical Presentation.** IMECE2013-65462Dong Qian, Zhong Zhou, Majid Minary, *University of Texas at Dallas, Richardson, TX, United States***10-34 MULTISCALE COMPUTATIONS IN FLUIDS, STRUCTURES, AND MATERIALS****10-34-1 Multiscale Computations in Fluids, Structures, and Materials 1****4th Floor, Manchester Grand Hyatt, Randle E 1:00pm–2:45pm**Session Organizer: **Yozo Mikata**, *Bechtel, Niskayuna, NY, United States*Session Co-Organizer: **Glaucio Paulino**, *University of Illinois, Urbana, IL, United States*Session Chair: **Abhijit Dasgupta**, *University of Maryland, College Park, College Park, MD, United States*Session Co-Chair: **Jake Ostien**, *Sandia National Laboratories, Livermore, CA, United States***1:00pm Dispersion Relations of 1D and 3D Peridynamics****Technical Presentation.** IMECE2013-65837Yozo Mikata, *Bechtel, Niskayuna, NY, United States***1:17pm Coupling Peridynamics and Classical Finite Elements****Technical Presentation.** IMECE2013-63919David Littlewood, *Sandia National Laboratories, Albuquerque, NM, United States***1:34pm Concurrent Multiple-Time-Scale Simulations With Improved Numerical Dissipation for Structural Dynamics****Technical Paper Publication.** IMECE2013-64642Tejas Ruparel, James Lee, *George Washington University, Washington, DC, United States*, Azim Eskandarian, *George Washington University, Ashburn, VA, United States***1:51pm Multiscale Analysis at Finite Temperature Using a Weighted Averaging Momentum Method****Technical Presentation.** IMECE2013-62908Yongchang Lee, Cemal Basaran, *University at Buffalo, State University of New York, Buffalo, NY, United States***2:08pm An Enriched Space-Time Approach to Lattice Dynamic Crack****Technical Presentation.** IMECE2013-65478Dong Qian, *University of Texas at Dallas, Richardson, TX, United States***2:25pm Phase-Field Model of Grains Growth With Diffuse Grain Boundaries Coupled With Anisotropic Elasticity****Technical Presentation.** IMECE2013-65786Alexandra Woldman, Chad Landis, *University of Texas at Austin, Austin, TX, United States*

TRACK 10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS / WEDNESDAY, NOVEMBER 20

10-20 SYMPOSIUM ON MECHANICS OF ADHESION AND FRICTION

10-20-3 Mechanics of Adhesion and Friction III

3rd Floor, Manchester Grand Hyatt, Del Mar A 3:00pm–4:45pm

Session Organizer: **Yong Zhu**, *North Carolina State University, Raleigh, NC, United States*

Session Co-Organizer: **Nanshu Lu**, *University of Texas at Austin, Austin, TX, United States*

3:00pm Tunable Adhesion via Patterned Interface Used for Transfer Printing: Viscoelastic Analysis and Experiments (I)

Technical Presentation. IMECE2013-63785

Hang Chen, Xue Feng, *Tsinghua University, Beijing, Beijing, China*, Young Huang, *Northwestern University, Evanston, IL, United States*

3:17pm Tunable Adhesion via Patterned Interface Used for Transfer Printing: Viscoelastic Analysis and Experiments (II)

Technical Presentation. IMECE2013-65913

Hang Chen, Xue Feng, *Tsinghua University, Beijing, Beijing, China*, Young Huang, *Northwestern University, Evanston, IL, United States*

3:34pm A Viscoelastic Model for the Rate Effect in Transfer Printing

Technical Presentation. IMECE2013-63754

Huanyu Cheng, Young Huang, *Northwestern University, Evanston, IL, United States*, Jian Wu, *Tsinghua University, Beijing, China*, John Rogers, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

3:51pm Elastomer Seal With Frictional Contact—Analytical Solution

Technical Paper Publication. IMECE2013-64348

Moosa S.M. Al-Kharusi, Sayyad Zahid Qamar, Tasneem Pervez, *Sultan Qaboos University, Al-Khoud, Oman*, Maaz Akhtar, *NED University of Engineering and Technology, Karachi, Sindh, Pakistan*

4:08pm Measurement of PDMS-PDMS Interface Adhesion for Different Cross-Linking Densities and UVO Surface Treatment

Technical Presentation. IMECE2013-64673

Nanshu Lu, *University of Texas at Austin, Austin, TX, United States*

4:25pm Interfacial Mechanics Between Low-Dimensional Nanomaterials and Flexible Substrates

Technical Presentation. IMECE2013-65614

Yong Zhu, *North Carolina State University, Raleigh, NC, United States*

10-24 SYMPOSIUM ON FRACTURE AND LIFETIME OF MATERIALS IN HONOR OF A. CHUDNOVSKY 75TH BIRTHDAY

10-24-3 Chudnovsky Symposium—3

3rd Floor, Manchester Grand Hyatt, Del Mar B 3:00pm–4:45pm

Session Organizer: **Ephraim Suhir**, *University of California, Santa Cruz, Santa Cruz, CA, United States*

Session Co-Organizer: **John Evans**, *NASA, Greenbelt, MD, United States*

3:00pm On the Effects of Thickness on Bridging Traction and Toughness in Delamination of Composites Under Monotonic and Fatigue Loads

Technical Presentation. IMECE2013-64515

John Botsis, *Ebrahim Farmand-Ashtiani, EPFL, Lausanne, Switzerland*, Joel Cugnoni, *Institute of Mechanical Engineering/EPFL, Lausanne, Switzerland*

3:17pm A Multiscale Kinetic Model of Precipitative Restoration Processes in Austenite Steels

Technical Presentation. IMECE2013-65793

Mansoor Ariyan, *University of Illinois at Chicago, Chicago, IL, United States*, Eduard G. Karpov, *University of Illinois at Chicago, Glenview, IL, United States*

3:34pm Modeling Fracture Process in Ductile Materials

Technical Presentation. IMECE2013-66421

Sheng-Wei Chi, *University of Illinois at Chicago, Chicago, IL, United States*, Shih-Po Lin, *University of California, Los Angeles, Los Angeles, CA, United States*

3:51pm Damage Quantification Using Wave Propagation Data With Integrated Numerical and Experimental Approach

Technical Paper Publication. IMECE2013-65844

Zahra Heidary, *Didem Ozevin, University of Illinois at Chicago, Chicago, IL, United States*

4:08pm Numerical Modeling of Fracture and Failure in Jointed Earthen Structural Materials

Technical Presentation. IMECE2013-66123

Craig Foster, *David A. Weed, Adam Tennant, University of Illinois at Chicago, Chicago, IL, United States*

4:25pm The Equation of Dynamic Crack Growth

Technical Presentation. IMECE2013-62867

Michael O'Leary, *Sargent & Lundy, Chicago, IL, United States*, Alexander Chudnovsky, *University of Illinois, Chicago, IL, United States*

10-26 HIGH STRAIN-RATE PHENOMENA: MODELING AND EXPERIMENT**10-26-2 High Strain Rate Phenomena and Durability and Lifetime Prediction II****3rd Floor, Manchester Grand Hyatt, Oxford 3:00pm–4:45pm**Session Organizer: **Yehia Bahei-El-Din**, *British University in Egypt, El-Shorouk City, Egypt*Session Co-Organizer: **Tarek Hatem**, *British University in Egypt, El-Shorouk City, Egypt***3:00pm High-Strain Rate Uniaxial Confined Compressive Behavior of Mason Sand and Boulder Clay****Invited Presentation.** IMECE2013-65579Hongbing Lu, Huiyang Luo, Yingjie Du, Zhenxing Hu, *University of Texas at Dallas, Richardson, TX, United States*, William Cooper, *Eglin AFB, Defuniak Springs, FL, United States***3:17pm Development of a Sub-Structure Fatigue Frame for Composite Systems and Initial Results****Technical Presentation.** IMECE2013-66088David Miller, Daniel Samborsky, John F. Mandell, Michael Schuster, *Montana State University, Bozeman, MT, United States***3:34pm Energy Absorption Mechanisms in Hard Epoxy Resin Matrix Composite Laminates Subjected to Dynamic Loading Events****Technical Paper Publication.** IMECE2013-62283David Segala, Paul Cavallaro, *Naval Undersea Warfare Center, Newport, RI, United States***3:51pm Interfacial Shear Strength of Banana Fiber in Low-Density Polyethylene****Technical Paper Publication.** IMECE2013-64770Joshua Weed, *Baylor University, Waco, TX, United States*, William Jordan, *Baylor University, McGregor, TX, United States***4:08pm Matrix Rate Dependency in Continuous Filament Glass Fabric Composites****Invited Presentation.** IMECE2013-65747Leslie Lamberson, Logan Shannahan, *Drexel University, Philadelphia, PA, United States***4:25pm Explosive Interactions of Granular Media With Structures****Invited Presentation.** IMECE2013-67361Vikram Deshpande, *Cambridge University, Cambridge, United Kingdom***10-27 MECHANICS OF SOFT MATERIALS****10-27-7 Fracture of Soft Materials****4th Floor, Manchester Grand Hyatt, Randle B 3:00pm–4:45pm**Session Organizer: **Oscar Lopez-Pamies**, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*Session Co-Organizer: **Xuanhe Zhao**, *Duke University, Durham, NC, United States***3:00pm Evolution of Failure Mechanisms in Soft Materials****Technical Presentation.** IMECE2013-62686Toshio Nakamura, *Stony Brook University, State University of New York, Stony Brook, NY, United States*, Oscar Lopez-Pamies, *University of Illinois at Urbana-Champaign, Urbana, IL, United States***3:17pm Simulation of the Interface Reaction Controlled Anisotropy in Silicon Anode for Lithium Ion Batteries****Technical Presentation.** IMECE2013-65291Yonghao An, Hanqing Jiang, *Arizona State University, Tempe, AZ, United States*, Ming Tang, *Lawrence Livermore National Laboratory, Livermore, CA, United States***3:34pm Multifunctionality and Control of Large-Scale Nanostructures With Soft Materials****Technical Presentation.** IMECE2013-63338Xuanhe Zhao, *Duke University, Durham, NC, United States***3:51pm Flexoelectricity in Soft Materials****Technical Presentation.** IMECE2013-66448Pradeep Sharma, Qian Deng, *University of Houston, Houston, TX, United States*, Liping Liu, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States***4:08pm Mechanics of Biofilms****Technical Presentation.** IMECE2013-63716Xuanhe Zhao, *Duke University, Durham, NC, United States***4:25pm Experimental, Numerical, and Analytical Studies of Deformable Layered Materials****Technical Presentation.** IMECE2013-66508Stephan Rudykh, Christine Ortiz, Mary Boyce, *Massachusetts Institute of Technology, Cambridge, MA, United States*

TRACK 10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS / WEDNESDAY, NOVEMBER 20

10-33 MULTI-PHYSICS SIMULATIONS AND EXPERIMENTS FOR SOLIDS

10-33-4 Multiscale Mechanics of Material

4th Floor, Manchester Grand Hyatt, Randle A 3:00pm–4:45pm

Session Organizer: **Vikas Tomar**, *Purdue University, West Lafayette, IN, United States*

Session Co-Organizer: **Zhen Chen**, *University of Missouri–Columbia, Columbia, MO, United States*

3:00pm Phase Field Simulation of Polycrystalline Dynamics Based on a Dislocations-Introduced Grain Boundary Model

Technical Presentation. IMECE2013-65733
Su Hao, *ACII, Inc., Irvine, CA, United States*

3:17pm The Effect of Helium Point Defects on the Tensile Strength of Irradiated Tungsten Nanostructures

Technical Presentation. IMECE2013-64848
You Sung Han, *Vikas Tomar, Purdue University, West Lafayette, IN, United States*

3:34pm Discrete Dislocation Plasticity at Finite Temperatures

Technical Presentation. IMECE2013-66672
A. Amine Benzerga, *Texas A&M University, College Station, TX, United States*, Shyam Keralavarma, *EPFL, Lausanne, Switzerland*

3:51pm The Size Effect on the Equation of State of Copper

Technical Presentation. IMECE2013-62827
Zhen Chen, *University of Missouri–Columbia, Columbia, MO, United States*

4:08pm Anisotropic Third-Order Bounds of Polydisperse Granular Mixtures

Technical Presentation. IMECE2013-64802
Andrew Gillman, *Karel Matous, University of Notre Dame, Notre Dame, IN, United States*

4:25pm Identification of Characteristic Thermo/Mechanical Length Scales in Metals From Gradient Plasticity and Molecular Dynamics Studies of Nano-Indentation

Technical Presentation. IMECE2013-64733
George Voyiadjis, *Dorel Moldovan, Cheng Zhang, Mohammadreza Yaghoobi, Louisiana State University, Baton Rouge, LA, United States*

10-34 MULTISCALE COMPUTATIONS IN FLUIDS, STRUCTURES, AND MATERIALS

10-34-2 Multiscale Computations in Fluids, Structures, and Materials 2

4th Floor, Manchester Grand Hyatt, Randle E 3:00pm–4:45pm

Session Organizer: **Yozo Mikata**, *Bechtel, Niskayuna, NY, United States*

Session Co-Organizer: **Glaucio Paulino**, *University of Illinois, Urbana, IL, United States*

Session Chair: **Dong Qian**, *University of Texas at Dallas, Richardson, TX, United States*

Session Co-Chair: **David Littlewood**, *Sandia National Laboratories, Albuquerque, NM, United States*

3:00pm Multiscale Modeling of Plasticity at the Nanoscale

Technical Presentation. IMECE2013-62985
Behrouz Shiari, *University of Michigan, Ann Arbor, MI, United States*

3:21pm Strongly Coupled Thermo-Hydro-Mechanical Simulations

Technical Presentation. IMECE2013-66261
Jake Ostien, *WaiChing Sun, Qiushi Chen, Sandia National Laboratories, Livermore, CA, United States*

3:42pm Concurrently Coupled Atomistic and Continuum Simulation of Polycrystalline Strontium Titanate

Technical Presentation. IMECE2013-63946
Shengfeng Yang, *Youping Chen, University of Florida, Gainesville, FL, United States*

4:03pm Phonon Transport in Si/SiGe Superlattices by Coarse-Grained Atomistic Simulations

Technical Presentation. IMECE2013-65980
Liming Xiong, *Youping Chen, University of Florida, Gainesville, FL, United States*

4:24pm Multiscale Modeling of Anisotropic Creep Response of Heterogeneous Single Crystal SnAgCu Solder

Technical Presentation. IMECE2013-67016
Subhasis Mukherjee, *Abhijit Dasgupta, University of Maryland, College Park, College Park, MD, United States*, Thomas R. Bieler, *Bite Zhou, Michigan State University, East Lansing, MI, United States*

10-39 MULTISCALE MODELING OF FATIGUE DAMAGE AND FAILURE MECHANICS**10-39-2 Multiscale Modeling of Fatigue Damage and Failure Mechanics II****4th Floor, Manchester Grand Hyatt, Randle D 3:00pm–4:45pm**Session Organizer: **Dong Qian**, *University of Texas at Dallas, Richardson, TX, United States*Session Co-Organizer: **J. Brian Jordon**, *University of Alabama, Tuscaloosa, AL, United States***3:00pm Material Anisotropy, Microstructure Heterogeneity and Non-Local Effects on Fatigue Crack Nucleation and Propagation in Metals: Insights From Experiments and Modeling****Invited Presentation.** IMECE2013-66853Pedro Peralta, *Arizona State University, Tempe, AZ, United States***3:21pm Material Anisotropy, Microstructure Heterogeneity and Non-Local Effects on Fatigue Crack Nucleation and Propagation in Metals: Insights From Experiments and Modeling****Invited Presentation.** IMECE2013-66854Pedro Peralta, *Arizona State University, Tempe, AZ, United States***3:42pm Closely Coupled Multiscale Model in Predicting Mechanical Deformation Behavior of Polycrystalline Materials****Invited Presentation.** IMECE2013-66855Dongsheng Li, *Pacific Northwest National Laboratory, Richland, WA, United States***4:03pm Evolution of Zirconium Hydrides Under Thermal and Mechanical Influences: Phase Field Modeling****Invited Presentation.** IMECE2013-66870Wei-Feng Rao, *Idaho National Laboratory, Idaho Falls, ID, United States***4:24pm A Mechanistic Approach to Model Micro-Cracking in Nuclear Fuels During Transient Conditions****Invited Presentation.** IMECE2013-66852Pritam Chakraborty, *Battelle Energy Alliance LLC, Idaho Falls, ID, United States***10-23 MECHANICS OF ELECTROCHEMICAL ENERGY STORAGE MATERIALS****10-23-1 Mechanics of Electrochemical Energy Storage Materials—I****3rd Floor, Manchester Grand Hyatt, Del Mar A 5:00pm–6:45pm**Session Organizer: **Shuman Xia**, *Georgia Institute of Technology, Atlanta, GA, United States*Session Co-Organizer: **Ting Zhu**, *Woodruff School of Mechanical Engineering, Atlanta, GA, United States***5:00pm Invited I: Fracture, Ratcheting, Delamination in Silicon Thin Film Electrodes on Substrates During Lithiation/Delithiation Cycles****Invited Presentation.** IMECE2013-65882Hamed Haftbaradaran, *Huajian Gao, Brown University, Providence, RI, United States*, Xingcheng Xiao, *General Motors, Warren, MI, United States***5:21pm Invited II: Fracture, Ratcheting, Delamination in Silicon Thin Film Electrodes on Substrates During Lithiation/Delithiation Cycles****Invited Presentation.** IMECE2013-65884Hamed Haftbaradaran, *Huajian Gao, Brown University, Providence, RI, United States*, Xingcheng Xiao, *General Motors, Warren, MI, United States***5:42pm In Situ Nanomechanics of Electrode Failure in Lithium-Ion Batteries****Technical Presentation.** IMECE2013-66302Ting Zhu, *Woodruff School of Mechanical Engineering, Atlanta, GA, United States***6:03pm A Beaded-String Silicon Anode for Lithium Ion Battery****Technical Presentation.** IMECE2013-66473Zheng Jia, *Teng Li, University of Maryland, College Park, MD, United States***6:24pm Stress-Modulated Driving Force for Lithiation Reaction in Hollow Nano-Anodes****Technical Presentation.** IMECE2013-66496Teng Li, *Zheng Jia, University of Maryland, College Park, MD, United States*

TRACK 10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS / WEDNESDAY, NOVEMBER 20

10-24 SYMPOSIUM ON FRACTURE AND LIFETIME OF MATERIALS IN HONOR OF A. CHUDNOVSKY 75TH BIRTHDAY

10-24-4 Chudnovsky Symposium—4

3rd Floor, Manchester Grand Hyatt, Del Mar B 5:00pm–6:45pm

Session Organizer: **Igor Palley**, *Honeywell, Madison, WI, United States*

5:00pm **New Insights Into Controlling Sub-Micron Failure Mechanisms in Composites Using Discrete Functionalized Multiwall Carbon Nanotubes**

Technical Paper Publication. IMECE2013-62501
Clive Bosnyak, Douglas Hunter, Andrew Stewart, Kurt W. Swogger, *Molecular Rebar Design, Austin, TX, United States*, Zhenwen Zhou, *University of Illinois at Chicago, Chicago, United States*

5:17pm **Extending the Lifetime of Electronic Products by Reversing the Manufacturing Process**

Technical Presentation. IMECE2013-63052
Joseph Fjelstad, *Verdant Electronics, Maple Valley, United States*

5:34pm **Observation and Evaluation of Scratch Damage Characteristics of Injection Molded, Rubber Toughened Poly(methylmethacrylate)**

Technical Paper Publication. IMECE2013-63417
Jihun An, Byung-Hyun Kang, Byoung-Ho Choi, *Korea University, Seoul, Korea (Republic)*, Hyoung-jun Kim, *LG Electronics, Pyeongtaek, Korea (Republic)*

5:51pm **On Utilization of Material Failure Criterion in Modeling Pull-Out Failure of Spot-Welded Joints**

Technical Paper Publication. IMECE2013-62536
Long Zeng, Yong Xia, He Zhao, Qing Zhou, *Tsinghua University, Beijing, China*

6:08pm **Analysis and Life Testing for Design of Cryogenic Bearing Assemblies on the James Webb Space Telescope Optical Telescope Element**

Technical Paper Publication. IMECE2013-62988
John Evans, Jacob Burke, Mat Samuel, *NASA, Greenbelt, MD, United States*, Allison Barto, Benjamin Gallagher, Paul Finley, *Ball Aerospace Technology Corporation, Boulder, CO, United States*

6:25pm **Dynamic Response of Electronic Systems to Shocks and Vibrations**

Technical Presentation. IMECE2013-62140
Ephraim Suhir, *University of California, Santa Cruz, Santa Cruz, CA, United States*

10-27 MECHANICS OF SOFT MATERIALS

10-27-8 Tunable Soft Materials

4th Floor, Manchester Grand Hyatt, Randle B 5:00pm–6:45pm

Session Organizer: **Christopher Yakacki**, *University of Colorado Denver, Denver, CO, United States*

Session Co-Organizer: **Katia Bertoldi**, *Harvard University, Cambridge, MA, United States*

5:00pm **Periodic Structures With Multiple Folding Mechanisms**

Technical Presentation. IMECE2013-63895
Sicong Shan, Sung Kang, Elithabeth Chen, James Weaver, Katia Bertoldi, *Harvard University, Cambridge, MA, United States*, Cangyu Qu, *Tsinghua University, Beijing, China*

5:17pm **Tunable Phononic Band-Gap Structures Undergoing Pattern Transformation**

Technical Presentation. IMECE2013-63939
Jongmin Shim, *University at Buffalo, State University of New York, Buffalo, United States*, Pai Wang, *Harvard University, Cambridge, MA, United States*

5:34pm **Tunable Phononic Crystals Through Dielectric Elastomers**

Technical Presentation. IMECE2013-64454
David Henann, *Brown University, Providence, RI, United States*

5:51pm **A Two-Stage Reaction to Mechanically Orient Mesogens in Liquid-Crystalline Elastomers**

Technical Presentation. IMECE2013-64680
Christopher Yakacki, Scott Reed, *University of Colorado Denver, Denver, CO, United States*, Mohand Saed, *University of Colorado Denver, Aurora, CO, United States*, Tao Gong, Christopher Bowman, *University of Colorado Boulder, Boulder, CO, United States*

6:08pm **Numerical Modeling of the Nonlinear Elastic Response of Filled Elastomers via Composite-Sphere Assemblage**

Technical Presentation. IMECE2013-65445
Oscar Lopez-Pamies, Taha Goudarzi, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

6:25pm **Mechanics of Tunable Hemispherical Electronic Eye Camera Systems That Combine Rigid Device Elements With Soft Elastomers**

Technical Presentation. IMECE2013-65532
Chaofeng Lu, *Zhejiang University, Hangzhou, Zhejiang, China*, Jianliang Xiao, *University of Colorado Boulder, Boulder, CO, United States*, Young Huang, *Northwestern University, Evanston, IL, United States*

10-33 MULTI-PHYSICS SIMULATIONS AND EXPERIMENTS FOR SOLIDS**10-33-5 Multiscale and Multi-Physics Modeling and Simulation (I)****4th Floor, Manchester Grand Hyatt, Randle A 5:00pm–6:45pm**Session Organizer: **H. Eliot Fang**, *Sandia National Laboratories, Albuquerque, NM, United States*Session Co-Organizer: **Huijuan Zhao**, *Clemson University, Clemson, SC, United States***5:00pm Making Nanomechanics Simulations Physical Response EAM Potentials****Technical Presentation.** IMECE2013-65762Hanchen Huang, *University of Connecticut, Storrs, CT, United States***5:21pm Pseudomagnetic Field in a Graphene Drumhead Under Localized Deformation****Technical Presentation.** IMECE2013-66075Shuze Zhu, Yinjun Huang, Teng Li, *University of Maryland, College Park, MD, United States***5:42pm A Molecular Dynamics Study of Thermal Conductivity Design and Manipulation of Graphene****Technical Presentation.** IMECE2013-65782Chengjian Li, Gang Li, Huijuan Zhao, *Clemson University, Clemson, SC, United States***6:03pm Coupled Thermo-Mechanical Behavior of Granular Chains****Technical Presentation.** IMECE2013-66394Gulsad Kucuk, Marcial Gonzalez, Alberto Cuitino, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States***6:24pm Multiscale Simulations of Phonon-Dislocation Interactions****Technical Presentation.** IMECE2013-65979Liming Xiong, Youping Chen, *University of Florida, Gainesville, FL, United States*, David McDowell, *Georgia Institute of Technology, Atlanta, GA, United States***10-34 MULTISCALE COMPUTATIONS IN FLUIDS, STRUCTURES, AND MATERIALS****10-34-3 Multiscale Computations in Fluids, Structures, and Materials 3****4th Floor, Manchester Grand Hyatt, Randle E 5:00pm–6:45pm**Session Organizer: **Yozo Mikata**, *Bechtel, Niskayuna, NY, United States*Session Co-Organizer: **Glaucio Paulino**, *University of Illinois, Urbana, IL, United States*Session Chair: **Branislav Basara**, *AVL List GmbH, Graz, Austria*Session Co-Chair: **Masaaki Tamagawa**, *Kyushu Institute of Technology, Kitakyushu, Japan***5:00pm A Control Volume Based Numerical Method for Fluid-Structure Interaction Problems****Technical Presentation.** IMECE2013-63232Branislav Basara, *AVL List GmbH, Graz, Austria***5:17pm Flow, Transport, and Reactions in Fractured Porous Media****Technical Presentation.** IMECE2013-62888Valeri Mourzenko, Jean-François Thovert, *CNRS, Futuroscope, France (Metro)*, Lukasz Jasinski, Pierre Adler, *UPMC, Paris, France (Metro)***5:34pm Effects of Adhesion to Wall on Thrombus Formation Using Modified Lattice Boltzmann Method****Technical Presentation.** IMECE2013-66474Masaaki Tamagawa, *Kyushu Institute of Technology, Kitakyushu, Japan***5:51pm Coupled Simulation of Fire Structure Interaction Using AFIST****Technical Presentation.** IMECE2013-63644Charles Luo, Tingting Zhang, Jim Lua, *Global Engineering and Materials, Inc., Princeton, NJ, United States*, Brian Lattimer, *Virginia Technology, Blacksburg, VA, United States***6:08pm 3D Multiscale Analysis of Particle Size and Volume Fraction Effects on Failure of Thin Heterogeneous Layers****Technical Presentation.** IMECE2013-64769Matthew Mosby, *University of Notre Dame, Mishawaka, IN, United States*, Karel Matous, *University of Notre Dame, Notre Dame, IN, United States***6:25pm Multiscale Simulation of Mechano-Chemical Response in Energetic Composites Subject to Impact****Technical Presentation.** IMECE2013-66476Abilash Nair, *Rutgers, The State University of New Jersey, New Brunswick, NJ, United States*, Mathew Cherukara, Aaron Mason, Steven Son, Alejandro Strachan, *Purdue University, West Lafayette, IN, United States*, Alberto Cuitino, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*

TRACK 10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS / WEDNESDAY, NOVEMBER 20

10-39 MULTISCALE MODELING OF FATIGUE DAMAGE AND FAILURE MECHANICS

10-39-3 Multiscale Modeling of Fatigue Damage and Failure Mechanics III

4th Floor, Manchester Grand Hyatt, Randle D 5:00pm–6:45pm

Session Organizer: **Dongsheng Li**, *Pacific Northwest National Laboratory, Richland, WA, United States*

Session Co-Organizer: **Wei-Feng Rao**, *Idaho National Laboratory, Idaho Falls, ID, United States*

5:00pm **Keynote Lecture: Multi-Time Scaling Induced Image Based Crystal Plasticity FE Models for Predicting Fatigue in Polycrystalline Alloys**

Technical Presentation. IMECE2013-66757

Somnath Ghosh, *Johns Hopkins University, Baltimore, MD, United States*

5:17pm **Multi-Time Scaling Induced Image Based Crystal Plasticity FE Models for Predicting Fatigue in Polycrystalline Alloys**

Invited Presentation. IMECE2013-66813

Somnath Ghosh, *Johns Hopkins University, Baltimore, MD, United States*

5:34pm **A Multi-Temporal Scale Approach to High Cycle Fatigue**

Technical Presentation. IMECE2013-65520

Dong Qian, *University of Texas at Dallas, Richardson, TX, United States*, Sagar Bhamare, *Innova Engineering, Irvine, CA, United States*

5:51pm **A Probabilistic Strength Distribution Model in Predicting Damage Evolution Due to Thermo-Oxidation of Polymeric Matrix Composites**

Technical Paper Publication. IMECE2013-65222

Jianyong Liang, Kishore Pochiraju, *Stevens Institute of Technology, Hoboken, NJ, United States*

6:08pm **Toward Improving Fracture Toughness of Particle-Reinforced Polymer Matrix Composites**

Technical Paper Publication. IMECE2013-66221

Keyanoush Sadeghipour, Wenhai Wang, George Baran, *Temple University, Philadelphia, PA, United States*

6:25pm **Role of Interface Structure in Spallation of a Layered Copper-Niobium Nanocomposite**

Invited Presentation. IMECE2013-66867

Srinivasan Srivilliputhur, *University of North Texas, Denton, TX, United States*

10-43 FAILURE MECHANICS OF ADVANCED MATERIALS AND STRUCTURES

10-43-5 Fatigue and Time-Dependent Failure

3rd Floor, Manchester Grand Hyatt, Mohsen A 5:00pm–6:45pm

Session Organizer: **Guy Genin**, *Washington University in St. Louis, St. Louis, MO, United States*

Session Co-Organizer: **Xiaomin Deng**, *University of South Carolina, Columbia, SC, United States*

5:00pm **Fatigue Crack Growth and Propagation Along the Adhesive Interface Between Fiber-Reinforced Composites**

Technical Presentation. IMECE2013-65983

Xue Feng, *Tsinghua University, Beijing, Beijing, China*

5:15pm **FEM for 3D SIF Determination for Fatigue Crack Growth Simulations With Curved Crack Fronts and Paths**

Technical Presentation. IMECE2013-66339

Xiaomin Deng, Michael A. Sutton, Eileen E. Miller, *University of South Carolina, Columbia, SC, United States*, Xiaodan Ke, Hubert W. Schreier, *Correlated Solutions, Inc., Columbia, SC, United States*

5:30pm **Failure Mechanisms in a High-Performance Armor System: Teleost Fish Scales**

Technical Presentation. IMECE2013-66479

Lawrence J. Szeewciw, Deju Zhu, Francois Barthelat, *McGill University, Montreal, QC, Canada*, Franck Vernerey, *University of Colorado at Boulder, Boulder, CO, United States*

5:45pm **Keynote Presentation: ARL Basic Research Efforts in Solid Mechanics Part I**

Technical Presentation. IMECE2013-66412

Larry Russell, *U.S. Army, Whitsett, NC, United States*

6:00pm **Keynote Presentation: ARL Basic Research Efforts in Solid Mechanics, Part II**

Technical Presentation. IMECE2013-66631

Larry Russell, *U.S. Army, Whitsett, NC, United States*

6:15pm **The Science of Slipping Between the Cracks: Strain Mapping on a Failing Specimen**

Technical Presentation. IMECE2013-66714

John J. Boyle, Robert B. Pless, Guy Genin, *Washington University in St. Louis, St. Louis, MO, United States*, Victor Birman, *Missouri University of Science and Technology, Saint Louis, MO, United States*, Maiko Kume, Stavros Thomopoulos, *Washington University School of Medicine, Saint Louis, MO, United States*

6:30pm **Damage Mechanisms and Interactions in Dynamically Loaded Fiber-Reinforced Composites: Peridynamic Solutions**

Technical Presentation. IMECE2013-66093

Florin Bobaru, Yenan Wang, *University of Nebraska–Lincoln, Lincoln, NE, United States*

THURSDAY, NOVEMBER 21

10-24 SYMPOSIUM ON FRACTURE AND LIFETIME OF MATERIALS IN HONOR OF A. CHUDNOVSKY 75TH BIRTHDAY

10-24-5 Chudnovsky Symposium—5

4th Floor, Manchester Grand Hyatt, Randle E 7:45am–9:15am

Session Organizer: **Byoung-Ho Choi**, *Korea University, Seoul, Korea (Republic)*7:45am **Random Vibration Fatigue Frequency-Domain Critical Plane Approaches**

Technical Paper Publication. IMECE2013-62607
 Giovanni de Morais Teixeira, John Draper, *Safe Technology, Sheffield, South Yorkshire, United Kingdom*, Radwan Hazime, *ADACS, Inc., Dearborn Heights, MI, United States*, Dewi Jones, *Safe Technology Limited, Sheffield, United Kingdom*

8:00am **Damage and Failures of CGA/BGA Assemblies Under Thermal Cycling and Dynamic Loadings**

Technical Paper Publication. IMECE2013-63062
 Reza Ghaffarian, *JPL-CalTechnology, Pasadena, CA, United States*

8:15am **Failure Analysis on Used Engine Oils by Optical Spectrum**

Technical Presentation. IMECE2013-63214
 Jianfang Liu, *Wuhan Research Institute of Materials Protection; Wuhan Polytechnic University, Wuhan, China*, Jian Li, *Kali Gu, Wuhan Research Institute of Materials Protection, Wuhan, China*

8:30am **Applying an Energy-Based Fatigue Life Prediction Method to Unnotched and Notched AL6061-T6 Specimen**

Technical Paper Publication. IMECE2013-64485
 Sepehr Nesaei, Todd M. Letcher, Fereidoon Delfanian, *South Dakota State University, Brookings, SD, United States*

8:45am **Hysteresis Strain Energy Behavior of AL6061-T6 With Multi-Fatigue Load Levels as Applied to an Energy-Based Fatigue Life Prediction Method**

Technical Paper Publication. IMECE2013-64684
 Todd M. Letcher, Sepehr Nesaei, Cody Auen, Matthew Nielsen, Fereidoon Delfanian, *South Dakota State University, Brookings, SD, United States*

9:00am **Ductile Failure Prediction of Large Scale Aluminum Structures Under Static and Dynamic Loading**

Technical Presentation. IMECE2013-65491
 Jim Lua, Phillips Liu, Tingting Zhang, Michael Stuebner, Eugene Fang, *Global Engineering and Materials, Inc., Princeton, NJ, United States*

10-33 MULTI-PHYSICS SIMULATIONS AND EXPERIMENTS FOR SOLIDS

10-33-6 Multiscale and Multi-Physics Modeling and Simulation (II)

4th Floor, Manchester Grand Hyatt, Randle D 7:45am–9:15am

Session Organizer: **Gary F. Dargush**, *University at Buffalo, Buffalo, NY, United States*Session Co-Organizer: **Xin-Lin Gao**, *University of Texas at Dallas, Richardson, TX, United States*7:45am **Nonlocal Damage Model Using the Phase Field Method: Theory and Applications**

Technical Presentation. IMECE2013-63513
 George Voyiadjis, Navid Mozaffari, *Louisiana State University, Baton Rouge, LA, United States*

8:00am **An Axisymmetric Mindlin Plate Model Based on a Modified Couple Stress Theory**

Technical Presentation. IMECE2013-63740
 Songsheng Zhou, *Houston Technology Center, Baker Hughes Inc., Houston, TX, United States*, Xin-Lin Gao, *University of Texas at Dallas, Richardson, TX, United States*

8:15am **Variational Integrators for Piezoelectricity**

Technical Paper Publication. IMECE2013-65356
 Pouyan Nasiri, Gary F. Dargush, *University at Buffalo, Buffalo, NY, United States*

8:30am **A Thermoplastic Constitutive Modeling and Geotechnical Centrifuge Simulation of Partially Saturated Soil Under Buried Explosive Loading**

Technical Paper Publication. IMECE2013-62519
 Asghar Yarahmadi, Rebecca Brannon, Carlos Bonifasi Lista, *University of Utah, Salt Lake City, UT, United States*

8:45am **A Two Dimensional Problem of Generalized Magnetoelastostatic Interactions for Half-Space in Rotating Medium**

Technical Presentation. IMECE2013-62146
 Abhijit Lahiri, Bappa Das, *Jadavpur University, Kolkata, India*

9:00am **Meshless Petrov Galerkin (MLPG) Method for Large Scale Problems: Computational Challenges**

Technical Presentation. IMECE2013-66989
 Krishna M, Singh, *Indian Institute of Technology Roorkee, Roorkee, UK, India*

TRACK 10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS / THURSDAY, NOVEMBER 21

10-24 SYMPOSIUM ON FRACTURE AND LIFETIME OF MATERIALS IN HONOR OF A. CHUDNOVSKY 75TH BIRTHDAY

10-24-6 Chudnovsky Symposium—6

4th Floor, Manchester Grand Hyatt, Randle E 9:30am–11:15am

Session Organizer: **Ephraim Suhir**, *University of California, Santa Cruz, Santa Cruz, CA, United States*

9:30am **Dynamics of Damage in a Lattice Model**

Technical Presentation. IMECE2013-65628

Andrej Cherkaev, *University of Utah, Salt Lake City, UT, United States*

9:51am **Effect of Drag-Reducing Polymers on Traffic of Blood Cells in Vascular System: Potential Medical Applications**

Technical Presentation. IMECE2013-63641

Marina Kameneva, *University of Pittsburgh, Pittsburgh, PA, United States*

10:12am **The J and M Integrals for a Cylindrical Cavity in a Time-Harmonic Wave Field**

Technical Paper Publication. IMECE2013-65353

Boris Gommerstadt, *Notheastern University, Boston, MA, United States*

10:33am **Application of Crack Layer in Modeling of Slow Crack Growth in High-Density Polyethylene**

Technical Paper Publication. IMECE2013-63039

Haiying Zhang, Zhenwen Zhou, Alexander Chudnovsky, *University of Illinois at Chicago, Chicago, IL, United States*

10:54am **Development of S-N Curves for Some Structural Materials**

Extended Abstract Publication. IMECE2013-64628

Somnath Chattopadhyay, *Georgia Southern University, Statesboro, GA, United States*

10-33 MULTI-PHYSICS SIMULATIONS AND EXPERIMENTS FOR SOLIDS

10-33-7 Multi-Physics Topics in Applications

4th Floor, Manchester Grand Hyatt, Randle D 9:30am–11:15am

Session Organizer: **Huijuan Zhao**, *Clemson University, Clemson, SC, United States*

Session Co-Organizer: **Dong Qian**, *University of Texas at Dallas, Richardson, TX, United States*

9:30am **Capacitive Energy Harvesting System for Low-Grade Heat**

Technical Presentation. IMECE2013-63252

Weiyi Lu, Yu Qiao, *University of California, San Diego, La Jolla, CA, United States*, Hyuck Lim, *Applied Materials, Santa Clara, CA, United States*

9:47am **The One-Dimensional Response of Sandwich Plates Subject to Blast in Deep and Shallow Water**

Technical Presentation. IMECE2013-63217

Andreas Schiffer, *University of Oxford, Oxford, Oxfordshire, United Kingdom*, Vito L. Tagarielli, *Imperial College London, London, London, United Kingdom*

10:04am **Modeling and Simulation of Electromagnetic Ferrofluid-Based Energy Harvesters**

Technical Presentation. IMECE2013-65727

Qi Liu, Mohammed Daqaq, Gang Li, *Clemson University, Clemson, SC, United States*

10:21am **One Dimensional Acoustic Metamaterial for Broadband Acoustic Attenuation**

Technical Presentation. IMECE2013-65541

Dong Qian, Hongbing Lu, *University of Texas at Dallas, Richardson, TX, United States*

10:38am **Using Nanoporous-Materials Functionalized Liquids to Mitigate Blast Waves**

Technical Presentation. IMECE2013-63248

Weiyi Lu, Cang Zhao, Yu Qiao, *University of California, San Diego, La Jolla, CA, United States*

10:55am **Ductile Fracture in Processed Thin Sheet Metals**

Technical Paper Publication. IMECE2013-65584

Huafeng Ding, Caichao Zhu, *Chongqing University, Chongqing, China*, Zhong Zhou, Dong Qian, *University of Texas at Dallas, Richardson, TX, United States*

10-39 MULTISCALE MODELING OF FATIGUE DAMAGE AND FAILURE MECHANICS**10-39-4 Multiscale Modeling of Fatigue Damage and Failure Mechanics IV****4th Floor, Manchester Grand Hyatt, Randle E 1:00pm–2:45pm**Session Organizer: **J. Brian Jordon**, *University of Alabama, Tuscaloosa, AL, United States*Session Co-Organizer: **Jianyong Liang**, *Stevens Institute of Technology, Hoboken, NJ, United States***1:00pm Localization Relationships for Elastic-Plastic Deformations in Polycrystalline Aggregates****Invited Presentation.** IMECE2013-66814Surya Kalidindi, *Georgia Institute of Technology, Atlanta, GA, United States***1:17pm Localization Relationships for Elastic-Plastic Deformations in Polycrystalline Aggregates****Invited Presentation.** IMECE2013-66815Surya Kalidindi, *Georgia Institute of Technology, Atlanta, GA, United States***1:34pm Using Simulation Technology in Manufacturing—Engagement With Products and Processes****Technical Presentation.** IMECE2013-66730Melanie N. Ambrose, James F. Mahoney, *Honeywell Federal Manufacturing & Technologies, Kansas City, MO, United States***1:51pm Fatigue Characterization and Modeling of AZ31B Spot-Welded Joints****Technical Paper Publication.** IMECE2013-66043Seyed Behzad Behraves, Hamid Jahed, Steve Lambert, *University of Waterloo, Waterloo, Canada***2:08pm Effects of Elevated Temperature Exposure on Fatigue Damage in AA6061 Friction Stir Welds****Technical Presentation.** IMECE2013-66556Robert R. McCullough, J.B. Jordon, *University of Alabama, Tuscaloosa, AL, United States*, Paul G. Allison, *U.S. Army Engineer Research & Development Center, Vicksburg, MS, United States***2:25pm Influence of the Keyhole on Fatigue Lifetimes in Friction Stir Welded AZ31 Mg Alloy****Technical Presentation.** IMECE2013-66568Joao Moraes, J. Brian Jordon, Harish Rao, *University of Alabama, Tuscaloosa, AL, United States***10-43 FAILURE MECHANICS OF ADVANCED MATERIALS AND STRUCTURES****10-43-6 Failure of Composites and Heterogeneous Materials—II****3rd Floor, Manchester Grand Hyatt, Connaught 1:00pm–2:45pm**Session Organizer: **H. Eliot Fang**, *Sandia National Laboratories, Albuquerque, NM, United States*Session Co-Organizer: **A. Amine Benzerga**, *Texas A&M University, College Station, TX, United States***1:00pm High Rate Through-the-Thickness Response of Hybrid 3D Woven Composites****Technical Presentation.** IMECE2013-66731Brian Justusson, Anthony Waas, *University of Michigan, Ann Arbor, MI, United States*, Mark R. Pankow, *North Carolina State University, Raleigh, NC, United States*, Chian-Fong Yen, *U.S. Army Research Laboratory, Aberdeen Proving Ground, MD, United States***1:21pm Mesoscale Analysis of Ballistic Penetration of 3D Orthogonal Woven Fiber Composites****Technical Presentation.** IMECE2013-66750Ranajay Ghosh, *Northeastern University, Boston, MA, United States*, Suvranu De, *Rensselaer Polytechnic Institute, Troy, NY, United States***1:42pm Ballistic Performance of Monolithic and Hybrid Woven Composites Using High Performance Polymer Fibers****Technical Presentation.** IMECE2013-66817Timothy Walter, Ashiq Quabili, Jian Yu, Chian-Fong Yen, *U.S. Army Research Laboratory, Aberdeen Proving Ground, MD, United States***2:03pm Instability in the Collapse of Explosively Driven Ni-Al Corrugated Laminate Cylinders****Technical Presentation.** IMECE2013-66077Karl L. Olney, Po-Hsun Chiu, David J. Benson, Vitali F. Nesterenko, *University of California, San Diego, La Jolla, CA, United States*, Andrew J. Higgins, Matthew Serge, *McGill University, Montreal, QC, Canada*, Gregory Fritz, Adam Stover, *Johns Hopkins University, Baltimore, MD, United States***2:24pm On the Effects of Material Anisotropy on Damage Accumulation: Application to Mg Alloys****Technical Presentation.** IMECE2013-66674A. Amine Benzerga, Babak Kondori, Shamik Basu, Ebubekir Dogan, Ibrahim Karaman, *Texas A&M University, College Station, TX, United States*

TRACK 10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS / THURSDAY, NOVEMBER 21

10-43-8 Modeling and Simulation of Failure Mechanics—II

4th Floor, Manchester Grand Hyatt, Randle D 1:00pm–2:45pm

Session Organizer: **Ertugrul Taciroglu**, *University of California, Los Angeles, Los Angeles, CA, United States*

Session Co-Organizer: **Zhen Chen**, *University of Missouri-Columbia, Columbia, MO, United States*

1:00pm The Combination of the MPM With Other Methods for Model-Based Simulation of Failure Evolution

Technical Presentation. IMECE2013-66272

Zhen Chen, *University of Missouri-Columbia, Columbia, MO, United States*

1:17pm Computationally Efficient Modeling of Inelastic Response of Open-Cell Foams

Technical Presentation. IMECE2013-66369

Ertugrul Taciroglu, Rani Harb, *University of California, Los Angeles, Los Angeles, CA, United States*, Nasr Ghoniem, *University of California, Los Angeles, Granada Hills, CA, United States*

1:34pm Damage Analysis of a Hybrid Energy Absorption Layer Based on the Principle of Topologically Interlocking Materials

Technical Presentation. IMECE2013-66426

Thomas Siegmund, Yuezhon Feng, *Purdue University, West Lafayette, IN, United States*, Ed Habtour, Jaret Riddick, *U.S. Army Research Laboratory, Aberdeen Proving Ground, MD, United States*

1:51pm Plane Strain Core Model for Ductile Failure Prediction of Dynamically Loaded Thin-Walled Structure

Technical Presentation. IMECE2013-66477

Tingting Zhang, Phillips Liu, Eugene Fang, Jim Lua, *Global Engineering and Materials, Inc., Princeton, NJ, United States*

2:08pm Dislocation Behavior in Cd_{1-x}Zn_xTe Crystals

Technical Presentation. IMECE2013-62635

Xiaowang Zhou, D.K. Ward, B.M. Wong, F.P. Doty, J.A. Zimmerman, *Sandia National Laboratories, Livermore, CA, United States*

2:25pm Phase Field Modeling of Soft Material Fracture

Technical Presentation. IMECE2013-66716

Xiao Wang, Wei Hong, *Iowa State University, Ames, IA, United States*

10-19 NANOSCALE MECHANICS OF POLYMER NANOCOMPOSITES AND NANOSTRUCTURED MATERIALS

10-19-1 Nanoscale Mechanics of Polymer Nanocomposites and Nanostructured Materials

4th Floor, Manchester Grand Hyatt, Randle A 3:00pm–4:45pm

Session Organizer: **Hassan Mahfuz**, *Florida Atlantic University, Boca Raton, FL, United States*

Session Co-Organizer: **Ashfaq Adnan**, *University of Texas Arlington, Arlington, TX, United States*

3:00pm Multiscale-Based Simulations of Longitudinal Mechanical Behaviors of Single-Walled Carbon Nanotubes Reinforced Polymer Nanocomposites

Technical Paper Publication. IMECE2013-62439

James Han, Yu-Fu Ko, Hsien-Yang Yeh, *California State University, Long Beach, Long Beach, CA, United States*

3:17pm On the Time Dependence of Size Effect in Polydimethylsiloxane

Technical Paper Publication. IMECE2013-64955

F. Alisafaei, S.H.R. Sanei, E.J. Smith, Chung-souk Han, *University of Wyoming, Laramie, WY, United States*

3:34pm Mechanical Properties Enhancement of Multifunctional Ceramic Nano-Composites

Technical Presentation. IMECE2013-65068

Huijuan Zhao, *Clemson University, Clemson, SC, United States*

3:51pm Thermo-mechanical Analysis of Structural Elements Incorporating Nanocomposites

Technical Paper Publication. IMECE2013-65588

Zeaid Hasan, *Arizona State University, Mesa, AZ, United States*, Aditi Chattopadhyay, *Arizona State University, Tempe, AZ, United States*

4:08pm Improving Fracture Toughness of Silicon Carbide Ceramics by Microstructure Tailoring

Technical Presentation. IMECE2013-65645

Ashfaq Adnan, Sheikh Ferdous, *University of Texas at Arlington, Arlington, TX, United States*

4:25pm Nanomechanical Measurements of Carbon Nanotube-Polymer Interfacial Strength

Technical Presentation. IMECE2013-65959

Xiaoming Chen, Meng Zheng, Changhong Ke, *State University of New York at Binghamton, Binghamton, NY, United States*, Cheol Park, *National Institute of Aerospace, Hampton, VA, United States*

10-43 FAILURE MECHANICS OF ADVANCED MATERIALS AND STRUCTURES

10-43-7 Experimental Studies and Failure Property Measurement

2nd Floor, Manchester Grand Hyatt, Edward D 3:00pm–4:45pm

Session Organizer: **L. Roy Xu**, *New Mexico State University, Las Cruces, TX, United States*

Session Co-Organizer: **Larry Russell**, *U.S. Army, Whitsett, NC, United States*

3:00pm Fracture Toughness of Needle Punched Glass Mat Composite

Technical Presentation. IMECE2013-64398

Bing Xiao, *Donghua University, Shanghai, Shanghai, China*,
Zhiyuan Zhang, *Kyoto Institute of Technology, Kyoto, Japan*

3:21pm Experimental investigation on the Radial and Circular Crack Propagation of PVB Laminated Glass Subject to Dynamic Out-of-Plane Loading

Technical Presentation. IMECE2013-66628

Jun Xu, *Columbia University, New York, NY, United States*,
Jingjing Chen, Yibing Li, *Tsinghua University, Beijing, China*, Xi Chen, *Columbia University, New York, NY, United States*

3:42pm Keynote Presentation—Engineering Failure Criteria for Composites Under Static and Dynamic Loading—Part I

Technical Presentation. IMECE2013-66740

Isaac Daniel, *Northwestern University, Evanston, IL, United States*

4:03pm Keynote Presentation—Engineering Failure Criteria for Composites Under Static and Dynamic Loading—Part II

Technical Presentation. IMECE2013-66745

Isaac Daniel, *Northwestern University, Evanston, IL, United States*

4:24pm Study on Non-Contact Electromagnetism Loading and Testing of High-Speed Motorized Spindle

Technical Presentation. IMECE2013-67382

Hongzhao Liu, Xuntong Zhou, Daning Yuan, Yanqiong Yan, Wenli Li, *Xi'an University of Technology, Xi'an, China*

10-43-9 Multiscale Characterization and Size Effects

4th Floor, Manchester Grand Hyatt, Randle D 3:00pm–4:45pm

Session Organizer: **Kaushik Dayal**, *Carnegie Mellon University, Pittsburgh, PA, United States*

Session Co-Organizer: **Shaofan Li**, *University of California, Berkeley, Berkeley, CA, United States*

3:00pm A Size Effect in Transgranular Cracking in Silicon Thin Films

Technical Presentation. IMECE2013-66035

Yu Qiao, Jin Chen, Venkata K. Punyamurtula, Weiyi Lu, Cang Zhao, *University of California, San Diego, La Jolla, CA, United States*

3:17pm Effect of Stress Singularities on Scaling of Fracture of Metal-Composite Hybrid Structures

Technical Presentation. IMECE2013-66160

Jia-Liang Le, Bing Xue, *University of Minnesota, Minneapolis, MN, United States*

3:34pm Keynote Lecture: Integrated Multiscale Characterization and Modeling of Ductile Failure in Heterogeneous Materials, Part I

Technical Presentation. IMECE2013-66755

Somnath Ghosh, *Johns Hopkins University, Baltimore, MD, United States*

3:51pm Keynote Lecture: Integrated Multiscale Characterization and Modeling of Ductile Failure in Heterogeneous Materials, Part II

Technical Presentation. IMECE2013-66756

Somnath Ghosh, *Johns Hopkins University, Baltimore, MD, United States*

4:08pm Multiscale Process Zone Model and Simulations of Material Failure

Technical Presentation. IMECE2013-66808

Shaofan Li, *University of California, Berkeley, Berkeley, CA, United States*

4:25pm On the ISO 8611 Bending Test of the HDPE Pallets

Technical Presentation. IMECE2013-62636

Enayat Mahajerin, *Saginaw Valley State University, Saginaw, MI, United States*, Gary Burgess, *Michigan State University, East Lansing, MI, United States*

TRACK 10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS / THURSDAY, NOVEMBER 21**10-43-10 Multiscale Characterization and Size Effects II****4th Floor, Manchester Grand Hyatt, Randle B 3:00pm–4:45pm**Session Organizer: **Mohammed Zikry**, *North Carolina State University, Raleigh, NC, United States*Session Co-Organizer: **Chongmin Song**, *University of New South Wales, Sydney, Australia***3:00pm Experimental Characterization and Computational Modeling of High Strain Rate Deformation and Failure of Ligament Tissue in the Knee****Technical Presentation.** IMECE2013-66708Ellen Arruda, Tyler Olsen, *University of Michigan, Ann Arbor, MI, United States*, Jinjin Ma, *Cleveland Clinic, Cleveland, OH, United States***3:21pm Modeling of Dynamic Failure in Metallic Systems at Multiple Scales****Technical Presentation.** IMECE2013-66407Avinash M. Dongare, *University of Connecticut, Storrs, CT, United States*, Raju Namburu, *Ramakrishna Valisetty, U.S. Army Research Laboratory, Aberdeen Proving Ground, MD, United States*, Arunchalam Rajendran, *University of Mississippi, University, MS, United States***3:42pm Fracture Analysis Without Enrichment: Scaled Boundary Polygons****Technical Presentation.** IMECE2013-66114Chongmin Song, *University of New South Wales, Sydney, Australia***4:03pm Modification of Pullout Behavior of Kevlar Fabric by Zinc Oxide Nanowire Reinforcement****Technical Paper Publication.** IMECE2013-66836Hyun-Sik Hwang, Brendan Patterson, Mohammad H. Malakooti, Henry Sodano, *University of Florida, Gainesville, FL, United States***4:24pm Microstructural Modeling of the Behavior of Energetic Materials****Technical Presentation.** IMECE2013-66688Judith Brown, Darrell Labarbera, Mohammed Zikry, *North Carolina State University, Raleigh, NC, United States*

MONDAY, NOVEMBER 18 / TUESDAY, NOVEMBER 19 / TRACK 11 MICRO- AND NANOSYSTEMS
ENGINEERING AND PACKAGING

**MICRO- AND NANOSYSTEMS ENGINEERING
AND PACKAGING**

MONDAY, NOVEMBER 18

**11-10 NANOENGINEERING FOR ENERGY AND
SUSTAINABILITY (NEES)**

11-10-3 Nanoengineering for Energy Storage

3rd Floor, Manchester Grand Hyatt, Connaught 3:00pm–4:45pm

Session Organizer: **Marriner Merrill**, *U.S. Naval Research Laboratory, Washington, DC, United States*

Session Co-Organizer: **Hsiao-Ying Shadow Huang**, *North Carolina State University, Raleigh, NC, United States*, **Partha Mukherjee**, *Texas A&M University, College Station, TX, United States*

TUESDAY, NOVEMBER 19

**11-8 PLENARY PRESENTATIONS IN MEMS/NEMS
AND PACKAGING**

**11-8-1 Plenary Presentations in MEMS/NEMS and
Packaging**

4th Floor, Manchester Grand Hyatt, Randle A 9:45am–11:30am

Session Organizer: **Michael Murphy**, *Louisiana State University, Baton Rouge, LA, United States*

Session Co-Organizer: **Suresh Sitaraman**, *Georgia Institute of Technology, Atlanta, GA, United States*, **Eui-Hyeok Yang**, *Stevens Institute of Technology, Hoboken, NJ, United States*

9:45am When Engineering Meets Medicine

Plenary Presentation. IMECE2013-67394

Chih-Ming Ho, *University of California, Los Angeles, Los Angeles, CA, United States*

**10:35am Challenges and Opportunities in Gen-3 Embedded
Cooling of Microsystems**

Plenary Presentation. IMECE2013-67389

Avram Bar-Cohen, *Defense Advanced Research Projects Agency, Arlington, VA, United States*

**11-1 COMPUTATIONAL STUDIES ON MEMS AND
NANOSTRUCTURES**

**11-1-1 Computational Studies on MEMS and
Nanostructures I**

4th Floor, Manchester Grand Hyatt, Randle D 1:00pm–2:45pm

Session Organizer: **Jeong Ho You**

Session Co-Organizer: **David Jack**, *Baylor University, Waco, TX, United States*, **Rasim Guldiken**, *University of South Florida, Tampa, FL, United States*

Session Chair: **Sarah Stair**, *Baylor University, Arlington, TX, United States*

**1:00pm Optimal Design of MEMS Considering Functionally
Graded Materials**

Technical Presentation. IMECE2013-64033

Wilfredo Montealegre, *Universidad Nacional de Colombia, Colombia*

**1:17pm Effect of Anisotropic Strain Field on the Electronic
Conductance of Carbon Nanotubes**

Technical Paper Publication. IMECE2013-64487

Masato Ohnishi, Ken Suzuki, Hideo Miura, *Tohoku University, Sendai, Japan*

**1:34pm Dynamic Analysis of Bulk Acoustic Wave
Piezoelectric Micropumps: Effects of Inlet-Outlet Port
Angles and Overall Pump Size**

Technical Paper Publication. IMECE2013-66211

Ersin Sayar, Istanbul Technical University, Istanbul, Turkey, Bakhtier Farouk, *Drexel University, Philadelphia, PA, United States*

**1:51pm Dynamic Analysis of Piezoelectric Valveless
Micropumps: Effects of Piezoelectric Transducer
Material**

Technical Paper Publication. IMECE2013-66215

Ersin Sayar, Istanbul Technical University, Istanbul, Turkey, Bakhtier Farouk, *Drexel University, Philadelphia, PA, United States*

**2:08pm Static and Dynamic Analysis of a Clamp-Clamp
Nano-Beams Under Electrostatic Actuation and
Detection Considering Intermolecular Forces**

Technical Paper Publication. IMECE2013-62216

Mahdi Mojahedi, Keikhosrow Firoozbakhsh, Mohammad Taghi Ahmadian, *Sharif University of Technology, Tehran, Iran*, **Ahmad Barari**, *University of Ontario, Oshawa, ON, Canada*

**2:25pm The Effect of Varying Mass and Stiffness in a
Simplified Phononic Crystal Structure**

Technical Presentation. IMECE2013-66267

Mohammadhosein Ghasemi Baboly, Mehmet F. Su, Zayd Leseman, *University of New Mexico, Albuquerque, NM, United States*, **Charles Reinke, Ihab El-Kady**, *Sandia National Laboratories, Albuquerque, NM, United States*

TRACK II MICRO- AND NANOSYSTEMS ENGINEERING AND PACKAGING / TUESDAY, NOVEMBER 19

11-2 DESIGN AND FABRICATION ANALYSIS, PROCESSES, AND TECHNOLOGY FOR MICRO AND NANO DEVICES AND SYSTEMS

11-2-1 Analysis, Processes, and Technology 1

4th Floor, Manchester Grand Hyatt, Randle E 1:00pm–2:45pm

Session Organizer: **Po-hao Huang**, *University of Arkansas, Fayetteville, AR, United States*

Session Co-Organizer: **Abdoul Maiga**, *University of Arkansas, Fayetteville, AK, United States*

1:00pm Performance Model for Optically Driven Micropumps With Carbon Opacified Aerogel Membranes

Technical Paper Publication. IMECE2013-62197

Yen-Lin Han, *Seattle University, Seattle, WA, United States*

1:17pm Quality Aspects of Electrochemical Micro Drilling With Insulated Tool and Masked Workpiece

Technical Paper Publication. IMECE2013-62864

Vijay Kumar Jain, S.K. Choudhury, *Indian Institute of Technology, Kanpur, Kanpur, U.P., India*, Shweta Singh, *I.I.T. Delhi (India), New Delhi, Delhi, India*

1:34pm Controlled Efficiency During Drilling With a High Intensity Beam

Technical Paper Publication. IMECE2013-63061

J.H. Wu, T.C. Chao, Peng-Sheng Wei, *National Sun Yat-Sen University, Kaohsiung, Taiwan, China*

1:51pm Fabrication of Al₂O₃ Nanopore Sensors for DNA Detection

Technical Paper Publication. IMECE2013-63154

Yin Zhang, Lei Liu, Jingjie Sha, Wei Si, Jian Ma, Yunfei Chen, *Southeast University, Nanjing, Jiangsu, China*

2:08pm Mold Alignment System for Double-Sided Micro Hot Embossing Using Kinematic Constraints

Technical Paper Publication. IMECE2013-63670

Glenn Conner, Juan A. Gomez, In-Hyounk Song, *Texas State University–San Marcos, San Marcos, TX, United States*, Devanda Lek, Byoung Hee You, *Texas State University–San Marcos, San Marcos, TX, United States*, T. Park, *Kyungnam University, Changwon, Gyeongsangnam-do, Korea (Republic)*

2:25pm Characterization of Nano-Channels in Machined in Different Environments

Technical Presentation. IMECE2013-63821

Zachary Callahan, Po-hao Huang, *University of Arkansas, Fayetteville, AR, United States*

11-7 APPLIED MECHANICS AND MATERIALS

11-7-1 MEMS and MEMS Packaging

3rd Floor, Manchester Grand Hyatt, Connaught 1:00pm–2:45pm

Session Organizer: **Uttam K. Chakravarty**, *University of New Orleans, New Orleans, LA, United States*

Session Co-Organizer: **Ahsan Mian**, *Wright State University, Dayton, OH, United States*, **Awlad Hossain**, *Eastern Washington University, Cheney, WA, United States*

1:00pm Wire-Electric Gyroscope

Technical Paper Publication. IMECE2013-63287

Vadym Avrutov, *National Technical University of Ukraine Kiev Polytechnic Institute, Kiev, Ukraine*

1:15pm Dynamic Response of Biomimetic Hair Receptors in Both Steady and Unsteady Flow Environment

Technical Paper Publication. IMECE2013-65250

Manohar Chidurala, Uttam K. Chakravarty, *University of New Orleans, New Orleans, LA, United States*, Benjamin T. Dickinson, *Air Force Research Laboratory, Eglin Air Force Base, United States*

1:30pm Understanding Deformation Mechanism of a Microscale Cricket Filiform Hair Socket

Technical Presentation. IMECE2013-65842

Awlad Hossain, *Eastern Washington University, Cheney, WA, United States*, Ahsan Mian, *Wright State University, Dayton, OH, United States*

1:45pm Spatial Optimization of Thermal Conductivity to Enable Precise Fluid Microscale Heating and/or Cooling

Technical Paper Publication. IMECE2013-66468

Amir Harandi, Tony Farquhar, *University of Maryland, Baltimore County, Baltimore, MD, United States*

2:00pm A Gradient-Enhanced Continuum Model for Size and Rate Effects in Thin Metal Film-Substrate Systems

Technical Presentation. IMECE2013-62626

Danial Faghihi, *University of Texas at Austin, Austin, TX, United States*, George Voyiadjis, *Louisiana State University, Baton Rouge, LA, United States*

2:15pm Structural Behavior of Microbeams Actuated by Out-of-Plane Electrostatic Fringing-Fields

Technical Paper Publication. IMECE2013-65770

Hassen Ouakad, *King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia*

2:30pm Thermal/Mechanical Analysis for Microscale Laser Joining of Glass/Silicon System

Technical Presentation. IMECE2013-62455

Mohammed Mayeed, *Southern Polytechnic State University, Marietta, GA, United States*

11-12 FLUID ENGINEERING IN MICRO- AND NANOSYSTEMS

11-12-1 Droplet/Particle/Bubble Manipulation

4th Floor, Manchester Grand Hyatt, Randle A 1:00pm–2:45pm

Session Organizer: **Rasim Guldiken**, *University of South Florida, Tampa, FL, United States*

Session Co-Organizer: **Mohammad Hossan**, *Washington State University, Pullman, WA, United States*

1:00pm **Investigations of Quality of Printed Triple Lines for Manufacture of Printed Electronics and Multi-Functional 3D Printing**

Technical Paper Publication. IMECE2013-64619
Saeid Vafaei, Christopher Tuck, Ricky Wildman, Ian Ashcroft, *University of Nottingham, Nottingham, United Kingdom*

1:17pm **Droplets Merging in Microfluidic Parallel T-Junctions**

Technical Presentation. IMECE2013-65046
Namwon Kim, *Texas A&M International University, Laredo, TX, United States*, Michael Murphy, Dimitris E. Nikipoulos, *Louisiana State University, Baton Rouge, LA, United States*, Steven Soper, *University of North Carolina, Chapel Hill, Chapel Hill, NC, United States*

1:34pm **Effect of Slip on Circulation Inside a Droplet**

Technical Paper Publication. IMECE2013-65074
Joseph Thalakkottor, Kamran Mohseni, *University of Florida, Gainesville, FL, United States*

1:51pm **High-Speed Aerosol Flow Through Micro-Nozzles for Direct-Write Processes**

Technical Paper Publication. IMECE2013-65271
Justin M. Hoey, Sourin Bhattacharya, Artur Lutfurakhmanov, Michael Robinson, Orven Swenson, Iskander Akhatov, *North Dakota State University, Fargo, ND, United States*

2:08pm **Sizing and Positioning Algorithm for 1 μm to 10 μm Particles Using Shadowgraphy**

Technical Paper Publication. IMECE2013-65286
Michael Robinson, Zakaria Mahmud, Orven Swenson, Justin M. Hoey, *North Dakota State University, Fargo, ND, United States*

2:25pm **AC Electrothermal Micropumping for Medical Applications**

Extended Abstract Publication. IMECE2013-65315
Nazmul Islam, *University of Texas at Brownsville, Brownsville, TX, United States*

11-13 QUALITY AND RELIABILITY IN ELECTRONICS AND PHOTONICS PACKAGING

11-13-1 Quality and Reliability in Electronics and Photonics Packaging

4th Floor, Manchester Grand Hyatt, Randle B 1:00pm–2:45pm

Session Organizer: **Tung Nguyen**, *Microsoft, Mountain View, CA, United States*

Session Co-Organizer: **Satish Parupalli**, *Intel, Hillsboro, OR, United States*

1:00pm **Comparison of Warpage Measurement Capabilities and Results Obtained by Using Laser and Digital Fringe Projection Methods**

Technical Paper Publication. IMECE2013-65072
Sungbum Kang, Charles Ume, *Georgia Institute of Technology, Atlanta, GA, United States*

1:17pm **Prognostic Health Monitoring Method for Fatigue Failure of Solder Joints on Printed Circuit Boards Based on a Canary Circuit**

Technical Paper Publication. IMECE2013-65317
Kenji Hirohata, Yosuke Hisakuni, Takahiro Omori, Tomoko Monda, Minoru Mukai, *Toshiba Corporation, Kawasaki, Kanagawa-ken, Japan*

1:34pm **Improvement of the Mechanical Reliability of 3D Electronic Packaging by Controlling the Mechanical Properties of Electroplated Materials**

Technical Paper Publication. IMECE2013-65539
Hideo Miura, Ken Suzuki, *Tohoku University, Sendai, Japan*

1:51pm **Quality Evaluation of Solder Bump in PBGA Package for Commercial Product Application Using Laser Ultrasonic Technique**

Technical Paper Publication. IMECE2013-66484
Jie Gong, Charles Ume, *Georgia Institute of Technology, Atlanta, GA, United States*, Kola Akinade, Ray Chaudhuri, *Cisco Corporation, Lawrenceville, GA, United States*

2:08pm **Strain Sensing for Through Silicon Vias**

Technical Presentation. IMECE2013-66766
Christine Taylor, Suresh Sitaraman, *Georgia Institute of Technology, Atlanta, GA, United States*

2:25pm **Failure Risks in Flexible PWBs and Adhesive Interconnects in Portable Products**

Technical Presentation. IMECE2013-66278
Jingshi Meng, Abhijit Dasgupta, *University of Maryland, College Park, MD, United States*

TRACK II MICRO- AND NANOSYSTEMS ENGINEERING AND PACKAGING / TUESDAY, NOVEMBER 19

11-1 COMPUTATIONAL STUDIES ON MEMS AND NANOSTRUCTURES

11-1-2 Computational Studies on MEMS and Nanostructures II

4th Floor, Manchester Grand Hyatt, Randle D 3:00pm–4:45pm

Session Organizer: **Hamid Alemohammad**, *University of Waterloo, Waterloo, ON, Canada*

Session Co-Organizers: **David Jack**, *Baylor University, Waco, TX, United States*, **Rasim Guldiken**, *University of South Florida, Tampa, FL, United States*

Session Chair: **Sarah Stair**, *Baylor University, Arlington, TX, United States*

3:00pm Oscillatory Behavior of the Nonlinear Clamped-Free Beam Microgyroscopes Under Electrostatic Actuation and Detection

Technical Paper Publication. IMECE2013-62214
Mahdi Mojahedi, Mohammad Taghi Ahmadian, Keikhosrow Firoozbakhsh, *Sharif University of Technology, Tehran, Iran*, Ahmad Barari, *University of Ontario, Oshawa, ON, Canada*

3:17pm Numerical Evaluation of Improvements in Thermal Barrier Coating Adhesion by Adoption of Plasma Treatment and Biomimicry

Technical Paper Publication. IMECE2013-63241
Naser Imran Hossain, Muhammad Wahab, Jiandong Liang, *Louisiana State University, Baton Rouge, LA, United States*

3:34pm Neural Network Based Model for Growth Rate of Molecular Beam Epitaxy (MBE) of MgO Growth on 6H-SiC Substrate

Technical Presentation. IMECE2013-64568
Ibrahim Zeid, Kate Ziemer, Sagar Kamarthi, Ghulam Uddin, *Northeastern University, Boston, MA, United States*

3:51pm Effect of Surface Roughness on Squeeze Film Damping of Micro-Cantilever Switches

Technical Presentation. IMECE2013-65905
Columbia Mishra, Prabhakar Marepalli, Shankhadeep Das, Sanjay R. Mathur, Jayathi Murthy, *University of Texas at Austin, Austin, TX, United States*, Alina Alexeenko, *Purdue University, West Lafayette, IN, United States*

4:08pm A Reduced-Order Model of a Microfluidic Transistor

Technical Paper Publication. IMECE2013-63711
Joseph Bakarji, Mohammad Cheikh, Khoudor Keniar, Issam Lakkis, *American University of Beirut, Beirut, Lebanon*

4:25pm Numerical Investigation of Fully Developed Fluid Flow and Heat Transfer in Double-Trapezoidal Microchannels

Technical Paper Publication. IMECE2013-66734
Mostafa Shojaeian, Ali Kosar, *Sabancı University, Istanbul, Turkey*

11-2 DESIGN AND FABRICATION ANALYSIS, PROCESSES, AND TECHNOLOGY FOR MICRO AND NANO DEVICES AND SYSTEMS

11-2-2 Analysis, Processes, and Technology 2

4th Floor, Manchester Grand Hyatt, Randle E 3:00pm–4:45pm

Session Organizer: **Tak-Sing Wong**, *Pennsylvania State University, University Park, PA, United States*

3:00pm Evaporative Particle Deposition on Superhydrophobic Surfaces

Technical Paper Publication. IMECE2013-63928
Mercy Dicuango, Susmita Dash, Justin A. Weibel, Suresh V. Garimella, *Purdue University, West Lafayette, IN, United States*

3:17pm Theoretical and Experimental Analysis of Active Valve Pumping for High Flowrate Applications

Technical Paper Publication. IMECE2013-64127
Karthik Kumar, Ali Besharatian, Luis P. Bernal, Rebecca L. Peterson, Khalil Najafi, *University of Michigan Ann Arbor, Ann Arbor, MI, United States*

3:34pm Microfeature Edge Quality Optimization in Excimer Laser Ablation of Metallic Film

Technical Paper Publication. IMECE2013-64149
Syed Nadeem Akhtar, S. Anantha Ramakrishna, J. Ramkumar, *Indian Institute of Technology Kanpur, Kanpur, Uttar Pradesh, India*

3:51pm Estimation of Fatigue Life of Epoxy-Alumina Polymer Nanocomposites

Technical Paper Publication. IMECE2013-64160
Dharmendra Kumar Shukla, Vineet Kumar, Vijay Verma, *Motilal Nehru National Institute of Technology Allahabad, Allahabad, Uttar Pradesh, India*

4:08pm Analysis of Axisymmetric Cup Forming of Metal Foil and Micro Hydroforming Process

Technical Paper Publication. IMECE2013-64355
Hideki Sato, *Tokyo Metropolitan University, Hachioji-shi, Tokyo, Japan*, Ken-ichi Manabe, *Tokyo Metropolitan University, Hachioji-city Tokyo, Japan*, Dongbin Wei, *University of Technology, Sydney, New South Wales, Australia*, Zhengyi Jiang, *University of Wollongong, New South Wales, Australia*

4:25pm Fatigue Life Prediction and Optimal Design of a Flexure Based Micro-Motion Stage

Technical Paper Publication. IMECE2013-63581
Qiliang Wang, Xianmin Zhang, *South China University of Technology, Guangzhou, Guangdong, China*

11-7 APPLIED MECHANICS AND MATERIALS**11-7-2 Experimental Methods and Characterization****3rd Floor, Manchester Grand Hyatt, Oxford 3:00pm–4:45pm**Session Organizer: **Awlad Hossain**, *Eastern Washington University, Cheney, WA, United States*Session Co-Organizer: **Mohammed Mayeed**, *Southern Polytechnic State University, Marietta, GA, United States***3:00pm Nano-Indentation for Characterizing Mechanical Properties of Soft Materials****Technical Paper Publication.** IMECE2013-62056
Awlad Hossain, *Eastern Washington University, Cheney, WA, United States*, Ahsan Mian, *Wright State University, Dayton, OH, United States***3:15pm Characterization of Materials Elastic-Plastic Properties through Microindentation Testing With a Cylindrical Flat-Tip Indenter****Technical Presentation.** IMECE2013-62610
Kevin Lynne, Zhong Hu, Fereidoon Delfanian, *South Dakota State University, Brookings, SD, United States***3:30pm Characterizing Strength and Plasticity in Small-Scale Ti Structures****Technical Presentation.** IMECE2013-64083
Justin Mueller, *University of California, Riverside, Moreno Valley, CA, United States*, Shannon Gott, Omid Khandan, M.P. Rao, *University of California, Riverside, Riverside, CA, United States***3:45pm Comparison of Nanoindentation Moduli Obtained From Loading and Unloading Curves****Technical Presentation.** IMECE2013-65987
L. Roy Xu, *New Mexico State University, Las Cruces, TX, United States***4:00pm Stress Relaxation Measurement of Agar Using a Polymer-Based Microfluidic Device****Technical Paper Publication.** IMECE2013-66054
Jiayue Shen, Peng Cheng, Wenting Gu, Michael Stacey, *Old Dominion University, Norfolk, VA, United States*, Zhili Hao, *Old Dominion University, Virginia Beach, VA, United States***4:15pm Effects of Material Property and Geometry in Nanoindentation Simulation of Thin Film Mechanical Characterization****Technical Paper Publication.** IMECE2013-66608
Sanjida Ahsan, Md Tahmidur Rahman, Rafiqul A. Tarefder, *University of New Mexico, Albuquerque, NM, United States***4:30pm Microstructural Analysis of Laser Micro-Welds Between Electrode Materials for Li-Ion Battery Applications****Technical Paper Publication.** IMECE2013-64689
Ahsan Mian, Hema Vijwani, Sharmila Mukhopadhyay, *Wright State University, Dayton, OH, United States*, Chris Taylor, Kevin Hartke, Larry Dossler, *Mound Laser and Photonics Center, Miamisburg, OH, United States***11-12 FLUID ENGINEERING IN MICRO- AND NANOSYSTEMS****11-12-2 Flows in Microfluidic Systems****4th Floor, Manchester Grand Hyatt, Randle A 3:00pm–4:45pm**Session Organizer: **Scott Thompson**, *Mississippi State University, Mississippi State, MS, United States*Session Co-Organizer: **Nazmul Islam**, *University of Texas at Brownsville, Brownsville, TX, United States***3:00pm Experimental and Numerical Study of the Effects of Asymmetric Micro Ratchets on Pool Boiling Performance****Technical Paper Publication.** IMECE2013-62982
Lance Brumfield, Sungook Park, *Louisiana State University, Baton Rouge, LA, United States***3:15pm Flow Maldistribution in Microsystems: Description and Effects****Technical Paper Publication.** IMECE2013-63044
Jaime Cervantes-de Gortari, Juan C. Torchia-Núñez, *National University of Mexico, Mexico City, Mexico*, Abel Hernandez-Guerrero, *University of Guanajuato, Salamanca, Guanajuato, Mexico***3:30pm Experimental Study of the Characteristics of Gas Impinging Streams Using PIV Technique****Technical Paper Publication.** IMECE2013-63902
Wei Wei, Zhiyi Li, Fengxia Liu, Zhijun Liu, *Dalian University of Technology, Dalian, Liao Ning, China***3:45pm Efficiency Study of Chaotic Fluid Mixing for AC Electrothermal Flows****Technical Presentation.** IMECE2013-65956
Sophie Loire, Paul Kauffmann, Igor Mezic, Carl Meinhart, *University of California, Santa Barbara, Santa Barbara, CA, United States***4:00pm Thermal and Optical Analysis of a Stacked Photobioreactor Design****Technical Paper Publication.** IMECE2013-66263
Aadhar Jain, Eunjung (Erica) Jung, Michael Kalontarov, David Erickson, *Cornell University, Ithaca, NY, United States***4:15pm Investigation of an Unsteady Flow Behavior Through a Valveless Microvalve With Step Expansion Shape Using in Microfluidic Systems****Technical Paper Publication.** IMECE2013-66310
Amir Nejat, Farshad Kowsary, A. Hasanzadeh, Saman Ebrahimi, *University of Tehran, Tehran, Iran***4:30pm Effect of Temperature on Water Transport in Nano-Structured Thin-Film Catalyst-Layers****Technical Presentation.** IMECE2013-65662
Prodip K. Das, Adam Z. Weber, *Lawrence Berkeley National Laboratory, Berkeley, CA, United States*

TRACK II MICRO- AND NANOSYSTEMS ENGINEERING AND PACKAGING / TUESDAY, NOVEMBER 19

11-14 MODELING AND SIMULATION IN ELECTRONICS AND PHOTONICS PACKAGING

11-14-1 Modeling and Simulation in Electronics and Photonics Packaging

4th Floor, Manchester Grand Hyatt, Randle B 3:00pm–4:45pm

Session Organizer: **Fatemeh Hassanipour**, *University of Texas at Dallas, Plano, TX, United States*

Session Co-Organizer: **Yuxun Zhou**, *Microsoft, Redmond, WA, United States*

3:00pm Simulation of Standardized Board for Uniform Impact Response Toward Optimal Shock Pulse

Technical Presentation. IMECE2013-64729

Sharan Kallolimath, Jiang Zhou, *Lamar University, Beaumont, TX, United States*

3:17pm Simultaneous Measurement of Chip Package and PWB Warpage Using Digital Fringe Projection Technique and Automatic Image Segmentation Algorithm

Technical Presentation. IMECE2013-65087

Sungbum Kang, Charles Ume, *Georgia Institute of Technology, Atlanta, GA, United States*

3:34pm Chip-Package Co-Design: Effect of Substrate Warpage on BEOL Reliability

Technical Paper Publication. IMECE2013-65877

Sathyanarayanan Raghavan, Suresh Sitaraman, *Georgia Institute of Technology, Atlanta, GA, United States*, Ilko Schmadlak, *Freescale Semiconductor, Munich, Bavaria, Germany*, George Leal, *Freescale Semiconductor, Austin, TX, United States*

3:51pm Thermomechanical Reliability Study of Lead-Free Solder Bumps on Ball Grid Array Packages Using Laser Ultrasound Technique

Technical Presentation. IMECE2013-66491

Jie Gong, Charles Ume, *Georgia Institute of Technology, Atlanta, GA, United States*

4:08pm High Cycle Fatigue Life-Prediction for Lead-Free Interconnects Under Simultaneous High Temperature and Vibration

Technical Paper Publication. IMECE2013-66820

Pradeep Lall, Geeta Limaye, *Auburn University, Auburn, AL, United States*

4:25pm LED Lumen Degradation and Remaining Life Under Exposure to Temperature and Humidity

Technical Paper Publication. IMECE2013-66832

Pradeep Lall, Hao Zhang, *Auburn University, Auburn, AL, United States*

11-2 DESIGN AND FABRICATION ANALYSIS, PROCESSES, AND TECHNOLOGY FOR MICRO AND NANO DEVICES AND SYSTEMS

11-2-3 Analysis, Processes, and Technology 3

4th Floor, Manchester Grand Hyatt, Randle E 5:00pm–6:45pm

Session Organizer: **Hideaki Tsutsui**, *University of California, Riverside, Riverside, CA, United States*

5:00pm Fabrication and Characterization of Micro-Patterned Magnetorheological Elastomeric Structures

Technical Paper Publication. IMECE2013-64535

Ammar Sirry Yashaa, Souran Manoochehri, *Stevens Institute of Technology, Hoboken, NJ, United States*

5:17pm Silicon Carbide MEMS Capacitive Pressure Sensor for Harsh Environments

Technical Paper Publication. IMECE2013-64764

Zhibang Chen, Wei Du, Feng Zhao, *Washington State University, Vancouver, WA, United States*

5:34pm Finite Element Analysis for Reliable Replication of Alignment Structures in Micro Hot Embossing

Technical Paper Publication. IMECE2013-64829

Juan A. Gomez, In-Hyok Song, Yoo Jae Kim, Byoung Hee You, *Texas State University–San Marcos, San Marcos, TX, United States*, Glenn Conner, *Texas State University–San Marcos, Llano, TX, United States*, Du Hwan Chun, *Yeungnam University, Gyongsan, Korea (Republic)*

5:51pm One and Two Dimensional Specimen Integration With MEMS Devices for Multi-Physics Characterization

Technical Presentation. IMECE2013-64877

Raghu Pulavarthy, Baoming Wang, Md Haque, *Pennsylvania State University, University Park, PA, United States*

6:08pm Characterization of Metal Oxide Sensor Thin Films Deposited by Spray Pyrolysis

Extended Abstract Publication. IMECE2013-65136

S.M. Navid Khatami, Don Nadun Kuruppumullage, Olusegun Ilegbusi, *University of Central Florida, Orlando, FL, United States*

6:25pm Self-Organization of Polymer Nanofiber Arrays for Bioinspired Multifunctional Systems

Technical Presentation. IMECE2013-63198

Sung Kang, Joanna Aizenberg, *Harvard University, Cambridge, MA, United States*

11-5 APPLICATIONS OF MICRO- AND NANOSYSTEMS IN MEDICINE AND BIOLOGY

11-5-1 Biosensing

4th Floor, Manchester Grand Hyatt, Randle A 5:00pm–6:45pm

Session Organizer: **Ioana Voiculescu**, *City College of New York, New York, NY, United States*

5:00pm **A Sensitive Multiparametric Biosensor With Capabilities of Rapid Toxicity Detection of Drinking Water**

Technical Paper Publication. IMECE2013-62281
Fei Liu, *City College of New York, Elmhurst, NY, United States*,
Anis N. Nordin, *International Islamic University Malaysia, Selangor, Malaysia*, Fang Li, *New York Institute of Technology, Old Westbury, NY, United States*, Ioana Voiculescu, *City College of New York, New York, NY, United States*

5:17pm **Detection of DNA in a Nanopore Fabricated From Glass Tube**

Technical Paper Publication. IMECE2013-62789
Jingjie Sha, Yunfei Chen, *Southeast University, Nanjing, Jiangsu, China*

5:34pm **Rapid Capture of Rare Cancer Cells Using a High-Performance Microfluidic Chip**

Technical Paper Publication. IMECE2013-62952
Wei'an Sheng, Tao Chen, Weihong Tan, Hugh Fan, *University of Florida, Gainesville, FL, United States*

5:51pm **Multiplex Single Molecule Detection Module for Stroke Diagnosis**

Technical Paper Publication. IMECE2013-65524
Daniel Park, Brooks Lowrey, C.R. Brown, Michael Murphy, *Louisiana State University, Baton Rouge, LA, United States*,
Byoung Hee You, *Texas State University–San Marcos, San Marcos, TX, United States*, V. Singh, *Center for Advanced Microstructures and Devices, Baton Rouge, LA, United States*,
Steven Soper, *University of North Carolina, Chapel Hill, Chapel Hill, NC, United States*, Alison Baird, *Stroke Center, SUNY Downstate Medical Center, Brooklyn, NY, United States*

6:08pm **Passive Split Ring Resonator for Continuous Physiological Sensing Through Conductivity Measurement**

Technical Paper Publication. IMECE2013-66744
Evan Baker, Noah Shaw, Chen Wang, Hao Zhang, Cheng Sun, *Northwestern University, Evanston, IL, United States*

6:25pm **Deployable MEMS Devices for Minimally Invasive Monitoring of Cortical Activities**

Extended Abstract Publication. IMECE2013-66662
Jinda Zhuang, Y. Sungtaek Ju, *University of California, Los Angeles, Los Angeles, CA, United States*

11-7 APPLIED MECHANICS AND MATERIALS

11-7-3 Nanomaterials

3rd Floor, Manchester Grand Hyatt, Oxford 5:00pm–6:45pm

Session Organizer: **Alireza Tabarraei**, *University of North Carolina at Charlotte, Charlotte, NC, United States*

Session Co-Organizer: **Md Haque**, *Pennsylvania State University, University Park, PA, United States*

5:00pm **Effect of Ni Addition on Beta-Sn Grain Boundary Diffusivity**

Technical Presentation. IMECE2013-62410
Yongchang Lee, Cemal Basaran, *University at Buffalo, State University of New York, Buffalo, NY, United States*

5:17pm **Mechanically Robust Nanotubular Titania**

Technical Presentation. IMECE2013-63851
Omid Khandan, Brent Scheidemantle, Nosang V. Myung, Masaru Rao, *University of California, Riverside, Riverside, CA, United States*

5:34pm **Lead Zirconate Titanate Nanotube Composite for Ultrasound Transducer Application**

Technical Paper Publication. IMECE2013-64980
Yong Shi, Guitao Zhang, Weihe Xu, *Stevens Institute of Technology, Hoboken, NJ, United States*

5:51pm **Mechanical Properties and Fabrication Process of Nanoporous Graphene**

Technical Presentation. IMECE2013-66056
Yilun Liu, Xi Chen, *Columbia University, New York, NY, United States*

6:08pm **Experimental Study of Thermoelectric Properties of SWCNTs and SiC Nanoparticles and Its Composites Doped With Sol-gels**

Technical Paper Publication. IMECE2013-65773
Mujibur Khan, Miletus Jones, *Georgia Southern University, Statesboro, GA, United States*, Luz Bugarin, Salvador Sandoval, *University of Texas at EL Paso, El Paso, TX, United States*

6:25pm **Mechanical Properties of Thin Films at High Temperatures**

Technical Presentation. IMECE2013-64814
Baoming Wang, Md Haque, *Pennsylvania State University, University Park, PA, United States*

TRACK II MICRO- AND NANOSYSTEMS ENGINEERING AND PACKAGING / TUESDAY, NOVEMBER 19

11-10 NANOENGINEERING FOR ENERGY AND SUSTAINABILITY (NEES)

11-10-1 NanoEngineering for Energy and Sustainability: Energy Production & Storage

4th Floor, Manchester Grand Hyatt, Randle D 5:00pm–6:45pm

Session Organizer: **Vikas Tomar**, *Purdue University, West Lafayette, IN, United States*

Session Co-Organizer: **Meisha Shofner**

5:00pm Exploring Lithium-Ion Intensity and Distribution via a Time-of-Flight Secondary Ion Mass Spectroscopy

Technical Paper Publication. IMECE2013-63013

Cheng-Kai ChiuHuang, Hsiao-Ying Shadow Huang, *North Carolina State University, Raleigh, NC, United States*,
Chuanzhen Zhou, *Analytical Instrumentation Facility, Raleigh, NC, United States*

5:17pm Heterogeneity and Morphology of Anisotropic Nanoscale Electroactive Particles in Lithium Ion Battery Electrodes

Technical Presentation. IMECE2013-65176

Pallab Barai, Partha Mukherjee, *Texas A&M University, College Station, TX, United States*

5:34pm Three-Dimensional Nanoporous Carbon Network for Lithium Ion Batteries

Technical Presentation. IMECE2013-66436

Miao Tian, Ronggui Yang, *University of Colorado Boulder, Boulder, CO, United States*, Wei Wang, *Ninbo Institute of Materials Technology and Engineering, Ninbo, Zhejiang, China*

5:51pm High Temperature Multifunctional Thermomechanics of Metallic and Ceramic Interfaces

Technical Presentation. IMECE2013-64828

Vikas Samvedi, Vikas Tomar, *Purdue University, West Lafayette, IN, United States*

6:08pm The Smallest Metallic Nanorods Using Physical Vapor Deposition

Technical Presentation. IMECE2013-65761

Hanchen Huang, Xiaobin Niu, *University of Connecticut, Storrs, CT, United States*, Stephen Stagon, *University of Connecticut, Meriden, CT, United States*, J. Kevin Baldwin, Amit Misra, *Los Alamos National Lab, Los Alamos, NM, United States*

6:25pm Optofluidics for Energy: Fuel and Electricity From Plasmonically Excited Photosynthetic Bacteria

Technical Paper Publication. IMECE2013-66626

Nathan Samsonoff, David Sinton, *University of Toronto, Toronto, Canada*

11-15 MANUFACTURING, MATERIALS, AND PROCESSES IN ELECTRONICS AND PHOTONICS PACKAGING

11-15-1 Manufacturing, Materials, and Processes in Electronics and Photonics Packaging

4th Floor, Manchester Grand Hyatt, Randle B 5:00pm–6:45pm

Session Organizer: **Seungbae Park**, *Binghamton University, State University of New York, Binghamton, NY, United States*

Session Co-Organizers: **Abhijit Dasgupta**, *University of Maryland, College Park, MD, United States*, **Prashant Gupta**, *Intel, United States*

5:00pm Decontamination of Surfaces Exposed to Carbon Based Nano Particles

Technical Presentation. IMECE2013-65089

Paul Su, William W. Doerr, *FM Global, Norwood, MA, United States*, Syed Hassan, Babak Haghpanah, Zahra Karimi, Ashkan Vaziri, *Northeastern University, Boston, MA, United States*

5:26pm Reliability Assessment of Three-Path Domed Compliant Interconnects

Technical Presentation. IMECE2013-66206

Raphael Okereke, Suresh Sitaraman, *Georgia Institute of Technology, Atlanta, GA, United States*

5:52pm Inhibiting the Re-deposition of AuSn4 on Au/Ni Metallization Pads by Varying the Accessibility of Cu in Isothermally Aged SAC305 Solder Joints

Technical Paper Publication. IMECE2013-66803

Subhasis Mukherjee, Abhijit Dasgupta, *University of Maryland, College Park, MD, United States*, Julie Silk, *Agilent Technologies Inc., Santa Rosa, CA, United States*, Lay-ling Ong, *Agilent Technologies Inc., Penang, Malaysia*

6:18pm Growth of ALD Barrier Layers for Organic Electronic Applications

Technical Presentation. IMECE2013-66840

Anuradha Bulusu, Samuel Graham, *Georgia Institute of Technology, Atlanta, GA, United States*

WEDNESDAY, NOVEMBER 20

11-2 DESIGN AND FABRICATION ANALYSIS, PROCESSES, AND TECHNOLOGY FOR MICRO AND NANO DEVICES AND SYSTEMS

11-2-4 Analysis, Processes, and Technology 4

2nd Floor, Manchester Grand Hyatt, Gregory B 9:45am–11:30am

Session Organizer: Masaru Rao, University of California, Riverside, Riverside, CA, United States

9:45am DNA Origami Based Fabrication of Reconfigurable Nanostructures

Technical Presentation. IMECE2013-65558
Haorong Chen, Tae-Gon Cha, Jong Hyun Choi, Purdue University, West Lafayette, IN, United States

10:06am Fabrication of Ultra-Low Aspect Ratio Hybrid Micro-Nanofluidic Devices Using Polydimethylsiloxane Adhesive Bonding

Technical Paper Publication. IMECE2013-65763
Marie Pinti, Shaurya Prakash, Ohio State University, Columbus, OH, United States

10:27am Simple, Fast, and Low Cost Fabrication Methods of Microchannels for Manipulation of Living Cells

Technical Paper Publication. IMECE2013-66152
Anas Alazzam, Bashar El-Khasawneh, Mohammad Abutayeh, Khalifa University of Science, Technology & Research, Abu Dhabi, United Arab Emir.

10:48am Deviations in Geometry of Miniature Gears Fabricated by Wire Electrical Discharge Machining

Technical Paper Publication. IMECE2013-66560
Kapil Gupta, Neelesh Kumar Jain, Indian Institute of Technology Indore, Indore, MP, India

11:09am An Experimental Investigation on the Fabrication of Microlens Array Using Meniscus of Photoresist

Technical Paper Publication. IMECE2013-64275
Jae Sung Yoon, Jeong Hwan Kim, Yeong-Eun Yoo, Doo-Sun Choi, Korea Institute of Machinery and Materials, Daejeon, Korea (Republic)

11-5 APPLICATIONS OF MICRO- AND NANOSYSTEMS IN MEDICINE AND BIOLOGY

11-5-2 Cell and Tissue Analysis

2nd Floor, Manchester Grand Hyatt, Gregory A 9:45am–11:30am

Session Organizer: Deyu Li, Vanderbilt University, Nashville, TN, United States

Session Co-Organizer: Zhili Hao, Old Dominion University, Virginia Beach, VA, United States

9:45am Adhesion, Proliferation, and Morphology of Endothelial Cells on Micro- and Nanopatterned Titanium and Silicon

Technical Presentation. IMECE2013-62515
Prashanthi Vandurangi, Shannon C. Gott, Victor Rodgers, Masaru Rao, University of California, Riverside, Riverside, CA, United States

10:02am Concurrent Spatial Mapping of the Elasticity of Heterogeneous Soft Materials via a Polymer-Based Microfluidic Device: A Preliminary Study

Technical Paper Publication. IMECE2013-63837
Wenting Gu, Peng Cheng, Old Dominion University, Norfolk, VA, United States, Zhili Hao, Old Dominion University, Virginia Beach, VA, United States

10:19am Optimizing Performance of MEMS-Based Mechanoporation Devices for Ultrahigh Throughput Cellular Manipulation

Technical Presentation. IMECE2013-63908
Harish Dixit, Daniel Nampe, Yanyan Zhang, Hideaki Tsutsui, Masaru Rao, University of California, Riverside, Riverside, CA, United States, C.B. Ballas, Indian University, Indianapolis, IN, United States

10:36am Microfluidic Molecular Trap: Probing Extracellular Signaling by Selectively Blocking Exchange of Specific Molecules in Cell-Cell Interactions

Extended Abstract Publication. IMECE2013-64489
Bryson M. Brewer, Deyu Li, Vanderbilt University, Nashville, TN, United States, Yandong Gao, University of California, Davis, Davis, CA, United States, Rebecca M. Sappington, Vanderbilt University Medical Center, Nashville, TN, United States

10:53am Impedance Analysis of Endothelial Cells Cultured on an Orbital Platform

Technical Presentation. IMECE2013-64789
Mark Gruenthal, Vanessa Velasco, Robert S. Keynton, Stuart Williams, University of Louisville, Louisville, KY, United States

11:10am Electrical Detection of Cell Penetration With Carbon Nanopipettes

Technical Presentation. IMECE2013-63318
Sean Anderson, Haim Bau, University of Pennsylvania, Philadelphia, PA, United States

TRACK II MICRO- AND NANOSYSTEMS ENGINEERING AND PACKAGING / WEDNESDAY, NOVEMBER 20

11-3 CARBON-BASED NANO-MATERIALS AND APPLICATIONS

11-3-1 Fundamentals of Carbon Nanomaterials

2nd Floor, Manchester Grand Hyatt, Gregory B 1:00pm–2:45pm

Session Organizer: **Jong Hyun Choi**, *Purdue University, Lafayette, IN, United States*

Session Co-Organizer: **Annie Tangpong**, *North Dakota State University, Fargo, ND, United States*

1:00pm Phonon-Phonon Interactions in Metallic Single-Walled Carbon Nanotubes

Technical Presentation. IMECE2013-62704

Pierre Gautreau, *University at Buffalo, State University of New York, Tonawanda, NY, United States*, **Cemal Basaran**, *University at Buffalo, State University of New York, Buffalo, NY, United States*

1:17pm Carbon Nanotube Based Optical Platform for Biomolecular Detection

Technical Presentation. IMECE2013-65553

Tae-Gon Cha, **Jing Pan**, **Jong Hyun Choi**, *Purdue University, West Lafayette, IN, United States*

1:34pm 3D Packaging Materials Based on Graphite Nanoplatelet and Aluminum Nitride Nanocomposites

Technical Paper Publication. IMECE2013-66419

Srilakshmi Lingamneni, **Kenneth E. Goodson**, *Stanford University, Stanford, CA, United States*, **Amy M. Marconnet**, *Massachusetts Institute of Technology, Cambridge, MA, United States*

1:51pm Strain Sensing of Glass Fiber Reinforced Coupons by Using Carbon Nanotube CNT Doped Resin

Technical Paper Publication. IMECE2013-63805

Achilles Vairis, *Technological Educational Institute of Crete, Heraklion, Greece*, **Nikolaos Alexopoulos**, *University of the Aegean, Chios, Greece*, **Evangelos Favvas**, *NCSR Demokritos, Athens, Greece*, **Stefanos Nitodas**, *Glonatech S.A., Ag. Paraskevi, Greece*

2:08pm A Computational Model for Predicting the Temperature Distribution Inside a CVD Reactor for Carbon Nanotube Synthesis

Technical Paper Publication. IMECE2013-64256

Kochandra Raji, **Choondal Sobhan**, *National Institute of Technology Calicut, Calicut, India*

2:25pm Thermal and Wear Analysis of HDPE/CNF Nanocomposites in Dry Sliding Contact With a Steel Ball

Technical Presentation. IMECE2013-64963

Songbo Xu, **Annie Tangpong**, **Iskander Akhatov**, *North Dakota State University, Fargo, ND, United States*, **Tian Liu**, **Weston Wood**, **Weihong (Katie) Zhong**, *Washington State University, Pullman, WA, United States*

11-6 MICRO AND NANO DEVICES

11-6-1 Sensors and Actuators

2nd Floor, Manchester Grand Hyatt, Gregory A 1:00pm–2:45pm

Session Organizer: **Byungki Kim**, *Korea University of Technology and Education, Cheonan, NO, Korea (Republic)*

Session Co-Organizer: **Seok Kim**, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

1:00pm A Monte Carlo Study of Molecular Spintronics Devices

Technical Paper Publication. IMECE2013-62413

Pawan Tyagi, **Christopher D'Angelo**, *University of the District of Columbia, Washington, DC, United States*

1:17pm Contactless Superconducting Magnetic Instrument for Precise Positioning in Cryogenic Environments

Technical Paper Publication. IMECE2013-63742

Jose L. Perez-Diaz, **Ignacio Valiente**, **Efren Diez-Jimenez**, *Universidad Carlos III de Madrid, Leganes, Spain*, **Juan Sanchez-Garcia-Casarrubios**, **Marco Antonio Alvarez-Valenzuela**, **Cristian Cristache**, *Universidad Carlos III, Leganes, Spain*, **Javier Serrano**, **Fernando Romera-Juarez**, **David Gonzalez de Marìa**, **Mikel Lamensans**, **Heribert Argelaguet-Vilaseca**, *LIDAX, Torrejon de Ardoz, Spain*

1:34pm Characterization of Micromachined Seesaw Type Microphone

Extended Abstract Publication. IMECE2013-64974

Byungki Kim, *Korea University of Technology and Education, Cheonan, NO, Korea (Republic)*, **Paul Phamduy**, *Polytechnic Institute of New York University, Brooklyn, NY, United States*

1:51pm Microscale Thermal Sensor Manufacturing and Measurement of Temperature Uniformity on Wafer Surface

Technical Paper Publication. IMECE2013-65537

Kim Jun Young, **Jang Kyung Min**, **Yang Hong Cheon**, **Kim Kwang Sun**, *Koreatech, Cheonan City, Korea (Republic)*

2:08pm Micro Double Pressure Sensor for Measuring the Applying Forces in Balloon Angioplasty

Technical Paper Publication. IMECE2013-65705

Arman Dabiri, *University of Arizona, Tucson, AZ, United States*

2:25pm An Analytical Model of Micromachined Electromagnetic Inductive Contactless Suspension

Technical Paper Publication. IMECE2013-66010

Kirill Poletkin, **Ulrike Wallrabe**, *University of Freiburg, Freiburg, Germany*, **Aleksandr Chernomorsky**, *Moscow Aviation Institute, Moscow, Russia*, **Christopher Shearwood**, *Nanyang Technological University, Singapore, Singapore*

11-17 ADVANCED PACKAGING AND POWER ELECTRONICS

11-17-1 Advanced Packaging and Power Electronics

3rd Floor, Manchester Grand Hyatt, Windsor C 1:00pm–2:45pm

Session Organizer: **Tse Wong**, Raytheon Company, El Segundo, CA, United States

Session Co-Organizers: **Patrick McCluskey**, **Kaushik Mysore**, Advanced Micro Devices, Austin, TX, United States

1:00pm Mechanical Performance Study of CNT Bundles as Off-Chip Interconnects

Technical Presentation. IMECE2013-66938

Nicholas Ginga, Suresh Sitaraman, Georgia Institute of Technology, Atlanta, GA, United States

1:26pm Coarse-Grained Molecular Dynamics Study of Epoxy Molding Compound and Fracture of Epoxy/Cu Bimaterial

Technical Presentation. IMECE2013-63364

Shaorui Yang, Jianmin Qu, Northwestern University, Evanston, IL, United States

1:52pm Multi-Physics Damage of Flip-Chip Package Under Pulse Current Loading

Technical Presentation. IMECE2013-62403

Wei Yao, Cemal Basaran, University at Buffalo, State University of New York, Buffalo, NY, United States

2:18pm Electromigration Analysis of Solder Joints Under Alternating Current Load: A Theoretical Procedure

Technical Presentation. IMECE2013-62404

Wei Yao, Cemal Basaran, University at Buffalo, State University of New York, Buffalo, NY, United States

11-6 MICRO AND NANO DEVICES

11-6-2 Bio-Application

2nd Floor, Manchester Grand Hyatt, Gregory A 3:00pm–4:45pm

Session Organizer: **Wei Xue**, Washington State University, Vancouver, WA, United States

Session Co-Organizer: **Byungki Kim**, Korea University of Technology and Education, Cheonan, NO, Korea (Republic)

Session Chair: **Feng Zhao**, Washington State University, Vancouver, WA, United States

3:00pm Vascular Stents With Surface Nanopatterning

Technical Presentation. IMECE2013-62476

Shannon C. Gott, Guanshui Xu, Masaru Rao, University of California, Riverside, Riverside, CA, United States, Benjamin Jabola, Saratech Inc., Lake Forest, CA, United States

3:17pm Characterization of Fenestrated Titanium Microneedles for Passive Ocular Drug Delivery

Technical Presentation. IMECE2013-63037

Omid Khandan, Masaru Rao, University of California, Riverside, Riverside, CA, United States, Amin Famili, Malik Y. Kahook, University of Colorado, Denver, Denver, CO, United States

3:34pm Bio-Inspired Stretchable Electronics for Biomedical Devices

Technical Presentation. IMECE2013-63323

Woon-Hong Yeo, Jonathan Fan, Woosik Lee, John Rogers, University of Illinois at Urbana-Champaign, Urbana, IL, United States, Sung-Young Jung, Pohang University of Science and Technology, Pohang, Korea (Republic)

3:51pm Optimal Design of Electrode Structure and Microfluidics Channel for Effective Particle Separations

Technical Paper Publication. IMECE2013-63346

Yun Chen, Souran Manoochehri, Stevens Institute of Technology, Hoboken, NJ, United States

4:08pm Performance Characterization of a Polymer-Based Microfluidic Device for Detecting Continuous Distributed Loads

Technical Paper Publication. IMECE2013-63709

Peng Cheng, Wenting Gu, Jiayue Shen, Arindam Ghosh, Old Dominion University, Norfolk, VA, United States, Ali Beskok, Old Dominion University, Chesapeake, VA, United States, Zhili Hao, Old Dominion University, Virginia Beach, VA, United States

4:25pm The Effect of Geometry on Sample Leakage in Multi-Channel Microfluidic Devices

Technical Paper Publication. IMECE2013-64079

Elham Rafie Borujeny, Zhenghe Xu, Neda Nazemifard, University of Alberta, Edmonton, AB, Canada

TRACK II MICRO- AND NANOSYSTEMS ENGINEERING AND PACKAGING / WEDNESDAY, NOVEMBER 20

11-9 DYNAMICS AND CONTROL OF MICRO- AND NANOSYSTEMS

11-9-1 Dynamics and Control of Micro- and Nanosystems

2nd Floor, Manchester Grand Hyatt, Gregory B 3:00pm–4:45pm

Session Organizer: **Eniko Enikov**, *University of Arizona, Tucson, AZ, United States*

Session Co-Organizers: **Zayd Leseman**, *University of New Mexico, Albuquerque, NM, United States*, **Rasim Guldiken**, *University of South Florida, Tampa, FL, United States*

3:00pm Nonlinear Resonances in Micromechanical Cantilever-Nanotube Systems Realized by Nanoscale Geometric Nonlinearities

Technical Presentation. IMECE2013-63734

Hanna Cho, *Texas Tech University, Lubbock, TX, United States*, Bongwon Jeong, Alexander Vakakis, D. Michael McFarland, Lawrence Bergman, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*, Min-Feng Yu, *Georgia Institute of Technology, Atlanta, GA, United States*

3:21pm Application of DQM Method to the Steady State Analysis of Thermo-Tunneling Electrodes

Technical Paper Publication. IMECE2013-64676

Eniko Enikov, Mahdi Ganji, *University of Arizona, Tucson, AZ, United States*

3:42pm Nonlinear Damping Originated Geometrically in a Microcantilever-Nanotube Dynamic System

Technical Presentation. IMECE2013-65133

Bongwon Jeong, Alexander Vakakis, D. Michael McFarland, Lawrence Bergman, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*, Hanna Cho, *Texas Tech University, Lubbock, TX, United States*, Min-Feng Yu, *Georgia Institute of Technology, Atlanta, GA, United States*

4:03pm Integration of Geometric Nonlinearity for Stable and Broadband Nonlinear Atomic Force Microscopy

Technical Presentation. IMECE2013-65162

Hanna Cho, *Texas Tech University, Lubbock, TX, United States*, Min-Feng Yu, *Georgia Institute of Technology, Atlanta, GA, United States*, Alexander Vakakis, Lawrence Bergman, D. Michael McFarland, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

4:24pm Stiction Repair of Cantilevers by Parametric Resonances

Technical Presentation. IMECE2013-66177

C. Prakash Vyasrayani, *Indian Institute of Technology, Hyderabad, India*, Arash Kheyraddinmousavi, Drew Goettler, Zayd Leseman, *University of New Mexico, Albuquerque, NM, United States*, Eihab Abdel-Rahman, *University of Waterloo, Waterloo, ON, Canada*

11-18 THERMAL MANAGEMENT IN ELECTRONICS AND PHOTONICS PACKAGING

11-18-1 Thermal Transport in Electronic Devices and Packaging Materials

3rd Floor, Manchester Grand Hyatt, Windsor C 3:00pm–4:45pm

Session Organizer: **Subramanyaravi Annapragada**, *United Technologies Research Center, East Hartford, CT, United States*

Session Co-Organizer: **Justin A. Weibel**, *Purdue University, West Lafayette, IN, United States*

3:00pm Pressure Drop and Heat Transfer Characteristics of Pin Fin Enhanced Microgaps in Single-Phase Microfluidic Cooling

Technical Paper Publication. IMECE2013-65618

Zhimin Wan, G. Yogendra Joshi, *Georgia Institute of Technology, Atlanta, GA, United States*

3:17pm A Computational Study of Air Cooled Data Centers Assisted With Locally Distributed Water to Air Heat Exchangers

Technical Paper Publication. IMECE2013-65958

Tianyi Gao, Bahgat Sammakia, *Binghamton University, State University of New York, Binghamton, NY, United States*, Roger Schmidt, *IBM Corp., Poughkeepsie, NY, United States*

3:34pm Surface Roughness Effect on Vertically Aligned Carbon Nanotube Array Thermal Interface Material

Technical Presentation. IMECE2013-66250

Yang Zhao, *Institute of Advanced Manufacturing Technology, Changzhou, Jiangsu, China*, Rong-Shiuan Chu, Costas Grigoropoulos, *University of California, Berkeley, Berkeley, CA, United States*

3:51pm Thermal Conduction in Nanoporous Tin Films

Technical Presentation. IMECE2013-66653

Pankaj Kaul, Vikas Prakash, *Case Western Reserve University, Cleveland, OH, United States*

4:08pm Hydrodynamic Modeling of PN Junction Solar Cells

Technical Presentation. IMECE2013-66712

Williams Calderon-Muñoz, Juan Osses-Marquez, *Universidad De Chile, Santiago, Chile*

4:25pm A Numerical Study for Contained Cold Aisle Data Center Using CRAC and Server Calibrated Fan Curves

Technical Paper Publication. IMECE2013-65145

Sami Alkharabsheh, Bahgat Sammakia, *Binghamton University, State University of New York, Binghamton, NY, United States*, Saurabh Shrivastava, *Panduit Corporation, Tinley Park, IL, United States*, Roger Schmidt, *IBM Corporation, Poughkeepsie, NY, United States*

11-6 MICRO AND NANO DEVICES**11-6-3 Fabrication and Structure****2nd Floor, Manchester Grand Hyatt, Gregory A 5:00pm–6:45pm**Session Organizer: **Seok Kim**, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*Session Co-Organizer: **Wei Xue**, *Washington State University, Vancouver, WA, United States*Session Chair: **Keunhan (Kay) Park**, *University of Utah, Salt Lake City, UT, United States***5:00pm Studies of the Dimensional Effects of SU-8 and PDMS Pillar Arrays on Hydrophobicity****Technical Paper Publication.** IMECE2013-62692Jiheng Zhao, Jianlong Gao, Wei Xue, *Washington State University, Vancouver, WA, United States*, Xinmiao Chen, Liping Liu, *Lawrence Technological University, Southfield, MI, United States***5:17pm Optimization of the Electro-Mechanical Behavior of a Bimorph Piezoelectric Actuator for Drop-on-Demand Techniques Based on Finite Element Method****Technical Paper Publication.** IMECE2013-63150Markus Kagerer, Benedikt Heller, Tim C. Lueth, Franz Irlinger, *Technische Universität München, Garching, Germany***5:34pm Modulating Gas Sensing Properties of CuO Nanowires by Surface Functionalization Using SnO₂ Nanocrystals****Technical Presentation.** IMECE2013-64096Ganhua Lu, *University of Alaska Anchorage, Anchorage, AK, United States*, Junhong Chen, Mark Mashock, *University of Wisconsin–Milwaukee, Milwaukee, WI, United States***5:51pm Wear Assessment of Large Aspect Ratio Silicon Microbearing Systems****Technical Paper Publication.** IMECE2013-64420Stephen Boedo, Shpend Demiri, Luke S. Holsen, *Rochester Institute of Technology, Rochester, NY, United States***6:08pm Microassembly of Tilting Micromirrors via Micro-Masonry****Technical Presentation.** IMECE2013-65437Zining Yang, Seok Kim, *University of Illinois at Urbana-Champaign, Urbana, IL, United States***6:25pm Micro-Masonry Based Deterministic Assembly of Silicon Dioxide Film and Heterogeneous Integration With Silicon****Technical Presentation.** IMECE2013-65441Hohyun Keum, Seok Kim, *University of Illinois at Urbana-Champaign, Urbana, IL, United States***11-11 MICRO-/NANOSCALE PHONONIC CRYSTALS AND ACOUSTIC METAMATERIALS: FUNDAMENTALS, DEVICES, AND APPLICATIONS****11-11-1 Micro-/Nanoscale Phononic Crystals and Acoustic Metamaterials: Fundamentals, Devices, and Applications****2nd Floor, Manchester Grand Hyatt, Gregory B 5:00pm–6:45pm**Session Organizer: **Charles Reinke**, *Sandia National Laboratories, Albuquerque, NM, United States*Session Co-Organizer: **Zayd Leseman**, *University of New Mexico, Albuquerque, NM, United States***5:00pm Temperature Dependence of Thermal Conductivity Reduction in Microscale Phononic Crystal Films****Technical Presentation.** IMECE2013-65323Charles Reinke, Bongsang Kim, Roy Olsson, Ihab El-Kady, *Sandia National Laboratories, Albuquerque, NM, United States*, Mehmet F. Su, Zayd Leseman, *University of New Mexico, Albuquerque, NM, United States*, Bruce Davis, Mahmoud Hussein, *University of Colorado, Boulder, CO, United States***5:17pm Localized PhoXonic Modes and Application to Sensor Devices****Invited Presentation.** IMECE2013-65912Yan Pennec, *Institut D'Electronique, De Microélectronique, Lille, France*, Samira Amoudache, *Université Mouloud Mammeri, Tizi-Ouzou, Algeria*, Bahram Djafari Rouhani, *IEMN/University of Lille, Villeneuve d'Ascq, France***5:34pm Phonon Heat Conduction at the Nanoscale: From Ballistic to Coherent****Invited Presentation.** IMECE2013-66018Gang Chen, Yongjie Hu, Maria Luckyanova, Jivtesh Garg, Kimberlee Collins, Lingping Zeng, *Massachusetts Institute of Technology, Cambridge, MA, United States*, Zhiting Tian, *Massachusetts Institute of Technology, Arlington, MA, United States***5:51pm Phonon Engineering and Phononic Devices: From Nanowires and Quantum Dots to Graphene and Van der Waals Materials****Technical Presentation.** IMECE2013-66108Alexander Balandin, *University of California, Riverside, Riverside, CA, United States***6:08pm Experimental Evidence of the Reduction of the In-Plane Thermal Conductivity of Silicon by Phononic Crystals****Technical Presentation.** IMECE2013-66191Seyedhamidrez Alaie, Drew Goettler, Mehmet F. Su, Zayd Leseman, *University of New Mexico, Albuquerque, NM, United States*, Charles Reinke, Ihab El-Kady, *Sandia National Laboratories, Albuquerque, NM, United States*

TRACK II MICRO- AND NANOSYSTEMS ENGINEERING AND PACKAGING / WEDNESDAY, NOVEMBER 20 / THURSDAY, NOVEMBER 21

6:25pm A Novel Technique for Measurement of in-Plane Thermal Conductivity of Thin Films

Technical Presentation. IMECE2013-66194

Seyedhamidrez Alaie, Drew Goettler, Mehmet F. Su, Zayd Leseman, *University of New Mexico, Albuquerque, NM, United States*, Charles Reinke, Ihab El-Kady, *Sandia National Laboratories, Albuquerque, NM, United States*

11-18 THERMAL MANAGEMENT IN ELECTRONICS AND PHOTONICS PACKAGING

11-18-2 Thermoelectric Devices

3rd Floor, Manchester Grand Hyatt, Windsor C 5:00pm–6:45pm

Session Organizer: **Satish Kumar**, *Georgia Institute of Technology, Atlanta, GA, United States*

Session Co-Organizers: **Lin Sun**, *Purdue University, West Lafayette, IN, United States*, **Chunjian Ni**, *IBM, Lafayette, IN, United States*

5:00pm Dimensionless Optimization of Thermoelectric Cooler Performance When Integrated Within a Thermal Resistance Network

Technical Paper Publication. IMECE2013-65940

Matthew R. Pearson, Charles E. Lents, *United Technologies Research Center, East Hartford, CT, United States*

5:21pm Optimization of a Thermoelectric Cooler for Time-Varying Heat Load and Sink Temperature

Technical Paper Publication. IMECE2013-65942

Matthew R. Pearson, Charles E. Lents, *United Technologies Research Center, East Hartford, CT, United States*

5:42pm Experimental Characterization of Thin-Film Thermoelectric Based Active Cooling Modules

Technical Paper Publication. IMECE2013-66318

Subramanyaravi Annapragada, Matthew R. Pearson, William Rioux, Charles E. Lents, *United Technologies Research Center, East Hartford, CT, United States*

6:03pm Hotspot Thermal Management Using on-Chip Thermoelectric Coolers

Technical Presentation. IMECE2013-66709

David Brown, Kam Y. Lee, Matthew Redmond, Satish Kumar, *Georgia Institute of Technology, Atlanta, GA, United States*

6:24pm Silicon Nanowire Based On-Chip Thermoelectric Generators

Technical Presentation. IMECE2013-66751

Kam Y. Lee, Gregory Peacock, Satish Kumar, *Georgia Institute of Technology, Atlanta, GA, United States*, Owen Sullivan, *Georgia Institute of Technology, Roswell, GA, United States*

THURSDAY, NOVEMBER 21

11-6 MICRO AND NANO DEVICES

11-6-4 Power and Thermal Application

4th Floor, Manchester Grand Hyatt, Randle B 7:45am–9:15am

Session Organizer: **Byungki Kim**, *Korea University of Technology and Education, Cheonan, NO, Korea (Republic)*

Session Chair: **Dong-Kwon Kim**, *Ajou University, Suwon, Korea (Republic)*

7:45am Design of an Ingestible Capsule With Wireless Communication and Powering Function for Obesity Treating

Technical Paper Publication. IMECE2013-63599

Tianyi Wang, Liang Yan, Zongxia Jiao, Juanjuan Peng, *Beihang University, Beijing, Beijing, China*

7:57am Experimental Study on Energy Harvesting From Salinity Gradient by Reverse Electrodialysis in Ag/AgCl Deposited AAO Nanochannel Array

Technical Paper Publication. IMECE2013-64364

Byeongdong Kang, Moojoong Kim, Hyungmin Joo, Hyun Jung Kim, Dong-Kwon Kim, *Ajou University, Suwon, Korea (Republic)*

8:09am Microfabricated Thermionic Energy Converters: Optimal Design and Recent Progress

Technical Presentation. IMECE2013-64931

Igor Bargatin, *University of Pennsylvania, Philadelphia, PA, United States*

8:21am MEMS Vibration Energy Harvester

Technical Presentation. IMECE2013-65123

John Oxaal, Diana-Andra Borca-Tasciuc, *Rensselaer Polytech Institute, Troy, NY, United States*

8:33am Response Surface Based Optimization of an Electro-Thermal Microactuator for High Track Density Optical Disk Drives

Technical Paper Publication. IMECE2013-65375

Qikai Xie, Xiaolin Chen, *Washington State University Vancouver, Vancouver, WA, United States*

8:45am Hollow Fiber Membrane (HFM) Facilitated CO₂ Delivery to a Cyanobacteria Substrate for Biofuel Production

Technical Paper Publication. IMECE2013-66317

Michael Kalontarov, Eunjung (Erica) Jung, Aadhar Jain, Syed S. Ahsan, David Erickson, *Cornell University, Ithaca, NY, United States*

8:57am Solid-Liquid Hybrid Thermal Interfaces for Low-Contact Pressure Thermal Switching

Technical Presentation. IMECE2013-66660

Yanbing Jia, Y. Sungtaek Ju, *University of California, Los Angeles, Los Angeles, CA, United States*

11-19 NANOSTRUCTURED MATERIALS**11-19-1 Nanostructured Materials—I****4th Floor, Manchester Grand Hyatt, Randle A 7:45am–9:15am**Session Organizer: **Xinnan Wang**, *North Dakota State University, Fargo, ND, United States*Session Co-Organizers: **Yong Zhu**, *North Carolina State University, Raleigh, NC, United States*, **Annie Tangpong**, *North Dakota State University, Fargo, ND, United States***7:45am Energy Dissipation Performance of 1-D Buckyball Alignment at High Impact Speed****Technical Presentation.** IMECE2013-65907Jun Xu, Xi Chen, *Columbia University, New York, NY, United States***8:07am Harnessing Deformation and Instability of Magnetoactive Foams: From Controlled Delivery to Microfluidics****Technical Presentation.** IMECE2013-63588Sungmin Hong, Ringo Yen, George A. Truskey, Xuanhe Zhao, *Duke University, Durham, NC, United States***8:29am Experimental Measurement of Coupled Thermomechanics in Silicon With an Account of Length Scale, Stresses, and Quantum Scale Thermodynamics****Technical Presentation.** IMECE2013-65904Ming Gan, Vikas Tomar, *Purdue University, West Lafayette, IN, United States***8:51am Mechanical Characterization and Failure Mechanism Study of a Fiber Reinforced Polymer Composite****Technical Presentation.** IMECE2013-65880Helena (huiqing) Jin, Wei-Yang Lu, *Sandia National Laboratories, Livermore, CA, United States*, Allen Gu, Jeff Gelb, *XRadia, Pleasanton, CA, United States***11-20 NANOMATERIALS FOR POROUS MEDIA****11-20-1 Nanoporous Materials****4th Floor, Manchester Grand Hyatt, Randle A 9:30am–11:15am**Session Organizer: **Robert Vajtai**, *Rice University, Houston, TX, United States*Session Co-Organizer: **Ajit Roy**, *Air Force Research Lab, Dayton, OH, United States***9:30am Anisotropic Nanoporous Materials****Invited Presentation.** IMECE2013-66846Paolo Bettotti, *University of Trento, Trento, Italy***9:47am Engineering the Structural Properties of Dealloyed Nanoporous Metals****Invited Presentation.** IMECE2013-66816Yi Ding, Zhonghua Zhang, *Shandong University, Jinan, Shandong, China***10:04am van der Waals Solids: 2D Layers to Aerogels****Invited Presentation.** IMECE2013-66860Robert Vajtai, *Rice University, Houston, TX, United States***10:21am Nanostructured Carbon Nanotubes****Invited Presentation.** IMECE2013-66330Anne-Riikka Leino, Olli Pitkänen, Topias Jarvinen, Melinda Mohl, Aron Dombovari, Geza Toth, Mika Huuhtanen, Krisztian Kordas, *University of Oulu, Oulu, Finland*, Ajaikumar Samikannu, Jyri-Pekka Mikkola, *Umeå University, Umeå, Sweden***10:38am Dopants as Morphology Promoters: A Fundamental Study of the Role of Boron and Sulfur in the Formation of MWNT Junctions****Technical Presentation.** IMECE2013-65971Ana Laura Elias, Lakshmy Pulickal Rajukumar, Amber McCreary, Nestor Perea-Lopez, David Swanson, Humberto Terrones, Mauricio Terrones, *Pennsylvania State University, University Park, PA, United States*, Arava Leela Mohana Reddy, Kaushik Kalaga, Robert Vajtai, Pulickel M. Ajayan, *Rice University, Houston, TX, United States*, Martha E. Audiffred, *Universidad de Guanajuato, Guanajuato, Guanajuato, Mexico*, Humberto R. Gutierrez, *University of Louisville, Louisville, KY, United States***10:55am Porous Carbon: Structures Built From Graphene and GO****Technical Presentation.** IMECE2013-66657Robert Vajtai, *Rice University, Houston, TX, United States*

TRACK II MICRO- AND NANOSYSTEMS ENGINEERING AND PACKAGING / THURSDAY, NOVEMBER 21**11-19 NANOSTRUCTURED MATERIALS****11-19-2 Nanostructured Materials—II****3rd Floor, Manchester Grand Hyatt, Emma B 3:00pm–4:45pm**

Session Organizer: **Xinnan Wang**, *North Dakota State University, Fargo, ND, United States*

Session Co-Organizer: **Ramazan Asmatulu**, *Wichita State University, Wichita, KS, United States*

3:00pm Viscoelastic Measurement of Tobacco Mosaic Virus Superlattice

Technical Presentation. IMECE2013-65447

Xinnan Wang, Haoran Wang, *North Dakota State University, Fargo, ND, United States*, Tao Li, Byeongdu Lee, *ANL, Argonne, IL, United States*

3:26pm Fire Retardancy of Polymeric Materials Incorporated With Nanoscale Inclusions

Technical Paper Publication. IMECE2013-66158

Ramazan Asmatulu, Ali Ghazinezami, Amir Jabbarnia, *Wichita State University, Wichita, KS, United States*

3:52pm Temperature Distribution in MEMS Thermal Actuators: In-Situ Raman Measurements and Multiphysics Modeling

Technical Presentation. IMECE2013-66133

Tzu-Hsuan Chang, Yong Zhu, *North Carolina State University, Raleigh, NC, United States*

4:18pm Indenter Tip Dependence in the Determination of Elastic Modulus in Polymers

Technical Paper Publication. IMECE2013-64831

Seyed Hamid Reza Sanei, F. Alisafaei, Chung-souk Han, *University of Wyoming, Laramie, WY, United States*

SAFETY, RELIABILITY, AND RISK

MONDAY, NOVEMBER 18

12-1 SAFETY ENGINEERING & MANAGEMENT,
PROCESS SAFETY, AND RISK ANALYSIS12-1-1 Safety Engineering & Management, Process
Safety, and Risk Analysis

3rd Floor, Manchester Grand Hyatt, Emma B 9:45am–11:30am

Session Organizer: **Juan Ramirez**, *Exponent Inc., Warrenville, IL, United States*Session Co-Organizer: **William Byrd**, *RCP Inc., Houston, TX, United States*9:45am Pressure Safety at Argonne National Laboratory—A
Compendium**Technical Presentation.** IMECE2013-62309Dejan Ristic, *Argonne National Laboratory, Lemont, IL, United States*10:06am Selecting Nanoparticle Properties to Mitigate Risks
to Workers and the Public—A Machine Learning
Modeling Framework to Compare Pulmonary Toxicity
Risks of Nanomaterials**Technical Paper Publication.** IMECE2013-62687Jeremy Gernand, Elizabeth Casman, *Carnegie Mellon University, Pittsburgh, PA, United States*

10:27am Safety of Fitness Equipment Cables

Technical Paper Publication. IMECE2013-63876Ralph Barnett, *Triodyne Inc., Glenview, IL, United States*10:48am How Does Concrete Affect Evaporation of Cryogenic
Liquids: Evaluating LNG Plant Safety**Technical Paper Publication.** IMECE2013-65318Delmar “Trey” Morrison, III, Ryan Hart, *Exponent, Inc., Warrenville, IL, United States*, Harri Kytomaa, Alfonso Ibarreta, Nicolas Ponchaut, *Exponent, Inc., Natick, MA, United States*11:09am The Effect of an Operator Compartment Door on
Standup Forklift Off-Dock and Tip-Over Injuries**Technical Paper Publication.** IMECE2013-66795John Wiechel, *Ohio State University, Columbus, OH, United States*, William R. “Mike” Scott, *Biodynamics Research Corporation, San Antonio, TX, United States*

12-4 RELIABILITY METHODS

12-4-1 Reliability Methods—I

3rd Floor, Manchester Grand Hyatt, Emma C 9:45am–11:30am

Session Organizer: **Mohammad Pourgol-Mohammad**, *Sahand University of Technology, Tabriz, Iran*Session Co-Organizer: **James Harris**, *National Institute for Occupational Safety and Health, Morgantown, WV, United States*9:45am Thermomechanical Fatigue Life Prediction of Heavy
Duty Diesel Engine Cylinder Heads**Technical Paper Publication.** IMECE2013-62385Xuyang Guo, Ying Cheng, *Beijing Institute of Technology, Beijing, Beijing, China*, Ziming Zhang, *China North Engine Research Institute, Tianjin, China*10:02am Reliability Analysis for Early Design Stage of
Electronics and Control System: Case Study of
Horizontal Drilling Equipment**Extended Abstract Presentation.** IMECE2013-63114Farzin Salehpour Oskouyi, Mohammad Pourgol-Mohammad, Amin Moniri Morad, *Sahand University of Technology, Tabriz, Iran*10:19am Reliability in New Product Design: Topology
Optimization of Clamp With a Case Study**Technical Paper Publication.** IMECE2013-63255Muni Prabakaran Muniappan, *Tech Mahindra, Hyderabad, AP, India*10:36am Torque Tension Testing of Fasteners Used for Nasa
Flight Hardware Applications**Technical Presentation.** IMECE2013-65732Ed Hemminger, *Ares Corporation, Greenbelt, MD, United States*, Alan J. Posey, Michael J. Dube, *NASA, Greenbelt, MD, United States*10:53am Comprehensive Comparisons of Random Space
Transformation Methods Between Rackwitz-Fiessler
and Nataf-Pearson in Theory and Algorithm**Technical Paper Publication.** IMECE2013-62357Sheng-Tong Zhou, Hongguang Li, Cheng Li, *State Key Laboratory of Mechanical System and Vibration, Shanghai Jiao Tong University, Shanghai, China*, Zuo-Yang Zhong, *Shanghai Jiao Tong University, Shanghai, China*11:10am Dynamic Simulation of Dependability of Nickel
Reduction Plant**Technical Paper Publication.** IMECE2013-64308Juha Penttilä, Veijo Ikonen, *Tampere University of Technology, Tampere, Finland*

TRACK 12 SAFETY, RELIABILITY, AND RISK / MONDAY, NOVEMBER 18**12-1 SAFETY ENGINEERING & MANAGEMENT,
PROCESS SAFETY, AND RISK ANALYSIS****12-1-2 Safety Engineering & Management,
Transportation Safety, and Risk Analysis****3rd Floor, Manchester Grand Hyatt, Emma A 1:00pm–2:45pm**

Session Organizer: **James Harris**, *National Institute for Occupational Safety and Health, Morgantown, WV, United States*
 Session Co-Organizer: **William Byrd**, *RCP Inc., Houston, TX, United States*

1:00pm The Role of Jet Fans in Rail Tunnel Safety

Technical Paper Publication. IMECE2013-62277
 Mark Colino, Elena Rosenstein, *Parsons Brinckerhoff Inc., New York, NY, United States*

1:21pm Effect of Including a Fetus in the Uterus of Pregnant Occupant Model in Crash Test Simulations

Technical Paper Publication. IMECE2013-64679
 Serpil Acar, *Loughborough University, Leicestershire, United Kingdom*, Moustafa Moustafa, Memis Acar, *Loughborough University, Loughborough, United Kingdom*

1:42pm Modeling Hazard and Threat Risks to Populations Surrounding Public-Use, Non-Towered Airports Due to General Aviation Operations

Technical Paper Publication. IMECE2013-65122
 Christian Salmon, *Western New England University, Springfield, MA, United States*, Vahid Motevalli, *Purdue University, West Lafayette, IN, United States*

2:03pm Development of an Adaptive Human-Machine-Interface to Minimize Driver Distraction and Workload

Technical Paper Publication. IMECE2013-65141
 Matthew Westin, Ronald Dougherty, Christopher Depcik, Austin Hausmann, Charles Sprouse III, *University of Kansas, Lawrence, KS, United States*

2:24pm Dredged Sediments as Materials in Tunnel Construction

Technical Paper Publication. IMECE2013-62392
 Fatiha Kazi Aoual - Benslafa, *École Nationale Polytechnique, Oran, Algeria*, Djamel Kerdal, *University of Sciences and Technology Mohamed Boudiaf Oran, Oran, Algeria*, Belkacem Mekerta, Abdélaziz Semcha, *École Nationale Polytechnique, Es Senia Oran, Algeria*

12-7 FORENSIC APPLICATIONS IN FAILURE ANALYSIS**12-7-1 Forensic Applications in Failure Analysis****3rd Floor, Manchester Grand Hyatt, Emma B 1:00pm–2:45pm**

Session Organizer: **Juan Ramirez**, *Exponent, Inc., Warrenville, IL, United States*

Session Co-Organizer: **John Wiechel**, *SEA, Limited, Columbus, OH, United States*

1:00pm Diagnosis of a Tar-Pump Low Head Development Problem Resulted in Huge Savings

Technical Paper Publication. IMECE2013-62432
 Kamorudeen Abidogun, *Saudi Basic Industries Corporation, Jubail Industrial City, Eastern Province, Saudi Arabia*

1:17pm Forensic Engineering Analysis Methods Employed for the Purpose of Determining the Location of a Long-Range Shooter Based on Terminal Bullet Trajectory

Technical Paper Publication. IMECE2013-62517
 Michael Knox, *Knox & Associates, LLC, Jacksonville, FL, United States*

1:34pm Forensic Examination, and Failure Analysis of a 220 MV Step-Up Transformer Fire

Technical Paper Publication. IMECE2013-62638
 Zuhair Ibrahim, Jeremiah Stepan, Daren Slee, Ali Reza, *Exponent Inc., Los Angeles, CA, United States*

1:51pm Enhanced Tire Mark Visualization Using Polarization Imaging

Technical Paper Publication. IMECE2013-63953
 Matthew L. Schwall, Daniel E. Rosenfeld, Joel C. Wilson, *Exponent Inc., Menlo Park, CA, United States*

2:08pm An Issue in Steel Structural Fatigue Design and Evaluation Codes

Technical Presentation. IMECE2013-65734
 Su Hao, *ACII, Inc., Irvine, CA, United States*

2:25pm Human Fall Evaluation Using Motion Capture and Human Modeling

Technical Paper Publication. IMECE2013-66790
 John Wiechel, Sandra Metzler, *Ohio State University, Columbus, OH, United States*, Dawn Freyder, *SEA, Limited, Tampa, FL, United States*, Nick Kloppenborg, *SEA, Limited, Worthington, OH, United States*

12-4 RELIABILITY METHODS**12-4-2 Reliability Methods—II****3rd Floor, Manchester Grand Hyatt, Emma A 3:00pm–4:45pm**Session Organizer: **Mohammad Pourgol-Mohammad**, *Sahand University of Technology, Tabriz, Iran*Session Co-Organizer: **John Wiechel**, *SEA, Limited, Columbus, OH, United States***3:00pm Centrifugal Pump Mechanical Seal Reliability Optimization by Reliability Allocation****Technical Presentation.** IMECE2013-66205
Peymaan Makarachi, Mohammad Pourgol-Mohammad, *Sahand University of Technology, Tabriz, Iran***3:21pm Reliability-Centered Maintenance for Off-Highway Truck: Case Study of Sungun Copper Mine Operation Equipment****Technical Paper Publication.** IMECE2013-66355
Amin Moniri Morad, Mohammad Pourgol-Mohammad, Javad Sattarvand, *Sahand University of Technology, Tabriz, Iran***3:42pm Reliability Based Design of an Automotive Dry Friction Clutch****Poster Presentation.** IMECE2013-66632
Amir Mohsen Hejazi, Mohammad Pourgol-Mohammad, *Sahand University of Technology, Tabriz, Iran***4:03pm Design for Reliability and Maintainability Cost Model****Technical Paper Publication.** IMECE2013-63659
Basel Alsayyed Ahmad, *United Arab Emirates University, Al Ain, United Arab Emir.***4:24pm Dynamic Reliability Modeling for Nuclear Power Plant Emergency Diesel Generators****Poster Presentation.** IMECE2013-65017
Sima Rastayesh, *Tehran Science and Technology Branch, Islamic Azad University, Tehran, Iran*, Mohammad Pourgol-Mohammad, *Sahand University of Technology, Tabriz, Iran***12-8 PRODUCT SAFETY****12-8-1 Product Safety****3rd Floor, Manchester Grand Hyatt, Emma B 3:00pm–4:45pm**Session Organizer: **Chimba Mkandawire**, *Exponent, Inc., Atlanta, GA, United States*Session Co-Organizer: **Juan Ramirez**, *Exponent, Inc., Warrenville, IL, United States***3:00pm Methods for Evaluating Occupant Kinematics in Forklift Tipover Demonstrations Using Occupants With High BMI Values****Technical Presentation.** IMECE2013-63366
Swathi Ravi, *Exponent, Inc., Philadelphia, PA, United States*, James Smith, *Exponent, Inc., Phoenix, AZ, United States*, Chimba Mkandawire, *Exponent, Inc., Atlanta, GA, United States***3:17pm The Research of Explosion Property for LPG Cylinder Overfilling****Technical Paper Publication.** IMECE2013-63382
Weifei Niu, *Tianjin University/Tianjin Special Equipment Inspection Institute, Tianjin, China*, Heng Wang, Zejun Wang, Hongchen Liu, Qihong Zhao, *Tianjin Special Equipment Inspection Institute, Tianjin, China***3:34pm Geysering Gasoline—The Hidden Hazard****Technical Paper Publication.** IMECE2013-63730
Thomas Berry, *Thomas A. Berry P.E., Goddard, KS, United States*, Kevin Severt, *Kevin B. Severt P.E., Wichita, KS, United States***3:51pm Probabilistic Fatigue Crack Growth Analysis for Life Prediction of Automotive Components****Technical Paper Publication.** IMECE2013-64923
Mahboubeh Yazdanipour, Mohammad Pourgol-Mohammad, Naghd-Ali Choupani, Mojtaba Yazdani, *Sahand University of Technology, Tabriz, Iran***4:08pm On the Safety of Heating Pads****Technical Paper Publication.** IMECE2013-66048
Ralph Barnett, James Wingfield, *Triodyne Inc., Glenview, IL, United States***4:25pm Ejection of Flammable Liquids During Loading and Unloading: A Preliminary Experimental Investigation****Technical Paper Publication.** IMECE2013-66262
Todd M. Hetrick, Juan Ramirez, Delmar “Trey” Morrison, III, *Exponent, Inc., Warrenville, IL, United States*



TRACK 12 SAFETY, RELIABILITY, AND RISK / MONDAY, NOVEMBER 18



SYSTEMS AND DESIGN

TUESDAY, NOVEMBER 19

13-6 SYSTEMS AND COMPLEXITY

13-6-3 Plenary Session

3rd Floor, Manchester Grand Hyatt, Mohsen A 9:45am–11:30am

Session Organizer: **Franz-Josef Kahlen**, *University of Cape Town, South Africa*

9:45am Complexity in Aerospace Systems

Plenary Presentation. IMECE2013-67432Sophia Bright, *GS&S Engineering, Boeing, St. Louis, MO, United States*

WEDNESDAY, NOVEMBER 20

13-2 PRODUCT AND PROCESS DESIGN

13-2-3 Product and Process Design—3

3rd Floor, Manchester Grand Hyatt, Windsor B 9:45am–11:30am

Session Organizer: **Blaine Lilly**, *Ohio State University, Columbus, OH, United States*

9:45am On the General Characterization of Machined Springs and Their Manufacturing Processes

Technical Paper Publication. IMECE2013-63402Juan de Dios Calderon, Carlos Perez, *ITESM Toluca, Toluca, Mexico, Mexico*

10:02am The Investigation of Traditional Japanese Trowel (Part 1): Process Analysis and Surface Observation

Technical Paper Publication. IMECE2013-63425Porakoch Sirisuwan, *Kyoto Institute of Technology, Sakyou-ku, Japan*, Akihiko Goto, *Osaka Sangyo University, Daito, Japan*, Chieko Narita, Tetsushi Koshino, *Kyoto Institute Technology, Kyoto, Japan*

10:19am Characterizing the Accuracy of FDM Rapid Prototyping Machines for Machine Design Applications

Technical Paper Publication. IMECE2013-64972Faryar Etesami, *Portland State University, Portland, OR, United States*, Tim Griffin, *ESCO Corporation, Portland, OR, United States*

10:36am Equivalent Linkages and Dead Center Positions of Planar Single-DOF Complex Linkages

Technical Paper Publication. IMECE2013-62306Jun Wang, Daxing Zhao, *Hubei University of Technology, Wuhan, Hubei, China*, Kwunlon Ting, *Tennessee Technological University, Cookeville, TN, United States*

10:53am Improved Bed Support for Molecular Sieve Dehydrators and Adsorbers

Technical Paper Publication. IMECE2013-63206Cyrus Thomas, Gordon Cartwright, Philip Diwakar, *Bechtel Oil, Gas & Chemicals, Houston, TX, United States*, Robert Norell, *Bilfinger Water Technologies, New Brighton, MN, United States*

11:10am Computer Simulation and Modeling of a Standing Wave Ultrasonic Motor Using Single Flexural Vibration Ring Transducer

Technical Paper Publication. IMECE2013-62925Mahmoud Shafik, Barry Mills, Lovemore Makombe, *University of Derby, Derby, United Kingdom*

13-2 PRODUCT AND PROCESS DESIGN

13-2-5 Product and Process Design—2

3rd Floor, Manchester Grand Hyatt, Windsor B 1:00pm–2:45pm

Session Organizer: **Steven Hoffenson**, *Chalmers University of Technology, Göteborg, Sweden*Session Co-Organizer: **Debarun Dutta**, *University of Petroleum & Energy Studies, Kolkata, West Bengal, West Bengal, India*

1:00pm Piping Engineering Design Management Scenario in a Top Oil and Gas Company

Technical Paper Publication. IMECE2013-62135Debarun Dutta, *University of Petroleum & Energy Studies, Kolkata, West Bengal, West Bengal, India*

1:17pm Researching on Design Method of an Octahedron Deployable Mast

Technical Paper Publication. IMECE2013-62336Liu Heping, Ani Luo, Cheng Li, Wentao Ma, Jianhua Song, *Harbin Engineering University, Harbin, Heilongjiang, China*

1:34pm Design of Spindle Supported by High Stiffness Water Hydrostatic Thrust Bearing

Technical Paper Publication. IMECE2013-62729Yohichi Nakao, Kohei Yamada, Kenji Suzuki, *Kanagawa University, Yokohama, Kanagawa, Japan*

1:51pm Differences Among an Expert and a Non-Expert in the Behavior for Chucking in the Lathe

Technical Paper Publication. IMECE2013-63361Porakoch Sirisuwan, *Kyoto Institute of Technology, Sakyou-ku, Japan*, Takashi Yoshikawa, *Nihama National College of Technology, Ehime, Nihama, Japan*, Tetsushi Koshino, Chieko Narita, *Kyoto Institute of Technology, Kyoto, Japan*

2:08pm Sustainability-Driven Tolerancing and Design Optimization of an Aircraft Engine Component

Technical Paper Publication. IMECE2013-63520Steven Hoffenson, Anders Forslund, Rikard Soderberg, *Chalmers University of Technology, Goteborg, Sweden*

2:25pm Surface Enhancement of Wind Turbine Gears and Bearings Through Laser-Based Manufacturing Processes

Technical Presentation. IMECE2013-64562Hongtao Ding, Ninggang Shen, Chelsey Pence, *University of Iowa, Iowa City, IA, United States*

TRACK 13 SYSTEMS AND DESIGN / WEDNESDAY, NOVEMBER 20**13-2 PRODUCT AND PROCESS DESIGN****13-2-6 Product and Process Design—1****3rd Floor, Manchester Grand Hyatt, Windsor B 3:00pm–4:45pm**Session Organizer: **Andrew Otto**, *Oregon State University, Corvallis, OR, United States*Session Co-Organizer: **Gerardo Carbajal**, *Universidad del Turabo, Gurabo, United States***3:00pm Design and Modeling of Hollow Impeller Palm Nut Cracking Machine****Technical Presentation.** IMECE2013-63635Rufus Chime, *Institute of Management and Technology, Enugu, Nigeria***3:17pm Rapidly Deployable Lightweight Shelters for Austere Environments****Technical Paper Publication.** IMECE2013-63721Eric Jayson, *ATA Engineering, San Diego, CA, United States*,
Greg Mathy, *ATA Engineering, Walnut Creek, CA, United States***3:34pm Test Apparatus for Powered Saw Chain Systems****Technical Paper Publication.** IMECE2013-64157Andrew Otto, John Parmigiani, *Oregon State University, Corvallis, OR, United States***3:51pm Design and Fabrication of Lunar Dust Excavator Robot****Technical Paper Publication.** IMECE2013-64543Md Jalal Uddin Rumi, Md Abdus Salam, *Military Institute of Science and Technology, Dhaka, Bangladesh*, Bhuiyan Shameem Mahmood Ebna Hai, *Helmut Schmidt University (University of the Federal Armed Forces Hamburg), Hamburg, Germany***4:08pm Design and Analysis of an Intake Manifold****Technical Paper Publication.** IMECE2013-66514Andres Calvo, *Chrysler Headquarters, Pontiac, MI, United States*, Hector Garcia, *Infotech Aerospace Services, Isabela, PR, United States*, Gerardo Carbajal, *Universidad del Turabo, Gurabo, PR, United States***4:25pm Applied Potential-Based Panel Method for Designing of Ship's Bow Form****Technical Presentation.** IMECE2013-65729Razieh Zangeneh, *Amirkabir University of Technology, Tehran, Iran*, Mahdi GharehBaygloo, X. Terry Yan, *Southern Illinois University, Edwardsville, IL, United States***13-3 DESIGN INNOVATIONS, METHODOLOGIES, AND PHILOSOPHIES****13-3-1 Collaborative Design****2nd Floor, Manchester Grand Hyatt, Edward D 5:00pm–6:45pm**Session Organizer: **Shuichi Fukuda**, *Stanford University, Stanford, CA, United States***5:00pm Mechatronics Product Design Methodology****Technical Paper Publication.** IMECE2013-62528Jesus Manuel Dorador Gonzalez, Ulises Penuelas Rivas, *Universidad Nacional Autonoma de Mexico, Mexico, Distrito Federal, Mexico***5:17pm Virtual Tools for Safety and Ergonomic Evaluations of Electric Vehicle Architecture****Technical Paper Publication.** IMECE2013-63045Ambarish Kulkarni, Ajay Kapoor, *Swinburne University of Technology, Hawthorn, VIC, Australia***5:34pm Set-Based Concurrent Engineering for Preserving Design Bandwidth in Product and Manufacturing System Platforms****Technical Paper Publication.** IMECE2013-63624Marcel T. Michaelis, Christoffer Levandowski, Hans Johannesson, *Chalmers University of Technology, Gothenburg, Sweden***5:51pm General Systems Theory in a Horizontal and Vertical Action Process for Cross-Disciplinary Knowledge Transfer****Technical Paper Publication.** IMECE2013-64235Steffen Vagts, Josef Schlattmann, *Hamburg University of Technology, Hamburg, Germany***6:08pm Collaborative Design in DARPA's FANG I Challenge****Technical Paper Publication.** IMECE2013-63642Michael R. Myers, Richard E. Gregory, Joseph E. Hite, Sandeep Neema, Ted Bapty, *Vanderbilt University, Nashville, TN, United States***6:25pm Concurrent Design of a Damper for a Suspension System Via Evolutive Optimization****Technical Paper Publication.** IMECE2013-64532Carlos Duchanoy, Marco A. Moreno-Armendáriz, *Centro de investigación en Computación, Mexico City, México D.F., Mexico*, Carlos A. Cruz Villar, *Sección Mecatrónica, CINVESTAV-IPN, Mexico, Distrito Federal, Mexico*

13-4 CAD, CAM, AND CAE**13-4-1 Analysis and Simulation****3rd Floor, Manchester Grand Hyatt, Windsor B 5:00pm–6:45pm**Session Organizer: **Raghu V. Prakash**, *Indian Institute of Technology Madras, Chennai, India***5:00pm Modal Analysis for the Column and Spindle Box of TH6213 Boring and Milling Center Machine****Technical Paper Publication.** IMECE2013-62103
Chuan yang Wang, Xu Wang, *Soochow University, Suzhou, China*, Zhibin Yu, *Suzhou Jiangyuan Precision Machinery Co. Ltd., Suzhou, Jiangsu, China***5:21pm Integrating of Computer Aided Design Analysis in the Engineering Design Process****Technical Paper Publication.** IMECE2013-62130
Hakan Petersson, *Halmstad University, Halmstad, Sweden*, Damien Motte, *Martin Eriksson, Lund University, Lund, Sweden*, Robert Bjarnemo, *Lund Institute of Technology/Lund University, Lund, Sweden***5:42pm Operator Related Causes for Low Correlation Between CAT Simulations and Physical Results****Technical Paper Publication.** IMECE2013-62678
Mikael Rosenqvist, Ann-Christine Falck, Rikard Soderberg, Kristina Warmefjord, *Chalmers University of Technology, Goteborg, Sweden***6:03pm Integration of Quality Function Deployment and Computer-Aided Design in Seat Comfort Design and Analyses****Technical Paper Publication.** IMECE2013-64832
Saed Amer, Landon Onyebueke, *Tennessee State University, Nashville, TN, United States***6:24pm Conceptual Design by a Topology Consistency Skeletal Modeler With Convolution Surfaces****Technical Paper Publication.** IMECE2013-63802
Guohua Ma, *Wentworth Institute of Technology, Boston, MA, United States*, Richard Crawford, *University of Texas at Austin, Austin, TX, United States***THURSDAY, NOVEMBER 21****13-3 DESIGN INNOVATIONS, METHODOLOGIES, AND PHILOSOPHIES****13-3-2 Quality and Innovation I****2nd Floor, Manchester Grand Hyatt, Molly A 7:45am–9:15am**Session Organizer: **Rama K. Koganti**, *JPS Health Network, Fort Worth, TX, United States*Session Co-Organizer: **Shuichi Fukuda**, *Stanford University, Stanford, CA, United States***7:45am PDM (Personal Design and Manufacturing) for Active Customers****Technical Paper Publication.** IMECE2013-63714
Shuichi Fukuda, *Stanford University, Stanford, CA, United States***8:00am Comparative Evaluation of a Novel Concept Design Method****Technical Paper Publication.** IMECE2013-63769
Damian Rogers, Filippo A. Salustri, *Ryerson University, Toronto, Canada***8:15am Comparative Analyzes of Features of Task Based Conceptual Design Methods****Technical Paper Publication.** IMECE2013-64458
Hrayr Darbinyan, *Olympia Tools International Inc., Shanghai Kunjek Hand Tool & Hardware Co. Ltd., Shanghai, China***8:30am Product and Process Design for Sustainable Assembly****Technical Presentation.** IMECE2013-63272
Michael Eastwood, Karl R. Haapala, *Oregon State University, Corvallis, OR, United States*, Matthew D. Carter, Paul W. Liner, *The Boeing Company, Portland, OR, United States***8:45am Non-FEA-Based Method as Means for Knowledge Based Assessment of Perceived Quality****Technical Paper Publication.** IMECE2013-64260
Ola Wagersten, *Chalmers Tekniska Hogskola, Goteborg, Sweden*, Casper Wickman, *Volvo Cars, Gothenburg, Sweden*, Rikard Soderberg, *Chalmers University of Technology, Goteborg, Sweden***9:00am Robust Design of North American Power Grid to Mitigate Cascading Failures****Technical Paper Publication.** IMECE2013-62970
Joseph Piacenza, John Fields, Mir Abbas Bozorgirad, Christopher Hoyle, Irem Tumer, *Oregon State University, Corvallis, OR, United States*

TRACK 13 SYSTEMS AND DESIGN / THURSDAY, NOVEMBER 21

13-4 CAD, CAM, AND CAE

13-4-2 Computer Aided Design Studies

2nd Floor, Manchester Grand Hyatt, Molly B 7:45am–9:15am

Session Organizer: **Monica Bordegoni**, *Politecnico di Milano, Milano, Italy*

7:45am Towards a Geometric Deviation Model of Product in CAD Environment

Technical Paper Publication. IMECE2013-62437
Dinh Son Nguyen, *Danang University of Technology, University of Danang, Danang, Lien Chieu, Viet Nam*

8:00am Functional Modeling: A Key Point in CAD Systems

Technical Paper Publication. IMECE2013-64369
Monica Bordegoni, Francesco Ferrise, Umberto Cugini, *Politecnico di Milano, Milano, Italy*

8:15am Overall Structure Control for Product Design Using Geometric Skeleton Based on Functional Decomposition

Technical Paper Publication. IMECE2013-64571
Lianshui Guo, Xuan Zhou, Lian Zhao, QingMin Liu, *Beihang University (Beijing University of Aeronautics and Astronautics), Beijing, China*

8:30am Utility of Matrix Algebra and Graphical User Interface in Design of Six-Bar Mechanism for Rectilinear Motion Generation

Technical Paper Publication. IMECE2013-65037
Behrooz Fallahi, Seyyed Alireza Seyyed Mousavi, Arjun Perla, Ilia Mokhtariandehkordi, *Northern Illinois University, DeKalb, IL, United States*

8:45am Optimization of a Composite Plate Using Genetic Algorithms

Technical Presentation. IMECE2013-65366
Elias Ledesma, Sergio Ledesma, *University of Guanajuato, Salamanca, Mexico*, Victor Alfonso Alcantar Camarena, *University of Guanajuato, Irapuato Gto, Mexico*

9:00am Federative Data Management Based on Unified XML Data Scheme to Support Prosthetic Dentistry Workflows

Technical Paper Publication. IMECE2013-62615
Reinhard Heister, Reiner Anderl, *Technische Universität Darmstadt, Darmstadt, Hessen, Germany*

13-3 DESIGN INNOVATIONS, METHODOLOGIES, AND PHILOSOPHIES

13-3-4 Innovative Design I

2nd Floor, Manchester Grand Hyatt, Gregory B 9:30am–11:15am

Session Organizer: **Timothy R. Shelton**, *Sandia National Laboratories, Albuquerque, NM, United States*

Session Co-Organizers: **Szu-Hung Lee**, *Imperial College London, London, United Kingdom*, **Shuichi Fukuda**, *Stanford University, Stanford, CA, United States*

9:30am Development and Analysis of Hilly Power Chassis With Vari-Ground Clearance and Vari-Wheel Track Mechanism

Technical Paper Publication. IMECE2013-66823
Qiaoming Gao, Gao Feng, Guoyan Xu, Ding Nenggen, *Beihang University, Beijing, China*

9:47am Novel Design of Injection Pump for Sea Water Desalination Plants

Technical Paper Publication. IMECE2013-62172
Mohammad Alnais, Mohamed Elashmawy, *University of Hail, Hail, Saudi Arabia*

10:04am An Exploration of Accuracy and Convergence of the Degenerate Uniform Strain Hexahedral Element (A Solution to the Unmeshed Void in an All-Hexahedral Mesh)

Technical Paper Publication. IMECE2013-63270
Timothy R. Shelton, Nathan K. Crane, James V. Cox, *Sandia National Laboratories, Albuquerque, NM, United States*

10:21am Solar Water Heater Design for Houses in Arid Zones

Technical Paper Publication. IMECE2013-63239
Ramsés Vega Castellanos, Hector Campbell, Juan de Dios Ocampo, Diego Ramón Bonilla García, *UABC, Mexicali, Baja California, Mexico*

10:38am Functional Analysis Diagrams With the Representation of Movement Transitions

Technical Paper Publication. IMECE2013-63738
Szu-Hung Lee, Pingfei Jiang, *P.R.N Childs, Imperial College London, London, United Kingdom*, Keith Gilroy, *Eschmann Equipment, Lancing, West Sussex, United Kingdom*

10:55am The Evaluations of the Muscle Activity During MOMI by Using the Different Immersed Bamboo in Water to Making Kyo-Uchiwa (Japanese Paper Fan)

Technical Paper Publication. IMECE2013-63476
Porakoch Sirisuwan, *Kyoto Institute of Technology, Sakyoku-ku, Japan*, Hisanori Yuminaga, *Kansai Vocational College of Medicine, Osaka, Japan*, Chieko Narita, *Tetsushi Koshino, Kyoto Institute of Technology, Kyoto, Japan*

13-4 CAD, CAM, AND CAE**13-4-5 Interaction in Design****2nd Floor, Manchester Grand Hyatt, Molly A 9:30am–11:15am**Session Organizer: **Umberto Cugini**, *Politecnico di Milano, Milano, Italy***9:30am Hand Gestures in CAD Systems****Technical Paper Publication.** IMECE2013-64551Serdar Tumkor, Sven Esche, Constantin Chassapis, *Stevens Institute of Technology, Hoboken, NJ, United States***9:51am Enhancing CAD Model Reuse Through 3D Annotations: A Theoretical Proposal for an Annotation-Centered Design Intent and Design Rationale Communication****Technical Paper Publication.** IMECE2013-64595Jorge Dorribo-Camba, *Texas A&M University, College Station, TX, United States*, Gerardo Alducin-Quintero, *Instituto Tecnológico y de Estudios Superiores de Monterrey, Puebla, Mexico*, Pascual Perona, Manuel Contero, *Universitat Politècnica de València, Valencia, Spain***10:12am Virtual Design Technologies for 21st Century Engineers: In What Ways Do Gestures Change Designers Interactions?****Technical Paper Publication.** IMECE2013-65262Caroline Hayes, *Iowa State University, Ames, IA, United States*, Mai Anh Nguyen, Caroline J. Cornelius, Ashley Clayson, Daniel Drew, Xuan Cheng, *University of Minnesota, Minneapolis, MN, United States***10:33am Evaluation of Bimanual Stretched String Control of Haptic Workspace Mapping for Virtual Assembly****Technical Paper Publication.** IMECE2013-65529Vikram Vyawahare, Richard Stone, *Iowa State University, Ames, IA, United States***10:54am BCI-Touch Based System, a Multimodal CAD Interface for Object Manipulation****Technical Paper Publication.** IMECE2013-65648Rohit Bhat, Akshay Deshpande, Ehsan Tarkesh Esfahani, Rahul Rai, *University at Buffalo, State University of New York, Buffalo, NY, United States***13-5 OPTIMIZATION****13-5-1 Optimization I****2nd Floor, Manchester Grand Hyatt, Molly B 9:30am–11:15am**Session Organizer: **Shuichi Fukuda**, *Stanford University, Stanford, CA, United States***9:30am Geometry-Based PSO for Mechatronic System Design Optimization****Technical Paper Publication.** IMECE2013-62545Wenqiang Yuan, Yusheng Liu, *Zhejiang University, Hangzhou, China***9:47am Developing a Baseline Strategy for Adaptive Control of Blinds in Buildings****Technical Paper Publication.** IMECE2013-62829Nasim Karizi, T. Agami Reddy, Partha Dasgupta, *Arizona State University, Tempe, AZ, United States***10:04am Layout Optimization of a Multiple Pinned Joint Under Bending in a Limited Contact Area****Technical Paper Publication.** IMECE2013-62921Amir Mohsen Hejazi, Mohammad Pourgol-Mohammad, *Sahand University of Technology, Tabriz, Iran***10:21am The Game Theory Approach for Solving the Hierarchical and Decentralized Bi-Level Problem****Technical Paper Publication.** IMECE2013-63247Ehsan Ghotbi, *Alfred University, Alfred, NY, United States*, Anoop Dhingra, *University of Wisconsin–Milwaukee, Milwaukee, WI, United States***10:38am Fuzzy Multi-Objective Approach for Designing of Biomass Supply Chain for Polygeneration With Triple Footprint Constraints****Technical Paper Publication.** IMECE2013-66236Aristotle Ubando, Alvin B. Culaba, Kathleen B. Aviso, Raymond R. Tan, *De La Salle University, Manila, NCR, Philippines*, Denny K.S. Ng, *University of Nottingham Malaysia, Selangor Darul Ehsan, Malaysia***10:55am Heuristic GP Finite Element Method for Structural Thickness Optimization****Technical Paper Publication.** IMECE2013-66364Mahmoud R. Saad, Sayed Metwalli, *Cairo University, Cairo, Egypt*

TRACK 13 SYSTEMS AND DESIGN / THURSDAY, NOVEMBER 21

13-3 DESIGN INNOVATIONS, METHODOLOGIES, AND PHILOSOPHIES

13-3-5 Innovative Design II

2nd Floor, Manchester Grand Hyatt, Gregory B 1:00pm–2:45pm

Session Organizer: **Shuichi Fukuda**, *Stanford University, Stanford, CA, United States*

1:00pm **Dimensional Analysis of the Generated Design Solutions for Reconfigurable Manufacturing System**

Technical Paper Publication. IMECE2013-64406
Aamer Ahmed Baqai, Arsalan Shafiq, *NUST, Rawalpindi, Punjab, Pakistan*

1:17pm **Experimental Investigation and Numerical Optimization of Key Factors Affecting the Programming Efficacy of Passive UHF RFID Tags**

Technical Paper Publication. IMECE2013-65265
Kassy Lum, Donnie Proffitt, Ann Whitney, Johne Parker, *University of Kentucky, Lexington, KY, United States*

1:34pm **A Passive Progressive Damping Design for Ride and Handling**

Technical Paper Publication. IMECE2013-64447
Nikolai Moshchuk, Chandra Namuduri, Flavio Nardi, Jihan Ryu, *General Motors, Warren, MI, United States*, Richard Knoll, William Golpe, *General Motors, Milford, MI, United States*

1:51pm **Engine Efficiency Optimization: Using the Magnetic Engine**

Technical Presentation. IMECE2013-65167
Hossein Bayat Pour, *Heriot-Watt University of Edinburgh, Shiraz, Fars, Iran*, Mohsen Bayat Pour, Zhila Mahjouri Ghasrodashti, *Shiraz University, Shiraz, Fars, Iran*

2:08pm **An Evaluation of the Aerodynamic Performance of a Solar Vehicle**

Technical Paper Publication. IMECE2013-65760
Warrick Kin, Sunita Kruger, Nicoleen Janse Van Rensburg, *University of Johannesburg, Johannesburg, Gauteng, South Africa*, Leon Pretorius, *University of Pretoria, Pretoria, South Africa*

2:25pm **Rapid Design and Fabrication Methodology for Moldable Materials Used in Artificial Photosynthesis**

Technical Paper Publication. IMECE2013-66806
Joshua Eggleston, Karl Walczak, David Dornfeld, *University of California, Berkeley, Berkeley, CA, United States*

13-6 SYSTEMS AND COMPLEXITY

13-6-1 Complex Systems 1

2nd Floor, Manchester Grand Hyatt, Molly A 1:00pm–2:45pm

Session Organizer: **Anabela Alves**, *University of Minho, Guimarães, Portugal*

Session Co-Chair: **Sandra Eilmus**, *Hamburg University of Technology, Hamburg, Germany*

1:00pm **The Möbius Strip of Lean Engineering and Systems Engineering**

Technical Paper Publication. IMECE2013-62354
Franz-Josef Kahlen, *University of Cape Town, Cape Town, South Africa*, Shannon Flumerfelt, *Oakland University, Rochester, MI, United States*, Anabela Alves, *University of Minho, Guimarães, Portugal*, Anna Bella Siriban-Manalang, *De La Salle University, Manila, Philippines*

1:21pm **Resilient Design of Complex Engineered Systems Against Cascading Failure**

Technical Paper Publication. IMECE2013-63308
Hoda Mehrpouyan, Brandon Haley, Irem Tumer, Christopher Hoyle, *Oregon State University, Corvallis, OR, United States*, Andy Dong, *University of Sydney, Sydney, Australia*

1:42pm **Product Life-Oriented Development of Component Commonality and Variety**

Technical Paper Publication. IMECE2013-63619
Sandra Eilmus, Dieter Krause, *Hamburg University of Technology, Hamburg, Germany*

2:03pm **Use of Catalog Mining to Extract Valuable New Knowledge Hidden in Tribial Parameters**

Technical Paper Publication. IMECE2013-63371
Hiroyuki Kodama, Toshiki Hirogaki, Eiichi Aoyama, *Doshisha University, Kyoto, Japan*, Keiji Ogawa, *University of Shiga Prefecture, Hikone, Shiga, Japan*

2:24pm **Design for Multiple Industries: A PDP (Parallel Distributed Processing) Approach**

Technical Paper Publication. IMECE2013-63713
Shuichi Fukuda, *Stanford University, Stanford, CA, United States*

13-3 DESIGN INNOVATIONS, METHODOLOGIES, AND PHILOSOPHIES

13-3-6 Quality and Innovation II

2nd Floor, Manchester Grand Hyatt, Gregory B 3:00pm–4:45pm

Session Organizer: **Paul Witherell**, *National Institute of Standards and Technology, Gaithersburg, MD, United States*

Session Co-Organizers: **Atul Narsingpurkar**, *Tata Consultancy Services, Troy, MI, United States*, **Tuomas Ritola**, *Aalto University, Espoo, Finland*, **Shuichi Fukuda**, *Stanford University, Stanford, CA, United States*

3:00pm Combining Product Innovation With Service Innovation to Increase Value Created With a System

Technical Paper Publication. IMECE2013-63489
Tuomas Ritola, Eric Coatanéa, *Aalto University, Espoo, Finland*

3:17pm Next Generation Technologies for Improving Product Planning and Development an Industry Perspective

Technical Paper Publication. IMECE2013-65173
Atul Narsingpurkar, *Tata Consultancy Services, Troy, MI, United States*, Jitesh Panchal, *Purdue University, West Lafayette, IN, United States*, Anurag Jain, *Tata Consultancy Services, Thane, Maharashtra, India*, Sathishkumar Thirugnanam, *Tata Consultancy Services, Columbus, IN, United States*

3:34pm Requirements Analyses to Support a Material Information Model for Sustainability

Technical Paper Publication. IMECE2013-65201
Arvind Harinder, *University of Virginia, Charlottesville, VA, United States*, Paul Witherell, K.C. Morris, *National Institute of Standards and Technology, Gaithersburg, MD, United States*

3:51pm Using TRIZ Tools at Early Stages of a User Centered Design Process

Technical Paper Publication. IMECE2013-65513
Javier Avila, Vicente Borja, Adri-n Espinosa, Silvia Gonzalez, *Universidad Nacional Autónoma de México, Mexico, Mexico*

4:08pm Engineering Decision Making in an Open Age

Technical Paper Publication. IMECE2013-63625
Shuichi Fukuda, *Stanford University, Stanford, CA, United States*

4:25pm An Effective Method to Design Mass Customized Medical Devices

Technical Paper Publication. IMECE2013-64026
Ibrahim Zeid, Tathagat Pathak, Tucker Marion, Sagar Kamarthi, *Northeastern University, Boston, MA, United States*

13-6 SYSTEMS AND COMPLEXITY

13-6-2 Complex Systems 2

2nd Floor, Manchester Grand Hyatt, Molly A 3:00pm–4:45pm

Session Organizer: **Franz-Josef Kahlen**, *University of Cape Town, Cape Town, South Africa*

Session Co-Organizer: **Shannon Flumerfelt**, *Oakland University, Rochester, MI, United States*

3:00pm An Energy Consumption Rewards System to Incentivize Environmentally Conscious Social Behavior in Complex Techno-Social Systems

Technical Paper Publication. IMECE2013-63927
Atishay Godre, Alexander Nikolaev, Rahul Rai, *University at Buffalo, State University of New York, Buffalo, NY, United States*

3:21pm Uncertainty Analysis Plus Importance in Severe Accident Calculations: Quantitative Evaluation of Important Parameters

Technical Paper Publication. IMECE2013-64623
Seyed Mohsen Hoseyni, Ali Abbaspour, Faramarz Yousefpour, *Science and Research Branch, Islamic Azad University, Tehran, Iran*, Mohammad Pourgol-Mohammad, *Sahand University of Technology, Tabriz, Iran*

3:42pm Flight Opportunities for Testing and Demonstrating Emerging Space Technologies

Technical Paper Publication. IMECE2013-64703
Douglas Maclise, *NASA-Ames Research Center, Moffett Field, CA, United States*, Richard C. Mains, *Mains Associates, Berkeley, CA, United States*, Alexander Van Dijk, *Mission Critical Technologies, El Segundo, CA, United States*

4:03pm Toward the Synthesis of Product Knowledge Across the Lifecycle

Technical Paper Publication. IMECE2013-65220
Paul Witherell, Boonserm Kulvatunyou, Sudarsan Rachuri, *National Institute of Standards and Technology, Gaithersburg, MD, United States*

4:24pm Stability Analysis for a Force Augmenting Device Considering Delays in the Human Model

Technical Paper Publication. IMECE2013-63751
Suresh Kumar Gadi, Ruben Garrido, Antonio Osorio, *CINVESTAV, Mexico City, Mexico*, Rogelio Lozano, *HEUDIASYC UMR CNRS, Compiègne, France*



TRACK 13 SYSTEMS AND DESIGN / THURSDAY, NOVEMBER 21



TRANSPORTATION SYSTEMS

THURSDAY, NOVEMBER 21

14-3 CRASHWORTHINESS, OCCUPANCY, AND BIO

14-3-1 Vehicle Crashworthiness Methods

2nd Floor, Manchester Grand Hyatt, Gregory A 7:45am–9:15am

Session Organizer: **John Reid**, *University of Nebraska-Lincoln, Lincoln, NE, United States*

Session Co-Organizer: **Ridha Baccouche**, *Ford Motor Company, Ann Arbor, MI, United States*

7:45am Numerical Investigations of the Positive Effects of Vehicle Dynamics Control Systems on Vehicle Crash

Technical Paper Publication. IMECE2013-62132
Ahmed Elmarakbi, Mustafa Elkady, John MacIntyre, University of Sunderland, Sunderland, United Kingdom, Hisham El-Hage, Lebanese International University, Beirut, Lebanon

8:03am Impact Damage and Residual Strength of Composite Joints in Car Bodies

Technical Paper Publication. IMECE2013-62523
Juanjuan Sun, Lingyu Sun, Beihang University, Beijing, Beijing, China, Junmin Du, Taikun Wang, The 713 Institute of China Shipbuilding Industry Corporation, Henan, China

8:21am Optimization Methodology for Innovative Automotive Crash Absorbers

Technical Paper Publication. IMECE2013-64541
Luca D'Agostino, Luca Bertocchi, Luca Splendi, Antonio Strozzi, Università degli studi di Modena e Reggio Emilia, Modena, Italy, Patrizio Moruzzi, Ferrari S.p.A., Maranello, Italy

8:39am Re Examination of NHTSAs Research Moving Deformable Barrier Front Oblique Impacts With Vehicle to Vehicle Crashes Using FE Models

Technical Paper Publication. IMECE2013-65198
Bavneet Brar, Ravi Tangirala, Hyundai-Kia America Technical Center, Inc., Superior Township, MI, United States

8:57am Investigation of Vehicle Crash Pulse Severity Using Frontal New Car Assessment Program (NCAP) Test Data

Technical Paper Publication. IMECE2013-66401
Chung-Kyu Park, Eun-Young Kim, Cing-Dao (Steve) Kan, George Washington University, Ashburn, VA, United States

14-4 ADVANCED AUTOMOTIVE TECHNOLOGIES

14-4-1 Electric and Hybrid Systems

3rd Floor, Manchester Grand Hyatt, Maggie 7:45am–9:15am

Session Organizer: **Mohamed El-Sayed**, *Kettering University, Flint, MI, United States*

Session Co-Organizers: **Holger Roser**, *University of Technology, Sydney, NSW, Australia, Bo Min Kim*, *Hyundai Motor Group, Hwaseong-si, Korea (Republic)*

7:45am Integrated Approach for System Oriented Analyzes and Optimization of Complex Hybrid Powertrain Applications by Means of Vehicle-in-the-Loop Roller Test Bench

Technical Paper Publication. IMECE2013-62943
Albert Albers, Alexander Schwarz, Matthias Behrendt, IPEK Institute for Product Engineering, Karlsruhe Institute for Technology, Karlsruhe, Baden-Württemberg, Germany

8:00am Investigating the Effects of Air Cooling on Battery Life in PHEVs Under Real World Driving Conditions

Technical Presentation. IMECE2013-64910
Tugce Yuksel, Jeremy Michalek, Carnegie Mellon University, Pittsburgh, PA, United States

8:15am Evaluation of a New Method for Costumer-Orientated Rating of Clutch Systems in Conceptual Hybrid Vehicles

Technical Paper Publication. IMECE2013-63401
Friedrich Brezger, IPEK Institute of Product Engineering, Karlsruhe Institute for Technology, Karlsruhe, Germany, Albert Albers, Karlsruhe Institut fuer Technologie, Karlsruhe, Germany

8:30am Investigating the Effect of Heater Use on Battery Life and Performance in Battery Electric Vehicles

Technical Presentation. IMECE2013-64937
Tugce Yuksel, Jeremy Michalek, Carnegie Mellon University, Pittsburgh, PA, United States

8:45am A Study of Urban Electric Bus With Hybrid Energy Storage System Based on Battery and Supercapacitors

Technical Paper Publication. IMECE2013-63423
Ferdinando L. Mapelli, Davide Tarsitano, Davide Annese, Politecnico di Milano, Milan, Italy, Marco Sala, Giorgio Bosia, Eutecne Srl, Genova, Italy

9:00am Robustness Analysis of Two-Speed Electric Vehicles

Technical Paper Publication. IMECE2013-64139
Holger Roser, Paul Walker, Nong Zhang, University of Technology, Sydney, Sydney, NSW, Australia

TRACK 14 TRANSPORTATION SYSTEMS / THURSDAY, NOVEMBER 21

14-4-6 Automotive Control Systems Design and Development

2nd Floor, Manchester Grand Hyatt, Gregory B 7:45am–9:15am

Session Organizer: **Nikolai Moshchuk**, *General Motors, Warren, MI, United States*

Session Co-Organizer: **Juan Jesús Castillo Aguilar**, *University of Málaga, Málaga, Spain*

7:45am Path Planning for Collision Avoidance Maneuver

Technical Paper Publication. IMECE2013-63893

Nikolai Moshchuk, Shih-Ken Chen, *General Motors, Warren, MI, United States*, Chad Zagorski, Amy Chatterjee, *General Motors, Milford, MI, United States*

8:07am Advanced Traction Control System for Motorbikes

Technical Paper Publication. IMECE2013-64575

Juan Jesús Castillo Aguilar, Juan Antonio Cabrera Carrillo, *University of Málaga, Málaga, Spain*

8:29am Two-Stage Lane Keeping Control Algorithm for Lane Sensing Inaccuracy Handling

Technical Paper Publication. IMECE2013-65892

Jin-Woo Lee, Bakhtiar Litkouhi, *General Motors Research and Development, Warren, MI, United States*, Hsun-Hsuan Huang, *iGate, Cambridge, MA, United States*

8:51am Optimizing Jets for Active Wake Control of Ground Vehicles

Technical Paper Publication. IMECE2013-66659

Domenic Barsotti, Sandra Boetcher, *Embry Riddle Aeronautical University, Daytona Beach, FL, United States*

14-3 CRASHWORTHINESS, OCCUPANCY, AND BIO

14-3-2 Occupant Protection & Biomechanics

2nd Floor, Manchester Grand Hyatt, Gregory A 9:30am–11:15am

Session Organizer: **Saeed Barbat**, *Ford, Novi, MI, United States*
Session Co-Organizer: **Lingyu Sun**, *Beihang University, Beijing, China*

9:30am Accuracy Evaluation of the Coupled Eulerian-Lagrangian Method in Abaqus/Explicit Using a Passenger Airbag Model

Technical Paper Publication. IMECE2013-62617

Biswanath Nandi, *Dassault Systemes, Providence, RI, United States*, Joerg Buettner, *TRW Automotive GmbH, Alfdorf, Germany*

9:51am A Numerical Analysis of Pre-Deployment Effect of Side-Impact Airbags in Reducing Occupant Injuries

Technical Paper Publication. IMECE2013-63234

Yi Yang Tay, Hamid Lankarani, *Wichita State University, Wichita, KS, United States*, Rasoul Moradi, *TASS International, Livonia, MI, United States*

10:12am Assessment of the Dynamic Response of a Lumbar Spine Functional Unit Under Axial Compressive High Loading Rate: Outcome on the Axial Disc Bulge and Its Relation to the Load Magnitude

Technical Paper Publication. IMECE2013-66019

Chandrashekhar Thorbole, *Thorbole Simulation Technology LLC, Springdale, AR, United States*, Michael Jorgensen, Hamid Lankarani, *Wichita State University, Wichita, KS, United States*

10:33am Occupant Modeling for Injury Risk Computation in Vehicle Fleet Frontal Crash Simulations

Technical Paper Publication. IMECE2013-66275

Randa Radwan Samaha, Lilly Nix, *George Washington University, Ashburn, VA, United States*, Priyaranjan Prasad, *Prasad Consulting, LLC, Plymouth, MI, United States*, Sarath Kamalakkannan, Vamsi Kommineni, *EASi LLC, Troy, MI, United States*, Kennerly Digges, *George Washington University, Charlottesville, VA, United States*

10:54am An Integrated Modeling Method to Evaluate Fleet Safety Performance of New Vehicle Designs

Technical Paper Publication. IMECE2013-66285

Randa Radwan Samaha, Dhafer Marzougui, Chongzen Cui, Cing-Dao (Steve) Kan, Azim Eskandarian, *George Washington University, Ashburn, VA, United States*, Priyaranjan Prasad, *Prasad Consulting, LLC, Plymouth, MI, United States*

14-4 ADVANCED AUTOMOTIVE TECHNOLOGIES**14-4-3 Modeling, Simulation, and Analysis Technologies****3rd Floor, Manchester Grand Hyatt, Maggie 9:30am–11:15am**Session Organizer: **Mohamed Bouazara**, *University of Quebec at Chicoutimi, Saguenay, Canada*Session Co-Organizer: **Adolfo Senatore**, *University of Salerno, Fisciano - Salerno, Italy***9:30am A Multibody Motorcycle Model for the Analysis and Prediction of Chattering Vibrations****Technical Paper Publication.** IMECE2013-62903
Giuseppe Catania, Luca Leonelli, *Università di Bologna, Bologna, Italy*, Nicolo Mancinelli, *Ducati Motor Holding S.p.A., Bologna, Italy***9:51am Driveline Dynamics Simulation and Analysis of the Dry Clutch Friction-Induced Vibrations in the EEK Frequency Range****Technical Paper Publication.** IMECE2013-64597
Adolfo Senatore, Vincenzo D'Agostino, *University of Salerno, Fisciano - Salerno, Italy*, Daniel Hochlenert, Utz von Wagner, *Technische Universität Berlin, Berlin, Germany***10:12am Driveline Configuration and Terrain Effect on Slippage and Efficiency of a 6x6/6x4 Terrain Truck in Transport Mode****Technical Paper Publication.** IMECE2013-66358
Vladimir Vantsevich, Dennis Murphy, *University of Alabama at Birmingham, Hoover, AL, United States*, Gianantonio Bortolin, *Volvo Construction Equipment, Eskilstuna, Sweden*, Blair Farley, Gabriel Judd, *University of Alabama at Birmingham, Birmingham, AL, United States***10:33am Load Dynamic Analysis of Upper and Lower Arm Automotive Suspension****Technical Paper Publication.** IMECE2013-63212
Mohamed Bouazara, Mostepha Saihi, *University of Quebec at Chicoutimi, Saguenay, QC, Canada*, Marc J. Richard, *Laval University, Quebec, QC, Canada***10:54am Design and Structure Analysis of Wheeled Chassis With Self-Balancing Rocker for Rescue Engineering Machinery****Technical Paper Publication.** IMECE2013-63568
Guoyan Xu, Xiaopo Wang, Gao Feng, Xiaolin Xie, Ding Nenggen, *Beihang University, Beijing, China***14-2 RAILROAD VEHICLE SYSTEM DYNAMICS****14-2-1 Railroad Vehicle and Bicycle Dynamics****2nd Floor, Manchester Grand Hyatt, Betsy C 1:00pm–2:45pm**Session Organizer: **Tarek Omar**, *Department of Transportation, Federal Railroad Administration, Washington, DC, United States*Session Co-Organizer: **Behrooz Fallahi**, *Northern Illinois University, DeKalb, IL, United States***1:00pm Development of a Methodology for the Evaluation of Motion Sickness Incidence in Railways****Technical Paper Publication.** IMECE2013-64960
Filippo Cianetti, *University of Perugia, Perugia, Italy*, Claudio Braccisi, *Università degli Studi di Perugia, Perugia, Italy*, Renzo Scaletta, *VI-Grade, Perugia, Italy***1:17pm Enhancement of the Computation of Common Normal Between Wheel and Rail Surface****Technical Paper Publication.** IMECE2013-65216
Behrooz Fallahi, Sunil Ballamudi, *Northern Illinois University, DeKalb, IL, United States***1:34pm Computation of Common Normal Between Wheel and Rail Surface via Linearized Track****Technical Paper Publication.** IMECE2013-65608
Behrooz Fallahi, Arjun Perla, Kyle Corn, *Northern Illinois University, DeKalb, IL, United States***1:51pm Numerical Investigation of Aerodynamic Drag on a Vacuum Tube High Speed-Train****Technical Paper Publication.** IMECE2013-65703
Sujay Kumar Mukherjea, Sreeja Bibin, *Bengal Engineering and Science University, Shibpur, Howrah, West Bengal, India***2:08pm Experimental Verification of Bicycle Frame FEA Models****Technical Paper Publication.** IMECE2013-62255
Paul Miles, *Grove City College, Colorado Springs, CO, United States*, Mark Archibald, *Grove City College, Grove City, PA, United States***2:25pm A Study on the Efficiency of Bicycle Hub Gears****Technical Paper Publication.** IMECE2013-64507
Elizabeth Casteel, Mark Archibald, *Grove City College, Grove City, PA, United States*

TRACK 14 TRANSPORTATION SYSTEMS / THURSDAY, NOVEMBER 21

14-3 CRASHWORTHINESS, OCCUPANCY, AND BIO

14-3-3 Systems & Components Crashworthiness

2nd Floor, Manchester Grand Hyatt, Gregory A 1:00pm–2:45pm

Session Organizer: **Lingyu Sun**, *Beihang University, Beijing, China*

Session Co-Organizer: **Ridha Baccouche**, *Ford Motor Company, Ann Arbor, MI, United States*

1:00pm Zone of Intrusion for F-Shape and Single-Slope Concrete Barriers

Technical Paper Publication. IMECE2013-62399
John Reid, Cale Stolle, *University of Nebraska–Lincoln, Lincoln, NE, United States*

1:17pm Application of Sliding Segment and Rolling Segments Drag Factors in Roll Phase Speed and Roll Rate Calculations

Technical Paper Publication. IMECE2013-63656
Mark Arndt, *Transportation Safety Technologies Inc., Mesa, AZ, United States*

1:34pm Prototyping a Lightweight Passenger Seat

Technical Paper Publication. IMECE2013-64381
Celalettin Yüce, Fatih Karpat, Nurettin Yavuz, Ömer Kaynakli, *Uludag University, Bursa, Turkey*, Gokhan Sendeniz, Emre Dolaylar, *Grammer AG, Bursa, Turkey*

1:51pm Composite Materials in Automotive: Improving Safety by Refining Fea Correlation

Technical Paper Publication. IMECE2013-64564
Giuseppe Miscia, Andrea Baldini, Luca D'Agostino, *Università degli studi di Modena e Reggio Emilia, Modena, Italy*, Angelo Narducci, *Ferrari S.p.a., Maranello, Modena, Italy*, Enrico Dolcini, *RIBA Composites S.r.l., Faenza (RA), Italy*, Enrico Bertocchi, *University of Modena, Modena, Italy*

2:08pm Investigation of Crashworthiness of Structural Composite Components in Vehicle Crash Tests

Technical Paper Publication. IMECE2013-64842
Chung-Kyu Park, Cing-Dao (Steve) Kan, *George Washington University, Ashburn, VA, United States*, William Thomas Hollowell, *WTH Consulting LLC, Apex, NC, United States*

2:25pm Different Forward Collision Warning Times Based on Driving Propensity and Action Time

Technical Presentation. IMECE2013-64005
Choongryeong Lee, Hyun-Yong Jeong, *Sogang University, Seoul, Korea (Republic)*

14-4 ADVANCED AUTOMOTIVE TECHNOLOGIES

14-4-4 Engine and Power-Train Technologies

2nd Floor, Manchester Grand Hyatt, Molly B 1:00pm–2:45pm

Session Organizer: **Sohel Anwar**, *Indiana University Purdue University Indianapolis, Carmel, IN, United States*

Session Co-Organizer: **Müjdat Firat**, *Firat University, Elazig, Turkey*

1:00pm Prediction of Combustion Pressure, NOx, and Soot for D.I. Diesel Engine by Simplified Model

Technical Paper Publication. IMECE2013-62067
Nagesh Walke, Neelkanth Marathe, *Automotive Research Association of India, Pune, India*, Milankumar Nandgaonkar, *College of Engineering, Pune, Pune, Maharashtra, India*

1:17pm Soot Load Sensing in a Diesel Particulate Filter via Electrical Capacitance Tomography

Technical Paper Publication. IMECE2013-62819
Ragibul Huq, *Indiana University Purdue University Indianapolis, Indianapolis, IN, United States*, Sohel Anwar, *Indiana University Purdue University Indianapolis, Carmel, IN, United States*

1:34pm Numerical Investigation of Heat Transfer, Fluid Flow, and Formation of Emissions in Diesel Engines

Technical Paper Publication. IMECE2013-64107
Müjdat Firat, *Firat University, Elazig, Turkey*

1:51pm The Effect of Gear Shifting Strategies on Vehicle Fuel Consumption and Acceleration

Technical Paper Publication. IMECE2013-64365
Amin Nejat, Arash Gobal, Sayyad Nasiri, *Sharif University of Technology, Tehran, Tehran, Iran*

2:08pm Fuel Economy Effects and Vehicle Manufacturer Statements on Idling Conventional Vehicles

Technical Presentation. IMECE2013-66384
Scott Curran, *University of Tennessee, Oak Ridge, TN, United States*

2:25pm Improved Energy Efficiency and Controllability of Mobile Work Machines by Reduced Engine Rotational Speed

Technical Paper Publication. IMECE2013-64239
Miika Ahopelto, Joni Backas, Reza Ghabcheloo, Kalevi Huhtala, *Tampere University of Technology, Tampere, Finland*

14-4 ADVANCED AUTOMOTIVE TECHNOLOGIES**14-4-5 Systems and Performance Optimization****2nd Floor, Manchester Grand Hyatt, Molly B 3:00pm–4:45pm**Session Organizer: **Yuping He**, *University of Ontario Institute of Technology, Oshawa, Canada*Session Co-Organizer: **Luca Leonelli**, *Ciri MaM, Università di Bologna, Bologna, Italy***3:00pm Multi-objective Optimization of Suspension and Seat for Vehicle Ride Dynamics Behavior Using NSGA-II Method****Technical Paper Publication.** IMECE2013-63093Kang Song, Xiao-kai Chen, *Beijing Institute of Technology, Beijing, China*, Yi Lin, *Beijing Automotive Technology Center, Beijing, China***3:17pm Optimization Methodology for an Automotive Composite Hood****Technical Paper Publication.** IMECE2013-64529Alberto Lazzarini, Alessandro Valgimigli, Andrea Baldini, *Università degli studi di Modena e Reggio Emilia, Modena, Italy*, Stefano Sangermano, *Maserati S.p.A., Modena, Italy*, Enrico Dolcini, *RIBA Composites S.r.l., Faenza (RA), Italy***3:34pm A Sensitivity-Based Approach to Improve Efficiency of Automotive Chassis Architecture****Technical Paper Publication.** IMECE2013-64536Alessandro Valgimigli, Enrico Bertocchi, Alberto Lazzarini, Luca D'Agostino, Luca Splendi, *Università degli studi di Modena e Reggio Emilia, Modena, Italy***3:51pm Camshaft Efficiency Optimization: Employing the Magnetic Bearing****Technical Presentation.** IMECE2013-65207Mohsen Bayat Pour, *Shiraz University, Shiraz, Fars, Iran*, Hossein Bayat Pour, *Heriot-Watt University of Edinburgh, Shiraz, Fars, Iran*, Setareh Mostajabi, *Qazvin Islamic Azad University, Shiraz, Fars, Iran***4:08pm An Automated Procedure for the Optimization of Suspension Damping of Road Racing Motorcycles****Technical Paper Publication.** IMECE2013-62906Luca Leonelli, *Ciri MaM, Università di Bologna, Bologna, Italy*, Nicolo Mancinelli, *Ducati Motor holding S.p.A., Bologna, Italy***4:25pm Benchmark Investigation of Dynamics Models for Design Optimization of Articulated Heavy Vehicles With Active Safety Systems****Technical Paper Publication.** IMECE2013-62314Yuping He, Md. Manjurul Islam, *University of Ontario Institute of Technology, Oshawa, Canada***14-4-7 Advanced Subsystems Development****2nd Floor, Manchester Grand Hyatt, Betsy C 3:00pm–4:45pm**Session Organizer: **Sebastian Wagner**, *Fraunhofer Institute for Transportation and Infrastructure Systems IVI, Dresden, Germany***3:00pm Advanced Automatic Steering Systems for Multiple Articulated Road Vehicles****Technical Paper Publication.** IMECE2013-62630Sebastian Wagner, Gunter Nitzsche, *Fraunhofer Institute for Transportation and Infrastructure Systems IVI, Dresden, Germany*, Robert Huber, *Leipzig University of Applied Sciences, Leipzig, Germany***3:17pm Concept Design for Sliding Boot of Submerging-Floating Moving Platform Based on Compliant Mechanism****Technical Paper Publication.** IMECE2013-62786Liu Jie, Gao Feng, Guoyan Xu, Ding Nenggen, *Beihang University, Beijing, China*, Cui Meng, *Beijing University of Chemical Technology, Beijing, China***3:34pm Experimental Study of a Roll-Plane Hydraulically Interconnected Suspension System Under Vehicle Articulation Mode****Technical Paper Publication.** IMECE2013-63377Guangzhong Xu, Holger Roser, Nong Zhang, *University of Technology, Sydney, Sydney, NSW, Australia***3:51pm Vehicle's New Anti-Roll System for Suspension Parasitic Stiffness Reduction and Nonlinear Roll Stiffness Characteristic****Technical Paper Publication.** IMECE2013-63392Bo Min Kim, Dae Sik Ko, Jong Min Kim, *Hyundai Motor Group, Hwaseong-si, Gyeonggi-do, Korea (Republic)***4:08pm Development of High Stiffness Axle for a Race Vehicle****Technical Paper Publication.** IMECE2013-64265Jin Ho Jung, Dong Min Lim, Jae Kil Lee, Seon Pyung Kim, *Hyundai Motor Company, Hwaseong-si, Gyeonggi-do, Korea (Republic)***4:25pm A Simulation Model to Compare the Effects of Different Thermal Management Systems on Battery Life in Electrified Vehicles****Technical Presentation.** IMECE2013-64922Tugce Yuksel, Nan Gao, Jeremy Michalek, *Carnegie Mellon University, Pittsburgh, PA, United States*



TRACK 14 TRANSPORTATION SYSTEMS / THURSDAY, NOVEMBER 21



VIBRATION, ACOUSTICS, & WAVE PROPAGATION

TUESDAY, NOVEMBER 19

15-1 ACOUSTIC AND ELASTIC WAVE PROPAGATION

15-1-1 Acoustic and Elastic Wave Propagation I

3rd Floor, Manchester Grand Hyatt, Madeleine D 1:00pm–2:45pm

Session Chair: **Henry Scarton**, *Rensselaer Polytechnic Institute, Troy, NY, United States*1:00pm **Acoustic Wave Propagation Simulation in Double-Layered Composite Cylindrical Structures****Technical Paper Publication.** IMECE2013-65085
Jikai Du, *South Dakota State University, Brookings, SC, United States*1:17pm **Acoustic Fiber Aluminum-Clad Steel Cable for Communications and Power Transmission****Technical Paper Publication.** IMECE2013-65704
Henry Scarton, Kyle Wilt, James A. LaDouce, Gary J. Saulnier, *Rensselaer Polytechnic Institute, Troy, NY, United States*, Pankaj K. Das, *University of California, San Diego, La Jolla, CA, United States*1:34pm **Nonlinearity in Ultrasonic Guided Waves Propagating in Solids Under Constrained Thermal Expansion****Technical Paper Publication.** IMECE2013-63755
Claudio Nucera, Francesco Lanza di Scalea, *University of California, San Diego, La Jolla, CA, United States*1:51pm **Acoustically Augmented Flow and Transport in Supercritical Fluids****Technical Paper Publication.** IMECE2013-66209
NusairNusair Hasan, Bakhtier Farouk, *Drexel University, Philadelphia, PA, United States*2:08pm **Kinematics, Dynamics, and Vibration Models for 3RPR Parallel Kinematics Manipulator****Technical Paper Publication.** IMECE2013-64525
Bashar El-Khasawneh, Anas Alazzam, *Khalifa University of Science, Technology & Research, Abu Dhabi, United Arab Emir.*2:25pm **A Two-Foot Linear Ultrasonic Motor for Fuze Safety System****Technical Paper Publication.** IMECE2013-64113
Yujuan Tang, Jiong Wang, *Nanjing University of Science and Technology, Nanjing, China*

15-5 GENERAL NOISE AND VIBRATION CONTROL

15-5-1 Noise and Vibration Control I

3rd Floor, Manchester Grand Hyatt, Madeleine C 1:00pm–2:45pm

Session Organizer: **Hugo Camargo**Session Co-Organizer: **Jeffrey Vipperman**, *University of Pittsburgh, Pittsburgh, PA, United States*Session Chair: **Junyi Yang**, *NIOSH, Pittsburgh, PA, United States*Session Co-Chairs: **Benjamin Beck**, *National Institute of Aerospace/LaRC, Hampton, VA, United States*, **Soren Maloney**, *Ziklag Consulting Group Co. Ltd., Trinidad/Tobago*1:00pm **Sound Radiation Analysis of a Longwall Cutting Drum**
Technical Paper Publication. IMECE2013-64530Junyi Yang, Hugo Camargo, David Yantek, *NIOSH, Pittsburgh, PA, United States*1:17pm **Development of a Gradient Thickness Plate to Focus Bending Waves****Technical Presentation.** IMECE2013-66207
Noah Schiller, Randolph H. Cabell, Roberto J. Cano, *NASA Langley Research Center, Hampton, VA, United States*, Sz-Chin S. Lin, *Illumina, Inc., San Diego, CA, United States*, Frank Simon, *ONERA-Centre de Toulouse, Toulouse, France*, Jonathan Herlan, *Middle Tennessee State University, Murfreesboro, TN, United States*1:34pm **An Active Helmholtz Resonator for Acoustic Noise Attenuation****Technical Paper Publication.** IMECE2013-62311
Shahin Nudehi, Stephen Charnley, Taylor Brandt, Parisa Nasserifar, *Valparaiso University, Valparaiso, IN, United States*1:51pm **System Identification and Observer-Based Control Design of a Piezoelectric Actuated Cantilever Beam****Technical Paper Publication.** IMECE2013-63871
Bei Lu, Qifu Li, *California State University, Long Beach, CA, United States*2:08pm **Light-Driven and Control of Paraboloidal Thin Shell Using Photodeformable Materials****Technical Paper Publication.** IMECE2013-64660
X.J. Wang, J.H. Huang, J. Wang, *Nanjing University of Science and Technology, Nanjing, Jiangsu Province, China*, W.X. Cheng, *Shanghai Institute of Ceramics, Shanghai, China*2:25pm **The Active Control of Vibration and Power Flow in the Crossing-Shaped Plate Structures****Technical Paper Publication.** IMECE2013-63954
Zhaobo Chen, Jia Xing Li, Yinghou Jiao, *Harbin Institute of Technology, Harbin, HeiLongjiang Province, China*

15-14 NCAD RAYLEIGH LECTURE

15-14-1 NCAD Rayleigh Lecture

3rd Floor, Manchester Grand Hyatt, Madeleine D 3:00pm–4:45pm

Session Chair: **Noah Schiller**, *NASA Langley Research Center, Hampton, VA, United States*3:00pm **Walking-Induced Vibrations in Buildings: Evaluation and Prediction****Plenary Presentation.** IMECE2013-66857
Eric Ungar, *Acentech, Cambridge, MA, United States*

TRACK 15 VIBRATION, ACOUSTICS, & WAVE PROPAGATION / WEDNESDAY, NOVEMBER 20

WEDNESDAY, NOVEMBER 20

15-5 GENERAL NOISE AND VIBRATION CONTROL

15-5-2 Noise and Vibration Control II

3rd Floor, Manchester Grand Hyatt, Mohsen B 9:45am–11:30am

Session Chair: **Junyi Yang**, NIOSH, Pittsburgh, PA, United States
 Session Co-Chair: **Benjamin Beck**, National Institute of Aerospace/LaRC, Hampton, VA, United States

9:45am **Measurements of Car Vibrations Under Real-Life Driving Conditions and Assessment of Energy Harvesting for Wireless Sensor Nodes**

Technical Paper Publication. IMECE2013-63312
 André Dompierre, Mohamed S. Traore, Luc Frechette, Université de Sherbrooke, Sherbrooke, QC, Canada

10:02am **Investigation of a Vibration Reduction System for Vehicle Seats by a Vibration Model Consisting of a Vehicle, Seat, and Human Body**

Technical Paper Publication. IMECE2013-62328
 Shinichiro Ota, Shuji Nishiyama, Tomoyuki Nakamori, Okayama Prefectural University, Okayama, Japan

10:19am **Heavy Truck Chassis Clamping Load Evaluation of the Bolted Joints Under External Loads**

Technical Paper Publication. IMECE2013-64194
 Ali Cinar, Ford Otosan, Gebze Kocaeli, Turkey

10:36am **Time-Frequency Analysis of Disc Brake Squeal in a Brake Experiment**

Technical Paper Publication. IMECE2013-63328
 X.D. Liu, Haixia Wang, Z.S. Wan, Y.C. Shan, Beihang University, Beijing, China

10:53am **Dynamic Classification: A Tool for Fault Detection and Vibration Behavior Monitoring of Bearings**

Technical Paper Publication. IMECE2013-64250
 Sanaa Kerroumi, Lanto Rasolofondraibe, Xavier Chimentin, University of Reims Champagne Ardenne, Reims, France

11:10am **Identification of Appropriate Wavelet for Vibration Study of Mechanical Impacts**

Technical Paper Publication. IMECE2013-62348
 Seyed Majid Yadavar Nikravesh, Power and Water University of Technology, Tehran, Tehran, Iran, Hossein Taheri, South Dakota State University, Brookings, SD, United States, Peter Wagstaff, University de Technologie de Compiègne, Compiègne, France

15-15 NOISE CONTROL AND ACOUSTICS TUTORIAL ON DYNAMOMETRY

15-15-1 Noise Control and Acoustics Tutorial on Dynamometry

3rd Floor, Manchester Grand Hyatt, Mohsen A 9:45am–11:30am

Session Chair: **Zhongquan Zheng**, University of Kansas, Lawrence, KS, United States
 Session Co-Chair: **Kristin Cody**, BMPC Bettis Lab, Jefferson Hills, PA, United States

9:45am **Tutorial on Dynamometry**

Plenary Presentation. IMECE2013-62800
 Michael Jonson, Pennsylvania State University, University Park, PA, United States

15-1 ACOUSTIC AND ELASTIC WAVE PROPAGATION

15-1-2 Acoustic and Elastic Wave Propagation II

3rd Floor, Manchester Grand Hyatt, Mohsen B 1:00pm–2:45pm

Session Chair: **Zhongquan Zheng**, University of Kansas, Lawrence, KS, United States

1:00pm **Wave Propagation in Saturated Porous Media**

Technical Paper Publication. IMECE2013-62884
 Aliaksei Pazdniakou, Pierre Adler, UPMC, Paris, France (Metro)

1:17pm **Sound Propagation Around Arrays of Cylinders**

Technical Paper Publication. IMECE2013-66665
 Zhongquan Zheng, Guoyi Ke, University of Kansas, Lawrence, KS, United States

1:34pm **Efficient Elastic Band Structure Calculations by Bloch Mode Synthesis**

Technical Presentation. IMECE2013-66382
 Dimitri Krattiger, Mahmoud Hussein, University of Colorado Boulder, Boulder, CO, United States

1:51pm **Energy Absorption in a 1D Array of Axially Aligned Pendulums With Linear Torsional Coupling**

Technical Paper Publication. IMECE2013-64470
 Brian P. Bernard, Jake E. Greenstein, Brian P. Mann, Duke University, Durham, NC, United States

2:08pm **Establishing the Admissible Waves and the Steady-State Response of a Rib-Stiffened, Layered Plate Structure Subjected to High-Frequency Acoustic Loading**

Technical Presentation. IMECE2013-64602
 Kirubel Teferra, Weidlinger Associates, Inc., New York, NY, United States, Jeffrey Cipolla, Weidlinger Associates, Washington, DC, United States

2:25pm **Impact Problems in One-Dimensional Goupillaud-Type Layered Elastic Media**

Technical Presentation. IMECE2013-66596
 Ani Velo, University of San Diego, San Diego, CA, United States, George A. Gazonas, U.S. Army Research Laboratory, Aberdeen Proving Ground, MD, United States

WEDNESDAY, NOVEMBER 20 / TRACK 15 VIBRATION, ACOUSTICS, & WAVE PROPAGATION

15-4 FLOW INDUCED NOISE AND VIBRATION

15-4-1 Flow Induced Noise and Vibration I

3rd Floor, Manchester Grand Hyatt, Mohsen A 1:00pm–2:45pm

Session Chair: **Robert Tomko**, *Bechtel Marine Propulsion Corporation, West Mifflin, PA, United States*

Session Co-Chairs: **Kristin Cody**, *BMPC Bettis Lab, Jefferson Hills, Pa, United States*, **Zhongquan Zheng**, *University of Kansas, Lawrence, KS, United States*

1:00pm Numerical Modeling of the Acoustic Damping of Perforated Liners With Bias Flow

Technical Paper Publication. IMECE2013-62629
Alireza Mazdeh, *Honeywell, Urbana, OH, United States*,
Ahmad Kashani, *University of Dayton, Dayton, OH, United States*

1:21pm Acoustic Emission Tests in the Monitoring of Cavitation Erosion in Hydraulic Turbines

Technical Paper Publication. IMECE2013-62960
Marco Faria, Eduardo Medeiros, Carlos Martinez, *Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, Brazil*,
Fernando Queiroz, *Furnas Centrais Elétricas, Belo Horizonte, Minas Gerais, Brazil*

1:42pm Signal Processing Techniques for Ultrasonic Waves to Measure Stresses in Oil Pipelines

Technical Paper Publication. IMECE2013-62600
Paulo Pereira Jr., Cleudiane S. Santos, Auteliano A. dos Santos Jr., *University of CampinasCampinas, Brazil*

2:03pm Influence of the Aerodynamic Vibration Excitation on the Turbine Blade Vibration in a Vehicle Turbocharger

Technical Paper Publication. IMECE2013-62612
Shujun Shan, Anping Hou, Zhang Zhang, *Beihang University, Beijing, China*, Xinqian Zheng, *Tsinghua University, Beijing, China*, Mingming Zhang, *Peking University, Beijing, China*

2:24pm The Effects of Adverse Pressure Gradients on the Fluctuating Surface Pressure Acting Near the Trailing Edge of High Reynolds Number Airfoils

Technical Presentation. IMECE2013-65192
Matthew Catlett, Jonathan Forest, Jason Anderson, Devin Stewart, *Carderock, West Bethesda, MD, United States*

15-4 FLOW INDUCED NOISE AND VIBRATION

15-4-2 Flow Induced Noise and Vibration II

3rd Floor, Manchester Grand Hyatt, Mohsen A 3:00pm–4:45pm

Session Chair: **Zhongquan Zheng**, *University of Kansas, Lawrence, KS, United States*

Session Co-Chairs: **Robert Tomko**, *Bechtel Marine Propulsion Corporation, West Mifflin, Pa, United States*, **Kristin Cody**, *BMPC Bettis Lab, Jefferson Hills, PA, United States*

3:00pm Towards a Universal Scaling for Broadband Turbulent Noise in Internal Flow Devices

Technical Paper Publication. IMECE2013-66723
Arjen de Jong, Joachim Golliard, *TNO, Delft, Netherlands*

3:17pm Vibratory Stress Suppression in Turbine Blades Subjected to Aerodynamic Loading

Technical Paper Publication. IMECE2013-63724
Imran Aziz, Wasim Tarar, Imran Akhtar, M. Nadeem Azam, *National University of Science and Technology, Rawalpindi, Punjab, Pakistan*

3:34pm The Influence of Geometry, Wall Thickness, and Material on the Acoustic Resonance Predictions in Closed-Ended Water-Filled Piping

Technical Paper Publication. IMECE2013-64850
Alireza Mokhtari, Vijay Chatoorgoon, *University of Manitoba, Winnipeg, MB, Canada*

3:51pm Research of Whirlpool Sound Radiation in Turbulence Coherent-Structure in Screw Compressor Exhausting Orifice

Technical Paper Publication. IMECE2013-62890
Xiaosa Li, Zegang Qian, Qichao Yang, *Hefei General Machinery Research Institute, Hefei, China*

4:08pm Vibration Analysis and Transformation of Hyper Compressor Pipeline for LDPE Plants

Technical Paper Publication. IMECE2013-62920
Wenjie Bai, Yongquan Li, *Xian Jiaotong University, Xian, China*,
Duan Quan, *Xi'an Jiaotong University, Xi'an, China*

4:25pm Efficient Simulation of Acoustic Emission With Reflections Removal Based on Infinite Element and Rayleigh Damping

Technical Paper Publication. IMECE2013-62880
D.H. Xiao, T. He, X.D. Liu, Y.C. Shan, H.S. Yu, *Beihang University, Beijing, China*

TRACK 15 VIBRATION, ACOUSTICS, & WAVE PROPAGATION / WEDNESDAY, NOVEMBER 20

15-9 PHONONIC CRYSTALS AND ACOUSTIC METAMATERIALS

15-9-1 Phononic Crystals/Metamaterials 1: Theoretical Advances

3rd Floor, Manchester Grand Hyatt, Mohsen B 3:00pm–4:45pm

Session Organizer: **Mahmoud Hussein**, *University of Colorado, Boulder, CO, United States*

Session Co-Organizer: **Liang-Wu Cai**, *Kansas State University, Manhattan, KS, United States*

3:00pm New Classes of Materials: From Unimode to Pentamode, Linear and Nonlinear

Invited Presentation. IMECE2013-63472

Graeme Milton, *University of Utah, Salt Lake City, UT, United States*

3:30pm Nonlocal Theory of Sound Propagation in Porous Media: Case of Two-Dimensional Arrays of Rigid Cylinders

Technical Presentation. IMECE2013-64765

Navid Nemati, Denis Lafarge, *Université du Maine, Le Mans, France*

3:45pm Identifying Intersections of Dispersion Curves for Phononic Crystals

Technical Paper Publication. IMECE2013-65754

Kuo-Chung Liu, *National Defense University, Tahsi, Taoyuan, Taiwan*, Yuan-fang Chou, *National Taiwan University, Taipei, Taiwan*

4:00pm Wavelet Element Method for Computing Band Structures of Phononic Crystals

Technical Paper Publication. IMECE2013-62443

Zhangyi Liu, Jiu Hui Wu, *Xi'an Jiaotong University, Xi'an, Shaan Xi, China*

4:15pm Acoustic and Elastic Cloaking Using Non-Singular Transformation

Extended Abstract Publication. IMECE2013-65649

Aref Tehranian, Siavouche Nemat-Nasser, *University of California, San Diego, La Jolla, CA, United States*

15-9 PHONONIC CRYSTALS AND ACOUSTIC METAMATERIALS

15-9-2 Phononic Crystals/Metamaterials 2: Damping and Nonlinearity

3rd Floor, Manchester Grand Hyatt, Mohsen B 5:00pm–6:45pm

Session Organizer: **Mahmoud Hussein**, *University of Colorado Boulder, Boulder, CO, United States*

Session Co-Organizer: **Liang-Wu Cai**, *Kansas State University, Manhattan, KS, United States*

5:00pm Detection and Estimation of Nonlinearity in Periodic Chains

Technical Presentation. IMECE2013-65582

Ganesh Ramakrishnan, Stefano Gonella, *University of Minnesota, Minneapolis, MN, United States*

5:17pm The Decay of Vibrations in One-Dimensional, Anharmonic Superlattices: Understanding the Role of Rigid Body Rotational Resonance

Technical Presentation. IMECE2013-65376

Nichlas Swintek, Pierre A. Deymier, *University of Arizona, Tucson, AZ, United States*

5:34pm Tunable Bandgaps in Woodpile Phononic Crystals Made of Stacked Cylindrical Elements

Technical Presentation. IMECE2013-62944

Eunho Kim, Jinkyu Yang, *University of Washington, Seattle, WA, United States*, Mehrashk Meidani, *University of Massachusetts Amherst, Amherst, MA, United States*

5:51pm Metadamping in Dissipative Metamaterials

Technical Paper Publication. IMECE2013-66210

Mahmoud Hussein, Michael Frazier, *University of Colorado Boulder, Boulder, United States*

6:08pm Non-Reflective and Highly Dissipative Acoustic Metamaterials

Extended Abstract Publication. IMECE2013-62513

Hossein Sadeghi, Ankit Srivastava, Siavouche Nemat-Nasser, *University of California, San Diego, La Jolla, CA, United States*

6:25pm A Generalized Dynamic Homogenization Theory for Periodic Media

Technical Presentation. IMECE2013-66212

Michael Frazier, Mahmoud Hussein, *University of Colorado, Boulder, Boulder, CO, United States*

THURSDAY, NOVEMBER 21

15-9 PHONONIC CRYSTALS AND ACOUSTIC METAMATERIALS

15-9-3 Phononic Crystals/Metamaterials 3: Local Resonance

3rd Floor, Manchester Grand Hyatt, Windsor C 7:45am–9:15am

Session Organizer: **Mahmoud Hussein**, *University of Colorado Boulder, Boulder, CO, United States*Session Co-Organizer: **Jinkyu Yang**, *University of Washington, Seattle, WA, United States*

7:45am Engineering of Dispersion Curves and Band Gaps in a Phononic Crystal Made of Pillars on a Membrane or Substrate

Technical Presentation. IMECE2013-64954Bahram Djafari Rouhani, Abdelali Mrabti, Mourad Oudich, Abdellatif Akjouj, *IEMN/University of Lille, Villeneuve d'Ascq, France*, Yan Pennec, *Institut D'Electronique, De Microélectronique, Lille, France*, Bernard Bonello, *Institut des Nanosciences de Paris, Université Pierre et Marie Curie, Paris, France*

8:00am Plate-Type Acoustic Metamaterial for Low-Frequency Sound Mitigation

Technical Presentation. IMECE2013-63118Badreddine Assouar, *CNRS - University of Lorraine, Vandoeuvre lès Nancy Cedex, France*, Mourad Oudich, *University of Lille, Villeneuve d'Ascq, France*, Matteo Senesi, *Massimo Ruzzene, Georgia Institute of Technology, Atlanta, GA, United States*

8:15am Wave Propagation in Cellular Solids

Technical Presentation. IMECE2013-65249Alessandro Spadoni, *École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland*

8:30am Inertial Amplification Induced Phononic Band Gaps in SC and BCC Lattices

Technical Paper Publication. IMECE2013-62674Semih Taniker, Cetin Yilmaz, *Bogazici University, Istanbul, Turkey*

8:45am Surface Acoustic Waves Interacting With Locally Resonant Microsphere Arrays

Technical Presentation. IMECE2013-63889Nicholas Boechler, Jeffrey K. Eliason, Anshuman Kumar, Alexei, A. Maznev, Keith, A. Nelson, Nicholas Fang, *Massachusetts Institute of Technology, Cambridge, MA, United States*

9:00am Low-Frequency Broadband Energy Harvesting Based on Locally Resonant Phononic Crystals

Technical Paper Publication. IMECE2013-62527Siwen Zhang, Jiu Hui Wu, *Xi'an Jiaotong University, Xi'an, Shaan Xi, China*

15-11 VIBRATION AND ACOUSTIC MEASUREMENT TECHNIQUES AND FACILITIES

15-11-1 Vibration and Acoustic Measurement Techniques and Facilities

3rd Floor, Manchester Grand Hyatt, Windsor B 7:45am–9:15am

Session Chair: **Kristin Cody**, *BMPC Bettis Lab, Jefferson Hills, PA, United States*Session Co-Chair: **Robert Tomko**, *Bechtel Marine Propulsion Corporation, West Mifflin, PA, United States*, **Michael Jonson**, *Pennsylvania State University, University Park, PA, United States*

7:45am Resonant Structure and Vibrometer-Based Fatigue Testing for Leaded Electronic Packages

Extended Abstract Publication. IMECE2013-62279Arvind Krishna, *Delphi, Kokomo, IN, United States*

8:00am Operating Strain Mode Identification Using Acceleration Measurements

Technical Paper Publication. IMECE2013-65306Jakerson R. Gevinski, Robson Pederiva, *University of Campinas, Campinas, Brazil*

8:15am A Signal Processing Approach to Overcome the Nonlinearity Response Problem of Acoustic Emission Sensors

Technical Paper Publication. IMECE2013-62229Tian Ran Lin, Weiliang Wu, Andy Tan, *Queensland University of Technology, Brisbane, Queensland, Australia*

8:30am Measured Variation of High-Frequency Sound Absorption in Porous Metals Subject to Changes in Temperature and Temperature Gradient

Technical Paper Publication. IMECE2013-62723Weihua Chen, *Xi'an Jiaotong University; Lanzhou University of Technology, Xi'an, Shaanxi, China*, Tianning Chen, Xiaopeng Wang, Zhiping Ying, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*

8:45am Modal Analysis of Structural Vibration

Technical Paper Publication. IMECE2013-62533Madan Lal Chandravanshi, A.K. Mukhopadhyay, *Indian School of Mines; Dhanbad; India, Dhanbad, Jharkhand, India*

9:00am A Simple Method for Measuring Muffler Transmission Loss With PU Probes

Technical Paper Publication. IMECE2013-62585Li Yan, Weikang Jiang, *Shanghai Jiaotong University, Shanghai, China*

TRACK 15 VIBRATION, ACOUSTICS, & WAVE PROPAGATION / THURSDAY, NOVEMBER 21

15-8 NUMERICAL METHODS IN VIBRATION AND ACOUSTICS

15-8-1 Numerical Methods in Vibration and Acoustics I

3rd Floor, Manchester Grand Hyatt, Windsor B 9:30am–11:15am

Session Chair: **Rui Botelho**, *General Dynamics Electric Boat, Groton, CT, United States*

Session Co-Chair: **Albert Allen**, *NASA Langley Research Center, Hampton, VA, United States*

9:30am Energy Finite Element Analysis of Structural Solid Domains

Technical Paper Publication. IMECE2013-62400
Sergey Medyanik, *Michigan Engineering Services, LLC, Ann Arbor, MI, United States*, Nickolas Vlahopoulos, *Sungmin Lee, University of Michigan, Ann Arbor, MI, United States*

9:47am A Hybrid Energy Model for Predicting High-Frequency Vibrational Response of Thin Plates Under Heavy Fluid Loading

Technical Paper Publication. IMECE2013-62953
Xiangjie Kong, Hualing Chen, Danhui Zhu, Wenbo Zhang, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*

10:04am A New Hybrid Method for Mid-Frequency Vibration of Beam-Plate System Under External Point Loading

Technical Paper Publication. IMECE2013-63168
Danhui Zhu, Hualing Chen, Xiangjie Kong, Wenbo Zhang, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*

10:21am A Novel Energy Flow Model for High-Frequency Vibration Analysis of Beams in a Thermal Environment

Technical Paper Publication. IMECE2013-63176
Wenbo Zhang, Hualing Chen, Danhui Zhu, Xiangjie Kong, *Xi'an Jiaotong University, Xi'an, Shaanxi, China*

10:38am A Method for Computation of Wave Propagation in Heterogeneous Solids: Algorithm Description

Extended Abstract Publication. IMECE2013-63639
Kwang-chun Park, *University of Colorado Boulder, Boulder, CO, United States*, S.S. Cho, *Korea Atomic Energy Research Institute, Daejeon, Chungcheongnam-do, Korea (Republic)*

10:55am A Method for Computation of Wave Propagation in Heterogeneous Solids: Implementation and Performance

Extended Abstract Publication. IMECE2013-65790
S.S. Cho, *Korea Atomic Energy Research Institute, Daejeon, Chungcheongnam-do, Korea (Republic)*, Radek Kolman, *Institute of Thermomechanics, Prague, Czech Republic*, Kwang-chun Park, *University of Colorado Boulder, Boulder, CO, United States*

15-9 PHONONIC CRYSTALS AND ACOUSTIC METAMATERIALS

15-9-4 Phononic Crystals/Metamaterials 4: Design and Experiments

3rd Floor, Manchester Grand Hyatt, Windsor C 9:30am–11:15am

Session Organizer: **Mahmoud Hussein**, *University of Colorado Boulder, Boulder, CO, United States*

Session Co-Organizer: **Nicholas Fang**, *Massachusetts Institute of Technology, Cambridge, MA, United States*

9:30am Wave Propagation in Gradient Cellular Structures

Technical Presentation. IMECE2013-64644
Fabrizio Scarpa, *University of Bristol, Bristol, Avon, United Kingdom*, Massimo Ruzzene, *Georgia Institute of Technology, Atlanta, GA, United States*, Chrystel Remillat, *University of Bristol, Bristol, United Kingdom*

9:47am Designing Phononic Crystals With Conic Convex Optimization

Technical Paper Publication. IMECE2013-64694
Han Men, Robert M. Freund, Ngoc-Cuong Nguyen, Joel Saa-Seoane, Jaime Peraire, *Massachusetts Institute of Technology, Cambridge, MA, United States*

10:04am Design of Phononic Materials Using Multiresolution Topology Optimization

Technical Paper Publication. IMECE2013-64743
Sandro L. Vatanabe, Emilio C.N. Silva, *University of Sao Paulo, Sao Paulo, Brazil*

10:21am Numerical Design of Acoustic Metamaterials Through Optimization

Technical Presentation. IMECE2013-64824
Joel Saa-Seoane, Ngoc-Cuong Nguyen, Han Men, Robert M. Freund, Jaime Peraire, *Massachusetts Institute of Technology, Cambridge, MA, United States*

10:38am Theoretical and Experimental Study on Phononic Crystal Structures for Low-Frequency Noise Reduction

Technical Paper Publication. IMECE2013-62423
Li Shen, Jiu Hui Wu, *Xi'an Jiaotong University, Xi'an, Shaan Xi, China*

10:55am Laser-Enabled Reconstruction of the Phononic Characteristics of Lattices

Technical Presentation. IMECE2013-65431
Paolo Celli, *University of Minnesota-Twin Cities, Minneapolis, MN, United States*, Stefano Gonella, *University of Minnesota, Minneapolis, MN, United States*

15-8 NUMERICAL METHODS IN VIBRATION AND ACOUSTICS**15-8-2 Numerical Methods in Vibration and Acoustics II****3rd Floor, Manchester Grand Hyatt, Windsor B 1:00pm–2:45pm**Session Chair: **Rui Botelho**, *General Dynamics Electric Boat, Groton, CT, United States*Session Co-Chair: **Albert Allen**, *NASA Langley Research Center, Hampton, VA, United States***1:00pm Vibration and Dynamic Analysis of Oil Well Drillstring Considering Coupled Axial and Torsional Effects Using Cylindrical Superelement****Technical Paper Publication.** IMECE2013-62837M.T. Ahmadian, Sh. Ghorbani, Keikhosrow Firoozbakhsh, *Sharif University of Technology, Tehran, Iran*, Ahmad Barari, *University of Ontario, Oshawa, ON, Canada***1:17pm A Method for FE Model Updating of Coupled Vibro-Acoustic Systems Using Constrained Optimization****Technical Paper Publication.** IMECE2013-66843D.V. Nehete, S.V. Modak, Kshitij Gupta, *Indian Institute of Technology, Delhi, Delhi, India***1:34pm Finite Element Simulation of Ultrasound Propagation in Trabecular Bone****Technical Paper Publication.** IMECE2013-64035Behzad Vafaeian, Yuchin Wu, Michael R. Doschak, Marwan El-Rich, Tarek El-Bialy, Samer Adeeb, *University of Alberta, Edmonton, AB, Canada***1:51pm Finite Element Simulation and Anechoic Chamber Experiment for the Effect of a Resonance Space on the Frequency Response Curve of a Micro Speaker****Technical Presentation.** IMECE2013-64032Dong Cheol Kim, Hyun-Yong Jeong, *Sogang University, Seoul, Korea (Republic)***2:08pm Direct Transmission Loss Calculation of Simplified Muffler Configurations Using a Lattice-Boltzmann Method****Technical Paper Publication.** IMECE2013-63941Adrien Mann, Franck Perot, *EXA Corporation, Brisbane, CA, United States***2:25pm Comparison of Muffler Performance Criteria Using Finite Element Analysis and Field Measurements****Technical Paper Publication.** IMECE2013-64690Scott Mang, Jeffrey Vipperman, *University of Pittsburgh, Pittsburgh, PA, United States***15-9 PHONONIC CRYSTALS AND ACOUSTIC METAMATERIALS****15-9-5 Phononic Crystals/Metamaterials 5: Tunability and Coupled Phenomena****3rd Floor, Manchester Grand Hyatt, Windsor C 1:00pm–2:45pm**Session Organizer: **Mahmoud Hussein**, *University of Colorado Boulder, Boulder, CO, United States*Session Co-Organizer: **Alessandro Spadoni**, *École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland***1:00pm Phononic Crystals With Adaptively Relaxed Cell Symmetry****Technical Presentation.** IMECE2013-65384Paolo Celli, *University of Minnesota-Twin Cities, Minneapolis, MN, United States*, Stefano Gonella, *University of Minnesota, Minneapolis, MN, United States***1:17pm Quest for Flexible Acoustic Circuitry With Acousto-Elastic Metamaterials****Technical Presentation.** IMECE2013-66216Jun Xu, Howon Lee, Nicholas Fang, *Massachusetts Institute of Technology, Cambridge, MA, United States*, Shengqiang Cai, *University of California, San Diego, La Jolla, CA, United States***1:34pm Resonances in Three-Dimensional Periodic Graphite-Like Structures****Technical Presentation.** IMECE2013-63383Zi-Gui Huang, Chun-Fu Su, *National Formosa University, Yunlin County, Taiwan***1:51pm Harnessing Instabilities to Design Switchable Locally Resonant Acoustic Metamaterials****Technical Presentation.** IMECE2013-64015Pai Wang, Filippo Casadei, Katia Bertoldi, *Harvard University, Cambridge, MA, United States***2:08pm Fluid-Structure Interactions for the Design of Tunable Acoustic Metamaterials****Technical Presentation.** IMECE2013-64918Filippo Casadei, Katia Bertoldi, *Harvard University, Cambridge, MA, United States***2:25pm Defect Modes and Optomechanic Interactions in Phoxonic Crystals****Technical Presentation.** IMECE2013-63849Bahram Djafari Rouhani, Said el-Jallal, *IEMN/University of Lille, Villeneuve d'Ascq, France*, Mourad Oudich, *University of Lille, Villeneuve d'Ascq, France*, Yan Pennec, *Institut D'Electronique, De Microélectronique, Lille, France*



TRACK 15 VIBRATION, ACOUSTICS, & WAVE PROPAGATION / THURSDAY, NOVEMBER 21



VIRTUAL PODIUM (POSTERS)

TUESDAY, NOVEMBER 19

16-16 SOCIETY-WIDE MICRO- AND NANOTECHNOLOGY FORUM

16-16-1 Society-Wide Micro- and Nanotechnology Forum

1st Floor, Manchester Grand Hyatt, Douglas Pavilion 12:30pm–4:00pm

Session Organizer: **Stuart Williams**, *University of Louisville, Louisville, KY, United States*Session Co-Organizers: **Umut Gurkan**, *Case Western Reserve University, Cleveland, OH, United States*, **Ronggui Yang**, *University of Colorado Boulder, Boulder, CO, United States***Fabrication and Characterization of Metal Oxides Nanofibers for Energy-Related Applications****Poster Presentation.** IMECE2013-66875Kyriaki Polychronopoulou, Mohammad Humood, *Khalifa University of Science, Technology and Research, Abu Dhabi, Abu Dhabi, United Arab Emir.*, Yasser E. Greish, *United Arab Emirates University, Al Ain, Abu Dhabi, United Arab Emir.***Fabrication of Hybrid Micro-Nanofluidic Devices With Centimeter Long Ultra-Low Aspect Ratio Nanochannels****Poster Presentation.** IMECE2013-66877Marie Pinti, Marie Pinti, Shaurya Prakash, *Ohio State University, Columbus, OH, United States***A Multiscale Material Design Space for Tailoring Fracture Toughness of Polycrystalline Metals****Poster Presentation.** IMECE2013-66880Yan Li, Min Zhou, David McDowell, *Georgia Institute of Technology, Atlanta, GA, United States***Bio-Inspired Stretchable Electronics for Biomedical Devices****Poster Presentation.** IMECE2013-66882Woon-Hong Yeo, Jonathan Fan, Woosik Lee, John Rogers, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*, Sung-Young Jung, *Pohang University of Science and Technology, Pohang, Korea (Republic)***Freezing of a Ferrofluid Marble****Poster Presentation.** IMECE2013-66891Ali Hashmi, Jie Xu, *Washington State University Vancouver, Vancouver, WA, United States*, Rui Cheng, Leidong Mao, *University of Georgia, Athens, GA, United States***Fast Droplet Generation With a Printhead Manufactured by Rapid Manufacturing Techniques Mounted on a Carrier Board****Poster Presentation.** IMECE2013-66897Markus Kagerer, *Technische Universität München, Garching, Germany*, Dominik Rumschoettel, Tim C. Lueth, Franz Irlinger, *Technische Universität München, Institute of Micro Technology and Medical Device Technology, Garching, Germany*, Thomas Ottnad, *Technische Universität München, Bavaria, Germany***Effect of Micro Size Fibers on the Bonding Strength of Implant-Cement Interfaces****Poster Presentation.** IMECE2013-66899William Snow, K.C. Utsaha, Aayush Khadaka, Morshed Khandaker, *University of Central Oklahoma, Edmond, OK, United States***Deformability Based Separation of Cancer Cells From Normal Cells in a Flow****Poster Presentation.** IMECE2013-66903Ali Hashmi, Ly Ho, Jie Xu, *Washington State University Vancouver, Vancouver, WA, United States*, Garrett Heiman, *Washington State University, Battle Ground, WA, United States*, Mahnaz Janghorban, Karyn Taylor, *Oregon Health & Science University, Portland, OR, United States*, Wael Harb, *IU Health Arnett, Lafayette, IN, United States*, Bin Hong, *TeloVISION LLC, West Lafayette, IN, United States***Large Near-Field Thermal Radiation Enhancement With Doped-Silicon Nanowire Hyperbolic Metamaterials****Poster Presentation.** IMECE2013-66906Xianglei Liu, Zihao Zhang, Zhuomin Zhang, *Georgia Institute of Technology, Atlanta, GA, United States***Using Finite Element Analysis to Investigate the Influence of Percolating Nano-Additive Networks on Composite Conductive Thermal Transport****Poster Presentation.** IMECE2013-66917Anthony J. Webb, Aaron P. Wemhoff, *Villanova University, Villanova, PA, United States***Detection of Hg, Cd, and Pb Ions in Water by PAA/CNTs Nanosensor****Poster Presentation.** IMECE2013-66941Fayez Shahin, *Beni-Suef University, Cairo, Cairo, Egypt*, Mohamed Shaban, Amin Hussein, *Beni-Suef University, Beni-Suef, Beni-Suef, Egypt***Carbon Nanotube Based Nanomechanical Systems****Poster Presentation.** IMECE2013-66976Tae-Gon Cha, Jong Hyun Choi, *Purdue University, West Lafayette, IN, United States***A New Experimental Facility for Measuring Momentum Accommodation Coefficient on Planar Surfaces Used in Microfabrication****Poster Presentation.** IMECE2013-66977Tathagata Acharya, Jordan Falgoust, Michael Martin, *Louisiana State University, Baton Rouge, LA, United States*, Richard E. Rasmussen, *Guidance Dynamics Corporation, Simi Valley, CA, United States***Unsteady Simulation of Thermally Actuated Resonators****Poster Presentation.** IMECE2013-66978Elham Maghsoudi, Michael James Martin, *Louisiana State University, Baton Rouge, LA, United States***Exposure to Carbon Nanotubes Leads to Changes in Biomechanics****Poster Presentation.** IMECE2013-66982Chenbo Dong, Cerasela Dinu, *West Virginia University, Morgantown, WV, United States*, Michael Kashon, David Lowry, Linda Sargent, *National Institute for Occupational Safety and Health, Morgantown, WV, United States*

TRACK 16 VIRTUAL PODIUM (POSTERS) / TUESDAY, NOVEMBER 19

Selective Absorption of Visible Light by Exciting Magnetic Resonance in Nanoparticle Based Metamaterials

Poster Presentation. IMECE2013-66992

Hao Wang, Kieran O'Dea, Liping Wang, *Arizona State University, Tempe, AZ, United States*

Near-Field Thermal Radiation Between Hyperbolic Metamaterials Made of Doped Silicon Nanowire Arrays

Poster Presentation. IMECE2013-66993

Jui-Yung Chang, Yue Yang, Liping Wang, *Arizona State University, Tempe, AZ, United States*

Prediction of the Maximum Resonance Wavelength in Deep Gratings Based on Magnetic Polaritons

Poster Presentation. IMECE2013-67005

Bo Zhao, Zhuomin Zhang, *Georgia Institute of Technology, Atlanta, GA, United States*

Dissipative Particle Dynamics Study of Carbon Nanotube Dispersed Liquid Crystals Under Electric Field

Poster Presentation. IMECE2013-67007

Man Prakash Gupta, Satish Kumar, *Georgia Institute of Technology, Atlanta, GA, United States*

Putting Molecular Dynamics Simulation on Cloud

Poster Presentation. IMECE2013-67008

Gabriel Dunham, David Chiu, Xinghui Zhao, Jie Xu, *Washington State University Vancouver, Vancouver, WA, United States*

An Energetic Approach for Wear Prediction of HDPE/CNF Nanocomposites in Dry Sliding Contact With a Steel Ball

Poster Presentation. IMECE2013-67010

Songbo Xu, Aydar Akchurin, Annie Tangpong, Iskander Akhatov, *North Dakota State University, Fargo, ND, United States*, Tian Liu, Weston Wood, Weihong (Katie) Zhong, *Washington State University, Pullman, WA, United States*

Drug Release Behavior of Regenerated Cellulose/Functionalized Carbon Nanofiber Matrix Under an Electric Stimulus

Poster Presentation. IMECE2013-67018

Nargis Chowdhury, Ahmed M. Al-Jumaily, John Robertson, M.V. Ramos, *Auckland University of Technology University, Auckland, New Zealand*

Near-Field Thermal Radiation Between Curved Surfaces

Poster Presentation. IMECE2013-67020

Yi Zheng, Arvind Narayanaswamy, *Columbia University, New York, NY, United States*

Thermodynamic Analysis for Near-Field Thermal Radiation

Poster Presentation. IMECE2013-67021

Yi Zheng, Arvind Narayanaswamy, *Columbia University, New York, NY, United States*

Superhydrophobic Surfaces for High-Performance Condensation Heat Transfer and Atmospheric Power Generation

Poster Presentation. IMECE2013-67024

Nenad Miljkovic, Daniel John Preston, Evelyn Wang, *Massachusetts Institute of Technology, Cambridge, MA, United States*, Ryan Enright, *Bell Labs Ireland, Dublin, Ireland*

Dimensional Effects of Micro Pillar Arrays on Hydrophobicity

Poster Presentation. IMECE2013-67028

Jianlong Gao, Jiheng Zhao, Wei Xue, *Washington State University, Vancouver, WA, United States*, Xinmiao Chen, Liping Liu, *Lawrence Technological University, Southfield, MI, United States*

Turbulent Jet Mixing in a Coaxial Cylindrical Channel for Controlled Synthesis of Nanoparticles

Poster Presentation. IMECE2013-67031

Jong-Min Lim, Laura M. Gilson, Sunandini Chopra, Robert S. Langer, Rohit Karnik, *Massachusetts Institute of Technology, Cambridge, MA, United States*, Omid C. Farokhzad, *Brigham and Womens Hospital, Boston, MA, United States*

A Permeability Model for Hexagonal and Square Arrangements of Cylindrical Micro-Pillar Arrays

Poster Presentation. IMECE2013-67034

Ahmed M. Taher, *KACST-Intel Consortium Center of Excellence in Nano-Manufacturing Applications, Riyadh, Saudi, Heverlee, Leuven, Belgium*, Benjamin Jones, Liesbet Lagae, *Interuniversity Microelectronics Center, Heverlee, Leuven, Belgium*, Ihab Adam, *Alexandria University, Alexandria, Alexandria, Egypt*

PIV Measurements of Turbulent Channel Flow Over Superhydrophobic Surfaces With Superimposed Riblets

Poster Presentation. IMECE2013-67037

Richard Perkins, Julie Crockett, *Brigham Young University, Provo, UT, United States*

Thermal Transport to Sessile Droplets on Superhydrophobic Surfaces With Rib and Cavity Features

Poster Presentation. IMECE2013-67038

Robb Hays, Julie Crockett, *Brigham Young University, Provo, UT, United States*

Accelerated Degradation of Organic Coatings in Flowing Aqueous Solutions

Poster Presentation. IMECE2013-67039

Qixin Zhou, Yechun Wang, *North Dakota State University, Fargo, ND, United States*

Multifunctional Carbon Nanotube-Epoxy Composites for Thermal Energy Management

Poster Presentation. IMECE2013-67044

Pankaj Kaul, Hao Jiang, Vikas Prakash, *Case Western Reserve University, Cleveland, OH, United States*

Pressure Drop Measurements in Turbulent Channel Flow Over Superhydrophobic Surfaces With Riblets

Poster Presentation. IMECE2013-67047

Joseph Prince, *BYU, Austin, UT, United States*, Julie Crockett, *Brigham Young University, Provo, UT, United States*

Effect of Lubrication on the Performance of Nano-Machining Process of Copper

Poster Presentation. IMECE2013-67049

Yachao Wang, Jing Shi, *North Dakota State University, Fargo, ND, United States*

Measurement of Thermal Transport Through Single Nanostructures Using Bi-Material Microcantilevers**Poster Presentation.** IMECE2013-67063Carlo Canetta, Arvind Narayanaswamy, *Columbia University, New York, NY, United States***Chemovoltaic Effect in Catalytic Metal-Semiconductor Nanostructures****Poster Presentation.** IMECE2013-67065Mohammad A. Hashemian, Maksym M. Plakhotnyuk, *University of Illinois at Chicago, Chicago, IL, United States*, Eduard G. Karpov, *University of Illinois at Chicago, Glenview, IL, United States***Multi-Physics of Nanoscale Thin Films****Poster Presentation.** IMECE2013-67066Raghu Pulavarthy, Tarek Alam, Baoming Wang, Md Haque, *Pennsylvania State University, University Park, PA, United States***Two-Phase Poro-Vascular Laminates for Surface Morphology Control****Poster Presentation.** IMECE2013-67068Marriner Merrill, *U.S. Naval Research Laboratory, Washington, DC, United States***Modeling and Design of a Micro Evaporator for a Micro Rankine Cycle****Poster Presentation.** IMECE2013-67070Hassan Azarkish, *University of Sistan and Baluchestan, Sherbrooke, Canada*, Selin Arslan, *Lawrence Technological University, Southfield, MI, United States*, Amin Behzadmehr, *University of Sistan and Baluchestan, Zahedan, Iran*, Luc Frechette, *Université de Sherbrooke, Sherbrooke, QC, Canada***Characterizing Strength and Plasticity in Small-Scale Ti Structures****Poster Presentation.** IMECE2013-67073Justin Mueller, *University of California, Riverside, Moreno Valley, CA, United States*, Shannon Gott, Omid Khandan, M.P. Rao, *University of California, Riverside, Riverside, CA, United States***Vascular Stents With Surface Nanopatterning****Poster Presentation.** IMECE2013-67075Shannon C. Gott, Guanshui Xu, Masaru Rao, *University of California, Riverside, Riverside, CA, United States*, Benjamin Jabola, *Saratech Inc., Lake Forest, CA, United States***Adhesion, Proliferation, and Morphology of Endothelial Cells on Micro- and Nanopatterned Titanium and Silicon****Poster Presentation.** IMECE2013-67076Prashanthi Vandurangi, Shannon C. Gott, Victor Rodgers, Masaru Rao, *University of California, Riverside, Riverside, CA, United States***Characterization of Fenestrated Titanium Microneedles for Passive Ocular Drug Delivery****Poster Presentation.** IMECE2013-67077Omid Khandan, Masaru Rao, *University of California, Riverside, Riverside, CA, United States*, Amin Famili, Malik Y. Kahook, *University of Colorado, Denver, Denver, CO, United States***Vibration of Gold Nano Beam Induced by Laser Pulse in Context of Two-Temperature Generalized Thermoelasticity****Poster Presentation.** IMECE2013-67085Hamdy Youssef, Khaled Elsibai, *Umm Al-Qura University, Makkah, Saudi Arabia*, Alaa El-Bary, *Arab Academy of Science and Technology, Alexandria, Egypt***A Geometrically Enhanced Microfluidic Device for Capture, Release, and Culture of Circulating Tumor Cells From Cancer Patients****Poster Presentation.** IMECE2013-67086Weian Sheng, Hugh Fan, *University of Florida, Gainesville, FL, United States***Effect of Anisotropic Strain Field on the Electronic Properties of Carbon Nanotubes****Poster Presentation.** IMECE2013-67087Masato Ohnishi, Ken Suzuki, Hideo Miura, *Tohoku University, Sendai, Japan***Improving Heat Dissipation in Carbon Nanotube Network on Silicon Oxide Substrate via Surface Functionalization****Poster Presentation.** IMECE2013-67097Liang Chen, Satish Kumar, *Georgia Institute of Technology, Atlanta, GA, United States***Multifunctional Morphing Particles****Poster Presentation.** IMECE2013-67106Lewis Cox, Zhengwei Li, Zheng Zhang, Jianliang Xiao, Yifu Ding, *University of Colorado Boulder, Boulder, CO, United States*, Jason P. Killgore, Donna C. Hurley, *National Institute of Standards and Technology, Boulder, CO, United States***Desalination of Water by Fast Vapor Transport Through Osmosis Membranes With Nanoscale Vapor Traps****Poster Presentation.** IMECE2013-67108Jongho Lee, Rohit Karnik, *Massachusetts Institute of Technology, Cambridge, MA, United States*, Tahar Laoui, *King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia***An Electrochemical System for Heat Recovery****Poster Presentation.** IMECE2013-67111Yuan Yang, Gang Chen, *Massachusetts Institute of Technology, Cambridge, MA, United States*, Seok Woo Lee, Yi Cui, *Stanford University, Stanford, CA, United States***Performance Model for Optically Driven Micropumps With Carbon Opacified Aerogel Membranes****Poster Presentation.** IMECE2013-67112Yen-Lin Han, *Seattle University, Seattle, WA, United States***Optimizing Performance of MEMS-Based Mechanoporation Devices for Ultrahigh Throughput Cellular Manipulation****Poster Presentation.** IMECE2013-67113Harish Dixit, Daniel Nampe, Yanyan Zhang, Hideaki Tsutsui, Masaru Rao, *University of California, Riverside, Riverside, CA, United States*, C.B. Ballas, *Indian University, Indianapolis, IN, United States*

TRACK 16 VIRTUAL PODIUM (POSTERS) / TUESDAY, NOVEMBER 19

Experimental and Theoretical Analysis of Patterned Growth of Micropores in Poly-Dimethylsiloxane (PDMS) Using the Thermocapillary Effect

Poster Presentation. IMECE2013-67114

Arya Banait, Vivek Vishwakarma, Leila Choobineh, Ankur Jain, *University of Texas at Arlington, Arlington, TX, United States*

Self-Organization of Polymer Nanofiber Arrays for Bioinspired Multifunctional Systems

Poster Presentation. IMECE2013-67118

Sung Kang, Joanna Aizenberg, *Harvard University, Cambridge, MA, United States*

Ultra-High Resolution Heat Flow Calorimetry for Studying Heat Transport in Nanostructures

Poster Presentation. IMECE2013-67119

Seid Sadat, Dakotah R. Thompson, Sai P. Reddy, Arun K. Kota, Anish Tuteja, Edgar Meyhofer, Pramod Reddy, *University of Michigan, Ann Arbor, MI, United States*

Laser-Induced Natural and Forced Convection Flow in Micro-Enclosure

Poster Presentation. IMECE2013-67123

Jupyoung Kim, Jae-Sung Kwon, Steven Wereley, *Purdue University, West Lafayette, IN, United States*

Visco-Elasticity Measurement of Tobacco Mosaic Virus Superlattice

Poster Presentation. IMECE2013-67125

Xinnan Wang, *North Dakota State University, Fargo, ND, United States*

Three-Dimensional Nanoporous Carbon Network for Lithium Ion Batteries

Poster Presentation. IMECE2013-67126

Miao Tian, Wei Wang, Ronggui Yang, *University of Colorado Boulder, Boulder, CO, United States*

High-Efficiency Electrochemical System for Harvesting Low-Grade Heat Energy

Poster Presentation. IMECE2013-67129

Seok Woo Lee, Hyun-Wook Lee, Yi Cui, *Stanford University, Stanford, CA, United States*, Yuan Yang, Gang Chen, *Massachusetts Institute of Technology, Cambridge, MA, United States*

AC Electrothermal Micro Pumping for Medical Applications

Poster Presentation. IMECE2013-67130

Nazmul Islam, *University of Texas at Brownsville, Brownsville, TX, United States*

Effect of Temperature on Electrical Resistivity of Nanoplatelet Based Conductive Nanocomposites

Poster Presentation. IMECE2013-67134

Amirhossein Biabangard Oskouyi, Pierre Mertiny, *University of Alberta, Edmonton, AB, Canada*, Uttandaraman Sundararaj, *University of Calgary, Calgary, AB, Canada*

Tuning the Selectivity of Graphene Membranes by Nucleation and Growth of Pore Defects

Poster Presentation. IMECE2013-67141

Sean C. O'Hern, Yi Song, Michael S.H. Boutilier, Suman Bose, Jing Kong, Rohit Karnik, *Massachusetts Institute of Technology, Cambridge, MA, United States*, Juan Carlos Idrobo, *Oak Ridge National Laboratory, Oak Ridge, TN, United States*, Tahar Laoui, Muataz Atieh, *King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia*

Mode Resolved Thermal Transport in Amorphous Silicon

Poster Presentation. IMECE2013-67144

Christopher H. Baker, Pamela M. Norris, *University of Virginia, Charlottesville, VA, United States*

Hafnia Plugged Optical Nanostructures for High Temperature Photonic and Plasmonic Applications

Poster Presentation. IMECE2013-67149

Katherine Smyth, Jeff Chou, Sang-Gook Kim, *Massachusetts Institute of Technology, Cambridge, MA, United States*, Heon Ju Lee, *Korea Institute of Science and Technology, Seoul, Korea (Republic)*

Thermal Transport Study in 3D Graphene-Carbon Nanotube Hybrid Structures

Poster Presentation. IMECE2013-67150

Jungkyu Park, Vikas Prakash, *Case Western Reserve University, Cleveland, OH, United States*

Heat Dissipation in Atomic-Scale Junctions

Poster Presentation. IMECE2013-67151

Woochul Lee, Kyeongtae Kim, Wonho Jeong, Pramod Reddy, *University of Michigan, Ann Arbor, MI, United States*, Linda Angela Zotti, Juan Carlos Cuevas, *Universidad Autónoma de Madrid, Madrid, Spain*, Fabian Pauly, *University of Konstanz, Konstanz, Germany*

Laser Diagnostics of Plasma in Synthesis of Graphene-based Materials

Poster Presentation. IMECE2013-67153

Alfredo Tuesta, Aizaz Bhuiyan, Robert Lucht, Timothy Fisher, *Purdue University, West Lafayette, IN, United States*

Flash Boiling and Desorption From a Macroporous Carbon Boron Nitrogen Foam

Poster Presentation. IMECE2013-67155

Jeffrey D. Engerer, Galen R. Jackson, Rajib Paul, Timothy S. Fisher, *Purdue University, West Lafayette, IN, United States*

Dynamics of a Viscous Droplet Approaching a Patterned Substrate in a Viscous Fluid

Technical Presentation. IMECE2013-67158

Kevin M. Beussman, Yechun Wang, Wei Y. Lim, Qixin Zhou, *North Dakota State University, Fargo, ND, United States*

Lead Zirconate Titanate Nanotube Composite for Ultrasound Transducer Application

Poster Presentation. IMECE2013-67159

Guitao Zhang, *Stevens Institute of Technology, Jersey City, NJ, United States*, Weihe Xu, Yong Shi, *Stevens Institute of Technology, Hoboken, NJ, United States*

Spectroscopic Ellipsometry Measurements of Wurtzite Gallium Nitride Surfaces as a Function of Open Atmosphere Annealing**Poster Presentation.** IMECE2013-67165Chet Szejewski, Costel Constantin, *James Madison University, Harrisonburg, VA, United States*, John Duda, *Seagate Technology, Bloomington, MN, United States*, Patrick Hopkins, *University of Virginia, Charlottesville, VA, United States***A Nanoindentation Technique to Determine Correlations Between Mechanical and Microstructural Properties of Aorta****Poster Presentation.** IMECE2013-67172Ali Hemmasizadeh, Soroush Assari, Michael Autieri, Kurosh Darvish, *Temple University, Philadelphia, PA, United States***Orientation, Temperature, and Scale Dependent Mechanical Behavior of Ti/Ni Multilayer Thin Films****Poster Presentation.** IMECE2013-67182Zhou Yang, Junlan Wang, *University of Washington, Seattle, WA, United States***Prediction and Fabrication of Complex Micro- and Nanoscale Patterns via Wrinkling****Poster Presentation.** IMECE2013-67183Sourabh Saha, Martin Culpepper, *Massachusetts Institute of Technology, Cambridge, MA, United States***Digital Image Correlation at the Nanoscale****Poster Presentation.** IMECE2013-67186Justin Blaber, Antonia Antoniou, *Georgia Institute of Technology, Atlanta, GA, United States***Thermal Conductivity of Novel 2-Dimensional Materials (Graphene and Beyond) Under Different Strains****Poster Presentation.** IMECE2013-67190Xiaokun Gu, Ronggui Yang, *University of Colorado Boulder, Boulder, CO, United States*, Yujie Wei, *Institute of Mechanics, Beijing, China***Effective Thermal Conductivity of Ultrathin Polymer Films****Poster Presentation.** IMECE2013-67191Jun Liu, Dae Up Ahn, Shenghong Ju, Xiaokun Gu, Ronggui Yang, *University of Colorado Boulder, Boulder, CO, United States*, Jie Zhu, *Institute of Thermophysics, Beijing, China*, Xingang Liang, *Tsinghua University, Beijing, China***Mechanical Properties of Nanoporous Metal Foams****Poster Presentation.** IMECE2013-67192Ran Liu, Antonia Antoniou, *Georgia Technology, Atlanta, GA, United States***Components of Friction Force for Droplets Dragged Across a Hydrophobic Surface****Poster Presentation.** IMECE2013-67194Peter Griffiths, Nathan Crane, *University of South Florida, Tampa, FL, United States*, Qi Ni, *University of South Florida, Pinellas Park, FL, United States***Rapid Detection of Drug Susceptibility Using Changes to Electrokinetic Responses of Drug Treated Mycobacterium Complex Cells****Poster Presentation.** IMECE2013-67195Shinnosuke Inoue, Jong-Hoon Kim, Cangelosi Gerard, Jae-hyun Chung, *University of Washington, Seattle, WA, United States*, Kyong-Hoon Lee, *NanoFactory, Inc., Bellevue, WA, United States***Spectral Phonon Contributions to Thermal Boundary Conductance at Metal/Silicon Interfaces****Poster Presentation.** IMECE2013-67196Matthew Caplan, *University of Virginia, Charlottesville, VA, United States***Single-Wire Metal-O₂ Battery Operating in Biological Fluids for Portable Point of Care Devices****Poster Presentation.** IMECE2013-67198Gareth Fotouhi, Jong-Hoon Kim, Caleb Ogier, John C. Kramlich, Amy Q. Shen, Jae-hyun Chung, *University of Washington, Seattle, WA, United States*, Kyong-Hoon Lee, *NanoFactory, Inc., Bellevue, WA, United States***Development of DNA Detection Sensor for Point-of-Care Diagnosis of Tuberculosis****Poster Presentation.** IMECE2013-67199Hyun-Boo Lee, Jong-Hoon Kim, Cangelosi Gerard, Jae-hyun Chung, *University of Washington, Seattle, WA, United States*, Kieseok Oh, *NanoFactory, Inc., Bellevue, WA, United States***Surface Morphology and Electrical Characterization of Metal-Semiconductor Pt-TiO₂ Nanostructures****Poster Presentation.** IMECE2013-67200Maksym M. Plakhotnyuk, Mohammad A. Hashemian, *University of Illinois at Chicago, Chicago, IL, United States*, Eduard G. Karpov, *University of Illinois at Chicago, Glenview, IL, United States***High Efficiency CO₂ Capture Using Novel Microscale Surfaces****Poster Presentation.** IMECE2013-67204Harish Ganapathy, Amir Shooshtari, Serguei Dessiatoun, Michael Ohadi, *University of Maryland, College Park, MD, United States*, Mohamed Alshehhi, *The Petroleum Institute, Abu Dhabi, Sas Al Nakhil, United Arab Emir.***Characterization of Nano-Channels in Different Environments for Use in a Mirco-Propulsive Device****Poster Presentation.** IMECE2013-67205Zachary Callahan, Po-hao Huang, *University of Arkansas, Fayetteville, AR, United States***Automated Platform for Multiplexed Measurements in Solid State Nanopore Devices****Poster Presentation.** IMECE2013-67209Tarun Jain, Ricardo Guerrero, Jong-Min Lim, Rohit Karnik, *Massachusetts Institute of Technology, Cambridge, MA, United States***Characterization of Metal Oxide Sensor Thin Films Deposited by Spray Pyrolysis****Poster Presentation.** IMECE2013-67213S.M. Navid Khatami, Olusegun Ilegbusi, *University of Central Florida, Orlando, FL, United States*

TRACK 16 VIRTUAL PODIUM (POSTERS) / TUESDAY, NOVEMBER 19

A Coupled Electromagnetic and Thermal Model for Picosecond and Nanometer Scale Plasmonic Lithography Process

Poster Presentation. IMECE2013-67215

Ion-Hong Chao, Adrienne Lavine, *University of California, Los Angeles, Los Angeles, CA, United States*, Liang Pan, *Purdue University, West Lafayette, IN, United States*, Cheng Sun, *Northwestern University, Evanston, IL, United States*, Xiang Zhang, *University of California, Berkeley, Berkeley, CA, United States*

Development of a MEMS Piezoelectric Vibration Energy Harvesting System for Vibration Powered Wireless Sensors in Automotive Applications

Poster Presentation. IMECE2013-67217

André Dompierre, Luc Frechette, *Université de Sherbrooke, Sherbrooke, QC, Canada*, Srikar Vengallatore, *McGill University, Montreal, QC, Canada*

Heat Transfer Physics in Solid Protein Films: Underlying Role of Anharmonic Vibrational Coupling

Poster Presentation. IMECE2013-67222

Caroline S. Gorham, Brian Foley, Ramez Cheaito, Patrick Hopkins, *University of Virginia, Charlottesville, VA, United States*, Chester Szejewski, Costel Constantin, *James Madison University, Harrisonburg, VA, United States*, John Duda, *Seagate Technology, Bloomington, MN, United States*, Bryan Kaehr, *Sandia National Laboratories, Albuquerque, NM, United States*

Atmospheric Plasma for PDMS Bonding

Poster Presentation. IMECE2013-67223

Kyle Kingery, MacCallister Higgins, Emil Geiger, *University of Nevada, Reno, Reno, NV, United States*

Intercalation Induced Crack Formation and Propagation in Lithium-ion Battery Electrodes: Grain-Level Implications

Poster Presentation. IMECE2013-67224

Pallab Barai, Partha Mukherjee, *Texas A&M University, College Station, TX, United States*

Traction-Separation Relations for Wide Area Molecular Interactions

Poster Presentation. IMECE2013-67233

Seung-Ryul Na, Ji Won Suk, Li Tao, Rod Ruoff, Deji Akinwande, Kenneth Liechti, *University of Texas at Austin, Austin, TX, United States*

Surface Wettability Effect on Water Condensation and Transport in PEM Fuel Cells

Poster Presentation. IMECE2013-67237

Xinmiao Chen, Robert Fletcher, Yawen Li, Liping Liu, *Lawrence Technological University, Southfield, MI, United States*, Jianlong Gao, Wei Xue, *Washington State University Vancouver, Vancouver, WA, United States*

Effects of Surface Roughness and Electrostatic Force on Nano-Wetting Properties of Water Over MgO Surface

Poster Presentation. IMECE2013-67238

Yanfei Li, Zhongquan Zheng, *University of Kansas, Lawrence, KS, United States*

Flow Visualization of Droplet Evaporation on a Hydrophobic Surface

Poster Presentation. IMECE2013-67239

Susmita Dash, Aditya Chandramohan, Justin A. Weibel, Suresh V. Garimella, *Purdue University, West Lafayette, IN, United States*

Minimum Radiative Heat Transfer Between Two Planar Metallic Surfaces

Poster Presentation. IMECE2013-67240

Jeffrey Mayo, Arvind Narayanaswamy, *Columbia University, New York, NY, United States*

A Remotely Controlled MEMS Ocular Drug Delivery Device From Lab to Implantation Site

Poster Presentation. IMECE2013-67244

Fatemeh Nazly Pirmoradi, Ki Tae Wolf, Liwei Lin, *University of California, Berkeley, Berkeley, CA, United States*, Kevin Ou, John K. Jackson, Payam Zachkani, Kevin Letchford, Jing Cui, Hongbin Zhang, Joanne A. Matsubara, Helen Burt, Mu Chiao, *University of British Columbia, Vancouver, BC, Canada*

Experimental and Numerical Study of Rapid Transient Joule Heating in 3D Embedded On-Chip Interconnects

Poster Presentation. IMECE2013-67245

Banafsheh Barabadi, Satish Kumar, Yogendra Joshi, *Georgia Institute of Technology, Atlanta, GA, United States*

Compressive Response of Carbon Nanotube Forests: Pristine, Coated, and Soaked

Poster Presentation. IMECE2013-67251

Parisa Pour Shahid Saeed Abadi, Baratunde Cola, Samuel Graham, *Georgia Institute of Technology, Atlanta, GA, United States*, Matthew R. Maschmann, Jeffery W. Baur, *Air Force Research Lab, Air Force Base, OH, United States*, Shelby B. Hutchens, Julia Greer, *California Institute of Technology, Pasadena, CA, United States*

In Situ Monitoring of Reversible Thermal Transport in Lithium Ion Battery

Poster Presentation. IMECE2013-67254

Yongjie Hu, Gang Chen, *Massachusetts Institute of Technology, Cambridge, MA, United States*

Carbon-Based, High Surface Area Sensing Platforms for Flowing Environments

Poster Presentation. IMECE2013-67258

Brian Iverson, *Brigham Young University, Provo, UT, United States*, Kevin Marr, *Brigham Young University, Richardson, UT, United States*

Advanced Thermal Battery for Electric Vehicle Climate Control

Poster Presentation. IMECE2013-67262

Shankar Narayanan, Evelyn Wang, Hyunho Kim, *Massachusetts Institute of Technology, Cambridge, MA, United States*

Identifying Defect-Tolerant Regimes for Gas Separation in Graphene Membranes

Poster Presentation. IMECE2013-67264

Michael S.H. Boutilier, Harold Au, Nicolas Hadjiconstantinou, Rohit Karnik, *Massachusetts Institute of Technology, Cambridge, MA, United States*, Chengzhen Sun, *Xian Jiaotong University, Xian, Shaanxi, China*

Study of Part-Site Interactions in Microscale Capillary Self Assembly**Poster Presentation.** IMECE2013-67265Jose Carballo, *University of South Florida, Riverview, FL, United States*, Nathan Crane, *University of South Florida, Tampa, FL, United States***Thermal Conductivity of Graphene Nanoribbons From Perturbation Theory****Poster Presentation.** IMECE2013-67266Prabhakar Marepalli, Jayathi Murthy, *University of Texas, Austin, TX, United States*, Dhruv Singh, *Intel Corporation, Hillsboro, OR, United States*, Timothy Fisher, *Purdue University, West Lafayette, IN, United States***Theory on Electron-Phonon Coupling and Thermal Conductance at Free Electron Metal/Insulator Interfaces****Poster Presentation.** IMECE2013-67280Ashutosh Giri, Patrick Hopkins, *University of Virginia, Charlottesville, VA, United States***Photolithographic Fabrication of a Multilevel Surface With Superhydrophobic Microribs and Superimposed Riblets****Poster Presentation.** IMECE2013-67284Joseph Prince, *Brigham Young University, Austin, UT, United States*, Ian Lavin, Richard Perkins, *Brigham Young University, Provo, UT, United States***Radiation-Based Near-Field Thermal Rectifier Made of Phase Transition Materials****Poster Presentation.** IMECE2013-67285Yue Yang, Liping Wang, *Arizona State University, Tempe, AZ, United States***Effect of Temperature on Electrical Resistivity of Nanoplatelet Based Conductive Nanocomposites****Poster Presentation.** IMECE2013-67286Amirhossein Biabangard Oskouyi, Pierre Mertiny, *University of Alberta, Edmonton, AB, Canada*, Uttandaraman Sundararaj, *University of Calgary, Calgary, AB, Canada***High Optical Absorbance and Laser Damage Resistance of Si(B)CN/Carbon Nanotube Composite Coatings****Poster Presentation.** IMECE2013-67287Romil Bhandavat, Gurpreet Singh, *Kansas State University, Manhattan, KS, United States*, Ari Feldman, Chris Cromer, John Lehman, *NIST, Boulder, KS, United States*, Lamuel David, *Kansas State University, Manhattan, KS, United States***Hierarchical Micro-/Nanostructured Surfaces With Improved Water Spreading for Efficient Boiling Heat Transfer****Poster Presentation.** IMECE2013-67288Qian Li, Wei Wang, Benoit Latour, Yung-Chen Lee, Ronggui Yang, *University of Colorado, Boulder, CO, United States***Superhydrophobic Nanowired Surfaces for Enhancement of Dropwise Condensation Heat Transfer****Poster Presentation.** IMECE2013-67289Qian Li, Jiafeng Wu, Gensheng Wu, Miao Tian, Ronggui Yang, *University of Colorado, Boulder, CO, United States*, Yunfei Chen, *Southeast University, Nanjing, China***Effect of Surface Engineering on Thermal Impedance Reduction****Poster Presentation.** IMECE2013-67291Theodorian Borca-Tasciuc, Hafez Raeisifard, Robert F. Karlceck Jr., Joel Plawsky, *Rensselaer Polytechnic Institute, Troy, NY, United States***Patterned Mechanical Stiffening of Hydrogel-Nanoparticle Composites by Near-Infrared Light****Poster Presentation.** IMECE2013-67292Kolin Hribar, Yu Suk Choi, Adam Engler, Shaochen Chen, *University of California San Diego, La Jolla, CA, United States***Durability Study of Low-Velocity Impact Responses of Conventional and Nanophased CFRP Composites Exposed to Seawater****Poster Presentation.** IMECE2013-67293Md. Mahmudur Rahman Chowdhury, Mohammad Hossain, *Tuskegee University, Tuskegee, AL, United States***Design and Demonstration of a Stacked Photobioreactor for Production of High Density Algal Cultures and BioFuel****Poster Presentation.** IMECE2013-67299Aadhar Jain, Michael Kalontarov, Eunjung (Erica) Jung, Syed S. Ahsan, David Erickson, *Cornell University, Ithaca, NY, United States***The Fluid-Structure Interaction Model for Investigating the Dynamic Characteristics of Micro-Scaled Biomimetic Artificial Flow Sensors****Poster Presentation.** IMECE2013-67300Manohar Chidurala, Uttam K. Chakravarty, *University of New Orleans, New Orleans, LA, United States***Development of High Transmittance and Conductivity Silver-Ink Grid Electrodes and Numerical Approach of High Figure of Merit on Metal Grid****Poster Presentation.** IMECE2013-67314Jin-Ha Kim, Hun K. Im, Seung S. Lee, Kwang-Cheol Lee, *Korea Research Institute of Standards and Science, Daejeon, Daejeon, Korea (Republic)***Freezing Rates Affect Thermal and Electrical Conductivity in Frozen Nanofluids****Poster Presentation.** IMECE2013-67316Scott N. Schiffres, Jonathan Malen, *Carnegie Mellon University, Pittsburgh, PA, United States*, Sivasankaran Harish, Junichiro Shiomi, *University of Tokyo, Tokyo, Japan*, Shigeo Maruyama, *University of Tokyo, Bunkyo-ku, Tokyo, Japan***Resonant Bonding Leads to Low Thermal Conductivity****Poster Presentation.** IMECE2013-67320Sangyeop Lee, Gang Chen, *Massachusetts Institute of Technology, Cambridge, MA, United States*, Keivan Esfarjani, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*, Tengfei Luo, *University of Notre Dame, Notre Dame, IN, United States***Phonon Poiseuille Flow in Suspended Graphene****Poster Presentation.** IMECE2013-67321Sangyeop Lee, Gang Chen, *Massachusetts Institute of Technology, Cambridge, MA, United States*, Keivan Esfarjani, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*

TRACK 16 VIRTUAL PODIUM (POSTERS) / TUESDAY, NOVEMBER 19 / WEDNESDAY, NOVEMBER 20

Measurement of Micro Volume Blood Viscosity Based on Micro-PIV Diffusometry

Poster Presentation. IMECE2013-67322

Han-Sheng Chuang, *National Cheng Kung University, Tainan City, Taiwan*, Chia-Hao Hsu, Yue-Syun Sie, *BME/National Cheng Kung University, Tainan City, Taiwan*, Dar-Bin Shieh, *Institute of Oral Medicine/NCKU, Tainan City, Taiwan*

Energy Dissipation Ability of Buckyball Under Dynamic Loadings: Performance and Mechanism

Poster Presentation. IMECE2013-67326

Jun Xu, Xi Chen, *Columbia University, New York, NY, United States*

Methods to Estimate Elasticity of Live Cells by Atomic Force Microscopy

Poster Presentation. IMECE2013-67330

Ashkan Aryaei, Champa Jayasuriya, *University of Toledo, Toledo, OH, United States*

Nano-Grained Bulk Glass as Effective Thermal Insulation Materials

Poster Presentation. IMECE2013-67331

Qing Hao, Mingqing Li, Qiang Li, Garrett Joseph Coleman, Pierre Lucas, *University of Arizona, Tucson, AZ, United States*

High Resolution Thermometry With Modulated Temperatures for Nanowire Thermal Conductivity Measurement

Poster Presentation. IMECE2013-67332

Jianlin Zheng, Edward Dechaumphai, Renkun Chen, *University of California, San Diego, La Jolla, CA, United States*, Matthew Wingert, *University of California, San Diego, Dana Point, CA, United States*

Electronically Programmable Shape in Hydrogels

Poster Presentation. IMECE2013-67334

Cunjia Yu, John Rogers, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*, Young Huang, *Northwestern University, Evanston, United States*, Hanqing Jiang, *Arizona State University, Tempe, AZ, United States*

Double Diffusive Convection in a Rotating Nanofluid Layer Saturating a Porous Medium

Poster Presentation. IMECE2013-67335

Anushri Verma, Amrith Aggarwal, *Jaypee Institute of Information Technology, Noida, Uttar Pradesh, India*

Evaluation of the Ionic Conductivity of Nitrile-Based Liquid Electrolytes for Lithium-Ion Batteries

Poster Presentation. IMECE2013-67339

Anirudh Deshpande, Soumik Banerjee, *Washington State University, Pullman, WA, United States*, Jose De Jesus Avila, *Yakima Valley Community College, Yakima, WA, United States*

WEDNESDAY, NOVEMBER 20

16-1 ADVANCES IN AEROSPACE TECHNOLOGY

16-1-1 Advances in Aerospace Technology

1st Floor, Manchester Grand Hyatt,
Douglas Pavilion

11:30am–3:00pm

Active Aerodynamic Systems

Poster Paper Publication. IMECE2013-65147

Thomas Fuller, *Wentworth Institute of Technology, Boston, MA, United States*, Chris Hashem, *Wentworth Institute of Technology, Tewksbury, MA, United States*, Benjamin Nadeau, *Wentworth Institute of Technology, Sabattus, ME, United States*, Megan Joiner, *Wentworth Institute of Technology, Brighton, MA, United States*, Craig Curtis, *Wentworth Institute of Technology, Brookline, MA, United States*

16-2 ADVANCED MANUFACTURING

16-2-1 Advanced Manufacturing

1st Floor, Manchester Grand Hyatt,
Douglas Pavilion

11:30am–3:00pm

Hot Milling: A Proposal to Minimize Thermal Cracks Formation in Cemented Carbide Tools

Poster Paper Publication. IMECE2013-62092

Ramsés Lima, Anderson Melo, *Federal University of Rio Grande do Norte, Natal, Brazil*

Electrical Discharge Machining Electrodes Manufactured via Selective Laser Sintering Technique Using New Composite Materials

Poster Paper Publication. IMECE2013-62345

Fred Amorim, Tiago Czelusniak, Camila Higa, *Pontifical Catholic University of Parana, Curitiba, Parana, Brazil*

A Uniform Deposition Method for 3D Tactile Sensor

Poster Presentation. IMECE2013-63107

Hochan Kim, Haeyong Yun, *Andong National University, Andong, Korea (Republic)*, Tae Jo Ko, *Yeungnam University, Kyungbuk, Korea (Republic)*, Kyungchang Lee, *Pukyong National University, Busan, Gyeongnam, Korea (Republic)*, In-hwan Lee, *Chungbuk National University, Chungju, Chungbuk, Korea (Republic)*, Jae-Won Choi, *University of Akron, Akron, OH, United States*

Synthesis and Mechanical Behavior of High-Strength, Low-Density Porous Magnesium Composites

Poster Presentation. IMECE2013-64202

Qizhen Li, *University of Nevada, Reno, Reno, NV, United States*

Process Optimization of Selective Laser Melting of Silver

Poster Presentation. IMECE2013-64230

Miranda Fateri, Jan-Steffen Hoetter, Andreas Gebhardt, *FH Aachen, Aachen, Germany*

3-Dimensional Electronic Circuit Fabrication Using Stereolithography Technology

Poster Presentation. IMECE2013-64267

In Hwan Lee, *Korea/Chung-Buk National University, Cheongju, Korea (Republic)*, Sung Hyun Jang, Hae Yong Cho, *Chungbuk National University, Cheongju, Chungbuk, Korea (Republic)*, Hochan Kim, *Andong National University, Andong, Korea (Republic)*, Tae Jo Ko, *Yeungnam University, Kyoungbuk, Korea (Republic)*

On the Processing of Nanocrystalline Cubic Boron Nitride

Poster Presentation. IMECE2013-66837

Robert Horvath, Michelle Lee, Stephen Tse, Bernard Kear, Stuart Deutsch, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*, Assimina Pelegri, *Rutgers, The State University of New Jersey, East Brunswick, United States*, Oleg Voronov, *DMI Inc., East Stroudsburg, PA, United States*

A Study on the Hydrostatic Extrusion of a Cu-Clad Al Bar With a Front Pad

Poster Presentation. IMECE2013-66886

Yong-Shin Lee, Sang Hun Yoon, *Kookmin University, Seoul, Korea (Republic)*, Sangmok Lee, Jongsup Lee, Geunan Lee, *KITECH, Incheon, Korea (Republic)*

Applicable Range in Object Size for Graspless Manipulation Using Capillary and Gravitational Forces

Poster Presentation. IMECE2013-67088

Kazuteru Kawamura, Kunio Takahashi, Pasomphone Hemthavy, Shigeki Saito, *Tokyo Institute of Technology, Meguro-ku, Tokyo, Japan*

Effect of Magnetic Field in Single Discharge Dry Micro EDM on Silicon and Stainless Steel

Poster Presentation. IMECE2013-67138

S. Kanmani Subbu, J. Ramkumar, *Indian Institute of Technology Kanpur, Kanpur (U.P.), India*, S. Dhamodaran, *University of California, San Diego, La Jolla, CA, United States*

16-3 BIOMEDICAL AND BIOTECHNOLOGY ENGINEERING

16-3-1 Biomedical and Biotechnology Engineering

1st Floor, Manchester Grand Hyatt,
Douglas Pavilion

11:30am–3:00pm

Implications of Increased Lower Extremity Movement Variability on Fall Susceptibility at Increased Stride Lengths During Locomotion

Poster Paper Publication. IMECE2013-63804

Andrew D. Nordin, Josh Bailey, Janet S. Dufek, *University of Nevada, Las Vegas, Las Vegas, NV, United States*

Understanding Temperature Profiles Experienced by Biological Samples During a Hybrid Vitrification Technique

Poster Paper Publication. IMECE2013-63947

Nilay Chakraborty, Ben Li, Rongheng Li, *University of Michigan–Dearborn, Dearborn, MI, United States*

Biomass Characteristics of Saudi Arabian Palm Dates Tree Waste Components

Poster Presentation. IMECE2013-64437

Hani Sait, *King Abdulaziz University, Rabigh, Saudi Arabia*, Ahmad Hussain, *King Abdulaziz University, Jeddah, Pakistan*, Arshad Salema, Farid Ani, *UTM, Johor, Malaysia*

Size-Dependent Antibacterial Behavior of Graphene Quantum Dot

Poster Paper Publication. IMECE2013-64872

Siheng Su, Carla B. Shelton, Jenny Qiu, *Texas Tech University, Lubbock, TX, United States*

A Simple 2D Wheelchair Positioning: Correcting IMUs Data Using One Encoder and Applying Kalman Filtering

Poster Paper Publication. IMECE2013-65210

Zohreh Salimi, Martin W. Ferguson-Pell, *University of Alberta, Edmonton, Canada*

Vibration Suppression Drafting Arm for Tremor Patients

Poster Paper Publication. IMECE2013-65217

Jose Mojica, Akihiko Kumagai, *California State University, Sacramento, Sacramento, CA, United States*, Steven Marsh, *GCL Solar Energy, Alamo, CA, United States*

A Novel MEMS Device for Selective Surface Adsorption of Lead (II) Ions From Blood Using Carbon Aerogel

Poster Paper Publication. IMECE2013-66306

Deepan Kishore Kumar, Adarsh Venkataraman Ganesan, Sundaram Swaminathan, Ravi Kant Mittal, *Birla Institute of Technology and Science, Pilani, Dubai, United Arab Emir.*, Niti Nipun Sharma, *Birla Institute of Technology and Science Pilani, Pilani Campus, Pilani, India*

Design of Novel Cold Plasma Modified Nanostructured Bone Construct for Improving Osteogenic Differentiation of Bone Marrow Derived Mesenchymal Stem Cells

Poster Presentation. IMECE2013-66552

Mian Wang, Michael Keidar, Lijie G. Zhang, *George Washington University, Washington, DC, United States*

Biosynthesis of Copper Nano Particles Using Plant Extracts

Poster Presentation. IMECE2013-66883

Shivashankar Mallikarjunappa, *SIT, Tumkur, Karnataka, India*

TRACK 16 VIRTUAL PODIUM (POSTERS) / WEDNESDAY, NOVEMBER 20

16-4 DYNAMICS, VIBRATION, AND CONTROL

16-4-1 Dynamics, Vibration, and Control

1st Floor, Manchester Grand Hyatt, 11:30am–3:00pm
Douglas Pavilion

A Feedforward Anti-Windup Scheme for Integral Controllers Inspired on a Deformed Integral Operator

Poster Paper Publication. IMECE2013-62227

Samaronne N. Carmo, Jose M. Araujo, *Instituto Federal de Educação, Ciência e Tecnologia da Bahia, Salvador, Brazil*

An Analytical Model of Delaminated Piezoelectric Beams

Poster Presentation. IMECE2013-62500

Ali Mahieddine, Mohamed Nadjib Benallal, Salaheddine Bentridi, *Université de Khemis Miliana, Ain Defla, Algeria*

Vibrational Controller for Magnetic Levitation

Poster Presentation. IMECE2013-67090

K.G. Vinod Kumar, *Velammal Engineering College/Anna University, Chennai, India*

Fuzzy Logic Control for Magnetic Levitation

Poster Presentation. IMECE2013-67094

K.G. Vinod Kumar, *Velammal Engineering College/Anna University, Chennai, India*, V.R. Ravi, *Velammal Engineering College/Anna University, Chennai, Chennai, Tamil Nadu, India*

16-5 EDUCATION AND GLOBALIZATION

16-5-1 Education and Globalization

1st Floor, Manchester Grand Hyatt, 11:30am–3:00pm
Douglas Pavilion

Embedding Project Based Learning in High School STEM Teaching to Increase Student Interest and Access to the Curriculum

Poster Presentation. IMECE2013-64550

Ibrahim Zeid, *Northeastern University, Boston, MA, United States*, Phil Moore, Phil Curtin, *Fitchburg High School, Fitchburg, MA, United States*

16-6 EMERGING TECHNOLOGIES

16-6-1 Emerging Technologies

1st Floor, Manchester Grand Hyatt, 11:30am–3:00pm
Douglas Pavilion

Analysis of Temporal Seasonal Residential Demand Profiles

Poster Presentation. IMECE2013-63267

Joshua D. Rhodes, Wesley Cole, Charles R. Upshaw, Thomas Edgar, *University of Texas at Austin, Austin, TX, United States*, Michael E. Webber, *University of Texas at Austin, Webber Energy Group, Austin, TX, United States*

Numerical Investigation of an Immersion Cooling Application for Light Emitting Diodes (LEDs)

Poster Presentation. IMECE2013-67004

Enes Tamdogan, *Ozyegin University, Istanbul, Turkey*, Mehmet Arik, *Ozyegin University, Cekmekoy Istanbul, Turkey*

On the Bubble Generation on the Surface of Plasmonic and Non-Plasmonic Nano Particles Under Solar Illumination

Poster Presentation. IMECE2013-67142

Hadi Ghasemi, Amy Marie Marconnet, Nenad Miljkovic, Gang Chen, *Massachusetts Institute of Technology, Cambridge, MA, United States*

16-7 ENERGY**16-7-1 Energy****1st Floor, Manchester Grand Hyatt,
Douglas Pavilion****11:30am–3:00pm****EGR Technology Evaluation as Alternative for Reducing Emissions in Diesel Engines****Poster Presentation.** IMECE2013-62919*Ricardo Torres, Centro Universitário da FEI, São Bernardo do Campo, São Paulo, Brazil, Dereck Nills Feereira Muche, Centro Univeristário da FEI, São Bernardo do Campo, Brazil, Jairo de Lima Souza, Scania Latin America, São Bernardo do Campo, Brazil***Preparation of Elastic Bipolar Plate for Polymer Electrolyte Fuel Cells****Poster Paper Publication.** IMECE2013-63579*Jae-Young Lee, Woo-Kum Lee, Hong-Ki Lee, Woosuk University, Jeollabuk-do, Korea (Republic), Bumchoul Choi, Hydrogen Fuel Cell Regional Innovation Center, Chonbuk-do, Korea (Republic), Joong-Pyo Shim, Kunsan National University, Jeollabuk-do, Korea (Republic)***Chemovoltaic Effect in Catalytic Metal-Semiconductor Nanostructures****Poster Presentation.** IMECE2013-63874*Eduard G. Karpov, University of Illinois at Chicago, Glenview, IL, United States, Mohammad A. Hashemian, Maksym M. Plakhotnyuk, University of Illinois at Chicago, Chicago, IL, United States***Nanometer Thickness Planar Schottky Contacts for Ultra-Fast Sensing and Energy Conversion Applications****Poster Presentation.** IMECE2013-63878*Mohammad A. Hashemian, Maksym M. Plakhotnyuk, University of Illinois at Chicago, Chicago, IL, United States, Eduard G. Karpov, University of Illinois at Chicago, Glenview, IL, United States***Performance Evaluation of Oxyfuel Combustion Gas Turbine Power Cycle Integrated With Ejector-Driven Ion Transport Membrane****Poster Presentation.** IMECE2013-64570*Jihee Yoo, University of Science and Technology, Daejeon, Daejeon, Korea (Republic), Young Duk Lee, Sanggyu Kang, Kook Young Ahn, Korea Institue of Machinery & Materials, Daejeon, Korea (Republic)***A Cost-Benefit and Environmental Impact Analysis of Using Distributed Energy Sources to Treat Hydraulic Fracturing Wastewater****Poster Presentation.** IMECE2013-64620*Yael R. Glazer, Jill B. Kjellsson, Kelly T. Sanders, University of Texas at Austin, Austin, TX, United States, Michael E. Webber, University of Texas at Austin, Webber Energy Group, Austin, TX, United States***Preliminary Performance Test of Mechanical Pump for a Stella-1****Poster Paper Publication.** IMECE2013-65654*Ji Woong Han, Ji-Young Jeong, Yong Bum Lee, Korea Atomic Energy Research Institute, Daejeon, Korea (Republic), Bock Seong Ko, Sang-Jun Park, YoonSang Lee, SAMJIN Industrial Co., Chungcheongnam-Do, Korea (Republic)***Physical Properties of Electrospun Nanofiber Separators for Graphene-Based Supercapacitors****Poster Presentation.** IMECE2013-66157*Ramazan Asmatulu, Amir Jabbaria, Ali Ghazinezami, Temmuz Coskun, Wichita State University Wichita, KS, United States***Fabrication of Larger Diameter TiO₂ Nanotubes During the Electrochemical Anodization****Poster Presentation.** IMECE2013-66516*Ramazan Asmatulu, Kimal H. Djam, Jonathan Dirks, Ikram Khan, Wichita State University, Wichita, KS, United States***Design of PID Controller for Magnetically Levitated Vertical Axis Wind Turbine in Low Wind Speed Applications Using LabVIEW****Poster Presentation.** IMECE2013-67095*K.G. Vinod Kumar, Velammal Engineering College/Anna University, Chennai, India***Experimental Investigation on Premixed Flame Stabilization in a Radial Meso-Scale Multi-Channel****Poster Presentation.** IMECE2013-67181*Dae Keun Lee, Chang-Bog Ko, Korea Institute of Energy Research, Daejeon, Korea (Republic)***Nanostructured High-Temperature Bulk Thermoelectric Energy Conversion for Combined Heat and Power Boiler****Poster Presentation.** IMECE2013-67249*Yanliang Zhang, Boise State University, Boise, ID, United States, Xiaowei Wang, Martin Cleary, Tej Pantha, Bo Yu, GMZ Energy, Waltham, MA, United States***Distributed Variable Frequency Drives for Local Reactive Power Supply****Poster Presentation.** IMECE2013-64038*Erin M. Keys, Michael E. Webber, University of Texas at Austin, Webber Energy Group, Austin, TX, United States*

TRACK 16 VIRTUAL PODIUM (POSTERS) / WEDNESDAY, NOVEMBER 20

16-8 FLUID ENGINEERING AND TECHNOLOGIES

16-8-1 Fluids Engineering and Technologies

1st Floor, Manchester Grand Hyatt, 11:30am–3:00pm
Douglas Pavilion

Influence of Airflow on the Segregation of Binary Particle System Under Vertical Vibration

Poster Paper Publication. IMECE2013-62874

Ping Wu, Li Li, Yuming Huang, Lige Tong, Chuanping Liu, Li Wang, *University of Science and Technology, Beijing, Beijing, China*

Hydraulic Characteristics of the New Type Bulb Turbine With Micro-Head

Poster Paper Publication. IMECE2013-62936

Lingyu Li, Yuan Zheng, Daqing Zhou, Zihao Mi, *Hohai University, Nanjing, China*

Performance Study on Vortex Tube Air Intake Filter in Gas Turbine

Poster Paper Publication. IMECE2013-63373

Tao Sun, Bo Wan, Zhongyi Wang, *Harbin Engineering University, Harbin, China*, Jia Han, *Avic Shen Yang Engine Design & Research Institute, Shen Yang, China*, Zhengwei Ma, *703th Research Institute of China Shipbuilding Industry Corporation, Harbin, China*

Manipulating Channel Properties in Paper-Based Microfluidic Devices to Control Fluid Transport

Poster Presentation. IMECE2013-64855

Carlos Castro, Cindy Rosillo, Hideaki Tsutsui, *University of California, Riverside, Riverside, CA, United States*

Computation of Forward-Time Finite-Time Lyapunov Exponents Using Discontinuous-Galerkin Spectral Element Methods

Poster Paper Publication. IMECE2013-64997

Daniel Nelson, Gustaaf B. Jacobs, *San Diego State University, San Diego, CA, United States*

System and Method for Analysis of Involving Factors in the Demisting Cyclone Efficiency

Poster Paper Publication. IMECE2013-65867

Masoud Molaei Najafabadi, Mohammad Ali Ehteram, *Amirkabir University of Technology, Tehran, Iran, M.T.*, Ahmadian, *Sharif University of Technology, Tehran, Iran*, Ahmad Barari, *University of Ontario, Oshawa, ON, Canada*

Electromagnetic Influence on Microstructure of Water-in-Oil Emulsion

Poster Presentation. IMECE2013-66181

Liana Kovaleva, Rasuz Zinnatullin, Almir Mullayanov, Marat Mavletov, Vladimir Blagochinov, *Bashkir State University, Ufa, Russia*, Iskander Akhatov, *North Dakota State University, Fargo, ND, United States*

Determination of Elastic Properties of Asphaltene Film

Poster Presentation. IMECE2013-66182

Liana Kovaleva, Yuri Zamula, Marat Mavletov, Ilnur Kamaltdinov, Flarida Kudasheva, *Bashkir State University, Ufa, Russia*, Iskander Akhatov, *North Dakota State University, Fargo, ND, United States*

Pressure Drop Analysis of a Pressure-Channel Type SuperCritical Water-Cooled Reactor

Poster Paper Publication. IMECE2013-67383

Alexey Dragunov, W. Peiman, *University of Ontario Institute of Technology, Oshawa, ON, Canada*

Quantification of the Thermodynamic and Hemodynamic Response to the Modular Anastomotic Valve Device in Hemodialysis

Poster Presentation. IMECE2013-67384

Andrew McNally, *University of Notre Dame, Notre Dame, IN, United States*

16-9 HEAT TRANSFER

16-9-1 Applications of Heat and Mass Transfer

1st Floor, Manchester Grand Hyatt, 11:30am–3:00pm
Douglas Pavilion

Session Organizer: **Roy E. Hogan**, *Sandia National Laboratories, Albuquerque, NM, United States*

Effects of Partial PCCI on the Combustion and Emission Characteristics in a HSDI Diesel Engine

Poster Paper Publication. IMECE2013-62580

Sangki Park, Yungjin Kim, Kihyung Lee, *Hanyang University, Gyeonggi-do, Korea (Republic)*

Heat of Combustion of Diesel/Biodiesel Blends

Poster Presentation. IMECE2013-62917

Ricardo Torres, Edson Rodrigues Silva, *Centro Universitário da FEI, São Bernardo do Campo, São Paulo, Brazil*

Investigation of Conjugate Heat Transfer in Microchannels Using Variable Thermophysical Property Nanofluids

Poster Paper Publication. IMECE2013-64630

Mahfoud Kadja, Issam Rezaiguia, *Université Constantine 1, Constantine, Algeria*

Submicron-Scale Condensation on Hydrophobic and Hydrophilic Surfaces

Poster Paper Publication. IMECE2013-66186

Yutaka Yamada, Tatsuya Ikuta, Takashi Nishiyama, Koji Takahashi, Yasuyuki Takata, *Kyushu University, Fukuoka, Japan*

Performance Investigation on Single Phase Pulse Detonation Engine Using Computational Fluid Dynamics

Poster Paper Publication. IMECE2013-66274

Krishna Pandey, Pinku Debnath, *National Institute of Technology, Silchar, Assam, India*

Thermal Transport via Surface Phonon Polaritons Along a SiO₂ Nanoparticle Chain

Poster Presentation. IMECE2013-66414

Olalekan Adewuyi, James Hammonds, *Howard University, Washington, DC, United States*

Bubble Dynamics in Electrowetting-Modulated Nucleate Boiling**Poster Presentation.** IMECE2013-66915Aritra Sur, Carmen Pascente, Yi Lu, Paul Ruchhoeft, Dong Liu, *University of Houston, Houston, TX, United States***Nucleate Boiling Heat Transfer Enhancement With Electrowetting****Poster Presentation.** IMECE2013-66916Aritra Sur, Yi Lu, Carmen Pascente, Paul Ruchhoeft, Dong Liu, *University of Houston, Houston, TX, United States***Heat Flux Manipulation and Control Using Thermal Meta-Materials****Poster Presentation.** IMECE2013-66942Rahul Kapadia, Prabhakar Bandaru, *University of California, San Diego, La Jolla, CA, United States***Impingement Heat Transfer Cooling of Gas Turbine Combustor and Turbine Blades: Conjugate Heat Transfer Investigations Using CFD****Poster Presentation.** IMECE2013-67014Abubakar El-Jumma, John E.J. Staggs, *University of Leeds, Leeds, West Yorkshire, United Kingdom*, Gordon E. Andrews, *University of Leeds, Leeds, United Kingdom***Double-Diffusive Natural Convection Heat Transfer in an Enclosure****Poster Presentation.** IMECE2013-67259Adnan Hafiz, Mohamed Antar, *King Fahad University of Petroleum and Mineral, Dhahran, Saudi Arabia***16-10 MECHANICS OF SOLIDS, STRUCTURES, AND FLUIDS****16-10-1 Mechanics of Solids, Structures, and Fluids****1st Floor, Manchester Grand Hyatt,
Douglas Pavilion****11:30am–3:00pm****Design and Characterization of a Mechanically Tunable Gradient Index Lens****Poster Presentation.** IMECE2013-64055Sara Wheeland, Alireza V. Amirkhizi, Siavouche Nemat-Nasser, *University of California, San Diego, La Jolla, CA, United States***Hydrothermal Aging and Mechanical Property of Injection Molded Jute/Glass/Polypropylene Hybrid Composites****Poster Paper Publication.** IMECE2013-64378Jian Wang, *College of Textiles, Donghua University, Shanghai, Shanghai, China*, Putinun Uawongsuwan, Hiroyuki Inoya, Toshihiko Hojo, Hiroyuki Hamada, *Kyoto Institute of Technology, Kyoto, Japan*, Yuqiu Yang, *Donghua University, Shanghai, China***Size Selection of Water Soluble Graphene Oxide Quantum Dots****Poster Paper Publication.** IMECE2013-64756Jenny Qiu, Junhua Wei, *Texas Tech University, Lubbock, TX, United States***Mechano-Kinetic Tuning in Shape Memory Polymers for In-Body Use****Poster Presentation.** IMECE2013-65457Keith Hearon, Jeffery E. Raymond, Duncan J. Maitland, *Texas A&M University, College Station, TX, United States***Interfacial Debonding of Glass Single Fiber Composites Using the Johnson-Cook Failure Model****Poster Paper Publication.** IMECE2013-66873Max Tenorio, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*, Assimina Pelegri, *Rutgers, The State University of New Jersey, East Brunswick, NJ, United States***Integrity of Aluminium Gas Receptacle****Poster Presentation.** IMECE2013-66934Frank Otremba, *Federal Institute for Material Research and Testing, Berlin, Germany*, Mathias Ziegenhorn, *HS Lausitz, Senftenberg, Germany***Edible Electronics: It Tastes Like Chicken****Technical Presentation.** IMECE2013-63758Huanyu Cheng, Young Huang, *Northwestern University, Evanston, IL, United States*, John Rogers, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

TRACK 16 VIRTUAL PODIUM (POSTERS) / WEDNESDAY, NOVEMBER 20

16-11 MICRO- AND NANOSYSTEMS ENGINEERING AND PACKAGING

16-11-1 Micro- and Nanosystems Engineering and Packaging

1st Floor, Manchester Grand Hyatt, 11:30am–3:00pm
Douglas Pavilion

Impact of Gaseous Contamination on IT Equipment Where Air-Side Economizers are Implemented: Computational Study

Poster Presentation. IMECE2013-65622

S.V.S. Gowtham Pedapudi, Oluwaseun Awe, Hardik Shah, Rahul Raghunathan, Dereje Agonafer, *University of Texas at Arlington, Arlington, TX, United States*

3D-MWNT Materials: Synthesis, Structural Characterization, and In Situ Raman Spectroscopy vs. Strain Measurements

Poster Presentation. IMECE2013-65982

Lakshmy Pulickal Rajukumar, Ana Laura Elias, Amber McCreary, Mauricio Terrones, Nestor Perea-Lopez, Humberto Terrones, Jiping Wang, *Pennsylvania State University, University Park, PA, United States*, Pulickel M. Ajayan, Robert Vajtai, Boris Yakobson, *Rice University, Houston, TX, United States*, Humberto R. Gutierrez, *University of Louisville, Louisville, KY, United States*, Ajit Roy, *Air Force Research Lab, Dayton, OH, United States*, Jonghwan Suhr, Wenjie Zhao, *University of Delaware, Newark, DE, United States*

Brazing of Carbon Nanotube Arrays for High-Temperature Thermal Interface Applications

Poster Presentation. IMECE2013-66327

Menglong Hao, Kimberly Saviers, Rajib Paul, Timothy S. Fisher, *Purdue University, West Lafayette, IN, United States*

Novel-Low Cost Powerless MEMS-Based Ossicular System

Poster Paper Publication. IMECE2013-66341

Adarsh Venkataraman Ganesan, Varun Das Ramanujam Ramdoss, Sundaram Swaminathan, Deepan Kishore Kumar, *Birla Institute of Technology and Science Pilani, Dubai Campus, Dubai, United Arab Emir.*

Biosynthesis of Copper Nano Particles Using Plant Extracts

Poster Presentation. IMECE2013-66884

Shivashankar Mallikarjunappa, *SIT, Tumkur, Karnataka, India*

Experimental Study of the Structural Aspects of the Synthesis of Nanocrystalline SrTiO₃:Fe

Poster Presentation. IMECE2013-67147

S. Fuentes, P. Muñoz, E. Veloso, *Universidad Católica del Norte, Antofagasta, Chile*, Emigdio Chávez Ángel, *Catalan Institute of Nanoscience and Nanotechnology, Barcelona, Barcelona, Spain*

16-12 SAFETY, RELIABILITY, AND RISK

16-12-1 Safety, Reliability, and Risk

1st Floor, Manchester Grand Hyatt, 11:30am–3:00pm
Douglas Pavilion

Fail-Safe? – A Study About the Integrity of Safety Valves for Tanks for Dangerous Goods

Poster Paper Publication. IMECE2013-62204

Franziska Reich, Frank Otremba, *Federal Institute for Material Research and Testing, Berlin, Germany*, Andreas Wuersig, *BAM, Berlin, Germany*

16-13 SYSTEMS AND DESIGN

16-13-1 Systems and Design

1st Floor, Manchester Grand Hyatt, 11:30am–3:00pm
Douglas Pavilion

Optimal Design of Worm Gear System Using in CVWL for Automobiles

Poster Paper Publication. IMECE2013-63365

Nogill Park, Jonghyeon Sohn, Gyeongmyeang Baek, *Pusan National University, Busan, Korea (Republic)*, Chunghan Oh, *Hyundai-Motor Company, Hwaseong-si, Korea (Republic)*

Long-Term Solar Heating System Performances Evaluation From Only Meteorological Parameter: Application and Comparison of the f Chart and phi-f-Chart Methods

Poster Presentation. IMECE2013-63572

Mustapha Koussa, *CDER, Bouzreah, Algeria*

Enhancing Infeasibility Detection Method for Mechanical Design Problems

Poster Paper Publication. IMECE2013-63651

Emad Khorshid, Azim Falah, *Kuwait University, Kuwait, Kuwait*

CFD Analysis of a Cryogenic Pressure Vessel Hydrogen Leak

Poster Paper Publication. IMECE2013-65391

Elias Ledesma, Alonso Salazar-Garibay, *University of Guanajuato, Salamanca, Mexico*, Salvador Aceves, *Francisco Espinosa-Loza, Lawrence Livermore National Laboratory, Livermore, CA, United States*

A Study on the Development of Slip Form System With Lightweight GFRP Panel

Poster Paper Publication. IMECE2013-65397

Hyejin Yoon, Young Jin Kim, Won Jong Chin, Hee Seok Kim, *Korea Institute of Construction Technology, Goyang-Si, Gyeongg-Do, Korea (Republic)*

Determination of the Slip-up Time for Slip Form System Using Surface Wave Velocity

Poster Paper Publication. IMECE2013-66129

Hee Seok Kim, Young Jin Kim, Won Jong Chin, Hyejin Yoon, *Korea Institute of Construction Technology, Goyang-Si, Gyeongg-Do, Korea (Republic)*

Roll-Over Stabilization Mechanism Incorporating a Modified Suspension System**Poster Paper Publication.** IMECE2013-66368Varun Das Ramdoss, Ganesh Kumar Swaminathan, Anomitra Banerjee, Deepan Kishore Kumar, *Birla Institute of Technology and Science Pilani, Dubai Campus, Dubai, United Arab Emir.***Detect Tool Breakage by Using Combination Neural Decision System & ANFIS Tool Wear Predictor****Poster Presentation.** IMECE2013-66878Soheil Mohtaram, *Islamic Azad University Science & Research Branch, Isfahan, Iran*, Mohammad Amin Nikbakht, *Islamic Azad University of Khomeinishahr, Isfahan, Iran***Application of CAD, CAE, Reverse Engineering, and Rapid Prototyping in New Product Development Industry****Poster Paper Publication.** IMECE2013-63266Muni Prabaharan Muniappan, *Tech Mahindra, Hyderabad, AP, India***16-14 TRANSPORTATION SYSTEMS****16-14-1 Transportation Systems****1st Floor, Manchester Grand Hyatt, Douglas Pavilion** **11:30am–3:00pm****16-15 VIBRATION, ACOUSTICS, AND WAVE PROPAGATION****16-15-1 Vibration, Acoustics, and Wave Propagation****1st Floor, Manchester Grand Hyatt, Douglas Pavilion** **11:30am–3:00pm**Session Organizer: **Noah Schiller**, *NASA Langley Research Center, Hampton, VA, United States***Effects of Crack-Dilatancy on Rayleigh Waves in Fluid-Saturated Porous Media****Poster Presentation.** IMECE2013-62145Tribhawan Saini, *Kurukshetra University, Kalka, Haryana, India***Modeling of Delaminated Composite Plates****Poster Presentation.** IMECE2013-64368Ali Mahieddine, Salaheddine Bentridi, Mohamed Nadjib Benallal, *Université de Khemis Miliana, Ain Defla, Algeria***Evaluation of Vibrational Behavior of Chassis Frame for Intense Load****Poster Presentation.** IMECE2013-67006Vikas Deulgaonkar, *Govt. COE, Amravati, University of Pune, Pune, India*, Ashok Matani, *Govt. COE, Amravati, Amravati, India*, Shrikant Kallurkar, *Atharva College of Engineering, Charkop Naka, Malad West Mumba, Mumbai, India***16-17 DEWITT POSTER SESSION FOR UNDERGRADUATE RESEARCH IN THERMAL/FLUID SCIENCES****16-17-1 Dewitt Poster Session for Undergraduate Research in Thermal/Fluid Sciences****1st Floor, Manchester Grand Hyatt, Douglas Pavilion** **11:30am–3:00pm****Spectral Phonon Contributions to Thermal Boundary Conductance at Metal/Silicon Interfaces****Poster Presentation.** IMECE2013-66983Matthew Caplan, Patrick Hopkins, *University of Virginia, Charlottesville, VA, United States*, John Duda, *Seagate Technology, Bloomington, MN, United States***Comparing Two Approaches for Characterizing Thermoelectric Generators****Poster Presentation.** IMECE2013-67139Reginald Pierce, Robert Stevens, *Rochester Institute of Technology, Rochester, NY, United States***Characterization of Gallium Nitride-Gold Interfaces as a Function of RMS Roughness Using Time Domain Thermoreflectance****Poster Presentation.** IMECE2013-67163Chet Szejewski, Costel Constantin, *James Madison University, Harrisonburg, VA, United States*, Patrick Hopkins, *University of Virginia, Charlottesville, VA, United States***A Comparison of Studies on Drag Reduction for Turbulent Channel Flow Over Superhydrophobic Surfaces****Poster Presentation.** IMECE2013-67178Michael Morgan, *Brigham Young University, Provo, UT, United States***Air Flow Visualization System: Using IR Thermography to Quantify Airflow****Poster Presentation.** IMECE2013-67214Reed Gonzalez, Sean Miles, Robert Choate, Aaron Huffman, Matt Eubanks, *Western Kentucky University, Bowling Green, KY, United States*

TRACK 16 VIRTUAL PODIUM (POSTERS) / WEDNESDAY, NOVEMBER 20

16-18 THE GRADUATE STUDENT POSTER SESSION IN HEAT TRANSFER AND FLUID SCIENCES

16-18-1 The Graduate Student Poster Session in Heat Transfer and Fluid Sciences

1st Floor, Manchester Grand Hyatt, 11:30am–3:00pm
Douglas Pavilion

Thermal Study on Chemical Vapor Deposition Equipment Processing Two Silicon Wafers

Poster Presentation. IMECE2013-67000

Tomoji Watanabe, Shigeki Hirasawa, *Kobe University, Kobe, Hyogo, Japan*

Thermodynamic Analysis for Near-Field Thermal Radiation: Energy and Entropy Transfer

Poster Presentation. IMECE2013-67022

Yi Zheng, Arvind Narayanaswamy, *Columbia University, New York, NY, United States*

Effective Temperature Jump Length and Influence of Axial Conduction for Thermal Transport Through Channels With Superhydrophobic Walls

Poster Presentation. IMECE2013-67036

Adam Cowley, Daniel Maynes, *Brigham Young University, Provo, UT, United States*

Droplet Rebound From Rib and Post Patterned Superhydrophobic Surfaces

Poster Presentation. IMECE2013-67046

Cristian Clavijo, Daniel Maynes, *Brigham Young University, Provo, UT, United States*

Modeling and Design of a Micro Evaporator for a Micro Rankine Cycle

Poster Presentation. IMECE2013-67071

Hassan Azarkish, *University of Sistan and Baluchestan, Sherbrooke, Canada*, Selin Arslan, *Lawrence Technology University, Southfield, MI, United States*, Amin Behzadmehr, *University of Sistan and Baluchestan, Zahedan, Iran*, Luc Frechette, *Université de Sherbrooke, Sherbrooke, QC, Canada*

Drag Reduction for Automotive-Carrying Style Rail Cars

Poster Presentation. IMECE2013-67072

Rob Condie, Daniel Maynes, *Brigham Young University, Provo, UT, United States*

Statistical Modeling of the Turbulent Far Wake Behind the Cross-Flowed and Slightly Heated Cylinder

Poster Presentation. IMECE2013-67079

Yadykar Ibragimov, Yuriy Nuzhnov, *Al-Farabi Kazakh National University, Combustion Problems Institute, Almaty, Kazakhstan*

Experimental Investigation of Two-Phase Refrigerant Flow Characteristics in a Mini-Channel Helical Heat Exchanger

Poster Presentation. IMECE2013-67128

Charles Okaeme, Guanqiu Li, TieJun Zhang, *Masdar Institute of Science and Technology, Abu Dhabi, United Arab Emir.*

Design of a Transcritical CO₂ Rankine Cycle Using Scroll Expander and Diaphragm Pump

Poster Presentation. IMECE2013-67137

Alexander Higgs, Guanqiu Li, TieJun Zhang, *Masdar Institute of Science and Technology, Abu Dhabi, United Arab Emir.*

Dynamic Control of Radiation-Based Thermal Management Through Origami-Inspired Design

Poster Presentation. IMECE2013-67157

Jared Park, Brian Iverson, Matthew Jones, Larry Howell, *Brigham Young University, Provo, UT, United States*, Isaac Delimont, *Brigham Young University, Lacey, WA, United States*

Thermal Transport in Chemically Ordered Materials for Thermoelectric Devices

Poster Presentation. IMECE2013-67160

LeighAnn Larkin, Justin L. Smoyer, MacKenzie R. Sinden-Redding, Pamela M. Norris, *University of Virginia, Charlottesville, VA, United States*

Effects of a Stability Control Device on the Performance of an Inducer in a Turbopump

Poster Presentation. IMECE2013-67179

Ryan Lundgreen, Daniel Maynes, *Brigham Young University, Provo, UT, United States*

Laminar Jet Impingement on a Superhydrophobic Surface With Thin Film Breakup

Poster Presentation. IMECE2013-67202

Jonathan Stoddard, Julie Crockett, *Brigham Young University, Provo, UT, United States*

VOF-Based Modeling of Condensation Heat Transfer in Microscale Geometries

Poster Presentation. IMECE2013-67216

Harish Ganapathy, *University of Maryland College Park, College Park, MD, United States*

Thermal Transport Due to Quasi-Localization of Vibrations in Amorphous Silicon

Poster Presentation. IMECE2013-67220

Caroline S. Gorham, *University of Virginia, Charlottesville, VA, United States*

Experimental and Numerical Study of Rapid Transient Joule Heating in 3D Embedded On-Chip Interconnects

Poster Presentation. IMECE2013-67247

Banafsheh Barabadi, *Georgia Institute of Technology, Atlanta, GA, United States*

Theory on Electron-Phonon Coupling and Thermal Conductance at Free Electron Metal/Insulator Interfaces

Poster Presentation. IMECE2013-67278

Ashutosh Giri, *University of Virginia, Charlottesville, VA, United States*

SUNDAY, NOVEMBER 17 / TRACK 17 ASME INTERNATIONAL UNDERGRADUATE RESEARCH AND DESIGN EXPO (POSTERS ONLY)

ASME INTERNATIONAL UNDERGRADUATE RESEARCH AND DESIGN EXPO (POSTERS ONLY)

SUNDAY, NOVEMBER 17

17-1 UNDERGRADUATE RESEARCH PROJECTS

17-1-1 Undergraduate Research Projects

1st Floor, Manchester Grand Hyatt, Douglas Pavilion **6:00pm–7:30pm**

System of Automatic Electronic Hydraulic Braking

Undergraduate Expo Presentation. IMECE2013-62089
Udit Garg, *MVJ College of Engineering, Delhi, Delhi, India,*
Rajita Talekar, *MVJ College of Engineering, Bangalore, Karnataka, India*

The Importance of Rules in Different Media and User-Friendly Formats: the Role of EASA

Undergraduate Expo Presentation. IMECE2013-62270
Muamer Mehdawi, *Gread Man Made River Libya, Benghazi, Libya*

Design of a Test Rig for Determination of Gearbox Efficiency and Tuning of Electronic Differential

Undergraduate Expo Presentation. IMECE2013-64669
Shruti Motiwale, *Unmesh Padalkar, Vinay Bhajantri, Rhythmima Shinde, Indian Institute of Technology Bombay, Mumbai, Maharashtra, India*

Automobile Frame Torsion Rigidity Validation Setup

Undergraduate Expo Presentation. IMECE2013-64710
Shivam Mittal, *Ashutosh Unhale, Indian Institute of Technology Bombay, Mumbai, India*

Suspension Design of Formula Student Race Car

Undergraduate Expo Presentation. IMECE2013-64746
Akshat Jain, *Vinci Gupta, Jagvendra Meena, Shruti Motiwale, Indian Institute of Technology Bombay, Mumbai, India*

Multi-Body Dynamic Analysis of Double Offset CV Joint Based on ADAMS

Undergraduate Expo Presentation. IMECE2013-64766
Vinay Bhajantri, *Shruti Motiwale, Indian Institute of Technology Bombay, Mumbai, India*

Plug-in Hybrid Electric Vehicle Architecture Comparison for Strong Hybridization of a Midsize Sedan as Part of EcoCAR2: Plugging Into the Future

Undergraduate Expo Presentation. IMECE2013-65536
Brian Harries, *William-Townsend Hyatt, Kenneth Leslie, Brandon Smith, Kenneth Meierjurgan II, Marc Compere, Embry-Riddle Aeronautical University, Daytona Beach, CA, United States*

Development of a Minimum Brake Specific Fuel Consumption Power-Management Strategy for a Series Plug-in Hybrid Electric Vehicle

Undergraduate Expo Presentation. IMECE2013-65551
Brian Harries, *Kenneth Meierjurgan II, Marc Compere, Embry-Riddle Aeronautical University, Daytona Beach, CA, United States*

Design, Analysis, and Development of a Frame for Autonomous Underwater Vehicles

Undergraduate Expo Presentation. IMECE2013-65676
Venkat Deepak, *Akash Verma, Rakesh Kumar, Dinesh Kumar, Indian Institute of Technology, Bombay, Mumbai, Maharashtra, India*

Design and Fabrication of an Ultra-Low Capacitive Pressure Transducer

Undergraduate Expo Presentation. IMECE2013-66041
Justin Brown, *Shahin Nudehi, Armand Gagne, Stephen Charnley, Kyle Devlin, Ryan Finley, Jenan Almishari, Anna Wint, Valparaiso University, Valparaiso, IN, United States*

Implementation of an Adaptive Cruise Control System for a 1989 Ford Escort Pony

Undergraduate Expo Presentation. IMECE2013-66311
Benjamin Olejniczak, *Shahin Nudehi, Valparaiso University, Valparaiso, IN, United States,* Karl Grunst, *Valparaiso University, Skokie, IL, United States,* Zach Olson, *Valparaiso University, Angola, IN, United States,* Sam Perry, *Valparaiso University, Palatine, IL, United States,* Chris West, *Valparaiso University, Montgomery, IL, United States,* John Mason, *Valparaiso University, Libertyville, IL, United States,* Zach Saylor, *Valparaiso University, Des Moines, IA, United States*

Small-Scale Hybrid Thermal Desalination

Undergraduate Expo Presentation. IMECE2013-66876
Ammar Alshegri, *Mohammad Humood, Abdul Rahman Farraj, Abdullah Al Hammadi, Mohammad Abutayeh, Khalifa University of Science, Technology and Research, Abu Dhabi, Abu Dhabi, United Arab Emir.*

Analysis of Air Cooling Effectiveness for 1U Servers

Undergraduate Expo Presentation. IMECE2013-66919
Dan Golematis, *Ian Dardani, Aaron P. Wemhoff, Villanova University, Villanova, PA, United States*

Role of Computer Simulation in Exploring Oil and Gas in the Arctic

Undergraduate Expo Presentation. IMECE2013-66929
Jasmin Honegger, *Yucheng Liu, University of Louisiana at Lafayette, Lafayette, LA, United States*

Energy Harvesting Performance of Bimorph Thermo-Piezoelectric Benders With Arbitrary Support Location

Undergraduate Expo Presentation. IMECE2013-66956
Armanj Hasanyan, *Muhammad Hajj, Virginia Technology, Blacksburg, VA, United States*

TRACK 17 ASME INTERNATIONAL UNDERGRADUATE RESEARCH AND DESIGN EXPO (POSTERS ONLY) / SUNDAY, NOVEMBER 17

Effect of Diamantane Nanoparticles on the Thermal Stability in Nanocrystalline Aluminum Alloy

Undergraduate Expo Presentation. IMECE2013-66990
Simon Pun, *University of California, Irvine, Temple City, CA, United States*, Farghalli Mohamed, Walid Hanna, *University of California, Irvine, Irvine, CA, United States*

Controlling the Response of a String of Vehicles to a Traffic Disturbance

Undergraduate Expo Presentation. IMECE2013-67009
Patrick O'Meara, Mihir Sen, Bill Goodwine, *University of Notre Dame, Notre Dame, IN, United States*

Experimental and Numerical Investigation of Natural and Forced Convection Heat Transfer for Electronics Components

Undergraduate Expo Presentation. IMECE2013-67012
Umut Yuruker, Enes Tamdogan, *Ozyegin University, Istanbul, Turkey*, Mehmet Arik, *Ozyegin University, Cekmekoy Istanbul, Turkey*

Pool Boiling on Enhanced Surfaces

Undergraduate Expo Presentation. IMECE2013-67025
Ashton Archer, Amy Betz, *Kansas State University, Manhattan, KS, United States*

MEMS EyePad for Characterizing Nystagmus

Undergraduate Expo Presentation. IMECE2013-67040
Deepan Kishore Kumar, Sundaram Swaminathan, *Birla Institute of Technology and Science Pilani, Dubai Campus, Dubai, United Arab Emir.*

Patient-Specific Hemodynamic Evaluation and in Silico Surgical Planning for Optimal Interventions in Tetralogy of Fallot Patients

Undergraduate Expo Presentation. IMECE2013-67048
Abhiram S. Rao, *University at Buffalo, State University of New York, Buffalo, NY, United States*, Priti G. Albal, Prahlad G. Menon, *Sun Yat-sen University - Carnegie Mellon University Joint Institute of Engineering, Pittsburgh, PA, United States*

Effect of Micro-Structured Surface Geometries on Condensation Heat Transfer

Undergraduate Expo Presentation. IMECE2013-67059
Andres Martinez, Caleb Chiroy, Amy Betz, *Kansas State University, Manhattan, KS, United States*

Optimal Design of a Savonius Wind Turbine

Undergraduate Expo Presentation. IMECE2013-67091
Sai Gole, Ranjana Meena, Vishaal Dhamotharan, Piyush Jadhav, Palaniappan Ramu, Arul Prakash, *Indian Institute of Technology Madras, Chennai, Tamil Nadu, India*

Design of PID Controller for Magnetically Levitated Vertical Axis Wind Turbine in Low Wind Speed Applications Using LabVIEW

Undergraduate Expo Presentation. IMECE2013-67093
K.G. Vinod Kumar, Vignesh Bakthavachalam, V.R. Ravi, *Velammal Engineering College/Anna University, Chennai, Chennai, Tamil Nadu, India*, Trilok Koushik Obuli, *Velammal Engineering College/ Anna University, Chennai, Kancheepuram, Tamil Nadu, India*

Transonic Fan Flow Predictions and Validation

Undergraduate Expo Presentation. IMECE2013-67096
Ali Alhamaly, Walter F. O'Brien, *Virginia Technology, Blacksburg, VA, United States*, Anthony M. Ferrar, *Virginia Polytechnic Institute and State University, Blacksburg, VA, United States*

An Enhancement of the Modeling Capabilities of a MOTUS 622i Full Flight Simulator

Undergraduate Expo Presentation. IMECE2013-67115
Jose Maldonado, Alexander Pellicier, Carlos Alvarado, *Polytechnic University of Puerto Rico, Vega Alta, PR, United States*

Generating Polygonal Meshes for Multiphysics Problems

Undergraduate Expo Presentation. IMECE2013-67127
Ke Liu, Evgueni T. Filipov, Heng Chi, Glaucio Paulino, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

Advanced Needle Coatings for Improved Lumbar Drain Procedure

Undergraduate Expo Presentation. IMECE2013-67136
Megan Doerzbacher, *Pennsylvania State University, Wexford, PA, United States*, Andrew Barnett, Douglas Wolfe, Siyang Zheng, Jason Moore, *Pennsylvania State University, University Park, PA, United States*, Nicholas Brandmeir, *Hershey Medical Center, Hershey, PA, United States*

Droplet Impact and the Effect of Charge on Droplets

Undergraduate Expo Presentation. IMECE2013-67143
Morgan Hemker, *Southern Illinois University Edwardsville, Marine, IL, United States*

Mathematical Model of an Air-Filled Stirling Refrigerator

Undergraduate Expo Presentation. IMECE2013-67145
Patrick McFarlane, *University of Notre Dame, South Bend, IN, United States*, Fabio Semperlotti, Mihir Sen, *University of Notre Dame, Notre Dame, IN, United States*

Design of Experiments for Aeroelastic Trim

Undergraduate Expo Presentation. IMECE2013-67156
Joseph Derrick, *University of Southern Indiana, Indianapolis, IN, United States*, Natasha Smith, *University of Southern Indiana, Evansville, IN, United States*

Topology Optimization With Polytopes: A Novel Super-Element Approach

Undergraduate Expo Presentation. IMECE2013-67161
Regis S. Thedin, Ivan F.M. Menezes, M.S. Carvalho, Anderson Pereira, *Pontifical Catholic University of Rio de Janeiro, Rio de Janeiro - RJ, Brazil*, Glaucio Paulino, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

Fuzzy Logic Speed Control of a Four Wheel Vehicle

Undergraduate Expo Presentation. IMECE2013-67166
Binnaz Didem Mengü, Baris Balta, Kenan Dorken, Enis Akyol, Ali Turac Bilmis, Batuhan Kaygusuz, Sedat Nazlibilek, *Atilim University, Ankara, Turkey*

SUNDAY, NOVEMBER 17 / TRACK 17 ASME INTERNATIONAL UNDERGRADUATE RESEARCH AND DESIGN EXPO (POSTERS ONLY)

Design of an Experiment for Measurement of Free-Convective Heat Transfer in the Transition From Continuum to Non-Equilibrium

Undergraduate Expo Presentation. IMECE2013-67185
Jordan Falgoust, Michael James Martin, *Louisiana State University, Baton Rouge, LA, United States*

Synthesizing High Purity Carbon Nanotube Arrays for Thermal Applications

Undergraduate Expo Presentation. IMECE2013-67188
Quang N. Pham, Matthew L. Bauer, Chris Saltonstall, Justin L. Smoyer, MacKenzie R. Sinden-Redding, Pamela M. Norris, *University of Virginia, Charlottesville, VA, United States*

Insights Into the Effect of Geometrical Parameters in the Mechanical Properties of the Radular Teeth of the Cryptochiton Stelleri: A 3D Print Approach

Undergraduate Expo Presentation. IMECE2013-67193
Chanhue Jeong, Enrique Escobar de Obaldia, Pablo Zavattieri, *Purdue University, West Lafayette, IN, United States*

Reduced Order Modeling for the Nonlinear Geometric Response of Some Joined Wings

Undergraduate Expo Presentation. IMECE2013-67206
Greg Philpot, *SEMTE, Faculties of Mechanical and Aerospace Engineering, Tempe, AZ, United States*, Rauno Cavallaro, Luciano Demasi, *San Diego State University, San Diego, CA, United States*, X.Q. Wang, *Arizona State University, Tempe, AZ, United States*, Marc Mignolet, *Arizona State University, Phoenix, AZ, United States*

Electrostatic Charging in Gas-Solid Fluid Systems

Undergraduate Expo Presentation. IMECE2013-67208
Jonathan Tucker, Lawrence Shadle, Sofiane Benyahia, Chris Guenther, *NETL-Department of Energy, Morgantown, WV, United States*, Mark Koepke, *West Virginia University, Morgantown, WV, United States*

Biophotofuel Cell: Design a Clean Energy Generation System Via Biophotofuel Cell Approach

Undergraduate Expo Presentation. IMECE2013-67229
Anjula Higgoda, Katrina Abou-Diab, Kaitlin Hom, Eric Moradian, William Ung, Yong X. Gan, *California State Polytechnic University, Pomona, Pomona, CA, United States*

Computational Investigation of the Effects of Nano-Grain Properties

Undergraduate Expo Presentation. IMECE2013-67230
Sabrina Ball, Ibrahim Guven, *University of Arizona, Tucson, AZ, United States*

Correlation Between Induced Spinal Fusion and Strain: An In Vitro Sheep Study

Undergraduate Expo Presentation. IMECE2013-67241
James Magas, Deborah Munro, *University of Portland, Portland, OR, United States*

Analysis and Simulation of Transonic Airfoil

Undergraduate Expo Presentation. IMECE2013-67243
Chuyoung Kim, Vincent Capece, *University of Kentucky, Paducah, KY, United States*

Numerical Simulation of Drug Release Process for a Remotely Controlled MEMS Ocular Device

Undergraduate Expo Presentation. IMECE2013-67250
Ki Wolf, Fatemeh Nazly Pirmoradi, Liwei Lin, *University of California, Berkeley, Berkeley, CA, United States*

Relationship Between Temperature and rpm on a Stirling Engine

Undergraduate Expo Presentation. IMECE2013-67253
Joshua Rosa, *Inter American University of Puerto Rico, Bayamon, PR, United States*

Near-Optimal Sensing Using Inverse Predictive Model for Intelligent Indoor Lighting

Undergraduate Expo Presentation. IMECE2013-67256
Aparna Dhinakaran, Jacob Aaron Richards, *University of California, Berkeley, Berkeley, CA, United States*, Benjamin Chu, *University of California, Berkeley, San Francisco, CA, United States*

Electric Freight Transportation

Undergraduate Expo Presentation. IMECE2013-67260
Yetlanezi Guerrero, Mohammed R. Danesh, *California State Polytechnic University, Pomona, Pomona, CA, United States*

Methodology for the Improvement of the Performance of a Proton Exchange Fuel Cell Using State-Space Modeling

Undergraduate Expo Presentation. IMECE2013-67261
Jairo Rodriquez, Sebastian Roa Prada, *Universidad Autónoma de Bucaramanga, Bucaramanga, Santander, Colombia*

Adhesion Characteristics of Limpets—Biomimicry Approach

Undergraduate Expo Presentation. IMECE2013-67267
Pablo Vazquez, Ivan Magdaleno, *Citrus College, Glendora, CA, United States*, Nathan Laidig, Koshy Varghese, Mariappan Jawaharlal, *Cal Poly Pomona, Pomona, CA, United States*

Micro-Total Analysis System for Malignant Hyperthermia Diagnosis

Undergraduate Expo Presentation. IMECE2013-67277
Adarsh Venkataraman Ganesan, *Birla Institute of Technology and Science Pilani, Dubai Campus, Dubai, United Arab Emir.*

Reduction of Urinary Tract Infections Caused by Urethral Catheter Through the Implementation of Hydrophobic Coating and Geometrical Modifications

Undergraduate Expo Presentation. IMECE2013-66555
Aya Gare, Tsung-Chow Su, *Florida Atlantic University, Boca Raton, FL, United States*

TRACK 17 ASME INTERNATIONAL UNDERGRADUATE RESEARCH AND DESIGN EXPO (POSTERS ONLY) / SUNDAY, NOVEMBER 17

17-2 UNDERGRADUATE DESIGN PROJECTS

17-2-1 Undergraduate Design Projects

1st Floor, Manchester Grand Hyatt, Douglas Pavilion 6:00pm–7:30pm

MOTO-SHIELD

Undergraduate Expo Presentation. IMECE2013-66889
LeDarion Carter, Phillip Spear, Tiesha Wolfe, Jeffrey Staten, Alandria Allen, Sabrina Lee, Shaowei Gong, *Tuskegee University, Tuskegee, AL, United States*

System Engineering Based Design and Analysis of a Lightweight Polygon Engine

Undergraduate Expo Presentation. IMECE2013-66945
Peter Yoshiba, Lauren Yoshiba, Ryan Kirkland, Daniel Davison, Adam Clark, Alex Cawthon, Christopher McNamara, Vincent Trieu, Cliff Stover, Kevin Anderson, *California State Polytechnic University at Pomona, Pomona, CA, United States*, Steve Cunningham, *Industrial Mentor, Butte Industries, Burbank, CA, United States*

Direct Contact Heating Technology for Hot Forming/Die Quenching

Undergraduate Expo Presentation. IMECE2013-66949
Joshua Rasera, Kyle Daun, *University of Waterloo, Waterloo, ON, Canada*, Bradford Froese, *Tigercat Industries Inc., Cambridge, ON, Canada*, Peter Plaisier, *Innovative Steam Technologies, Cambridge, ON, Canada*, Cameron Rush, *YarMetal Fabrications Inc., Toronto, ON, Canada*, Mike D'Souza, *F&P Manufacturing Inc., Tottenham, ON, Canada*

Design and Development of a Single Wheel Recreational Hauler for Motorcycles

Undergraduate Expo Presentation. IMECE2013-66953
Clayton McMunn, Tariq Shobab, *British Columbia Institute of Technology, Coquitlam, Canada*, Aaron Hufsmith, *British Columbia Institute of Technology, North Vancouver, BC, Canada*, Cyrus Raoufi, Kevin Peffers, *British Columbia Institute of Technology, Burnaby, BC, Canada*

R3GA: Real Three-Dimensional Graphing Assistant

Undergraduate Expo Presentation. IMECE2013-66975
Rachael Freedman, *Lehigh University, Newtown, PA, United States*, David Angstadt, *Lehigh University, Bethlehem, PA, United States*

The First Step in VU's Solar Hydrogen Process: Development of a Solar Thermal Reactor for the Reduction of Metal Oxide Particles

Undergraduate Expo Presentation. IMECE2013-67015
Jesse Fosheim, Chris Baum, Brian Borth, Scott Campbell, Benjamin Gruenwald, Parisa Nasserifar, Gretchen VanHeeren, Katherine Krueger, Robert Palumbo, *Valparaiso University, Valparaiso, IN, United States*

Real-Time Substrate Transport Control for Stable and Efficient Thin-Film-Based Roll-to-Roll (R2R) Nanomanufacturing

Undergraduate Expo Presentation. IMECE2013-67056
Guoao Sun, Wencheng Wang, Liang Pan, *Purdue University, West Lafayette, IN, United States*

Active Dense Tensegrity Structure

Undergraduate Expo Presentation. IMECE2013-67057
Zhiwei Wu, Thomas Siegmund, *Purdue University, West Lafayette, IN, United States*

Solar Power Irrigation System

Undergraduate Expo Presentation. IMECE2013-67098
Molly Matheny, *Florida Atlantic University, Tequesta, FL, United States*, Ruben Abreu, *Florida Atlantic University, Boca Raton, FL, United States*, Bert Adams, *Florida Atlantic University, Deerfield Beach, FL, United States*

Design of a Lagrange Drifter for Monitoring Ocean Current and Wave

Undergraduate Expo Presentation. IMECE2013-67102
Ruben Abreu, *Florida Atlantic University, Boca Raton, FL, United States*, Bert Adams, *Florida Atlantic University, Deerfield Beach, FL, United States*

Solar Tracking System for Domestic Applications

Undergraduate Expo Presentation. IMECE2013-67103
Sai Phani Teja Balusu, *PSG College of Technology, Hyderabad, Andhra Pradesh, India*, Dhachana Moorthy Paramasivam, *PSG College of Technology, Coimbatore, Tamil Nadu, India*, P. Radhakrishnan, *PSG Institute of Advanced Studies, Coimbatore, Tamil Nadu, India*

The Redesign of the Pik Rite Model 6200 Vine Diverter

Undergraduate Expo Presentation. IMECE2013-67120
Matthew Hager, Ariel Hughes, Benjamin Schrock, *Bucknell University, Lewisburg, PA, United States*

Residential Induction Water Heater

Undergraduate Expo Presentation. IMECE2013-67121
Nilu Jariwala, *Wentworth Institute of Technology, South Weymouth, MA, United States*, Mehdi Goulamaly, Mark Piontkowski, Mansour Zenouzi, *Wentworth Institute of Technology, Boston, MA, United States*

Design of an On-Off Controller for Position-Controlling of a DC-Motor

Undergraduate Expo Presentation. IMECE2013-67131
Kyle T. Peerless, Ben M. Horten, Pezhman A. Hassanpour, *Loyola Marymount University, Los Angeles, CA, United States*

Bicycle Assist Using Regenerative Braking

Undergraduate Expo Presentation. IMECE2013-67133
Mani Hemanth Dhullipalla, Ram Kumar P K, Krishna Khashempur, Sarang Joshi, Shankar C. Subramanian, *Indian Institute of Technology Madras, Chennai, Tamil Nadu, India*

SUNDAY, NOVEMBER 17 / TRACK 17 ASME INTERNATIONAL UNDERGRADUATE RESEARCH AND DESIGN EXPO (POSTERS ONLY)**Design of a Thermally Driven Diffusion Absorption Refrigeration System****Undergraduate Expo Presentation.** IMECE2013-67152Hannah E. Oermann, Alexander Rattner, Srinivas Garimella,
*Georgia Institute of Technology, Atlanta, GA, United States***Design and Modeling of a Rolling Clamps Transport Device (RCTD) for a Multi-Story Fully Automated Parking****Undergraduate Expo Presentation.** IMECE2013-67169Ruqaya AlNoammani, Hamda AlMehairbi, Noha El Shirbini,
Lydia Lawand, Tamer Shahin, Fahrettin Ozturk, *Petroleum
Institute, Abu Dhabi, Abu Dhabi, United Arab Emir.***Standing Frame and Control System Designed for Rehabilitation****Undergraduate Expo Presentation.** IMECE2013-67176Eric VanMiddendorp, Jessica Seeley, Dave Regan, John
Farris, *Grand Valley State University, Grand Rapids, MI, United
States***HERALD: The Hybrid Exploration Robot for Air and Land Deployment****Undergraduate Expo Presentation.** IMECE2013-67201Lauren Davis, *Chicago, IL, United States*, Michael Kofron,
University of Pennsylvania, Doylestown, PA, United States,
Stella Latscha, *University of Pennsylvania, Philadelphia, PA,
United States*, Gabrielle Merritt, *University of Pennsylvania,
Madison, MS, United States*, Anthony Stroffolino, *PartMaker,
Inc., Philadelphia, PA, United States*, Mark Yim, *University of
Pennsylvania, St. Davids, PA, United States***Ultramouse: A Communicative Device Which Allows Those With Disabilities to Operate a Computer Using Head Movement****Undergraduate Expo Presentation.** IMECE2013-67221Henry Clever, Sarah Kieweg, *University of Kansas, Lawrence,
KS, United States*, Henry Evans, *Los Altos Hills, CA, United
States***Study of Solar Thermoelectric Energy for Residential Scale Combined Heat and Electricity****Undergraduate Expo Presentation.** IMECE2013-67226Claire Kunkle, *Santa Clara University, Santa Clara, CA, United
States***Low Cost Design of Heart Mimicking Pulsatile Flow Pump****Undergraduate Expo Presentation.** IMECE2013-67290Haroldo Gourian, Deryk Perez, Carlos Preciado, Joseph
Gomez, Daniel Weiss, Jaehoon Seong, *California State
Polytechnic University, Pomona, Pomona, CA, United States*



**TRACK 17 ASME INTERNATIONAL UNDERGRADUATE
RESEARCH AND DESIGN EXPO (POSTERS ONLY) / SUNDAY, NOVEMBER 17**





WEDNESDAY, NOVEMBER 20 / TRACK 18 NSF STUDENT COMPETITION

NSF STUDENT COMPETITION

WEDNESDAY, NOVEMBER 20

18-1 NSF STUDENT COMPETITION

18-1-1 NSF Student Competition

**1st Floor, Manchester Grand Hyatt,
Douglas Pavilion Exhibit Hall**

11:30am–2:30pm



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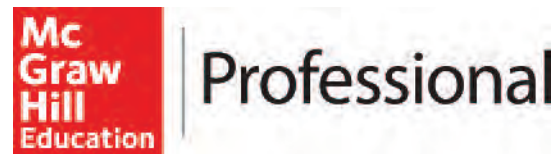
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Product/Service: Talent/Talent Enhancement Providers


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Phone: 573-341-4270
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Product/Service: Education


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Product/Service: Publishing


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COLLEGE OF ENGINEERING

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Phone: 877-254-0058
Email: Linda_Krute@ncsu.edu
Website: engineeringonline.ncsu.edu

The College of Engineering at North Carolina State University offers 15 online graduate degree programs for working engineers who cannot come to campus because of work, family or geographical constraints. One of the largest online programs is the Master of Science in Mechanical Engineering. For more information, visit the Engineering Online website at <http://EngineeringOnline.ncsu.edu> or contact Dr. Linda Krute at Linda_Krute@ncsu.edu. NC State's online program was recently ranked #7 by US News & World Report.

Product/Service: Education



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Product/Service: Testing, Measurement Equipment, Research & Development



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Product/Service: Computer Software

EXHIBITOR DESCRIPTIONS

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Phone: 503-968-6251
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Booth 705

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Product/Service: Computer Software

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Product/Service: Education



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Department of Mechanical Engineering**

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Website: <http://www.uab.edu/engineering/home/departments-research/me>

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Product/Service: Education



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Booth 203



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Product/Service: Publishing



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Booth 604

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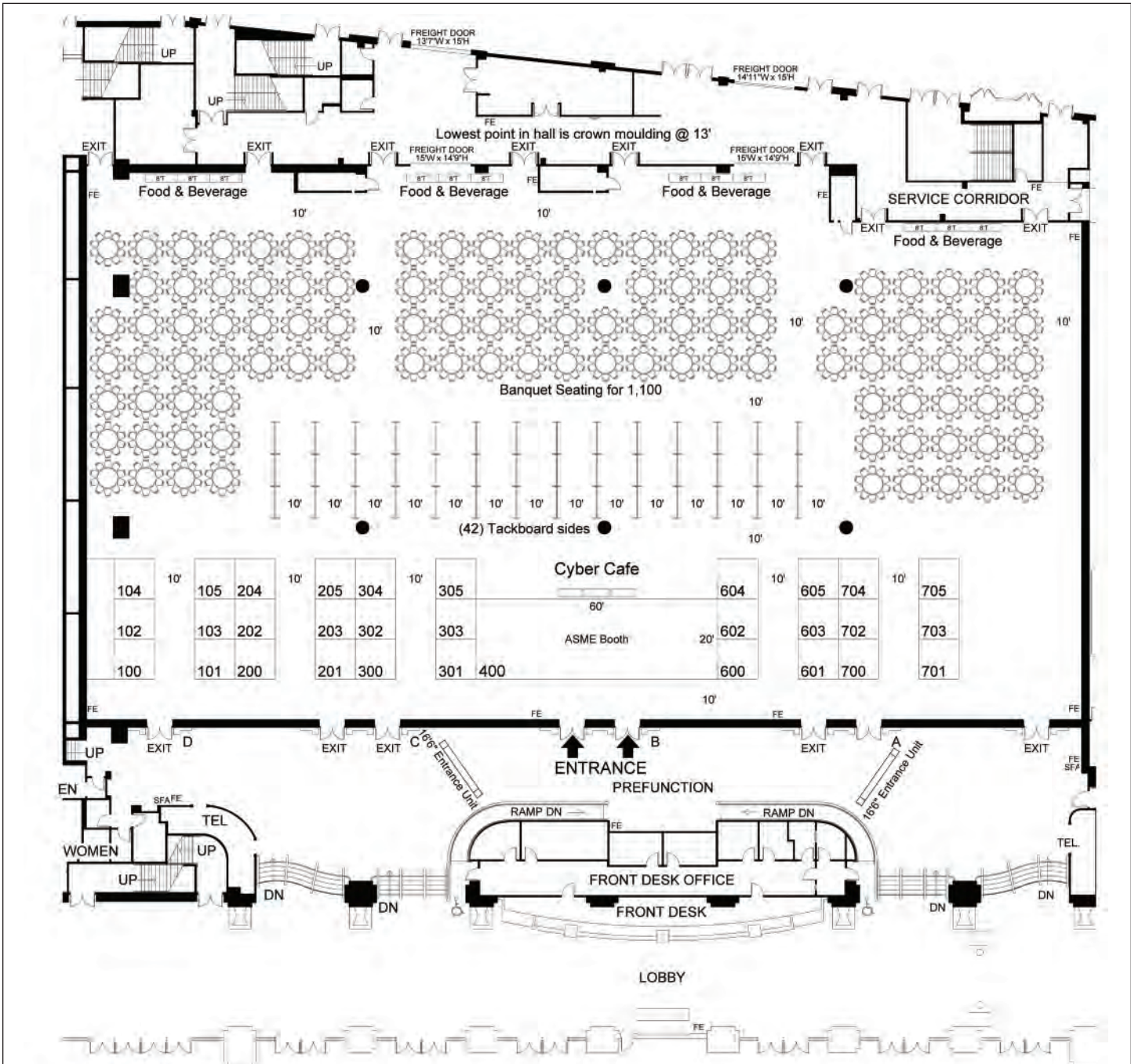
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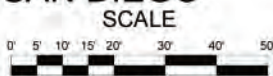
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29% - 1,200 SqFt Rented
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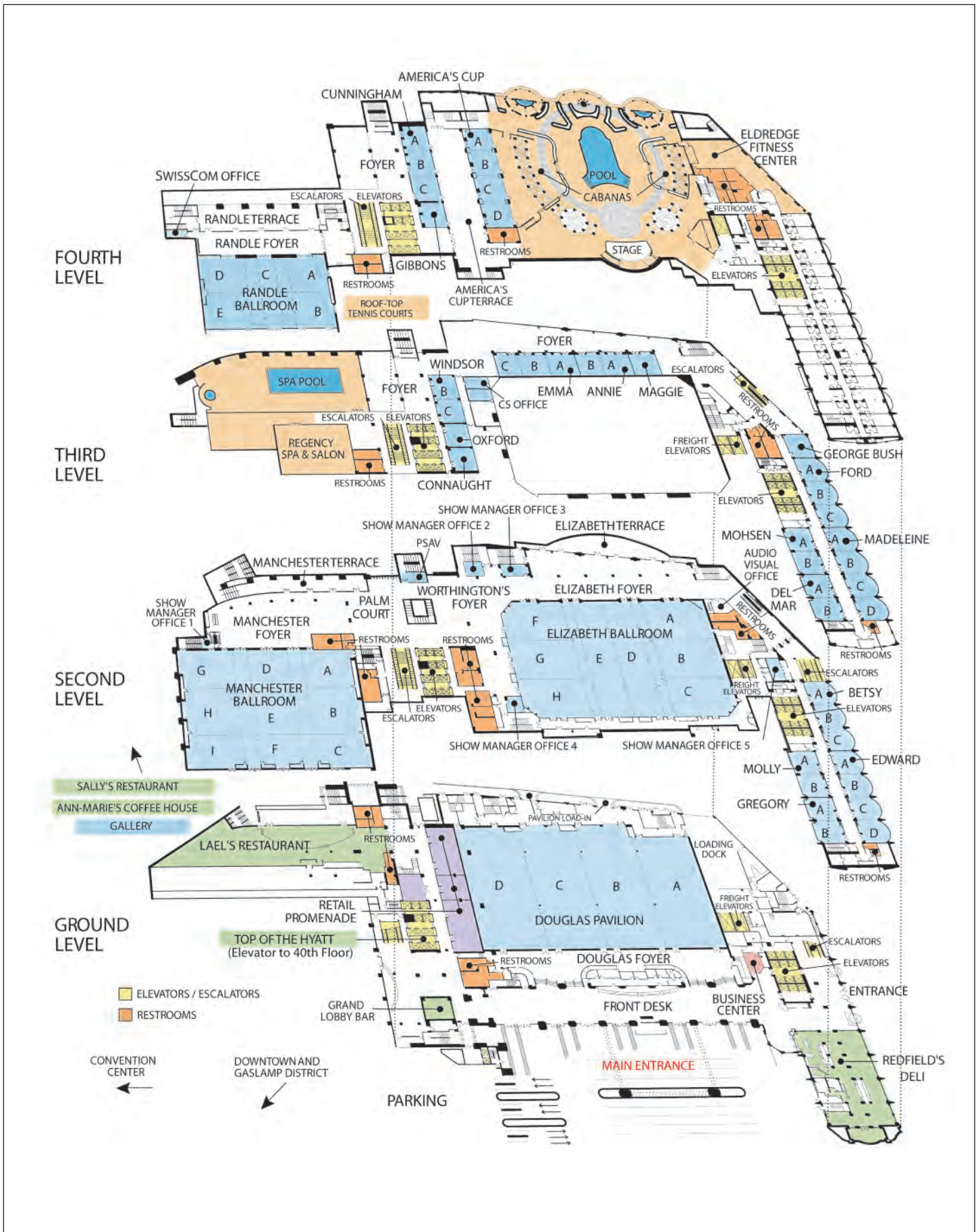
Dimension	Size	Qty	SqFt
10'x10'	100	30	3,000
20'x60'	1,200	1	1,200
Totals:		31	4,200



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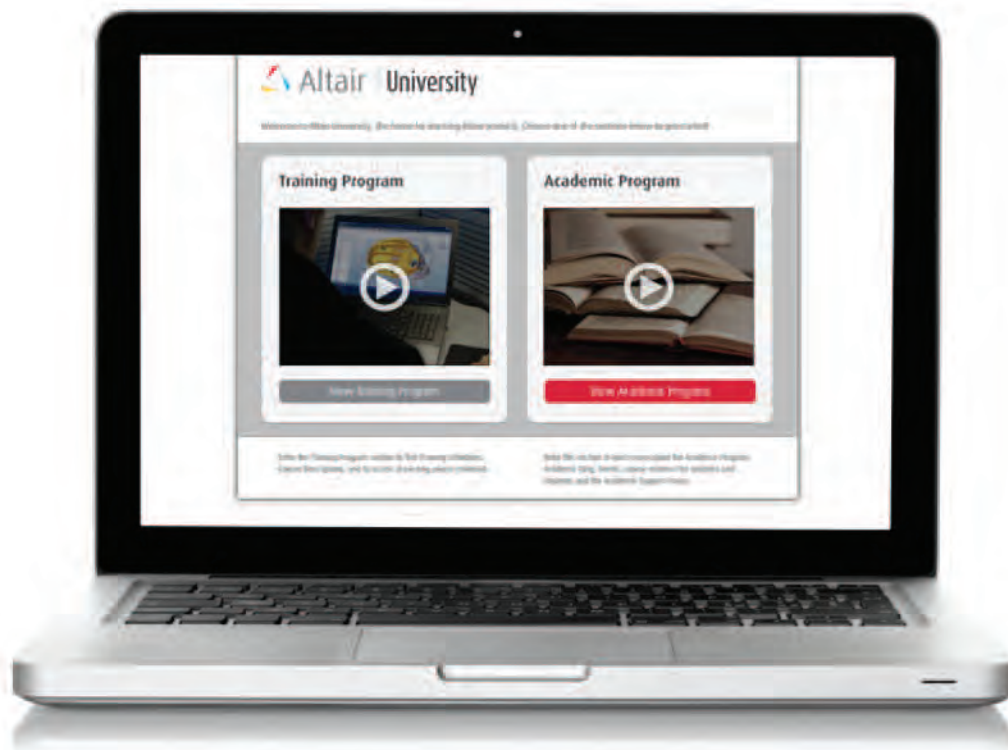
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HOTEL FLOOR PLAN



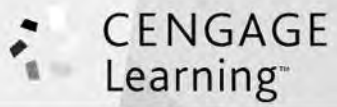


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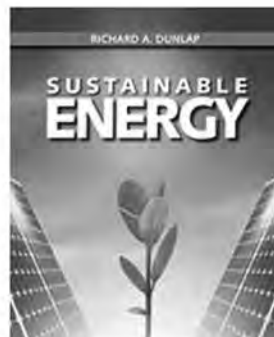
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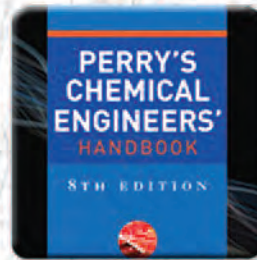
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