Tuesday August 28, 2018

7:00 AM	**Authors' Breakfast, Grand Ballroom, Third Floor**	
8:00 AM	**Track 2 Keynote: Scott Scheeler, Cisco Systems** Mason I & II **Internet of Things (IoT)**	
	1-2: Thermal Management Applications I Second Floor, Mason II Session Organizer: **Dhruv Singh**, *Global Foundries, New York, NY, United States* Session Co-Organizer: **Winston Zhang**, *Novark Technologies, Inc., Shenzhen, Guangdong, China*	**2-1: Data Center Cooling I** Second Floor, Mason I Session Organizer: **Sami Alkharabsheh**, *Binghamton University, Binghamton, NY, United States* Session Co-Organizer: **Timothy Chainer**, *IBM, Yorktown Heights, NY, United States*
8:45 AM	**Design of Vapor Chambers with Minimized Thickness (8505)** Technical Presentation Only ***Ryan Lewis**, **Jason West**, Kelvin Thermal, Boulder, CO, United States, **Yung Cheng Lee**, University of Colorado, Boulder, CO, United States*	**Characterization of Vertically Split Distribution-Wet Cooling Media Used in Data Centers (8370)** Technical Presentation Only ***Mullaivendhan Varadharasan**, The University of Texas at Arlington, Arlington, TX, United States*
9:05 AM	**Thermal Management of Hybrid Silicon Microring Laser (8293)** Technical Presentation Only ***Wenqing Shen**, **Satish Kumar**, Georgia Institute of Technology, Atlanta, GA, United States, **Di Liang, Niru Kumari, Chong Zhang, Marco Fiorentino, Raymond G Beausoleil**, Hewlett Packard Labs, Palo Alto, CA, United States*	**A Thermo-mechanical Study on Vertically Split Distribution-Wet Cooling Media Used in Data Centers (8378)** Technical Paper Publication ***Mullaivendhan Varadharasan**, **Dereje Agonafer**, **Ahmed Al Khazraji, Jimil M. Shah**, **Ashwin Siddarth**, The University of Texas at Arlington, Arlington, TX, United States*, ***James Hoverson**, **Mike Kaler**, Mestex, a Division of Mestek Inc, Dallas, TX, United States*
9:25 AM	**Lidded vs. Lidless Package Cooling Assessment (8294)** Technical Paper Publication ***Xiaopeng Huang, Vadim Gektin**, Futurewei Technologies, Santa Clara, CA, United States*	**Air Flow Pattern and Path Flow Simulation of Airborne Particulate Contaminants in a High-Density Center Utilizing Airside Economization (8436)** Technical Paper Publication ***Gautham Thirunavakkarasu, Satyam Saini, Jimil M. Shah**, **Dereje Agonafer**, The University of Texas at Arlington, Arlington, TX, United States*
9:45 AM	**Interconnect Design Optimization in Ceramic Quad-Flatpack No-Lead Devices (8316)** Technical Presentation Only ***Tse Wong**, Raytheon Company, Los Alamitos, CA, United States*, ***Shea Chen**, Raytheon Company, Dallas, TX, United States*	**A Review of the State of the Art in Application of Evaporative Cooling Systems to Data Centers (8391)** Technical Paper Publication ***A. G. Agwu Nnanna**, Purdue University Calumet, Hammond, IN, United States*, ***Michael Okorie**, Purdue University Northwest, Hammond, IN, United States*
10:15 AM	**Tea/Coffee Break, Second Floor Foyer**	
	1-1: Fundamentals of Thermal Transport I Second Floor, Mason II Session Organizer: **Krishna Kota**, *New Mexico State University, Las Cruces, NM, United States* Session Co-Organizer: **Vadim Gektin**, *Futurewei Technologies, Santa Clara, CA, United States*	**2-7: Advanced Cooling Technology** Second Floor, Mason I Session Organizer: **Sruti Chigullapalli**, *Intel, Phoenix, AZ, United States* Session Co-Organizer: **Brad Zakaib**, *CoolIT, Calgary, AB, Canada,* **Shima Hajimirza**, *Texas A&M, College Station, TX, United States*
10:30 AM	**Phonon Scattering Mechanisms Dictating the Thermal Conductivity of Lead Zirconate Titanate (PbZr1-xTixO3 or "PZT") Thin Films Across the Compositional Phase Diagram (8426)** Technical Presentation Only ***Patrick Hopkins**, **John Gaskins, Jon Ihlefeld**, University of Virginia, Charlottesville, VA, United States*, ***Brian Foley**, Georgia Tech, Atlanta, GA, United States*	**On Material Modeling and Characterization of Thermal Interface Materials under Quasi Static Loading Condition (8271)** Technical Presentation Only ***Emad A. Poshtan**, Bosch, Reutlingen, Germany*
10:50 AM	**Multiscale and Multiphysics Computations of Thin Evaporating Films (8462)** Technical Presentation Only ***Kimia Montazeri, Shiwei Zhang, Mohammad Javad Abdolhosseini Qomi, Yoonjin Won**, University of California Irvine, Irvine, CA, United States*	**Next Gen Test-vehicle to Simulate Thermal Load for IoT FPGA Applications (8300)** Technical Paper Publication ***Suresh Parameswaran, Gamal Refai-Ahmed**, **Suresh Ramalingam Boon Ang**, Xilinx, Inc., San Jose, CA, United States*

4-1: Wide-Bandgap Electronics
Second Floor, Sansome

Session Organizer: **Jungwan Cho**, *Kyunghee University, Yongin, Gyeonggi-do, Korea (Republic)*
Session Co-Organizer: **Dimeji Ibitayo**, *U.S. Army Research Laboratory, Adelphi, MD, United States*

Failure Mechanism Assessment of TO-247 Packaged SiC Power Devices (8385) Technical Paper Publication

***Klas Brinkfeldt, Andreas Lövberg**, **Dag Andersson**, **Göran Wetter**, Swerea IVF, AB, Mölndal, Sweden*, ***Zsolt Toth-Pal**, **Mattias Forslund, Samer Shisha**, Scania CV AB, Södertälje, Sweden*

Electro-Thermal Characteristics of In Situ Oxide, GaN Interlayer-Based Vertical Trench MOSFETs (8333) Technical Presentation Only

***Bikramjit Chatterjee**, **Sukwon Choi**, Pennsylvania State University, University Park, PA, United States*, ***Dong Ji, Srabanti Chowdhury**, University of California, Davis, Davis, CA, United States*

Analysis of Thermal Properties of Power Multifinger HEMT Devices (8256) Technical Paper Publication

***Ales Chvala, Robert Szobolovszky, Jaroslav Kovac jr., Martin Florovic, Juraj Marek, Patrik Pribytny, Lubos Cernaj, Daniel Donoval**, **Jaroslav Kovac**, Slovak University of Technology in Bratislava, Bratislava, Slovakia (Slovak Republic)*, ***Sylvain Delage, Jean Claude Jacquet**, III-V Lab, Marcoussis, France*

Improving the Thermal Performance of Etched back GaN-on-Si HEMTs for Power Electronics (8440) Technical Presentation Only

***Georges Pavlidis, Samuel Kim**, Georgia Institute of Technology, Atlanta, GA, United States*, ***Farid Medjdoub**, Institute of Electronic, Microelectronic and Nanotechnology, Villeneuve-d'Ascq, France*, ***Samuel Graham**, Georgia Institute of Technology, Lithonia, GA, United States*

4-2: Wide-Bandgap Optoelectronics
Second Floor, Sansome

Session Organizer: **Kerry Maize**, *Purdue University, West Lafayette, IN, United States*
Session Co-Organizer: **Jae-Hyun Ryou**, *University of Houston, Houston, TX, United States*

Interface Anchored Effect on Improving Working Stability of Deep Ultraviolet Light-Emitting Diode Using Graphene Oxide-based Fluoropolymer Encapsulant (8205) Technical Presentation Only

***Jiangnan Dai, Renli Liang, Linlin Xu, Changqing Chen**, Huazhong University of Science and Technology, Wuhan, China*

Enhanced the Optical Power of AlGaN-based Deep Ultraviolet Light-Emitting Diode by Optimizing Mesa Sidewall Angle (8206) Technical Presentation Only

***Qian Chen, Jiangnan Dai, Renli Liang, Changqing Chen**, Huazhong University of Science and Technology, Wuhan, China*

4-5: Power Electronics Packaging – Enhanced Functionality
Second Floor, Jackson

Session Organizer: **Paul Paret**, *National Renewable Energy Laboratory, Golden, CO, United States*
Session Co-Organizer: **Pedro O. Quintero**, *University of Puerto Rico - Mayaguez, Mayaguez, PR, United States*

Mechanical Characterization of Transient Liquid Phase Sintered (TLPS) Cu-Sn (8392) Technical Paper Publication

***Erick Gutierrez, Subramani Manoharan, Maxim Serebreni, Patrick McCluskey**, University of Maryland, College Park, MD, United States*

All-Inorganic Multi-Color Converter Based on Eu3+-Doped Phosphor-in-Glass for White Light-Emitting Diodes (8225) Technical Paper Publication

***Yang Peng, Yun Mou**, **Hao Cheng**, **Mingxiang Chen**, **Xiaobing Luo**, Huazhong University of Science and Technology, Wuhan, Hubei, China*, ***Xujia Xu**, **Hong Li**, Wuhan University of Technology, Wuhan, Hubei, China*

Enhanced Light Extraction Efficiency of Deep Ultraviolet LEDs by using Nanolens Arrays (8231) Technical Presentation Only

***Jun Zhang, Renli Liang, Jiangnan Dai, Changqing Chen**, Huazhong University of Science and Technology, Wuhan, China*

Mechanical Characterization Study of Sintered Silver Pastes Bonded in a Double-Lap Configuration (8276) Technical Paper Publication

***Paul Paret**, **Joshua Major, Douglas DeVoto**, **Sreekant Narumanchi**, National Renewable Energy Laboratory, Golden, CO, United States*, ***Yansong Tan**, **Guo-Quan Lu**, Virginia Polytechnic and State University, Blacksburg, VA, United States*

4-6: Power Electronics Packaging – Processing
Second Floor, Jackson

Session Organizer: **Douglas DeVoto**, *NREL, Golden, CO, United States*
Session Co-Organizer: **Mike Fish**, *U.S. Army Research Laboratory, Adelphi, MD, United States*

POL-kW - A Wirebond-less Packaging Technology for Power Electronics (8259) Technical Presentation Only

***Liang Yin, Christopher Kapusta**, **Arun Gowda**, **Kaustubh Nagarkar**, General Electric, Niskayuna, NY, United States*

Thermal Transport and Thermal Management by Silicon Nanoporous Structures (8478) Technical Presentation Only

***Jaeho Lee**, University of California, Irvine, Irvine, CA, United States*

11:10 AM	**Effect of Interfacial Thermal Conductance Between the Nanoparticles (8212)** Technical Paper Publication ***Anil Yuksel, Michael Cullinan, Edward Yu**, The University of Texas at Austin, Austin, TX, United States*, ***Jayathi Murthy**, University of California Los Angeles, Los Angeles, CA, United States*	**Investigation on Optimal TIM Properties for High Powered Package (8421)** Technical Presentation Only ***Gamal Refai-Ahmed**, **Ho Hyung Lee, Hoa Do, Scott McCann, Tom Lee**, Xilinx, Inc., San Jose, CA, United States*, *Xilinx, San Jose, CA, United States*, ***Jerry Chen**, SPIL, Taichung, Taiwan*
11:30 AM	**High Resolution, Steady-State Measurements of Interfacial Thermal Resistance (8321)** Technical Presentation Only ***Ronald Warzoha**, U.S. Naval Academy, Annapolis, MD, United States*, ***Lauren M. Boteler**, US. Army Research Laboratory, Adelphi, MD, United States*	**Active Thermal Resistance Control for Maximizing Combined Cooling Capability in Mobile Devices (8532)** Technical Presentation Only ***Yunhyeok Im, Kyoung Min Lee, Heeseok Lee, Youngmin Shin**, Samsung Electronics, Hwaseong-si, Gyeonggi-do, Korea (Republic)*
12:00 PM	**Lunch, InterPACK Achievement Award, Third Floor Grand Ballroom**	
		2-2: Data Center Cooling II Second Floor, Mason I Session Organizer: **Husam Alissa**, *Microsoft, Redmond, WA, United States* Session Co-Organizer: **Ioannis Manousakis**, *Microsoft, Redmond, WA, United States*
1:30 PM	**Track 1 Panel: Challenges in Advanced Packaging for Harsh Environments** Mason II **Abstract:** Electronics packaging in harsh environments continues to be a key technological challenge that limits overall system performance and reliability in multiple applications despite advances in underlying technologies. This panel will bring together leading experts from academia and industry to present a perspective on key technological challenges as well as opportunities in this important direction. Industry panelists will specifically focus on case studies of advances in electronics packaging that have led to successful products. Panelists from academia will provide an overview of recent fundamental research advances in this field. The panel will also discuss harsh environment packaging in the context of the rapidly evolving supply chain environment in the microelectronics and MEMS industry.	**Weather Analysis Using Neural Networks for Modular Data Centers (8253)** Technical Paper Publication ***Feyisola Adejokun**, **Ashwin Siddarth**, **Dereje Agonafer**, University of Texas at Arlington, Arlington, TX, United States*, ***Abhishek Guhe**, Mestex Inc., Dallas, TX, United States*
1:50 PM		**An Advanced TLS System Architecture and Design for Data Center Energy Efficiency (8273)** Technical Paper Publication ***Jun Zhang**, **Jing Liu**, Intel, Shanghai, China*, ***Frank Pang**, **Qiongyao Liu, Bo Wang, Meng Ruan**, Tencent, Shenzhen, China*, ***Nishi Ahuja**, Intel, Phoenix, AZ, United States*
2:10 PM		**Improving Energy Efficiency in Data Centers by Controlling Task Distribution and Cooling (8305)** Technical Paper Publication ***Yusuke Nakajo**, Graduate School of Science and Technology, Keio University, Kanagawa, Japan*, ***Jayati Athavale, Minami Yoda**, **Yogendra Joshi**, Georgia Institute of Technology, Atlanta, GA, United States*, ***Hiroaki Nishi**, Keio University, Yokohama, Kanagawa, Japan*
2:30 PM		**CFD Simulation-Based Artificial Neural Network Modeling for Data Center Cooling Prediction (8488)** Technical Presentation Only ***Nikita R Sukthankar, Abhishek Walekar**, University of Texas, Arlington, Arlington, TX, United States*, ***Ashwin Siddarth**, University of Texas Arlington, Arlington, TX, United States*, ***Dereje Agonafer**, University of Texas At Arlington, Arlington, TX, United States*
3:00 PM	**Tea/Coffee Break, Second Floor Foyer**	

Electroluminescence from n-ZnO Nanowires/GaN QDs/p-GaN Heterostructure Light-emitting Diodes (8222) Technical Presetation Only

***Yi Zhang, Changqing Chen, Jiangnan Dai**, Huazhong University of Science and Technology, WuHan, HuBei, China*

Highly Efficient Chip Scale Package LED Based on Surface Patterning (8266) Technical Presentation Only

***Haodong Tang**, University of Birmingham, Birmingham, United Kingdom*, ***Tiangqi Zhang, Shang Li, Zuoliang Wen, Xiangitan Xiao, Yulong Zhang, Fei Wang, Kai Wang**, Southern University of Science and Technology, Shenzhen, China*

High-performance Deep Ultraviolet Light-emitting Diodes with Graphene Oxide Based Fluoropolymer Encapsulant (8229) Technical Presentation Only

***Changqing Chen, Shuai Wang, Renli Liang, Linlin Xu, Jun Zhang, Jiangnan Dai**, Huazhong University of Science and Technology, Wuhan, China*

Microscale Electronic and Photonic Devices - Thermal Optimization & Fabrication (8554) Invited Presentation

***Ercan M. Dede,** Toyota Research Institute of North America, Ann Arbor, MI, United States*

4-3: Ultra-Wide Bandgap Materials

Second Floor, Sansome

Session Organizer: **Brian Foley**, *Georgia Tech, Atlanta, GA, United States*
Session Co-Organizer: **Debbie Senesky**, *Stanford University, Berkeley, CA, United States*

Thermal Characterization of Ultra-Wide Bandgap Lateral Power Devices Using 2D Materials (8451) Technical Presentation Only

***James Spencer Lundh, Tianyi Zhang, Amritanand Sebastian, Saptarshi Das, Mauricio Terrones, Sukwon Choi**, Pennsylvania State University, University Park, PA, United States*, ***Sanyam Bajaj, Fatih Akyol, Siddharth Rajan**, Ohio State University, Columbus, OH, United States*

Phonon Scattering Effects in the Thermal Conductivity Reduction of Ion Irradiated Diamond (8371) Technical Presentation Only

***Ethan Scott, John Gaskins, Patrick Hopkins**, University of Virginia, Charlottesville, VA, United States*, ***Khalid Hattar**, Sandia National Laboratories, Albuquerque, NM, United States*, ***Mark Goorsky**, University of California Los Angeles, Los Angeles, CA, United States*

Self-Heating in Lateral and Vertical Gallium Oxide Schottky Barrier Diodes (8452) Technical Presentation Only

***Bikramjit Chatterjee, Md Zahabul Islam**, Pennsylvania State University, University Park, PA, United States*, ***Jacob Leach**, Kyma Technologies, Inc., Raleigh, NC, United States*, ***Md Amanul Haque, Sukwon Choi**, Pennsylvania State University, University Park, PA, United States*

The Influence of N: Al Flux Ratio on Heteroepitaxial AlN: A Molecular Dynamics Simulation (8315) Technical Paper Publication

***Libin Zhang, Guo Zhu, Kuan Sun, Zhiyin Gan, Xiaobing Luo**, Huazhong University of Science and Technology, Wuhan, Hubei, China*

4-7: Power Electronics Packaging – Reliability Physics

Second Floor, Jackson

Session Organizer: **Fang Luo**, *University of Arkansas, Fayetteville, AR, United States*
Session Co-Organizer: **Jaeho Lee**, *University of California, Irvine, Irvine, CA, United States*

A Critical Review on Degradation Modeling and Reliability Parameter Estimation of Capacitors (8262) Technical Paper Publication

***Anunay Gupta, Om Prakash Yadav**, North Dakota State University, Fargo, ND, United States*, ***Douglas DeVoto, Joshua J Major**, NREL, Golden, CO, United States*

Interconnect Fatigue Failure Parameter Isolation for Power Device Reliability Prediction (8275) Technical Paper Publication

***Cody Marbut**, University of Arkansas - Fayetteville, Springdale, AR, United States*, ***David Huitink, Mahsa Montazeri**, University of Arkansas, Fayetteville, AR, United States*

Microstructural Evolution in SAC Solders Subjected to Isothermal Aging (8491) Technical Presentation Only

***Jing Wu, Jeffrey Suhling, Pradeep Lall**, Auburn University, Auburn, AL, United States*

Comparison of Thermal and Stress Analysis Results for a High Voltage Module Using FEA and a Quick Parametric Analysis Tool (8394) Technical Paper Publication

***Steven Miner**, U.S. Naval Academy, Annapolis, MD, United States*, ***Lauren M. Boteler**, US. Army Research Laboratory, Adelphi, MD, United States*

1-7: Fundamentals of Thermal Transport II
Second Floor, Mason II

Session Organizer: **Ankur Jain**, *The University of Texas at Arlington, Arlington, TX, United States*
Session Co-Organizer: **Przemyslaw Gromala**, *Robert Bosch GmbH, Reutlingen, Germany,* **Winston Zhang**, *Novark Technologies, Inc., Shenzhen, Guangdong, China*

3:15 PM **Thermal Conductance across a-SiO_2-a-SiO_2 Interfaces (8204)** Technical Presentation Only

***Brian F. Donovan**, **Ronald Warzoha**, **Joshua LaFlam**, United States Naval Academy, Annapolis, MD, United States*

3:35 PM **Thermal Conductance at Phase Change Material-Metal Contacts (8323)** Technical Presentation Only

***Ronald Warzoha**, U.S. Naval Academy, Annapolis, MD, United States*

Track 2 Panel: Data Centers and IT Management
Mason I

Abstract: The panelists will present and discuss state of the art, challenges, opportunities and future directions for the thermal management of high power servers.

3:55 PM **On Thermal Interface Materials with Polydisperse Fillers: Packing Algorithms and Effective Properties (8337)** Technical Paper Presentation

***Piyas Chowdhury**, **Anuja De Silva, Indira Seshadri**, IBM Research, Albany, NY, United States*, ***Kamal Sikka**, IBM Research, East Fishkill, NY, United States*

4:15 PM **Substrate Thermal Conductivity Controls Ability to Manufacture Microstructures via Laser-Induced Direct Write (8346)** Technical Presentation Only

***John Tomko, David Olson, Jeffrey Braun, Andrew Kelliher**, **Patrick E. Hopkins**, University of Virginia, Charlottesville, VA, United States*, ***Bryan Kaehr**, Sandia National Laboratories, Albuquerque, NM, United States*

4:45 PM **Women in Engineering Panel**
Sansome
4:45 PM – 6:45 PM

Abstract: The Panel on "Women in Engineering" will be composed of exemplary female educators and industry/lab leaders who will discuss their career paths and challenges as well as their advice to younger females. The panel will have representation from a wide range of educators from university level and leaders from related industries and government labs. All female graduate students, and particularly those who participate in the graduate student poster session, will be strongly encouraged to attend and learn about potential careers in academia, industry and government institutions. The panel will be beneficial to young female engineers and university faculty as well. In addition, the event will be useful to graduate students and attendees (industry, government, and academia) of both genders.

Robotics Workshop
Jackson
4:45 PM – 6:15 PM

Abstract: Have fun as you learn about robotics with this introductory course! From understanding sensors to programming robots for missions, this course will quip you with hands-on experience in building and programing robots and help you set up after-school STEM-Robotics clubs for your local community children. The hands-on lessons are taught by award winning teams from Education Empowers Inc. (501 (c) non-profit) as well as industry professionals.

6:30 PM **Industry, Government Lab and Academia Posters**
Third Floor, Grand Ballroom
6:30 PM – 8:30 PM

4-4: Ultra-Wide-Bandgap Devices
Second Floor, Sansome

Session Organizer: **Ronald Warzoha**, *U.S. Naval Academy, Annapolis, MD, United States*
Session Co-Organizer: **Sukwon Choi**, *Pennsylvania State University, University Park, PA, United States*

Thermal Management of Beta-Ga2O3 based Field Effect Transistors (FETs) (8317) Technical Presentation Only

***Nitish Kumar**, Georgia Institute of Technology, Atlanta, GA, United States*, ***Zhanbo Xia, Siddharth Rajan**, Ohio State University, Columbus, OH, United States*, ***Satish Kumar**, Georgia Institute of Technology, Atlanta, GA, United States*

Thermal Management of Ultra-Wide Bandgap Ga2O3 Electronics (8453) Technical Presentation Only

***Bikramjit Chatterjee**, **Sukwon Choi**, Pennsylvania State University, University Park, PA, United States*, ***Ayayi Ahyi, Sarit Dhar**, Auburn Univeristy, Auburn, AL, United States*, ***Ke Zeng, Uttam Singisetti**, University at Buffalo, Buffalo, NY, United States*, ***Jacob Leach, Kevin Udwary**, Kyma Technologies, Inc., Raleigh, NC, United States*, ***Craig McGray**, Modern Microsystems, Inc., Silver Spring, MD, United States*, ***Eric R. Heller**, Air Force Research Laboratory, Wright-Patterson Air Force Base, OH, United States*

Thermal Characterization of AlGan/AlN HEMTs for Power Electronics (8326) Technical Presentation Only

***Samuel Kim**, Georgia Institute of Technology, Atlanta, GA, United States*, ***Samuel Graham**, Georgia Institute of Technology, Lithonia, GA, United States*

Self-Heating in Ultra-Wide Bandgap AlGaN Channel High Electron Mobility Transistors (8352) Technical Presentation Only

***James Spencer Lundh**, **Sukwon Choi**, Pennsylvania State University, University Park, PA, United States*, ***Albert G. Baca, Robert J. Kaplar, Andrew M. Armstrong, Andrew A. Allerman**, **Thomas Beechem**, **Christopher B. Saltonstall,** Sandia National Laboratories, Albuquerque, NM, United States*, ***Eric R. Heller**, Air Force Research Laboratory, Wright-Patterson Air Force Base, OH, United States*

4-8: Power Electronics Packaging – Reliability Testing
Second Floor, Jackson

Session Organizer: **Yunhyeok Im**, *Samsung Electronics, Hwaseong-si, Gyeonggi-do, Korea (Republic)*
Session Co-Organizer: **Damena Agonafer**, *Washington University in St. Louis, St. Louis, MO, United States*

Using Scanning Probe Microscopy to Investigate Aging Induced Microstructural Evolution in Lead Free Solders (8490) Technical Presentation Only

***Sudan Ahmed, Jeffrey Suhling, Pradeep Lall**, Auburn University, Auburn, AL, United States*

Structural Analysis of the Integrity of Power Modules and Assemblies by Thermal Transient Testing (8218) Technical Paper Publication

***Gabor Farkas**, **Zoltan Sarkany, Marta Rencz**, Mentor Graphics, Budapest, Hungary*

Investigation of the Effects of High Temperature Aging on the Mechanical Behavior of Lead Free Solders (8396) Technical Paper Publication

***Mohammad Alam, KM Rafidh Hassan**, **Jeffrey Suhling**, **Pradeep Lall**, Auburn University, Auburn, AL, United States*

Reliability Characterization of a Packaging Design based on Transient Liquid Phase Bonding (8353) Technical Presentation Only

***Paul Paret**, National Renewable Energy Laboratory, Golden, CO, United States*, ***Darshan Pahinkar**, Georgia Institute of Technology, Atlanta, GA, United States*, ***Samuel Graham**, Georgia Institute of Technology, Lithonia, GA, United States*, ***Sreekant Narumanchi**, **Douglas DeVoto, Joshua Major**, National Renewable Energy Laboratory, Golden, CO, United States*

K-16 Committee Meeting
6:30 PM – 7:30 PM

7:00 AM	**Authors' Breakfast, Grand Ballroom, Third Floor**	
8:00 AM	**Track 3 Keynote: Daniel Gamota** Jackson **Structural and Physical Health Monitoring: Industrialization of Electronics Architectures for IIoT/IoT and Wearables Products**	
	2-6: Reliability in Cooling Systems Second Floor, Mason I Session Organizer: **Joshua Gess**, *Oregon State University, Corvallis, OR, United States* Session Co-Organizer: **Naveenan Thiagarajan**, *GE Global Research, Niskayuna, NY, United States*	**3-4: Applications and System Level Challenges** Second Floor, Mason II Session Organizer: **Janos Veres**, *Parc, Palo Alto, CA, United States* Session Co-Organizer: **Piyas Chowdhury**, *IBM Research, Albany, NY, United States*
8:45 AM	**Fundamental Study of Polymer to Metal bonding in Integrated Circuit Packaging (8254)** Technical Paper Publication ***Dinesh Thanu, Roozbeh Danaei, Alexander Bermudez, Sergio Chan, Suzana Prstic,*** *Intel Corporation, Chandler, AZ, United States*	**Point-of-Care Nano Biochip for Multiplex Tumor Marker Detection for Enhanced Cancer Care (8401)** Technical Presentation Only ***Eon Soo Lee, Joo Un Lee, Harsimranjit Singh****, New Jersey Institute of Technology (NJIT), Newark, NJ, United States*, ***Bharath Babu Nunna****, New Jersey Institute of Technology, Randolph, NJ, United States*
9:05 AM	**Experimental Analysis of Chiller Cooling Failure in a Small Size Data Center Environment Using Wireless Instrumentation (8334)** Technical Paper Publication ***Mohammad Tradat, Bahgat Sammakia****, SUNY Binghamton, Binghamton, NY, United States*, ***Husam Alissa****, Microsoft, Redmond, WA, United States*, ***Kourosh Nemati****, Future Facilities, San Jose, CA, United States*	**Structural Health Monitoring systems - A Pathway to Industrial IOT (8518)** Technical Presentation Only ***Amrita Kumar, Jeffrey Bergman****, Acellent Technologies Inc, Sunnyvale, CA, United States*
9:25 AM	**Experimental and Numerical Investigation of Underfill Materials on Thermal Cycle Fatigue of Second Level Solder Interconnects (8338)** Technical Paper Publication ***Maxim Serebreni, Nathan Blattau, Craig Hillman****, DfR Solutions, Beltsville, MD, United States*, ***Patrick McCluskey****, University of Maryland, College Park, MD, United States*, ***David Hillman****, Rockwell Collins, Cedar Rapids, IA, United States*	
9:45 AM	**Innovative Test Approach for High End Semiconductor Package Testing of IoT Devices (8393)** Technical Presentation Only ***Mohsen Mardi****, Xilinx, San Jose, CA, United States*	
10:15 AM	**Tea/Coffee Break, Second Floor Foyer**	
		4-10: Power Electronics Packaging – Thermal Interface Materials Second Floor, Sansome Session Organizer: **Binjian Ma**, *Washington University in St. Louis, St. Louis, MO, United States* Session Co-Organizer: **Shima Hajimirza**, *Texas A&M, College Station, TX, United States*
10:30 AM		**Numerical Approach of Cold Gas Spray of Ceramic Substrates for Power Electronics (8279)** Technical Paper Publication ***Marco Echeverria****, University of Puerto Rico, Mayaguez, PR, United States*, ***Pedro O. Quintero****, University of Puerto Rico - Mayaguez, Mayaguez, PR, United States*, ***Dimeji Ibitayo****, U.S. Army Research Laboratory, Adelphi, MD, United States*, ***Lauren M. Boteler****, US. Army Research Laboratory, Adelphi, MD, United States*

Track 5 Keynote: Paul Krajewski, General Motors
Mason I & II

The Role of Prognostics in Future Transportation Systems

4-11: Power Electronics Thermal Management – Embedded Cooling
Second Floor, Jackson

Session Organizer: **Steven Miner**, *U.S. Naval Academy, Annapolis, MD, United States*
Session Co-Organizer: **Ram Ranjan**, *United Technologies Research Center, East Hartford, CT, United States*

Heat Transfer Characteristics and Flow Pattern Visualization for Flow Boiling in a Vertical Narrow Microchannel (8447) Technical Paper Publication

***Kan Zhou**, **Junye Li**, **Wei Li**, **Kuang Sheng, Hua Zhu**, Zhejiang University, Hang-Zhou City, Zhejiang Province, China**Zhaozan Feng**, CRRC Zhuzhou Institute Company, Zhuzhou, Hunan Province, China*

Orientation Effects in Two-Phase Microgap Flow (8383) Technical Paper Publication

***Franklin Robinson**, NASA Goddard Space Flight Center, Greenbelt, MD, United States*, ***Avram Bar-Cohen**, University Of Maryland, College Park, MD, United States*

Practical Concerns for Adoption of Microjet Cooling (8468) Technical Paper Publication

***Stephen Walsh, James Smith, Eric Browne, Timothy Hennighausen, Bernard Malouin**, MIT Lincoln Laboratory, Lexington, MA, United States*

Structural and Thermal Study of Self Regulating Flow Control Device for Dynamic Cooling of Electronic Cooling (8228) Technical Presentation Only

***Rajesh Kasukurthy, rishiruben palanikumar**, The University of Texas at Arlington, Arlington, TX, United States*

4-15: Power Electronics Thermal Management – Components and Materials
Second Floor, Sansome

Session Organizer: **Xuhui Feng**, *National Renewable Energy Laboratory, Golden, CO, United States*
Session Co-Organizer: **Lauren Kegley**, *Wolfspeed, Fayetteville, MD, United States*

Numerical Study of the Flow Condition of the Hydrodynamic Levitated Mechanical Micropump (8210) Technical Paper Publication

***Ruikang Wu, Wei Lan, Xingjian Yu, Weicheng Shu, Meng Wang**, **Xiaobing Luo**, Huazhong University of Science and Technology, Wuhan, China*

Controlling of Dielectric Liquid Droplet Spreading by Corona Discharge (8224) Technical Presentation Only

***Huai Zheng**, Wuhan University, Wuhan, China*

Experimental Study of Flexible Electrohydrodynamic Conduction Pumping for Electronics Cooling (8322) Technical Paper Publication

***Nicolas Vayas Tobar, Pavolas Christidis, Nathaniel O'Connor, Michal Talmor**, Worcester Polytechnic Institute, Worcester, MA, United States*, ***Jamal Seyed-Yagoobi**, WPI-ME Department, Worcester, MA, United States*

Study on Droplet Movement on Super-hydrophobic Surface under Non-uniform Electric Fields (8232) Technical Presentation Only

***Jie Liu**, Wuhan University, Wuhan, China*

4-13: Power Electronics Thermal Management – Heat Exchangers and Heat Pipes
Second Floor, Mason I

Session Organizer: **Mandar Kulkarni**, *Amazon Lab126, Sunnyvale, CA, United States*
Session Co-Organizer: **Jeffrey Didion**, *NASA Goddard Space Flight Center, Greenbelt, MD, United States*

Thermal-Hydraulic Performance and Optimization of Tube Ellipticity in a Plate Fin-And-Tube Heat Exchanger (8448) Technical Paper Publication

***Zhuo Yang, Tariq Amin Khan**, **Wei Li**, **Hua Zhu**, **Zhijian Sun**, **Zhengjiang Zhang**, **Jincai Du**, Zhejiang University, Hang-Zhou City, China, Zhejiang Province, China*, ***Jianxin Zhou**, Hangzhou Yuhu Technology Co., Ltd., Zhejiang, Zhejiang Province, China*

5-4: PHM for Automotive Systems
Second Floor, Jackson

Session Organizer: **Sven Rzepka**, *Fraunhofer ENAS, Chemnitz, Germany*
Session Co-Organizer: **Gereon Meyer**, *VDI/VDE Innovation + Technik GmbH, Berlin, Germany*

Assessment of Damage Progression in Automotive Electronics Assemblies Subjected to Temperature and Vibration (8356) Technical Paper Publication

***Pradeep Lall, Tony Thomas**, Auburn University, Auburn, AL, United States*

10:50 AM	**Track 3 Panel: Integration of Sensors with Flexible Systems for IIoT** Mason II **Abstract:** Industrial Internet of Things (IIOT) use cases require customized form factors to integrate sensing systems into the user's unique workflows. These applications in structural monitoring, health care and industrial wearables impose challenging microelectronic packaging requirements. This multi-disciplinary panel will share their experience in research, technology development, design and systems integration related to these key challenges.	**Thermal Interface Materials Enhanced by Micro and Nanostructures (8307)** Technical Paper Publication ***Mei-Chien Lu**, Monte Rosa Technology, Saratoga, CA, United States*
11:10 AM		**Low Temperature Transient Liquid Phase Bonding of AlN to CuW and CuMo (8324)** Technical Presentation Only ***Darshan Pahinkar**, Georgia Institute of Technology, Atlanta, GA, United States*, ***Samuel Graham**, Georgia Institute of Technology, Lithonia, GA, United States*
11:30 AM		**An Interfacial Chemistry Study of the Influence of Titanium Adhesion Layer Oxygen Stoichiometry on Thermal Boundary Conductance at Gold Contacts (8328)** Technical Presentation Only ***David Olson, Keren M. Freedy, Stephen McDonnell, Patrick E. Hopkins**, University of Virginia, Charlottesville, VA, United States*
12:00 PM	**Lunch, Allan Kraus Thermal Management Medal & InterPACK/ISPS Keynote Luncheon Speaker, Third Floor Grand Ballroom**	
	1-5: Microfabrication Second Floor, Mason II Session Organizer: **Subramanyaravi Annapragada**, *United Technologies Research, East Hartford, CT, United States* Session Co-Organizer: **Jingshi Meng**, *Apple, Cupertino, CA, United States,* **Anna Prakash**, *Intel Corp, Chandler, AZ, United States*	**2-3: Server Cooling I** Second Floor, Mason I Session Organizer: **Gisuk Hwang**, *Wichita State University, Wichita, KS, United States* Session Co-Organizer: **Timothy Chainer**, *IBM, Yorktown Heights, NY, United States,* **Sami Alkharabsheh**, *Binghamton University, Binghamton, NY, United States*
1:30 PM	**Low Temperature Cu-Cu Bonding Using Oxalic Acid Surface-Modified Cu Nanoparticles (8215)** Technical Paper Publication ***Yun Mou, Yang Peng, Hao Cheng, Mingxiang Chen**, Huazhong University of Science and Technology, Wuhan, China*	**Measurement of the Thermal Performance of a Single-Phase Immersion Cooled Server at Elevated Temperatures for Prolonged Time (8432)** Technical Paper Publication ***Pratik Bansode, Jimil M. Shah, Gautam Gupta, Dereje Agonafer**, The University of Texas at Arlington, Arlington, TX, United States*, ***Harsh Patel, David Roe, Rick Tufty**, LiquidCool Solutions, Rochester, MN, United States*
1:50 PM	**Low Temperature Fabrication of Three-Dimensional Ceramic Substrate by Using Inorganic Alkali Activated Aluminosilicate Cement Paste for UV-LED Packaging (8226)** Technical Paper Publication ***Hao Cheng, Zi Zhou Yang, Yang Peng, Yun Mou, Mingxiang Chen, Huazhong** University of Science and Technology, WuHan, HuBei, China*	**Facility Cooling Failure Analysis of Direct Liquid Cooling System in Data Centers (8443)** Technical Paper Publication ***Sami Alkharabsheh, Udaya Puvvadi, Bharath Ramakrishnan, Kanad Ghose, Bahgat Sammakia**, SUNY Binghamton University, Binghamton, NY, United States*
2:10 PM	**Packaging of a Two-Sided Single-Axis Silicon MEMS Accelerometer (8270)** Technical Presentation Only ***Andrew Hollowell, Katherine Musick, Paul Resnic, Thomas Friedmann, Ryan Shaffer, Brian Homeijer,** Sandia National Laboratories, Albuquerque, NM, United States*	**Identification, Characterization and Implications of Particulate Contaminants found at a Data Center Utilizing an Airside Economizer (8434)** Technical Presentation Only ***Jimil M. Shah, Abel Misrak, Dereje Agonafer**, The University of Texas at Arlington, Arlington, TX, United States*

Evaporative Wicking Phenomena on Nanotextured Surfaces for Heat Pipe Applications (8456) Technical Paper Publication

Duong Vy Le, *UC Irvine, Simi Valley, CA, United States*, ***Shiwei Zhang, Jonggyu Lee, Yoonjin Won,*** *University of California, Irvine, Irvine, CA, United States*

Thermal Model Based Fault Detection and Isolation of Power Inverter IGBT Module (8368) Technical Paper Publication

Azeem Sarwar*, General Motors, Warren, MI, United States*, ***Madi Zholbaryssov,*** *University of Illinois at Urbana Champaign, Urbana, IL, United States*

Experimental Study on Flow Evaporation Heat Transfer Characteristics inside Horizontal Three-Dimensional Enhanced Tubes (8454) Technical Paper Publication

Wei Li*,* ***Zhichuan Sun****, Zhejiang University, Hang-Zhou City, China*, ***Chuancai Zhang****,* ***Lianxiang Ma, Yan He, Bin Zhang, Wei Chen****, Qingdao University of Science and Technology, Qingdao, Shandong Province, China*, ***Zhichun Liu****, Huazhong University of Science and Technology, Wuhan, Hubei Province, China*, ***David J Kukulka****, State University of New York College at Buffalo, New York, NY, United States*

Feasibility of PCB-Integrated Vibration Sensors for Condition Monitoring of Electronics Systems (8386) Technical Paper Publication

Klas Brinkfeldt, Andreas Lövberg*,* ***Per-Erik Tegehall****,* ***Dag Andersson****,* ***Göran Wetter****, Swerea IVF, Mölndal, Sweden*, ***Jan Strandberg****, RISE Acreo AB, Norrköping, Sweden*, ***Mikael Kwarnmark****, Cogra Pro AB, Älvängen, Sweden*, ***Johnny Goncalves, Jonas A. Söderlund****, Note Norrtelje AB, Norrtälje, Sweden*

Biphilic Jumping-Droplet Condensation (8480) Technical Presentation Only

Shreyas Chavan*,* ***Nenad Miljkovic****, University of Illinois at Urbana-Champaign, Urbana, IL, United States*, ***Ross Lundy****, Trinity College Dublin, Dublin, Ireland*, ***Shenghui Lei, Ryan Enright****, Nokia Bell Labs, Dublin, Dublin, Ireland*

AI and ML for Autonomous Driving (8508) Invited Presentation

Zubin Abraham*, Robert Bosch LLC, Sunnyvale, CA, United States*

4-12: Power Electronics Thermal Management – Two-Phase Heat Transfer

Second Floor, Sansome

Session Organizer: **Jorge Padilla***, Google, Mountain View, CA, United States*
Session Co-Organizer: **James Palko***, University of California Merced, Merced, CA, United States*

5-6: Sensors and Components for Harsh Temperature and Harsh Environment

Second Floor, Jackson

Session Organizer: ***Fabian Welschinger****, Robert Bosch GmbH, Renningen, Germany*
Session Co-Organizer: ***Pradeep Lall****, Auburn University, Auburn, AL, United States*

Experimental Investigation of Microdroplet Evaporation on a Porous Micropillar Structure (8309) Technical Presentation Only

Li Shan, Binjian Ma*,* ***Shuai Shuai****,* ***Zichen Du****,* ***Damena Agonafer****, Washington University in St. Louis, St. Louis, MO, United States*

Investigation of Moisture Transport through Housing Materials Used in Automotive Electronics (8335) Technical Presentation Only

Bulong Wu, Artur Roman, Bongtae Han*, University of Maryland, College Park, MD, United States*

Comparison of Evaporation and Condensation Characteristics among Three Enhanced Tubes (8449) Technical Paper Publication

Kunrong Shen*,* ***Zhichuan Sun****,* ***Xiaolong Yan****,* ***Wei Li****, Zhejiang University, Hang-Zhou City, Zhejiang Province, China*,
David J Kukulka*, State University of New York College at Buffalo, New York, NY, United States*, ***Jianxin Zhou****, Hangzhou Yuhu Technology Co., Ltd., Zhejiang, Zhejiang Province, China*, ***Deyu Luan, Yan He, Bin Zhang****, Qingdao University of Science and Technology, Qingdao, Shandong Province, China*

Packaging of an Optical Dynamic Pressure Sensor for Operation in High Temperatures (8382) Technical Presentation Only

Erik Adolfsson*,* ***Andreas Lövberg****,* ***Dag Andersson****,* ***Klas Brinkfeldt****, Swerea IVF AB, Mölndal, Sweden*, ***Håkan Johansson****, Simea optic AB, Västerås, Sweden*

Nanoporous Metals from Block Copolymer Templates for Enhanced Surface Area Boiling (8366) Technical Presentation Only

Joseph Katz*,* ***Chi Zhang, Tanya Liu, Mehdi Asheghi****, Stanford University, Stanford, CA, United States*, ***Michael T. Barako****, NG Next, Northrup Grumman Corporation, Redondo Beach, CA, United States*, ***Kenneth Goodson****, Stanford University, Stanford, CA, United States*

In-plane Pre-stress Analysis for Automotive Airbag Electronic Control Unit's Printed Circuit Board Transverse Vibration (8214) Technical Paper Publication

Xiaochuan Guo*, Bosch Automotive Products (Suzhou) Co., Ltd, Suzhou, Jiangsu, China*

2:30 PM	**Complete Mitigation of Tin Whisker Growth from Electroplated Tin Coatings in Electronic Packages (8344)** Technical Presentation Only ***Indranath Dutta**, Washington State University, Pullman, WA, United States, **Susmriti Das Mahapatra**, Intel Corporation, Chandler, AZ, United States*	**Mechanisms Governing the Transient Behavior of Vapor Chambers and Performance Relative to Heat Spreading by Conduction (8246)** Technical Presentation Only ***Gaurav Patankar, Justin Weibel, Suresh Garimella,** Purdue University, West Lafayette, IN, United States, Purdue University, W Lafayette, IN, United States*
3:00 PM	**Tea/Coffee Break, Second Floor Foyer**	
	1-3: Thermal Management Applications II Second Floor, Sansome Session Organizer: **Vivek Vishwakarma**, *Intel Corporation, Hillsboro, OR, United States* Session Co-Organizer: **Hemanth Dhavaleswarapu**, *Intel, Chandler, AZ, United States*	**2-5: Two-Phase Flow** Second Floor, Mason I Session Organizer: **Dinesh Thanu**, *Intel Corporation, Chandler, AZ, United States* Session Co-Organizer: **Yong Sun**, *Apple, Sunnyvale, CA, United States,* **Anil Yuksel**, *University of Texas at Austin, Austin, TX, United States*
3:15 PM	**Reduced Working Temperature of Quantum Dots-Light-Emitting Diodes Optimized by QDs@silica-on-chip Structure (8301)** Technical Paper Publication ***Bin Xie, Xingjian Yu, Xiaobing Luo**, Huazhong University of Science and Technology, Wuhan, Hubei, China, **Haochen Liu, Xiao Wei Sun, Kai Wang**, Southern University of Science and Technology, Shenzhen, Guangdong, China*	**High-Frequency Thermal-Fluidic Characterization of Dynamic Microchannel Flow Boiling Instabilities (8247)** Technical Presentation Only ***Todd Kingston, Justin Weibel, Suresh Garimella**, Purdue University, West Lafayette, IN, United States*
3:35 PM	**Thermal Switching with Liquid to Vapor Phase Change (8339)** Technical Presentation Only ***Tanya Liu, Joseph Katz, Mehdi Asheghi, Kenneth Goodson**, Stanford University, Stanford, CA, United States, **James Palko**, University of California Merced, Merced, CA, United States, **Chirag Kharangate**, Case Western Reserve University, Cleveland, OH, United States, **Ercan M. Dede**, **Feng Zhou**, Toyota Research Institute of North America, Ann Arbor, MI, United States*	**Visualization of Two-Phase Flow Morphology and Wall Temperature in High-Aspect-Ratio Manifold Microchannels (8248)** Technical Presentation Only ***Kevin P. Drummond, Justin Weibel, Suresh Garimella**, Purdue University, West Lafayette, IN, United States*
3:55 PM	**Experimental Validation of Inverse Methods Applied to Microelectronics (8402)** Technical Presentation Only ***David Gonzalez Cuadrado, Amy Marconnet, Guillermo Paniagua**, Purdue University, West Lafayette, IN, United States*	**The Effect of Lateral Thermal Coupling between Parallel Microchannels on Two-Phase Flow Distribution (8249)** Technical Presentation Only ***Tijs Van Oevelen, Justin Weibel, Suresh Garimella**, Purdue University, West Lafayette, IN, United States*
4:15 PM	**Thermal Characterization of Si Photonic Ring Modulator (8295)** Technical Presentation Only ***Wenqing Shen, Satish Kumar**, Georgia Institute of Technology, Atlanta, GA, United States, **Niru Kumari, Ashkan Seyedi, Marco Fiorentino, Raymond G Beausoleil** Hewlett Packard Labs, Palo Alto, CA, United States*	**Liquid-Vapor Interface Reconstruction from High-Speed Stereo Images during Pool Boiling (8250)** Technical Presentation Only ***Carolina Mira-Hernández, Justin Weibel, Suresh Garimella, Pavlos Vlachos**, Purdue University, West Lafayette, IN, United States*
4:45 PM	**Maker and AI Workshop** Mason I & II 4:45 PM – 6:15 PM **Abstract:** Learn how to combine the Raspberry PI and the Intel Movidius Neural Compute Stick to bring the power of AI to the edge.	**Heat Sink Additive Manufacturing Workshop** Jackson 4:45 PM – 6:15 PM **Abstract:** The ASME K-16 Committee is proud to sponsor a student design competition focused on the development of novel heat sinks built with Additive Manufacturing (AM) techniques. Top undergraduate students from universities around the world have developed and fabricated unique, intricate, and effective heat sinks. The top four student groups will present and justify their heat sink design approach to technical leaders at InterPACK.
6:30 PM	**InterPACK Meeting** Room 6:30 PM – 7:30 PM	
7:30 PM		**JEP Meeting** Room 7:30 PM – 8:30 PM

Numerical Investigation of Shape Effect on Microdroplet Evaporation Technical Paper Publication. IPACK2018-8311

Shuai Shuai, Li Shan, Binjian Ma, Zichen Du, Damena Agonafer, *Washington University in St Louis, St louis, MO, United States,* ***Baris Dogruoz,*** *Cisco Systems Inc., Santa Clara, CA, United States*

Emerging Packaging Technology Challenges for Self Driving Vehicles Invited Presentation. IPACK2018-8506

Sandeep Sane, *Intel, Chandler, AZ, United States*

3-1: Design, Materials, and Characterization

Second Floor, Mason II

Session Organizer: **Benjamin Leever**, *Air Force Research Laboratory, Wright-Patterson AFB, OH, United States*
Session Co-Organizer: **Li Sun**, *Intel, Phoenix, AZ, United States*

Effect of Non-Uniform Velocity on Thermal Performance of Micro Pin Heat Sink (8299) Technical Presentation Only

Hamidreza Bayat, *Southern Methodist University, Dallas, TX, United States,* ***Sepide Bayat,*** *Islamic Azad University, Tehran, Iran,* ***Arash Moazezi,*** *Islamic Azad University South Tehran Branch, Tehran, Iran,* ***Arash Mirabdolah Lavasani,*** *Islamic Azad University Central Tehran Branch, Tehran, Iran*

Thermal Characterization of Si BEOL Microelectronic Structures (8350) Technical Paper Publication

Assaad El Helou, Peter E. Raad, *Southern Methodist University, Dallas, TX, United States,* ***Archana Venugopal, Dhishan Kande,*** *Texas Instruments, Dallas, TX, United States*

An Exposition on Data Scaling, Bounds Selection and Search Algorithms for Fitting Constitutive Model Parameters of Solder Alloys (8365) Technical Presentation Only

Travis Dale, Ganesh Subbarayan, John Blendell, Carol Handwerker, *Purdue University, West Lafayette, IN, United States*

Design and Calibration of Resistive Stress Sensors on 4H Silicon Carbide (8219) Technical Paper Publication

Richard Jaeger, Jun Chen, Jeffrey Suhling, *Auburn University, Auburn, AL, United States,* ***Leonid Fursin,*** *United Silicon Carbide, Monmouth, NJ, United States*

Track 4 & 5 Panel: Vehicular Power Electronics

Jackson

Abstract: Vehicular/automotive electronics represents the third wave of electronics most prominently. Power electronics is heterogeneously integrated together with various sensor and communication technologies into highly miniaturized units. These systems are exposed to harsh field conditions yet need to show highest reliability and functional safety. They must be fabricated with maximum efficiency in order to find their intended mass market. Then, the impact of these products on the lives of the people around the globe will be as fundamental and disruptive as it has been of the personal computers (wave 1) and the smart phones (wave 2).
After a brief survey on these effects, the joint panel of InterPACK, Tracks 4 & 5, will discuss various aspects and contributions that allow coping with the great engineering and research challenges related to this new wave of electronics technologies

- from the industrial perspective of OEM, tier 1 and technology suppliers,
- from the academic perspective of universities and research organizations,
- and from the governmental and societal perspective.

Thursday August 30, 2018

7:00 AM	**Authors' Breakfast, Grand Ballroom, Third Floor**	
8:00 AM	**Track 1 Keynote: Uma Krishnamoorthy, Bosch** Mason I & II **Microsensors Research and Development at Bosch**	
	2-4: Server Cooling II Second Floor, Mason I Session Organizer: **Yingying Wang**, *Qualcomm, San Diego, CA, United States* Session Co-Organizer: **Xiangfei Yu**, *IBM, Wappingers Falls, NY, United States,* **Shima Hajimirza**, *Texas A&M, College Station, TX, United States*	**3-3: Mechanical Reliability I** Second Floor, Mason II Session Organizer: **Allyson Hartzell**, *Veryst Engineering, Needham, MA, United States* Session Co-Organizer: **Valerie Marty**, *Connected Micro LLC, Corvallis, OR, United States*
8:45 AM	**Rack-Level Study of Hybrid Cooled Servers Using Warm Water Cooling with Variable Pumping for Centralized Coolant System (8255)** Technical Paper Publication ***Manasa Sahini, Chinmay Kshirsagar, Dereje Agonafer,*** *University of Texas at Arlington, Arlington, TX, United States*, ***Patrick Mcginn****, Cool IT Systems, Calgary, AB, Canada*	**The Effect of Substrate Cracking on the Mechanical Reliability of Barrier Films for Flexible Electronics (8325)** Technical Presentation Only ***Kyungjin Kim, Hao Luo, Olivier Pierron****, Georgia Institute of Technology, Atlanta, GA, United States*, ***Ting Zhu,*** *Woodruff School of Mech Eng, Atlanta, GA, United States*, ***Samuel Graham,*** *Georgia Institute of Technology, Lithonia, GA, United States*
9:05 AM	**Multi-Die Water-Cooled Heat Sinks with Concentrated Channels (8288**) Technical Presentation Only ***Yaser Hadad, Bharath Ramakrishnan, Paul R. Chiarot, Bahgat Sammakia,*** *State University of New York At Binghamton, Binghamton, NY, United States*	**Fatigue Strength of Lead Free Solder Material under Various Wave Forms (8263)** Technical Presentation Only ***Takashi Kawakami, Takahiro Kinoshita, Yuki Murai, Toyama*** *Prefectural University, Imizu, Japan*
9:25 AM	**Impact of Internal Design on the Efficiency of IT Equipment in a Hot Aisle Containment System - An Experimental Study (8422)** Technical Paper Publication ***Sadegh Khalili, Bahgat Sammakia,*** *State University of New York at Binghamton-SUNY, Binghamton, NY, United States*, ***Husam Alissa,*** *Microsoft, Redmond, WA, United States*, ***Kourosh Nemati****, Future Facilities, San Jose, CA, United States*, ***Mark Seymour,*** *Future Facilities, London, United Kingdom*, ***David Moss, Robert Curtis,*** *Dell EMC, Round Rock, TX, United States*	**Evolution of the Mechanical Properties and Microstructure of SAC305 Lead Free Solder Joints Subjected to Mechanical Cycling Technical Presentation Only.** IPACK2018-8403 ***Md Mahmudur Chowdhury, Mohd Aminul Hoque, Sinan Su, Sa'd Hamasha***, ***Jeffrey Suhling***, ***Pradeep Lall****, Auburn University, Auburn, AL, United States*
9:45 AM	**Evaporatively Cooled Condenser in Data Center (8471)** Technical Presentation Only ***A. G. Agwu Nnanna****, Purdue University Calumet, Hammond, IN, United States*	**Improved Approaches for FEA Analyses of PBGA Packages Subjected to Thermal Cycling (8398)** Technical Paper Publication ***Chienchih Chen***, ***Jeffrey Suhling***, ***Pradeep Lall****, Auburn University, Auburn, AL, United States*
10:15 AM	**Tea/Coffee Break, Second Floor Foyer**	
	1-6: Design and Characterization Second Floor, Mason I Session Organizer: **Subhasis Mukherjee**, *San Disk, a Western Digital Brand, Milpitas, CA, United States* Session Co-Organizer: **Tuhin Sinha**, *IBM, Albany, NY, United States*	**3-5: Mechanical Reliability II** Second Floor, Mason II Session Organizer: **Allyson Hartzell**, *Veryst Engineering, Needham, MA, United States* Session Co-Organizer: **E. Yegan Erdem**, *Bilkent University, Ankara, Turkey*

Track 4 Keynote: Avi Bar-Cohen, Ratheon
Jackson

Gen3 Embedded Cooling for Wide Bandgap Power Amplifiers

4-14: Power Electronics Thermal Management – System Level

Second Floor, Sansome

Session Organizer: **Dinesh Thanu**, *Intel Corporation, Chandler, AZ, United States*
Session Co-Organizer: **Sangbeom Cho**, *Georgia Institute of Technology, Atlanta, GA, United States*

Multifunctional Chip for Use in Thermal Analysis of Power Systems (8355) Technical Paper Publication

David Gonzalez-Nino, Pedro O. Quintero, *University of Puerto Rico - Mayaguez, Mayaguez, PR, United States*, ***Lauren M. Boteler, Damian P. Urciuoli, Dimeji Ibitayo,*** *U.S. Army Research Laboratory, Adelphi, MD, United States*, ***Iain M. Kierzewski,*** *General Technical Services, LLC, Wall Township, NJ, United States*

Evaluation of Thermal Coupling Effect with Multichip Power Modules (8390) Technical Presentation Only

Xuhui Feng, Kevin Bennion, Gilbert Moreno*, National Renewable Energy Laboratory, Golden, CO, United States*

Characterization of the Thermal Performance of a 3-D Manifold for High-Power Density Inverter Designs (8413) Technical Presentation Only

Joseph Schaadt, *Stanford University, Sunnyvale, CA, United States*, ***Chirag Kharangate,*** *Case Western Reserve University, Cleveland, OH, United States*, ***Nathan Pallo, Robert Pilawa-Podgurski,*** *University of Illinois at Urbana-Champaign, Urbana, IL, United States*, ***Mehdi Asheghi, Kenneth Goodson,*** *Stanford University, Stanford, CA, United States*

Electrical and Thermal Characterization of a Stacked Power Module with Integrated Double Sided Cooling (8420) Technical Presentation Only

Lauren M. Boteler, Richard Thomas, Michael Rego, *U.S. Army Research Laboratory, Adelphi, MD, United States*, ***Steven Miner,*** *U.S. Naval Academy, Annapolis, MD, United States*

5-2: Packaging Materials

Second Floor, Jackson

Session Organizer: **Martin Niessner**, *Infineon Technologies AG, Neubiberg, Bavaria, Germany*
Session Co-Organizer: **Xiaochuan Guo**, *Bosch Automotive Products (Suzhou) Co., Ltd, Suzhou, Jiangsu, China*

Deficiencies in Industry Standard Component Reliability Tests and its Implications on Material and Process Selection on Component Manufacturing (8519) Invited Presentation

Gnyaneshwar Ramakrishna, *Cisco Systems Inc., San Jose, CA, United States*

Volumetric and Isochoric Nonlinear Viscoelasticity for Epoxy-Based Polymers: Experimental Characterization and Theoretical Modeling (8342) Technical Presentation Only

Fabian Welschinger, *Robert Bosch GmbH, Renningen, Germany*, ***Przemyslaw Gromala,*** *Robert Bosch GmbH, Reutlingen, Germany*, ***Hüsnü Dal,*** *Middle East Technical University, Ankara, Turkey*, ***Hyun-Seop Lee, Bongtae Han,*** *University of Maryland, College Park, MD, United States*

Viscoplastic Constitutive Model for High Strain Rate Mechanical Properties of SAC-Q Leadfree Solder after High-Temperature Prolonged Storage (8357) Technical Paper Publication

Pradeep Lall, Vikas Yadav, Jeffrey Suhling*, Auburn University, Auburn University, AL, United States*, ***David Locker,*** *U.S. Army AMRDEC, Huntsville, AL, United States*

Packaging Materials Challenges to Meet Future Auto Requirements (8507) Invited Presentation

Rajen Dias*, Amkor Technology, Inc., Tempe, AZ, United States*

4-9: Power Electronics Packaging – Functional Materials

Second Floor, Sansome

Session Organizer: **Banafsheh Barabadi**, *Apple, Cupertino, CA, United States*
Session Co-Organizer: **Patrick McCluskey**, *University of Maryland, College Park, MD, United States*

5-1: Package and System Reliability

Second Floor, Jackson

Session Organizer: **Klas Brinkfeldt**, *Swerea IVF, Mölndal, Sweden*
Session Co-Organizer: **Azeem Sarwar**, *General Motors, Warren, MI, United States*

10:30 AM	**Full Chip-Scale Numerical Simulation on Heterogeneous Integrated Fan-out Wafer Level Packaging (InFO-WLP) (8243)** Technical Paper Publication ***Daixing Wang**, **Yufeng Jin**, School of Electronic and Computer Engineering, Peking University Shenzhen Graduate School, Shenzhen, China*, ***Yudan Pi**, Peking university, Beijing, Beijing, China*, ***Wei Wang**, Peking University, National Key Lab of Micro/Nano Fabrication Technology, Beijing, China*	**The Effects of Curing Profile, Temperature, and Aging on the Mechanical Behavior of Solder Mask Materials (8405)** Technical Paper Publication ***Promod Chowdhury, Jeffrey Suhling, Pradeep Lall,** Auburn University, Auburn, AL, United States*
10:50 AM	**Evaluation of X-Ray Phase Contrast Imaging for Non-Destructive Testing (NDT) of Plastic Electronic Packages (8272)** Technical Presentation Only ***Lyle Menk, Andrew Hollowell, Ryan Goodner, Kyle Thompson, Amber Dagel**, Sandia National Laboratories, Albuquerque, NM, United States*	**Nanoindentation Measurements of the Mechanical Properties of Individual Phases within Lead Free Solder Joints Subjected to Isothermal Aging (8408)** Technical Paper Publication ***Abdullah Fahim, Sudan Ahmed**, **Jeffrey Suhling**, **Pradeep Lall**, Auburn University, Auburn, AL, United States*
11:10 AM	**Creep Response of Assemblies Bonded with Pressure Sensitive Adhesive (PSA) (8345)** Technical Paper Publication ***Hao Huang**, **Abhijit Dasgupta**, University of Maryland, College Park, MD, United States*, ***Qian Jiang**, University of Maryland, CALCE, College Park, MD, United States*, ***Krishna Darbha, Ehsan Mirbagheri**, Microsoft, Redmond, WA, United States*	**The Effects of Temperature, Strain Rate, and Aging on the Poisson's Ratio of SAC Lead Free Solders (8410)** Technical Paper Publication ***KM Rafidh Hassan, Mohammad Alam**, **Jeffrey Suhling**, **Pradeep Lall**, Auburn University, Auburn, AL, United States*, ***Munshi Basit**, Georgia Southern University, Statesboro, GA, United States*
11:30 AM	**Elastic Properties of Few-grained SAC Solder Joints Based on Anisotropic Multi-Scale Predictive Models (8380)** Technical Presentation Only ***Qian Jiang, Hao Huang**, **Abhijit Dasgupta**, University of Maryland, College Park, MD, United States*, *University of Maryland, College Park, College Park, MD, United States*	**Microstructural Evolution in SAC305 and SAC-Bi Solders Subjected to Mechanical Cycling (8414)** Technical Paper Publication ***Mohd Aminul Hoque, Md Mahmudur Chowdhury, Abdullah Fahim**, **Jeffrey Suhling**, **Sa'd Hamasha, Pradeep Lall**, Auburn University, Auburn, AL, United States*
12:00 PM	**Lunch, Awards, Third Floor Grand Ballroom**	
		1-4: Microsystems Packaging Second Floor, Mason I Session Organizer: **Fabian Welschinger**, *Robert Bosch GmbH, Renningen, Germany* Session Co-Organizer: **Przemyslaw Gromala**, *Robert Bosch GmbH, Reutlingen, Germany*
1:30 PM	**Reliability Considerations for Flexible Hybrid Electronics** **Allyson Hartzell** Mason II (Registration Required) **Abstract:** The focus of this tutorial is the reliability of flexible hybrid electronics primarily in wearable systems. For the purpose of this talk, the system includes flexible interconnect, yet also the MEMS and sensors and packaging. The entire systems hierarchy must all be well designed, processed and without killer defects. This tutorial webinar will cover some of the newer MEMS and sensor devices with advanced packaging and flexible interconnects, and how to assess field failure mechanisms, identify failure mechanisms and statistically model reliability.	**Cylindrical Tuber Encapsulant Layer Realization by Patterned Surface for COB-LEDs Packaging (8211)** Technical Paper Publication ***Xingjian Yu, Run Hu, Ruikang Wu, Bin Xie, Xiaoyu Zhang, Xiaobing Luo,** Huazhong University of Science and Technology, Wuhan, China*
1:50 PM		**Quantification of Underfill Influence to Chip Packaging Interactions of WLCSP (8257)** Technical Paper Publication ***Huayan Wang, Shao Shuai, Vanlai Pham**, **Seungbae Park**, Binghamton University, Vestal, NY, United States*, ***Panju Shang, Cheng Zhong**, Huawei Technology Co. Ltd, Shenzhen, Guangdong, China*

High External Quantum Efficiency of Flip-chip UV-LED via Silicone-intermediate Hemispherical Quartz Lens (8230) Technical Presentation Only

Shuai Wang, Ju He, Renli Liang, Jiangnan Dai, Changqing Chen, Huazhong *University of Science and Technology, Wuhan, China*

Controlling the Solder Joint Reliability of eWLB Packages in Automotive Radar Applications using a Design for Reliability Approach (8379) Technical Paper Publication

Martin Niessner*, Infineon Technologies AG, Neubiberg, Bavaria, Germany*, ***Gerhard Haubner, Walter Hartner, Sebastian Pahlke,*** *Infineon Technologies AG, Regensburg, Bavaria, Germany*

Investigation of the Role of Surface Nanocoating on Two-phase Evaporative Heat and Mass Transfer Using Molecular Dynamic Simulation (8313) Technical Presentation Only

Binjian Ma, Li Shan, Shuai Shuai, Zichen Du, Damena Agonafer, *Washington University in St Louis, St louis, MO, United States*, ***Baris Dogruoz,*** *Cisco Systems Inc., Santa Clara, CA, United States*

Characterization and Modeling of the Curing Process of Epoxy Based Thermoset Material Using Stress Measurements (8281) Technical Presentation Only

Przemyslaw Gromala, Alicja Palczynska, Arvind Shamraoji*, Robert Bosch GmbH, Reutlingen, Germany*, ***Agnes Veres****, Robert Bosch Kft, Budapes, Hungary*, ***Kaspar Jansen,*** *Delft University of Technology, Delft, Netherlands*

Performance Enhancement of PCM-based Heat Sinks Using Gradient Porous Thermal Conductivity Enhancer for Electronics Cooling (8236) Technical Presentation Only

Ali Ghahremannezhad, Kambiz Vafai*, University of California, Riverside, Riverside, CA, United States*

Copper, Silver, and PCC Wirebonds Reliability in Automotive Underhood Environments (8358) Technical Paper Publication

Pradeep Lall, Shantanu Deshpande*, Auburn University, Auburn, AL, United States*, ***Luu Nguyen****, Texas Instruments Inc., Santa Clara, CA, United States*

Transient Thermal Mitigation Using Package Integrated Phase Change Materials (8504) Technical Presentation Only

Mike Fish, Lauren M. Boteler, Morris S. Berman, *U.S. Army Research Laboratory, Adelphi, MD, United States*

Thermo-mechanical Reliability of the High-Performance Vehicle Computers Enabling Fully Autonomous Driving (8500) Technical Presentation Only

Sven Rzepka, Rainer Dudek, *Fraunhofer ENAS, Chemnitz, Germany*

4-16: Power Electronics Thermal Management – Thermoelectrics and Emerging Cooling Techniques

Second Floor, Sansome

Session Organizer: **Gilbert Moreno***, National Renewable Energy Laboratory, Golden, CO, United States*
Session Co-Organizer: **Yanbao Ma***, University of California Merced, Merced, CA, United States*

Waste Heat Recovery for Powering Mobile Devices Using Thermoelectric Generators and Evaporatively-cooled Heat Sink (8354) Technical Paper Publication

Michael Ozeh, A. G. Agwu Nnanna, *Purdue University Northwest, Hammond, IN, United States*

Tunable Thermal Transport and Reversible Thermal Conductivity Switching in Topologically Networked Bio-Inspired Materials (8424) Technical Presentation Only

John Tomko, *University of Virginia, Charlottesville, VA, United States*, ***Abdon Pena-Francesch, Huihun Jung, Benjamin Allen, Melik Demirel,*** *Pennsylvania State University, State College, PA, United States*, ***Madhusudan Tyagi,*** *National Institute of Standards, Gaithersburg, MD, United States*, ***Patrick E. Hopkins****, University of Virginia, Charlottesville, VA, United States*

5-3: Electronics for Novel Drivetrain Technologies

Second Floor, Jackson

Session Organizer: ***Gopi Krishnan****, Tesla, Palo Alto, CA, United States*
Session Co-Organizer: ***Przemyslaw Gromala****, Robert Bosch GmbH, Reutlingen, Germany*

Drive Schedule Impacts to Thermal Design Requirements and the Associated Reliability Implications in Electric Vehicle Traction Drive Inverters (8280) Technical Paper Publication

Bakhtiyar Mohammad Nafis, David Huitink, Ange Iradukunda, *University of Arkansas, Fayetteville, AR, United States*

Investigation of Active Power Cycling Combined with Passive Thermal Cycles on Discrete Power Electronic Devices for Automotive Applications (8348) Technical Paper Publication

Alexander Otto, Sven Rzepka*, Fraunhofer ENAS, Chemnitz, Germany*, ***Bernhard Wunderle,*** *TU Chemnitz, Chemnitz, Germany*

2:10 PM		**An Emerging Industry-Scale Ecosystem Based on Package Level Integration (8367)** Technical Presentation Only ***Ramune Nagisetty**, Intel Corporation, Hillsboro, OR, United States*, ***Sergey Y. Shumarayev,** Intel Corporation, San Jose, CA, United States*, ***Robert Munoz,** Intel Corporation, Austin, TX, United States*
2:30 PM		**Solid-State Microjoining Mechanisms of Wire Bonding and Flip Chip Bonding (8555)** Invited Presentation ***Yasuo Takahashi**, Osaka University, Osaka, Japan*
3:00 PM	**Tea/Coffee Break, Second Floor Foyer**	
	4-17: Batteries, Photovoltaics and Energy Harvesting Devices Second Floor, Sansome Session Organizer: **Guangsheng Zhang**, *University of Alabama in Huntsville, Huntsville, AL, United States* Session Co-Organizer: **Marc Dunham**, *Analog Devices, San Jose, CA, United States*	**4-18: Low Dimensional Materials and Nanoscale Heat Transfer** Second Floor, Jackson Session Organizer: **Ronald Warzoha**, *U.S. Naval Academy, Annapolis, MD, United States* Session Co-Organizer: **Justin Freedman**, *Lam Research Corp, Fremont, CA, United States*
3:15 PM	**Wall-Mount Concentrated Solar Co-generation with Self-tracking (8336)** Technical Presentation Only ***Kazuaki Yazawa, Ali Shakouri,** Purdue University, West Lafayette, IN, United States*	**The Effects of Nano-Structuring on the Thermal Conductivity of PbTe/PbSe Superlattice Thin Films (8201)** Technical Presentation Only ***Mallory DeCoster, John Gaskins, Patrick Hopkins**, University of Virginia, Charlottesville, VA, United States*, ***Xin Chen, Helmut Baumgart,** Old Dominion University, Newport News, VA, United States*
3:35 PM	**In-Operando Thermal Diagnostics of Lithium-Ion Batteries (8258)** Technical Presentation Only ***Sean Lubner, Sumanjeet Kaur, Yanbao Fu, Vince Battaglia, Ravi Prasher,** Lawrence Berkeley National Lab, Berkeley, CA, United States*, ***Krishna Shah,** University of Texas, Arlington, Arlington, CA, United States*	**Thermal Conductivity of Entropy Stabilized Oxides: Approaching the Amorphous Limit in Single Crystalline Isotropic Alloys through Mass and Strain Disorder (8428)** Technical Presentation Only ***Jeffrey Braun, Christina Rost, Ashutosh Giri, David Olson, Patrick E. Hopkins,** University of Virginia, Charlottesville, VA, United States*, ***Mina Lim, Donald Brenner, Jon-Paul Maria, George Kotsonis.** North Carolina State University, Raleigh, NC, United States*, ***Gheorghe Stan,** National Institute of Standards and Technology, Gaithersburg, MD, United States*
3:55 PM	**Thermal Characterization of Lithium-Ion Batteries (8411)** Technical Presentation Only ***Rajath Kantharaj, Swagata Kalve, Yexin Sun, Amy Marconnet,** Purdue University, West Lafayette, IN, United States*	**Thermal Transport in Amorphous Superlattices of Low-K Dielectric Materials (8427)** Technical Presentation Only ***Ashutosh Giri, John Gaskins, Patrick Hopkins,** University of Virginia, Charlottesville, VA, United States*, ***Sean King,** Intel, Oregon, OR, United States*
4:15 PM	**A Novel Activated Carbon Enabled Steam Generation System under Simulated Solar Light (8387)** Technical Paper Publication ***Ashreet Mishra,** Purdue University Northwest, Hammond, IN, United States*, ***A. G. Agwu Nnanna,** Purdue University Calumet, Hammond, IN, United States*	**Ballistic Transport of Long Wavelength Phonons in Superlattices and Nanograined Alloys (8425)** Technical Presentation Only ***Patrick Hopkins, Avik W. Ghosh, S. Joe Poon**, University of Virginia, Charlottesville, VA, United States*, ***Ramez Cheaito,** Gooch & Housgo, Fremont, CA, United States*, ***Carlos Polanco,** Oak Ridge National Labs, Oak Ridge, TN, United States*, ***Ganesh Balakrishnan,** University of New Mexico, Albuquerque, NM, United States*, ***Brian F. Donovan,** United States Naval Academy, Annapolis, MD, United States*
4:45 PM		

Degradation Analysis of Solar Cells by Temperature, Humidity and UV Stress (8264) Technical Presentation Only

Dalia Martinez, Sumanjeet Kaur, Mauricio Solis, Gao Liu, Ravi Prasher, *Lawrence Berkeley National Laboratory, Berkeley, CA, United States*

Understanding the Effect of Parallel Cooling on the Thermal and Electrical Balance of a Lithium-Ion Battery Pack for Electric Vehicles (8372) Technical Presentation Only

Kshitij Gupta, Carlos Da Silva, Zhe Gong, Carl Lamoureux, Olivier Trescases, Cristina H. Amon, *University of Toronto, Toronto, ON, Canada*

Long-Term Effects of Power Quality and Power Cycling on Thermoelectric Module Performance (8282) Technical Paper Publication

Viral Patel, Hsin Wang, Kyle R. Gluesenkamp, Anthony Gehl, Geoff Ormston, Emily Kirkman, *Oak Ridge National Laboratory, Oak Ridge, TN, United States*

European Roadmaps for the Electrification and Automation of Road Transport (8503) Invited Presentation

Gereon Meyer, *VDI/VDE Innovation + Technik GmbH, Berlin, Germany*

Maker and AI Workshop

Mason I & II

3:15 PM – 6:15 PM

Abstract: Our Industry has reinvented itself through multiple disruptive changes in technologies, products and markets. With the rapid migration of logic, memory and applications to the Cloud infrastructures, Data Centers and 5G Networks, the Internet of Things (IoT) to internet of everything (IOE), Autonomous Vehicles, the proliferation of Smart Devices every where, and increasing interest in artificial intelligence (AI) & Virtual Reality (VR), the pace of innovation is increasing to meet these challenges. What are the paths forward? The IEEE Heterogeneous Integration Technology Roadmap (HIR), is sponsored by the IEEE Electronic Packaging Society (EPS), the Electron Devices Society (EDS), Photonics Society together with ASME EPPD and SEMI. It will address the future directions of heterogeneous integration technologies and applications serving future markets and applications, so very crucial to our profession, our industries, academic and research communities. Following the spirit of ITRS, the HIR is a pre-competitive technology roadmap provides long-term vision to identify the needs of future technology challenges, roadblocks, and potential solutions focused on system integration and broad market applications in order to accelerate progress for the broad electronics industry.