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**JOURNALS**

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   - 2016 Impact Factor: 1.312 (Journal Citation Reports, Clarivate Analytics, 2017)

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   - 2016 Impact Factor: 1.142 (Journal Citation Reports, Clarivate Analytics, 2017)

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   - 2016 CiteScore: 1.68
   - 2016 Impact Factor: 1.313 (Journal Citation Reports, Clarivate Analytics, 2017)

**BOOKS**

1. **Steam Generators for Nuclear Power Plants**
2. **Thermal-Hydraulics of Water Cooled Nuclear Reactors**
3. **Handbook of Generation IV Nuclear Reactors**

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Technical Program (Continued)

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www.facebook.com/ASME.IPTI

@asmedotorg
Sunday, July 22 (pg 27)
Full Day Workshops 09:00 – 15:00
• Computational Fluid Dynamics (CFD) Bouzy, 1st Floor
• Thermal-Hydraulics Methods, Experimentation and Benchmarking Epernay, 1st Floor
• Nuclear Codes and Standards Reims, 1st Floor

Half Day Workshops AM
09:00 – 12:00
• Waterhammer Analysis Chalon, 1st Floor
• Part 1 - Communication for Nuclear Professionals Aisance, Mezzanine Floor

Half Day Workshops PM
12:30 – 15:00
• Probability Safety Assessment and Severe Accidents Chalon, 1st Floor
• Part 2 - International Communication about Nuclear Power Operation and Safety Monitoring Technologies Aisance, Mezzanine Floor

Technical Sessions 16:00 – 18:00
O&M 1-4 System and Equipment Operation
O&M 2-4 Reactor Physics: Methodology Development I
NFM 2-5 Reactor Physics: Methodology Development II
NFM 2-8 Zirconium-based Materials and Zirconium Compounds
NFM 2-10 Nuclear Fuel Safety and Performance Analysis II
NFM 2-12 Reactor Physics: Methodology Development III
CFD 9-3 Single-phase Flow
D&D 10-10 D&D General Session II
MSB 11-2 Containment issues: Cooling, Hydrogen, Fission Products
SPC 16-6 Neutronics Analysis and Reactor Physics I
SPC 16-11 Nuclear Safety and Accident Analysis I
SPC 16-14 Thermalhydraulics I

Monday, July 23 (pg 34)
Opening Ceremonies & Keynote Plenary Session 08:30 – 10:00 1st Floor
Welcome and Opening Remarks
Marc Goldsmith, Past President, ASME
Zenguang Li, Co-Chair ICON26, Vice President CNS, Chief Engineer of CNNC
Naoyuki Sasaki, President, JSME
The President of Meche Keynote Speaker One
The UK’s Future Power Mix – the Role for Nuclear
Tom Greatrex, The Nuclear Industry Association, UK
Keynote Speaker Two
New Nuclear Plants can Compete Against Fossil Energy (and Complement Renewables) if Best Practices Used
Kirsty Gogan, Energy for Humanity, UK
Coffee Break 10:00 – 10:30 Chablis Suite, Ground Floor
Plenary Session 10:30 – 12:30 Crement, Industry Leadership Forum 1st Floor
Keynote Speaker One
Nuclear Energy Powering China’s Green Development
Zenguang Li, China National Nuclear Corporation, CNS, China
Keynote Speaker Two
Overcoming Economic Challenges and Building Enduring Value: A U.S. Nuclear Plant Operator’s Perspective
Christopher Mudrick, Exelon Nuclear, USA
Keynote Speaker Three
Public Engagement on Nuclear Energy
Andrew Sherry, National Nuclear Laboratory, UK
Keynote Speaker Four
Japan’s Nuclear Energy Policy
Shinjiro Takeda, Ministry of Economy, Trade and Industry, Japan
Lunch 12:30 – 14:00 Chablis Suite, Ground Floor
Technical Sessions 14:00 – 16:00
Panel Session 14:00 – 16:00
Panel Session 1: Leak Before Break (LbB) and Leakage Through Cracks
Panel #1: Leak Before Break (LbB) and Leakage Through Cracks
(Crement, 1st Floor)
Panel Session 2: New Nuclear Power Plant Construction
Panel #2: New Nuclear Power Plant Construction
Panel #3: Robust Fuel Development
Panel #4: Communication with Nuclear Stakeholders
Panel #5: Fukushima-Daiichi Nuclear Power Plant Decommissioning R&D
Panel #6: V&V of Software Used to Analyze Thermal-Hydraulics in Nuclear Systems
Poster Session, and Coffee Break 15:46 – 16:30 Chablis Suite, Ground Floor
Technical Sessions 16:30 – 18:30
Opening Reception 18:30 – 20:30 Chablis Suite Ground Floor

Tuesday, July 24 (pg 46)
Plenary Session 8:30 – 10:00 Crement, Current Status of Nuclear Power 1st Floor
Keynote Speaker One
Current Status of Nuclear Power in China
Dongshan Zheng, General Nuclear International Ltd., China
Keynote Speaker Two
Transformative Efficiency: Innovation to Improve Operations and Maintenance
Ken Canavan, Westinghouse Electric Company, USA
Keynote Speaker Three
Nuclear Energy in a Clean Energy Future
King Lee, Harmony Programme, China
Keynote Speaker Four
Hitach-GE’s Challenges to Continuous Supply of Advanced Nuclear Technology
Yasunori Inada, Hitachi GE Nuclear Energy, Japan
Poster Session and Coffee Break 10:00 – 10:30 Chablis Suite, Ground Floor
Technical Sessions 10:30 – 12:30
Panel Session 1: Reactor Physics: Monte Carlo Methods and Calculations I
Panel #1: Reactor Physics: Monte Carlo Methods and Calculations I
Panel #2: Nuclear Fuel Safety and Performance Analysis IV
Panel #3: High Temperature Components I
Panel #4: Fusion Technology I
Panel #5: New Methodology for Codes and Standards
Panel #6: Super-critical Fluids I
Panel #7: Vibration Analysis
Panel #8: Thermal Mixing I
Panel #9: Turbulent and Transient Flow
Panel #10: Advanced Reactors and Fusion Technologies
Panel #11: Nuclear Components, Nuclear Waste and Radiation II
Panel #12: Nuclear Fuels and Materials II
Panel #13: Thermalhydraulics IV
Poster Session, Lunch 12:30 – 14:00 Chablis Suite, Ground Floor
Panel Sessions 14:00 – 16:00
Panel #2: Experience Feedback of New Nuclear Power Plant Construction Crement, 1st Floor
Panel #3: Robust Fuel Development Bouzy, 1st Floor
Panel #4: Communication with Nuclear Stakeholders Chalon, 1st Floor
Panel #5: Fukushima-Daiichi Nuclear Power Plant Decommissioning R&D Reims, 1st Floor
Panel #6: V&V of Software Used to Analyze Thermal-Hydraulics in Nuclear Systems Epernay, 1st Floor
Poster Session, and Coffee Break 16:00 – 16:30 Chablis Suite, Ground Floor
Technical Sessions 16:30 – 18:30
Panel Session 1: Equipment Reliability
Panel #1: Equipment Reliability
Panel #2: High Temperature Components II
Panel #3: Control of SMR and Advanced Reactors
Panel #4: Nuclear Accidents I
Panel #5: The Importance of Codes and Standards
Panel #6: Advanced Reactors
Panel #7: Bubbles
Panel #8: Flow Through Complex Structures I
Panel #9: Advanced Reactors
Panel #10: Radiation Detection and Protection
Panel #11: Nuclear Education and Public Acceptance II
Panel #12: Nuclear Components, Nuclear Waste and Radiation I
Panel #13: Thermalhydraulics V
Panel #14: Measurement, Instrument and Control II
Conference Banquet 19:00 – 22:00 Twickenham Stadium, Rose Suite
**Wednesday, July 25 (pg 57)**

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<td>Exhibition</td>
<td>O&amp;M 1-5 Equipment Operation and Failure Analysis</td>
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<td>09:30 – 16:30</td>
<td>Panel Sessions</td>
<td>Panel #7: Education and Human Resources Development</td>
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<td>09:30 – 16:00</td>
<td>Panel #8: Advanced Manufacturing</td>
<td>Panel #8: Advanced Manufacturing</td>
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<td>09:30 – 16:00</td>
<td>Panel #9: SMRs &amp; Advanced Tech</td>
<td>Panel #9: SMRs &amp; Advanced Technologies</td>
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<td>09:30 – 16:00</td>
<td>Panel #10: Intelligent Technology</td>
<td>Panel #10: Intelligent Technology Application in Nuclear Power Plants</td>
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<td>10:00 – 16:00</td>
<td>Poster Session</td>
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<td>10:00 – 16:30</td>
<td>Coffee Break</td>
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**Technical Sessions 10:30 – 12:30**

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<td>10:30 – 12:00</td>
<td>Fracture and Failure</td>
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<td>I&amp;C 4-5</td>
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<td>I &amp; C Simulation Models and Systems</td>
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<td>ARF 5-4</td>
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<td>Advanced Reactor General</td>
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<td>NSS 6-6</td>
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<td>Emergency Preparedness</td>
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<td>CSL 7-5</td>
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<td>Personnel Certifications, Regulatory Influence, and Computer Codes</td>
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<td>THS 8-9</td>
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<td>Modeling NPPs Using System Analysis Software I</td>
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<tr>
<td>THS 8-12</td>
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<td>Scaling and Seismic: Methodology, Development, and Application</td>
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<tr>
<td>THS 8-15</td>
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<td>Natural Circulation Experiments, Phenomena, and Analyses I</td>
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<td>THS 8-21</td>
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<td>THS 8-23</td>
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<td>CFD 9-2</td>
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<td>CFD 9-14</td>
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<td>Small Modular Reactors-SMR Water Coolled</td>
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**Lunch 12:30 – 14:00**

Chablis Suite, Ground Floor

**Thursday, July 26 (pg 69)**

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<tbody>
<tr>
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<td>Technical Sessions 08:30 – 10:30</td>
<td>Future Reactor Concepts and Innovative Nuclear Applications</td>
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<td>PSS 3-12 Seismic and Transient Analyses</td>
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<td>NSS 6-5 Security of SMRs and Advanced Reactors I</td>
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<td>THS 8-6 Thermal-hydraulic Experiments I</td>
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<td>THS 8-14 Core Experiments, Phenomena, and Modeling</td>
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<td>THS 8-30 Thermal-hydraulic Experiments III</td>
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<td>THS 8-36 Equipment Design Studies II</td>
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<td>CFD 9-5 Heat Transfer</td>
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<td>CFD 9-12 Multi-phase Flow Analysis III</td>
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<td>MSB 11-1 Core Cooling, Core Degradation and In-Vessel melt Retention</td>
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<td>RAM 14-2 Risk Assessment and Management II</td>
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<td>CVW 15-1 Methodologies, Protocols, and Strategies for Conducting V&amp;V</td>
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**Coffee Break 10:30 – 11:00**

Chablis Suite, Ground Floor

**Technical Sessions 11:00 – 13:00**

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<td>Thermal-hydraulic Modeling: 1st Principle Physics and Correlations II</td>
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<td>Modeling NPPs Using System Analysis Software II</td>
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<tr>
<td>CFD 9-9</td>
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<td>Phase Change</td>
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<tr>
<td>CFD 10-3</td>
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<td>Decommissioning and Sources</td>
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<td>Advanced Reactors II</td>
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<td>RAM 14-3</td>
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<td>Risk Assessment and Management II</td>
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<td>CVW 15-2</td>
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<td>V&amp;H of High Fidelity Numerical Tools</td>
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**Lunch 13:00 – 14:00**

Chablis Suite, Ground Floor

**Technical Sessions 14:00 – 16:00**

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<td>Fission Reactor Design and Analyses II</td>
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<td>Thermal-hydraulic Modeling: 1st Principle Physics and Correlations III</td>
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<td>THS 8-35</td>
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<td>Modeling NPPs Using System Analysis Software IV</td>
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<td>Fast Reactors: Experiments and Analyses II</td>
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<td>CFD 9-10</td>
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**Coffee Break 16:00 – 16:30**

Chablis Suite, Ground Floor

**Technical Sessions 16:30 – 18:30**

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<td>ARF 5-7</td>
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<td>Modeling and Simulation I</td>
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<td>THS 8-4</td>
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<td>Severe Accident Experiments and Analyses II</td>
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<td>THS 8-7</td>
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<td>Thermal-hydraulic Modeling and Probabilistic Risk Assessment Related Analyses</td>
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<td>THS 8-20</td>
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<td>Equipment Design Studies I</td>
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<td>THS 8-39</td>
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<td>Thermal-hydraulic Modeling: 1st Principle Physics and Correlations IV</td>
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<td>D&amp;D 10-6</td>
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<td>Dose and Radiation Effects</td>
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<td>Accident Analysis, Prevention and Mitigation</td>
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<td>RAM 14-5</td>
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<td>Risk Assessment and Management V</td>
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<tr>
<td>CVW 15-5</td>
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<td>V&amp;H of Systems Analysis Numerical Analysis Tools III</td>
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**Registration**

- Champagne Suite, Foyer, 1st Floor
  - Sunday, July 22: 08:00 – 19:00
  - Monday, July 23: 07:00 – 18:30
  - Tuesday, July 24: 08:00 – 17:30
  - Wednesday, July 25: 08:00 – 17:30
  - Thursday, July 26: 08:00 – 17:00

**Exhibition**

- Chablis Suite, Ground Floor
  - Monday, July 23: 10:00 – 20:30
  - Tuesday, July 24: 09:30 – 19:30
  - Wednesday, July 25: 09:30 – 19:30
  - Thursday, July 26: 09:30 – 16:30
London Novotel West (LNW)

1 Shortlands, Hammersmith, London
W6 8DR United Kingdom
Phone: +44 (0)20 8741 1555
www.novotellondonwest.co.uk

Chablis Suite – Exhibit & Poster Hall
(Ground Floor)

Mezzanine Floor
On behalf of the organizers, we would like to welcome you to the premier nuclear event in London, United Kingdom — the 26th International Conference on Nuclear Engineering (ICONE-26), with the theme of Nuclear Power — Powering the World, One Atom at a Time. Over the years, this conference has served as an important platform for nuclear professionals to engage in academic discussions and broaden their knowledge in this field. We are honored to organize such a grand conference to facilitate more effective communication among professionals who devote themselves to the nuclear engineering field.

ICONE-26 will cover a wide range of sessions including: opening and plenary sessions, ten panels, 16 technical tracks, six workshops and three technical tours. In our opening and plenary sessions, we are fortunate to have prominent officials, leading scholars and industry leaders participate and provide their valuable perspectives on nuclear engineering issues. In addition, during our panel sessions, nearly 70 experts will strengthen your understanding in the nuclear engineering fields through their in-depth observations on research and development activities as well as nuclear power plant licensing, construction and operation experiences.

The technical tracks will present diverse topics including: operations & maintenance, engineering, modifications, life extension, life cycle and balance of plant; nuclear fuel and material, reactor physics and transport theory; plant systems, structures, components and materials; I&C and influence of human factors; advanced reactors and fusion technologies; nuclear safety, security, and cyber security; codes, standards, licensing, and regulatory issues; thermal-hydraulics and safety analyses; computational fluid dynamics (CFD); decontamination & decommissioning, radiation protection, and waste management; mitigation strategies for beyond design basis events; nuclear education, and public acceptance; innovative nuclear power plant design and small modular reactors; risk assessments and management; computer code verification and validation as well as student paper competition.

Through the student paper competition (TRACK-16), you will witness the progress of a number of outstanding students. Based on the competition results, some of them will receive financial support from the organizers. We encourage you to show your support and provide constructive feedback during or after their presentation time. The goal of the student program is to raise the students’ awareness and fully engage them in their nuclear engineering career and also keep them updated on the current situation and future trends in the nuclear industry. In addition, we will hold workshops to expand our knowledge in our professions before our conference starts. Lectures will be presented about the research, development and challenges we are confronted with.

Again, for the success of the conference, the steering committee, the organization committee and the technical program committee have been working hard for more than one year. We would like to express our sincere thanks to the reviewers for ensuring the highest quality of technical papers are presented. Special thanks are also extended to the sponsors. Finally, we show high regard to all the authors and speakers in the technical, panel and plenary sessions.

On behalf of all committee members, we wish you a pleasant stay in London — this dynamic and metropolitan city of royal culture and modern art. Furthermore, we are looking forward to seeing you at ICONE-27 to be held at the Tsukuba International Congress Center in Tsukuba, Ibaraki, Japan, May 19–24, 2019.

Guoqiang Wang, Ph.D., ASME Fellow
Chairman, ASME Nuclear Engineering Division
Chairman, ASME ICONE-26 Conference

Nobuyuki Ueda, Ph.D.
Vice President, CRIEPI
Chairman, JSME ICONE-26 Conference

Zengguang Lei, Ph.D.
Vice President, Chinese Nuclear Society
Chairman, CNS ICONE-26 Conference

Jenifer Baxter, Ph.D.
Head of Engineering
IMechE ICONE-26 Conference
Welcome from the CEO of London & Partners

I’m delighted to welcome you to London for your conference. With over 300 languages spoken here, London is the world in one city. It is a uniquely diverse place and a city full of energy.

In recent years, we’ve been welcoming record numbers of business and leisure visitors, who come to experience our great range of ever growing and evolving venues, restaurants, parks and cultural attractions; as I hope you will do.

I wish you a productive and enjoyable conference and hope your time here will inspire you to visit us again.

Laura Citron
Chief Executive Officer
London & Partners
ICONE2018 Organizing Committee

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<th>JSME</th>
<th>CNS</th>
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<td>Guoqiang Wang</td>
<td>Nobuyuki Ueda</td>
<td>Zengguang Lei</td>
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<td>Westinghouse Electric Company LLC</td>
<td>CRIEPI</td>
<td>China National Nuclear Corporation</td>
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<td>Conference Co-Chairs</td>
<td>Leon Cizelj</td>
<td>Kohei Hisamochi</td>
<td>Zhi Wang</td>
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<td>Jožef Stefan Institute</td>
<td>Hitachi GE Nuclear Energy</td>
<td>Chinese Nuclear Society</td>
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<td>Technical Program Chairs</td>
<td>Shripad Revankar</td>
<td>Hiroshi Kikura</td>
<td>Rui Shu</td>
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<td>Purdue University</td>
<td>Tokyo Institute of Technology</td>
<td>China Nuclear Power Technology Research Institute Ltd.</td>
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<td>Hideharu Takahashi</td>
<td>Yanping Huang</td>
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<td>Texas A&amp;M University</td>
<td>Tokyo Institute of Technology</td>
<td>Nuclear Power Institute of China</td>
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<td>Student Program Chairs</td>
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<td>Masahiro Takei</td>
<td>Suyuan Yu</td>
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<td>Chiba University</td>
<td>Tsinghua University</td>
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<td>Student Program Co-Chairs</td>
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ASME Nuclear Engineering Division Executive Committee

Guoqiang Wang, Chair
Leon Cizelj, Vice Chair
Shripad Revankar, Programming
Jovica Riznic, Member
Clay Smith, Secretary
Robert Stakenborghs, Past Chair
Asif Arastu, Member
Yassin Hassan, Member
Richard Schultz, Treasurer

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Robert Stakenborghs, Past Chair
Asif Arastu, Member
Yassin Hassan, Member
Richard Schultz, Treasurer

Clay Smith, Secretary
Robert Stakenborghs, Past Chair
Asif Arastu, Member
Yassin Hassan, Member
Richard Schultz, Treasurer
ICONE Awards

Student and Track Leader Awards Presentation
Wednesday, July 25
18:45 – 20:30
Chablis Suite, Ground Floor

Akiyama Medal
Best Student Award in ICONE Student Competition

At every ICONE conference, the Akiyama Medal is presented to the best paper award winner from the student paper competition of ASME, CNS, and JSME. The award was established in memory of Prof. Mamoru Akiyama (1935-2009). Prof. Akiyama was a professor emeritus at the Department of Nuclear Engineering at the University of Tokyo, and he was one of the founding members of the ICONE conference.

Student Awards
Five ‘Best Paper’ and five ‘Best Poster’ awards in each of the following regions will be presented during this session: North America, Japan/Asia, China and Europe.

ICONE Awards
Conference Banquet
Tuesday, July 24
19:00 – 22:00
Twickenham Stadium, Rose Suite

ICONE Award
The Nuclear Education Division presents the ICONE Award to the following individuals in recognition of their many years of service and contribution to the ICONE series of International Conferences on Nuclear Engineering. The ICONE Awards will be presented during the Conference Banquet.

Guoqiang Wang, ICONE26 Conference Chair, ASME
Yanping Huang, ICONE26 Technical Program Committee Co-Chair, CNS
Kazuyuki Takase, Nagaoka University of Technology, ASME

ASME Nuclear Engineering Division Special Long Service Award in Nuclear Engineering
The Nuclear Engineering Division presents the 2018 Service Award to the following recipient for his pioneering and outstanding contributions to nuclear engineering and technology and for his peaceful use of nuclear energy for the betterment of the world. The Service Award will be presented at the Conference Banquet.

Dr Frederick Moody, GE Nuclear and Professor, San Jose State University, USA
Organizers and Reviewers Recognition

Track & Session Organizers Recognition

The Nuclear Engineering Division recognizes the following individuals for their contributions in arranging the technical program, reviewing abstracts, organizing technical tracks and sessions and working with colleagues from around the world. These contributions were major factors in the success of ICONE26.

Ahmed A.Y. Al-Waaly  Antony Hurst  Mathew M Panicker  Robert Stakenborghs  Zeyun Wu  
Asif Arastu  Tomohiko Ikegawa  Patricia Paviet  Joerg Starflinger  Min Xiao  
Xuewu Cao  Chikako Iwaki  Ross Peel  Vladimir Stevanovic  Koji Yamada  
Paul K. Chan  Kazuhiro Kamei  Shripad Revankar  Guanhui Su  Takeshi Yamada  
Leon Cizelj  Ivo Klenak  Jovica Riznic  John Sulley  Hidemasa Yamano  
Brian Edmonds  Dongsheng Li  Takaaki Sakai  Xiaodong Sun  Suyuan Yu  
Mohamed El-Genk  Elia Merzari  Daisuke Sato  Shiro Takahashi  Wenzhou Zhou  
Jianbing Guo  Alexei Miasoedov  Carsten Schroer  Masaaki Tanaka  HuaDong Zhu  
Wolfgang Hansen  Shuichiro Miwa  Richard Schultz  Kazuyuki Tsukimori  
Yassin Hassan  Akemi Nishida  Afaque Shams  Takashi Wakai  
Anthony Hechanova  Hakan Ozaltun  Takashi Shimomura  Guoqiang Wang  
Hideki Horie  Liang-ming Pan  Koji Shirai  Minglu Wang  

Paper Reviewers Recognition

The Nuclear Engineering Division recognizes the following paper reviewers for their outstanding contribution to the technical program and ICONE series of International Conferences on Nuclear Engineering.

Kwang-Il Ahn  JongWook Go  Qian Lin  Nan Qian  Jian-Ping Tan  
Milotos Alamaniotis  Wade Grant  HUA Liu  Shripad Revankar  Masaaki Tanaka  
Claire Allison  Jianbing Guo  Rong Liu  Jovica Riznic  Nhu Cuong Tran  
Kenji Arai  Wolfgang Hansen  Rosa Lo Frano  Dan Robertson  Kazuyuki Tsukimori  
Asif Arastu  Yassin Hassan  Elia Merzari  Takaaki Sakai  Rodolfo Vaghetto  
Hamza Ayash  Yinbiao He  George Mesina  Daisuke Sato  Arun Veeramany  
Yongjun Bai  Anthony Hechanova  Yoshinori Mihara  Hiroyuki Sato  Andrija Volkovskii  
Paolo Balestra  Sung Deok Hong  Blaz Mikuz  Marcel Schienbein  Takashi Wakai  
Paul Barsdley  Hideki Horie  Mohammad Pourgol  Joshua Schlegel  Dingqu Wang  
Giacomo Busco  Lihua Huang  Mohammad  Carsten Schroer  Guoqiang Wang  
Rong Cai  Antony Hurst  Shoji Mori  Subash Sharma  Jinkai Wang  
Mauro Cappelli  Tomohiko Ikegawa  Victor Morokhovskiy  Wei Shen  Jun Wang  
Laure Caronini  Milica Ilic  Heinrich Muscher  Guobao Shi  Mingjun Wang  
Paul K. Chan  Relu Istrat  George Mesina  Goran Simeunovic  Yahui Wang  
Ronghua Chen  Gonzalez Jimenez  Thien Nguyen  Igor Simonovski  James Wilson  
Marco Cherubini  Daesyoung Jo  Akemi Nishida  Gyanender Singh  Wenbin Wu  
Leon Cizelj  Kauzihiro Kamie  Omid Noorikalkhoran  Danrong Song  Zeyun Wu  
Zhang Dan  Ivo Klenak  Hakan Ozaltun  Robert Stakenborghs  Min Xiao  
Rich Davey  Hajime Koikegami  Liang-ming Pan  Joerg Starflinger  Xiaojun Xiao  
Andrea De Santis  Zafar Koreshi  Patricia Paviet  Vladimir Stevanovic  Zhenhua Xu  
Dante De Santis  Satoshi Kurata  Ross Peel  Daxue Sun  Takeshi Yamada  
Kazuyuki Demachi  Jonathan Lai  Jinghan Peng  Licheng Sun  Hidemasa Yamano  
Tinashe Dhiwayo  Matja Leskocar  Alessandro Petrucci  Peiwei Sun  Bao-Wen Yang  
Yikang Dou  Dongsheng Li  Alexandru Pop  Xiaodong Sun  Suyuan Yu  
Allen Edwards  Weichao Li  Jamie Powers  Hideharu Takahashi  
Mohamed El-Genk  Yunzhao Li  Bill Press  Shiro Takahashi  
Thomas Galioto  Jun Liao  Andrew Prudil  Masahiro Takei  

Attendee Information

Acknowledgement
The 26th International Conference on Nuclear Engineering is sponsored by the American Society of Mechanical Engineers (ASME), the Chinese Nuclear Society (CNS), the Japan Society of Mechanical Engineers (JSME) and the Institute of Mechanical Engineers (IMechE). The conference is hosted by the ASME Nuclear Division. Conference organizers would also like to acknowledge the cooperation of the following organizations: Atomic Energy Society of Japan, Canadian Nuclear Society, Canadian Standards Association, European Nuclear Society, International Atomic Energy Agency, Korean Society of Mechanical Engineers, Korean Nuclear Society and the Nuclear Society of Slovenia.

Conference Proceedings
The official proceedings of the 26th International Conference on Nuclear Engineering will be produced at the conclusion of the conference and published online. Papers that were not presented on site in London will not be published in the conference proceedings and cannot be cited or indexed.

Registration
The Registration Desk is located in the Champagne Suite Foyer, 1st Floor, Novotel London West and is open during the following hours:

- Sunday, July 22: 08:00 – 19:00
- Monday, July 23: 07:00 – 18:30
- Tuesday, July 24: 08:00 – 17:30
- Wednesday, July 25: 08:00 – 17:30
- Thursday, July 26: 08:00 – 17:00

Name Badges: In addition to being a means of identification to colleagues, you are required to wear your name badge for admission to conference sessions and events. Room monitors will check name badges before allowing anyone into the session or event. Replacement badges are available at the Registration Desk at a cost of £20 per badge.

Daily Registration: Attendees who have paid the one-day registration fee qualify for a badge representing the day they have selected to attend. Attendees wearing this badge are entitled to the following on the day they have selected to attend: admission to conference sessions, refreshment breaks, the Exhibition, food and beverage served on the specified day, excluding the Conference Banquet. Daily attendees will also receive a conference bag, a program and online paper access.

Accompanying Person: Guests tickets are available for purchase for the Opening Reception and Conference Banquet only. Pre-purchased tickets will be included in the registration package of the attending registrant.

Exhibitors: Exhibit staff have access to the Exhibition Hall only and may participate in the Opening Reception and the four Lunches.

Dietary Requirements
If you advised the Conference Secretariat of your special dietary needs during the registration process, dietary tickets for each Lunch (Monday, Tuesday, Wednesday and Thursday) and the Conference Banquet have been included in your registration envelope if necessary. If you have not advised the Conference Secretariat of your special dietary needs, please inform the staff at the Registration Desk at your earliest convenience.

Conference Hotel
All meetings and social events take place at the Novotel London West with the exception of the Conference Banquet. The hotel is 100% smoke free. Parking fees are £1.50 per hour for hotel guests and £3.50 per hour for non-guests.

Wifi
Complimentary Wifi is available throughout the Novotel London West meeting space. To access the Wifi service log onto the Novotel network and follow the prompts in your browser. No password is required.

ASME Conference App
Engage with sessions, speakers, and organizations, watch social networking in action, including posting on the in-app feed or sharing outside it. Download the "Crowd Compass Attendee Hub" App from your app store. After installation, search for ICONE and download. The password to access the ICONE26 app is ‘icone2018’. Once ICONE is downloaded, you can set up a login. You will then receive a verification email with a code you need to enter in the app. Once you have entered the code in the app, this will grant you access to the event. Alternatively you can access the app via a web browser at https://event.crowdcompass.com/ICONE.

Visit London App
The Visit London App is available for iPhone and Android devices and is free to download with no roaming charges. The app has everything you need to explore London like a local including ‘around me’ functionality which allows users to discover restaurants, shopping, and attractions in close vicinity. Search ‘Visit London app’ in your app store.

First Aid
The Hotel has trained first aiders on site. In the event of the need of first aid, please contact Security directly on 02082377188 (or on ext. 7188 from an in-house phone). First Aid supplies are available throughout the hotel. The nearest first aid boxes for the Champagne and Chablis Suites are available in the conference suite’s organiser's offices.

Continued
Smoking
Smoking is not permitted anywhere within the Novotel London West. Smoking is permitted outside.

Tipping Etiquette
It is customary to leave 10–15% of the bill when eating out. However, restaurants often add on a service charge (usually 12.5%), especially if you’re in a large group, so it’s worth checking your bill if you don’t want to tip twice. Tipping is not required for any of the official Conference meal events.

Authors Briefing & Breakfast Sessions
On the morning of their session, authors, panelists, session chairs and co-chairs are invited to attend the ‘Authors’ Briefing’ to discuss session protocol and get acquainted. The briefing will take place in the Beaujolais room from 8:15am – 8:45am on Sunday and 7:45am – 8:15am Monday through Thursday. Continental breakfast will be available.

Speaker Practice Room
If you are a presenter, please be in the session room 30 minutes prior to the start of the first presentation of your session in order to upload your presentation.

Beaujolais on the Mezzanine Floor will be available to all conference participants as a presentation “practice” room. The room will be equipped with (2) LCD projectors, (2) computers, and (2) screens, and will be open during the following hours. Authors are encouraged to use this facility to meet with their co-authors and review presentations.

Sunday, July 22 14:00 – 17:30
Monday, July 23 07:00 – 17:30
Tuesday, July 24 07:00 – 17:30
Wednesday, July 25 07:00 – 17:30
Thursday, July 26 07:00 – 17:00

Meeting Room Protocol
Every effort will be made to ensure that all sessions start and end on time. Presenters and attendees are all asked to work together to achieve this. This may mean having to cut short a valuable discussion; however, conference organizers request your cooperation for the benefit of all attendees. Please turn your cell phone and other noise making devices off or set to vibrate.
Social Events

Opening Reception
Monday, July 23
18:30 – 20:30
Chablis Suite, Ground Floor
Join your friends and colleagues as we kick off ICONE 26! The Opening Reception will be held amongst the Exhibits and Posters. Appetizers and drinks will be served. Guest tickets are available for purchase at the registration desk.

Lunches
Monday, July 23 to Thursday, July 26
12:30* – 14:00
Chablis Suite, Ground Floor
Lunch will be provided from Monday to Thursday and is included in your registration. Pre-confirmation during the registration process is required to access the lunches.

Poster Sessions & Coffee Breaks
Monday, July 23 to Thursday, July 26
10:00 – 10:30* and 16:00 – 16:30
Chablis Suite, Ground Floor
*The Thursday morning coffee break is from 10:30-11:00

Conference Banquet
Wednesday, July 25
19:00 – 22:00
Twickenham Stadium
Twickenham Stadium (known as ‘Twickers’ by the locals) is the home of England Rugby and is the largest dedicated rugby union venue in the world. Owned by the governing body of rugby union in England, the Rugby Football Union (RFU), the stadium hosts home test matches for the England National Rugby Union Team. The Stadium has also hosted American Football as part of the NFL London Games in 2016 and 2017 and hosts concerts by some of today’s biggest stars including The Rolling Stones and Lady Gaga.

Join us for a ‘Sparkling Wine Reception’ in the Rose Suite which will feature a buffet dinner with wine included. A ticket is not included in a full Conference registration but may be available for purchase at an additional cost. Please see the registration desk to inquire about availability.

Twickenham Stadium
Sponsors

HOSTS

GOLD

Westinghouse Electric Company
westinghousenuclear.com

At Westinghouse, we are solely focused on nuclear energy technology. Our goal is simple—to provide solutions to our customers to keep their plants safe, reliable and efficient. Helping our customers support the needs of their customers is why we are committed to quality, safety, and innovation at every turn.

SILVER

Nuclear Power Institute of China
npic.ac.cn

As a subsidiary of the China National Nuclear Corporation (CNNC) the Nuclear Power Institute of China (NPIC) is a nuclear reactor engineering R&D base and high-tech research and design institute in China incorporating nuclear reactor engineering research, design, test, operation and small batch production.

BRONZE

Siemen’s Industry Software
siemens.com

EXHIBITORS

AFCEN
afcen.com

AFCEN is an International Standard Developing Organization who produces up-to-date codes offering accurate rules for the design, construction and in-service inspection of components for use in industrial or experimental nuclear facilities (RCC codes), ensures certified training programs enabling code users to achieve skills in using AFCEN codes.

Institute of Nuclear Energy Safety Technology
fds.org.cn

Super multi-functional Calculation Program for Nuclear Design and Safety Evaluation - SuperMC is a large-scale integrated software system for neutronics design. Taking neutron transport calculation as the core, SuperMC supports the whole process neutronics calculation containing deletion, radiation source term/dose/bilhazard, material activation and transmutation and the multi-physics coupling calculation of the thermol-hydraulics, structural mechanics, chemistry, biology, etc.
Exhibitor Listing

**Exhibition**
Visit the exhibits to discover new products and services from some of the industry’s leading organizations. Coffee and tea will be served amongst the exhibits during the coffee breaks.

**Dates & Times:**
- Monday, July 23  10:00 – 20:30
- Tuesday, July 24  09:30 – 19:30
- Wednesday, July 25  09:30 – 19:30
- Thursday, July 26  09:30 – 16:30

**Location:** Chablis Suite, Ground Floor

**Exhibitors:**
- ACFEN
- Elsevier
- Institute of Nuclear Energy Safety Technology
- Nuclear Power Institute of Technology
- Siemens Industry Software
- Westinghouse Electric Company
Nuclear Division & Committee Meetings Schedule

**Sunday, July 22**

**Steering Committee Pre-Meeting** (Invitation only)
18:15 – 20:15
Check the conference app for room location (app information on page 11)

**Tuesday, July 24**

**NED Executive Committee Meeting** (Invitation only)
12:30 – 14:00
Chablis Private Office, Ground Floor

**Wednesday, July 25**

**Combined Technical Committee Meeting**
(Invitation only)
12:45 – 13:45 (lunch will be provided)
Muscadet, Mezzanine Floor

**Thursday, July 26**

**Steering Committee Exit Meeting** (Invitation only)
18:45 – 19:30
Chablis Private Office, Ground Floor

**ASME/CNS/JSME/IMechE Committee Dinner Meeting** (Invitation only)
19:30 – 21:30
Off-Site, contact herreral@asme.org for location

**ACES-2019 Committee Meeting** (Invitation only)
21:30 – 22:30
Check the conference app for room location (app information on page 11)

Authors Briefing & Breakfast Sessions

Beaujolais Room

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<th>Sunday, July 22</th>
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Panel Sessions

Monday, July 23

14:00 – 16:00  Cremant, 1st Floor

Leak Before Break (LbB) and Leakage through Cracks

Chair:  Jovica Riznic, CNSC
Panelists:  Dr Peter Gill, Consultant  
           John Sharples, Wood PLC  
           Dr Gery Wilkowski, MC2  
           Dr Klaus Heckman, GRS  
           Dr Jinya Katsuyama, JAEA  
           Dr David Rudland, USNRC

Leak-before-Break (LbB) is a structural integrity assessment methodology which provides a means of justifying safe operation of Nuclear components through the concept of large break preclusion. This can be achieved through the application of fracture mechanics to determine limiting defect sizes and crack opening areas, along with fluid mechanics to determine leakage rates. LbB has been successfully applied in many different countries to meet the relevant regulatory requirements.

The objectives of this expert panel session are as follows:
- Introduce the fundamental concepts of LbB
- Highlight the latest research in this topic
- Outline how the regulatory environment shapes the requirements of LbB procedures

PANELISTS:

Dr Peter Gill is a Chartered Mechanical Engineer, specializing for the last 8 years in Structural Integrity within the Materials Science and Structural Integrity (MSSI) business of Wood. Peter works on plant assessment methodologies, and performs research and development on Leak-before-Break and environmental fatigue. He completed a Nuclear Engineering doctorate entitled “Investigating leak rates for Leak-before-Break assessments” at the University in Manchester in 2013. Since then he has had a lead role in developing the Leak-before-Break section of the R6 structural integrity assessment procedure. Peter has also developed sessions at the ASME Pressure Vessels and Piping conference and is a visiting researcher at the Dalton Nuclear Institute at the University of Manchester.

John Sharples is a Technical Manager and Chief Technologist in the field of structural integrity at Wood. He has worked in the nuclear industry for over 30 years, mainly on developing, validating and applying structural integrity assessment procedures. A large part of his work has been associated with the R6 fracture mechanics procedures, the BS7910 fitness-for-purpose code and numerous European projects, including STYLE+ and the NULIFE Network of Excellence, focused on plant life management and plant life extension issues. John sits on the NUGENIA Executive Committee.

Dr Gery Wilkowski has been involved in conducting experimental and analytical pipe fracture mechanics projects since 1974. He received his bachelor's and master's degrees in mechanical engineering from University of Michigan and his PhD in Nuclear Engineering from University of Tokyo. He has published over 400 papers on oil and gas pipelines, as well as nuclear pressure vessels and piping systems and fracture toughness testing. He was involved with the technical basis of the original NRC Draft Standard Review Plan 3.6.3 on LBB, and conducted large project on piping fracture behavior for the NRC and the International Piping Integrity Research Group Program (IPIRG). He has been a technical editor of several journals, and is an ASME Fellow since 1997. He was the Chairman or Vice-Chairman of the ASME PVP Division’s Materials and Fabrication Committee for 8 years, has been a member of the ASME Be-PV Code Section XI Committee since the early 1980’s, and is the current secretary of the Section XI Working Group on Pipe Flaw Evaluation since about 1990. He founded Engineering Mechanics Corporation of Columbus in 1998 after being at Battelle-Columbus for 23 years. He has developed the Lie-Balanced Putter System that is USGA/R&A approved, patented, and went into commercial production in 2016. He enjoys golf, drinking beer, eating fresh oysters, and drinking beer.

Dr Klaus Heckmann studied physics in Darmstadt (Germany) and Grenoble (France). He earned his PhD in Nuclear Physics in 2011. Since 2012 he works for Gesellschaft für Anlagen- und Reaktorsicherheit (GRS) gGmbH in Cologne/Germany, in the structural mechanics group. His professional interest is focus on Leakage rates, fracture mechanics, probabilistic methods and techniques, and software development.

Dr Jinya Katsuyama is a Principal Researcher in Nuclear Safety Research Center of Japan Atomic Energy Agency (JAEA). In 2004, he started research on the structural integrity assessment method based on weld residual stress analysis at Osaka University. From 2006, he has been engaged in research on the aged degradation of nuclear components such as neutron irradiation embrittlement in reactor pressure vessel, stress corrosion cracking and fatigue in piping welds at JAEA. In addition, he has been developing deterministic and probabilistic fracture mechanics methodologies for reactor pressure vessel and primary piping in light water reactors. Currently, he contributes to development of a guideline on probabilistic fracture mechanics analysis methodology focusing on its practical use in Japan.
Dr David Rudland is a Senior Technical Advisor for Nuclear Materials in the Office of Nuclear Reactor Regulations at the U.S. Nuclear Regulatory Commission where he has worked for ten years. He is the Division of Materials and License Renewal subject matter expert in the area of nuclear materials and component integrity with an emphasis on probabilistic fracture mechanics, solid mechanics and materials aging management. He is also the NRC representative on the ASME Board of Nuclear Codes and Standards and heavily involved in both the ASME Section XI code committees and the ASME PVP Division. Before joining the NRC, he worked as an NRC contractor at Engineering Mechanics Corporation of Columbus and Battelle Memorial Institute. Dr Rudland received a Bachelor’s and Master’s degree in Mechanical Engineering from the University of Illinois, and a Ph.D. in Materials Engineering from Yokohama University in Japan through a visiting scholar program.

Tuesday, July 24
14:00 – 16:00
Cremant, 1st Floor
Experience Feedback of New Nuclear Power Plant Construction

Chair: Yanping Huang, NPIC
Co-Chair: Kohei Hisamochi, Hitachi GE
Panelists: Fengwei Song, China Zhongyuan Engineering Corporation
Tai Jiang, CNPE
Yusuke Amma, Hitachi
Cuifang Wang, SNERDI
Donghai Wang, CNPE

Panelists:

Fengwei Song is Vice President of China Zhongyuan Engineering Corporation, a subsidiary of China National Nuclear Corporation. He is also working as General Manager of Karachi Nuclear Power Project Unit 2& Unit 3 in Pakistan. Mr. Song received a bachelor’s degree in welding processing from Jiangsu University of Science and Technology in 1985. He has been working at the frontier of nuclear power projects for over 30 years and contributed to many nuclear power projects in China such as Qinshan NPP, Daya Bay NPP, Haiyang NPP, Tianwan NPP. He has worked as general manager for five different nuclear power projects and is well known for his expertise in M310, VVER, AP1000 and HPR1000 as well as his safety management methodology and produced innovative construction methods. He is the sole author of Pre-introduction of HPR1000 Primary Loop Equipment and first author of Research on Chemical Treatment of Marine Organism for Coastal Nuclear Power Plant as sole author and Modular Construction of Reactor Pit Pool for a Nuclear Power Plant and Application of MVC on a Nuclear Power Plant Seawater Desalination Design.

Tai Jiang is Deputy Chief Engineer of China Nuclear Engineering Co., Ltd (CNPE), he is also Chief Engineer of the Fuqing Nuclear Power Project department of CNPE.

Tai Jiang had worked at Beijing Institute of Nuclear Engineering as Material Engineer for 17 years from 1987 to 2004. Tai Jiang had taken part in Lingao Nuclear Power Project Phase 2, Fuqing Nuclear Power Project Phase 1 And Fangjiashan Nuclear Power Project as Manager of the Design department from 2005 to 2013.

From 2013 to present, Tai Jiang has worked in the Fuqing Nuclear Power Project department of CNPE, which is in charge of managing Fuqing unit 5&6, Fuqing unit 5 is first unit of htr1000.

Yusuke Amma is the Construction engineer of Nuclear Plant Department of Hitachi-GE Nuclear Energy, LTD. He started work as a welding engineer in the Nuclear Manufacturing Department. He worked at Shimane Nuclear Power Plant Construction Project for 3 years as installation supervisor from 2008 to 2011. After that he also took part in Fukushima nuclear power plant as a supervisor after the Fukushima disaster. From 2012 to present, he has worked at Wyfla Neyydl nuclear power station project on the construction planning team.

Cuifang Wang is the Deputy Director of Project Management Department of Shanghai Nuclear Engineering Research & Design Institute (SNERDI), and is the deputy Project Manager of CAP1000 standard design project and Sanmen Phase-2 design project.

She has 15 years experience of I&C system design and 8 years of project management experience for the nuclear power plants.

Beginning from 2010, Mrs. Cuifang WANG contributed herself on the development and operation of experience feedback system in SNERDI. Her team built the procedures and software platform, established relations with owners, engineering company, manufacturers to collect experience feedback to optimize the design of CAP project.

Donghai Wang is the director of the quality assurance department of CNPE (China Nuclear Power Engineering Co., Ltd). He has worked in BINE and CNPE for 25 years (BINE-Beijing Institute of Nuclear Engineering). From 1993 to 2015, he was responsible for the design of ultimate heat sink, water intake and discharge, water supply and drainage, fire fighting, water treatment, cooling tower for nuclear power plants. Since 2016, he has been in charge of quality assurance of CNPE. Donghai Wang received a Bachelor’s degree in Water Treatment from Wuhu University, and a Master’s degree in Nuclear Energy Science and Engineering from Harbin Engineering University.
14:00 – 16:00

Robust Fuel Development

Bouzy, 1st Floor

**Chairs:**
- Sumit Ray, Westinghouse
- Min Xiao, CNPRI
- Hisaki Sato, Toshiba

**Panelists:**
- Sumit Ray, Westinghouse
- Nicolas Vioujard, Framatome
- Dr Min Xiao, CNPRI
- Hisaki Sato, Toshiba Energy Systems & Solutions Corporation
- Dave Goddard, UK National Nuclear Laboratory

The development of Robust or Accident Tolerant Fuel (ATF) has become an international area of interest and effort in the last few years. Conceptually ATF would provide leap-ahead improvement in LWR fuel safety during beyond design basis accidents and commercial benefit to nuclear utilities. Accelerated by the severe accident at the Fukushima Daiichi nuclear power plant in Japan, a variety of research and commercial analysis of ATF is presently underway globally. The goal of this effort is insertion of ATF lead test rods into a commercial PWR within the next couple of years.

This panel will present and discuss the state-of-art knowledge of ATF from the point of view of industry, government, non-profit research agencies, and academic representatives currently leading global ATF development. The significant challenges in development and implementation of ATF, such as large scale ATF fabrication, acceptance by nuclear utilities, the role of government and inter-government agencies in ATF research oversight, and the engineering and scientific challenges to develop ATF will be presented. The goal of this panel is to communicate the current understanding of the commercial and technical challenges faced in ATF development.

**Panelists:**

**Sumit Ray** is currently Director of Fuel Technology & Product Development in the Westinghouse Global Technology organization. In this position, he is responsible for the development of all new fuel related technologies and fuel designs for Westinghouse. Sumit has been with Westinghouse for over thirty five years, in increasing positions of responsibility. He has held various director level positions in Fuel Development & Core Design, and has held a variety of management positions in Reactor Core Design, Fuel Development and Regulatory Licensing.

Sumit is currently the Westinghouse executive lead on the DOE CASL program and is also a member of the CASL Board of Directors. He currently also leads the Accident Tolerant Fuel program for Westinghouse. Sumit is a member of the American Nuclear Society, and participates as a member of the ANS rewards committee. Sumit holds a Bachelor’s Degree in Chemical engineering from the Indian Institute of Technology in Kanpur, India, a Master’s Degree in Chemical Engineering from West Virginia University, and an MBA from the University of Pittsburgh. In addition, Sumit has taken post Graduate level classes in Nuclear Engineering at Carnegie Mellon University.

**Nicolas Vioujard** started his career in Framatome in November 1999 as Thermal-Hydraulic Engineer responsible of the CATHARE GB code (code used for Large Break LOCA safety studies). In 2003, he joined the Fuel Design Business Unit of the former AREVA group and hold various management position in the fields of Fuel Assembly Design, Fuel Rod Design, Materials Development. In particular, from 2008 to 2013, he was Worldwide Manager, Materials and Thermal-Mechanics.

In 2013, he joined a subsidiary of the former AREVA group, now renamed Orano Projet, as Manager General Arrangement to lead a Department in charge of Layout, Piping, Civil work and HVAC Design, serving Fuel cycle facilities of the Orano group.

In 2016, he was appointed Deputy Engineering Manager for Flamanville 3 Project and then in 2017 for Taishan Project in both cases for the scope of activities under the responsibility of AREVA/Framatome. Since beginning of 2018, Nicolas Vioujard came back to the Framatome Fuel Business Unit as Materials Line Senior Manager in the Products and Technology Division.

**Dr Min Xiao**, Ph.D, Professor, Deputy Chief Engineer, China Nuclear Power Research Institute (CNPRI)/China General Nuclear Power (CGN)

Min Xiao has been a great contributor to the field of reactor core design, fuel management and PWR fuel industry in China. He has organized and implemented a series of advanced core design and fuel management projects for China 1000MWe PWRs including:
- Daya Bay NPP 18 Month Fuel Cycle, first in China;
- Severe Accident Management Guideline Implementation in Daya Bay NPP, first in China;
- Ling Ao Advanced Fuel Management (1/4 refueling) project, first in China; and
- PWR Initial Core 18 Month Project with Gadolinium-bearing Fuel, first in the world.

He has won multiple awards including; first prize of National Defense Science and Technology, first prize of China National Nuclear Industry Science and Technology Achievements, and the Grand ICONE AWARD (ICONE25, in Shanghai, China, 2017).


**Hisaki Sato**, Toshiba Energy Systems & Solutions Corporation, Kanagawa, Japan

Hisaki Sato is a group manager of Nuclear Core & Fuel group in Nuclear Safety System Design & Engineering Department at Toshiba Energy Systems & Solutions Corporation. He has 17 years experience in nuclear industry, 10 years in Nuclear Core & Fuel group and 7 years experience in Reactor Core Design.
Dave Goddard is the Laboratory Fellow for Nuclear Fuel Manufacturing at the UK National Nuclear Laboratory. He has over 25 years’ experience providing specialist technical support to fuel manufacturing operations in the UK. He is currently leading work on developing fuels with enhanced accident tolerance including the investigation of novel fabrication routes for high uranium density fuels, such as uranium silicide, that could lead to a step change in the next generation of nuclear fuels. This work is being supported through collaborations with a number of leading universities. Dave is a Fellow of the Institute of Materials, Minerals and Mining and a Royal Academy of Engineering Visiting Professor at the University of Manchester.

Dr Hiroyuki Yamada is a Senior Research Scientist in Nuclear Risk Research Center of Central Research Institute of Electric power Industry (CRIEPI). He has been engaged in nuclear safety research on the seismic PRA since 1996 in Japan Atomic Energy Research Institute (JAERI). In 2002, he started to research on the disaster mitigation and communication based on the spatial temporal information system in National Research Institute for Earth Science and Disaster Prevention (NIED). From 2007, he has been engaged in research on the nuclear risk communication in Japan Nuclear Energy Safety Organization (JNES). He was involved in IAEA project of Tsunami EBP from 2007 to 2010. He has developed TiPEEZ (Tsunami and Post Earthquake Response in the External Zone) system, and TiPEEZ system for disaster management was implemented in Member States. From 2014, he has been engaged in research on risk communication and seismic/tsunami PRA in order to assist nuclear operators and nuclear industry to continually improve the safety of nuclear facilities. He is a Specially Appointed Professor in Graduate School of Engineering of Niigata Institute of Technology since 2016.

Kirsty Gogan is co-founder and executive director of Energy for Humanity (EFH), a UK-and Switzerland-based non-profit organisation with a global outlook focused on solving climate change and enabling universal access to modern energy services. Future leaders will need all tools at their disposal to solve global challenges including air pollution and energy security, whilst providing low cost, clean power to billions of people and improving life chances for women and children throughout the world.

In pursuit of these goals, Energy for Humanity (EFH) strongly advocates for evidence-based, whole-system, and technology-inclusive solutions in pursuit of the best (meaning, fastest, most cost-effective, most feasible) outcomes for people and nature. Our work includes running projects in multiple countries, including oversight of a successful campaign to prevent premature closure of the Swiss nuclear fleet in 2016. EFH led a delegation of the world’s most highly regarded climate scientists to Paris COP21 in order to make the case for nuclear to be recognised as a climate solution. EFH was subsequently shortlisted for the Business Green Leaders “Green NGO of the Year” Award in 2016. In 2017, at COP23, EFH published a new report on European Climate Leadership 2017 and presented a new study on Decarbonizing Cities with Advanced Nuclear. Ms. Gogan is also founding director of CleanTech Catalyst (a consultancy specialising in climate and energy), recently commissioned by the Energy Technologies Institute to lead the
PaNeLISTS:
Panelists:

**Chair:** Richard Schultz, Texas A&M University

**Panelists:**
- Dr Yassin Hassan, Texas A&M University
- Shuo Li, State Nuclear Power Technology Corp.
- Elia Merzari, Argonne National Laboratory
- Dr Hideo Nakamura, Japan Atomic Energy Agency
- Sam Treasure (or other participant from Rolls-Royce Ltd)

The panelists will discuss the importance, scope, and techniques fundamental to verifying and validating software used to analyze thermal-hydraulics in nuclear systems. Of particular interest are the techniques used to define the matrix of experiments used to validate the software (both systems analysis and CFD) over the nuclear system operational and accident domains. The various scaling techniques employed to design experimental facilities and to achieve the V&V objectives will likely be discussed.

### PaNeLISTS:

**Dr Yassin Hassan** is Professor and Head of the Department of Nuclear Engineering, Sallie and Don Davis’61 Professor of Engineering and also Professor of the Department of Mechanical Engineering at Texas A&M University. Prior to joining Texas A&M University, he worked for seven years at Nuclear Power Division, Babcock & Wilcox Company, Lynchburg, Virginia. His research is in computational and experimental thermal hydraulics, reactor safety, laser-based flow visualization and diagnostic imaging techniques, system modeling, multiphase flow, transient and accident analyses and advanced nuclear reactors.

**Shuo Li** works for State Power Investment Corporation Research Institute (SPICRI) and National Energy Key Laboratory of Nuclear Power Software in China. The software package COSINE (Core and System Integrated Engine for design and analysis) is developed by SPICRI. He mainly researches in the development and V&V of NPP design software.

**Dr Hideo Nakamura** is Technical Associate of Nuclear Safety Research Center, Japan Atomic Energy Agency (IAEA) since April 2018. He joined former Japan Atomic Energy Research Institute (JAEIR) in 1981 to work for the ROSA (Rig-of-Safety Assessment) program to study thermal-hydraulic phenomena during reactor accidents for both of BWR & PWR with large-scale experiments under reactor prototypical conditions. In 2001, he became a head of Thermo-hydraulic Safety Research Group dedicated for both of severe accident and beyond design-basis accidents. Since 2005, he was a director of operating agent (JAEA) of the OECD/NEA ROSA and ROSA-2 Projects with LSTF experiments. He is an executive editor of Nuclear Engineering and Technology since 2015.

### Wednesday, July 25

**14:00 – 16:00**

**Epernay, 1st Floor**

**V&V of Software Used to Analyze Thermal-Hydraulics in Nuclear Systems**

**Education and Human Resources Development**

**Chair:** Asif Arastu, Unisont Engineering, Inc.
- Yassin Hassan, Texas A&M University
- Leon Cizelj, Jozef Stefan Institute
- John Roberts, The University of Manchester
- Hideharu Takahashi, Tokyo Institute of Technology
- Kan Wang, Tsinghua University

**Panelists:**
- Dr Yassin Hassan, Texas A&M University
- Dr Guanghui Su, Xi’an Jiaotong University
- Dr Leon Cizelj, Jozef Stefan Institute
- Dr Akihide Kugo, JANSI
- Dr Kan Wang, Tsinghua University
- Hiroshige Kikura, Tokyo Institute of Technology

**Panelists:**

**Dr Yassin Hassan** is Professor and Head of the Department of Nuclear Engineering, Sallie and Don Davis’61 Professor of Engineering and also Professor of the Department of Mechanical Engineering at Texas A&M University. Prior to joining Texas A&M University, he worked for seven years at Nuclear Power Division, Babcock & Wilcox Company, Lynchburg, Virginia. His research is in computational and experimental thermal hydraulics, reactor safety, laser-based flow visualization and diagnostic imaging techniques, system modeling, multiphase flow, transient and accident analyses and advanced nuclear reactors.

**Dr Guanghui Su** is a professor of Xi’an Jiaotong University, and he is the winner of the National Science Foundation for Distinguished Young Scholars of China, Yangtze river scholars Distinguished Professor. He is the co-editor of ASME Journal of Nuclear Engineering and radiation Science and as TPC Chair of ICONE18 held in Xian 2010.

**Dr Leon Cizelj** is head of Reactor Engineering Division of the Jozef Stefan Institute, Ljubljana, Slovenia (http://r4.ips.si/en). He is responsible for the strategic and operational leadership of the division active in the field of nuclear engineering and safety of nuclear installations. Activities include research, postgraduate education, technical and scientific support to the Slovenian nuclear regulatory body and technical and scientific consulting to end users. Full professor of nuclear engineering at the University of Ljubljana, Slovenia, Faculty of mathematics and physics. President of the ENEN (European Nuclear Education Network www.enen.eu) Association in 2016, 2017 and 2018. Associate editor of Journal of Nuclear Engineering and radiation Science ASME. Member of the editorial board of Science and Technology of Nuclear Installations. Ph. D. in Physics 1993, University of Ljubljana, Slovenia. Author or coauthor of more than 690 publications more than 100 interviews in the Slovenian mainstream media.
Dr Akioide Kugo is Executive Officer and General Manager for International Department of Japan Nuclear Safety Institute.

Dr Kugo dedicated himself in developing leadership educational programs for nuclear operators such as from the CEOs to the first-line managers. Dr Kugo is also a member of Working Group on Human and Organizational Factors (WGHOF) of CSNI OECD/NEA. From the aspects of human attributes, Dr Kugo established the program of a crisis management drill and exercise based on the episodic memories of Fukushima Accident. He also applied the methodology of psychological model of Johari-Window to the assessment of leadership training for shift supervisors of nuclear power station. Dr Kugo received a bachelor's degree in Mechanical Engineering from Tokyo University in Japan, and Master degree of Arts in International Study from Leeds University in U.K., and Ph.D. in Energy Science from Kyoto University in Japan. Dr Kugo currently looks after the international business of JANSI.

Dr Kan Wang, PhD, Professor of Nuclear Engineering and Director of Institute of Nuclear Energy Science and Engineering Management (INESEM) at Department of Engineering Physics in Tsinghua University, Beijing. Main research interests include: Development of nuclear numerical reactors, Monte Carlo methods and multi-physics coupling applied in reactor analysis. New and advanced thorium-based nuclear energy system. Safety analysis. About 680 journal and conference papers have been published, 35 PhD have been fostered while 20 PhD students are at study. Consulting work include: China Nuclear Power Society (Vice President), China Nuclear Education Society (Vice President), Beijing Nuclear Society (Vice President), Academic Committee of Reactor Design Technology Key Lab (Vice Director), etc.

Craig Stover is a Senior Technical Leader in the Advanced Nuclear Technology (ANT) program at the Electric Power Research Institute (EPRI). In his role, Craig is responsible for managing materials, component, and advanced manufacturing research to support new nuclear plant construction. Craig’s prior work within EPRI has included managing heat exchanger and thermal performance research. Craig joined EPRI after spending 6 years with South Carolina Electric & Gas (SCE&G). During his time at SCE&G, Craig worked on the VC Summer Project licensing and constructing 2 new nuclear power plants. Craig holds a BS degree in Mechanical Engineering from the University of South Carolina and a MBA from Ohio University.

Dr Michael Preuss is Deputy Director of the Nuclear Rolls-Royce University Technology Centre at the University of Manchester and champions the Materials Systems for Demanding Environment theme within the Henry Royce Institute, UK’s National Institute for Materials Science Research and Innovation. He is also associated editor for Journal of Nuclear Materials and led an EPSRC Programme grant focusing on advanced nuclear manufacturing (NNUMAN), which involved academics from the University of Manchester and the Nuclear-AMRC. Michael obtained his PhD from the Technical University Hamburg-Harburg and joined the University of Manchester in 1999. In 2003, he was appointed as Lecturer in Materials Performance and became a core member of the Materials Performance Centre, which focuses on nuclear materials research. Michael was appointed as Chair in Metallurgy in 2010 and has served on a number of scientific advisory boards at large scale research facilities. Currently, he chairs the Scientific Advisory Council of the European Spallation Source (ESS) based in Lund, Sweden and is SAC member of UK’s Neutron and Muon Source ISIS.

Dr Will Kyffin is responsible for the powder metallurgy activities within the Nuclear AMRC. This focuses on the consolidation of metallic powders via HIP for nuclear applications. Prior to the Nuclear AMRC, Dr Kyffin spent 8 years in a technical role at TWI researching solid state joining techniques. Before this, Dr Kyffin was a product metallurgist responsible for ensuring quality of wrought nickel based products such as Inconel 718, 625 and 825. His degree and PhD are from the University of Manchester in 1999. In 2003, he was appointed as Lecturer in Materials Performance and became a core member of the Materials Performance Centre, which focuses on nuclear materials research. Michael was appointed as Chair in Metallurgy in 2010 and has served on a number of scientific advisory boards at large scale research facilities. Currently, he chairs the Scientific Advisory Council of the European Spallation Source (ESS) based in Lund, Sweden and is SAC member of UK’s Neutron and Muon Source ISIS.

Craig Stover
EPRI
Tomofumi Yamamoto
Mitsubishi Heavy Industries

Craig Stover, EPRI
Dr Michael Preuss, Nuclear Rolls-Royce University Technology Centre at the University of Manchester
Dr Will Kyffin, Nuclear Advanced Manufacturing Research Centre
Eleonora Lambridis, Westinghouse
Naoki Suda, Mitsubishi Heavy Industries

Advanced Manufacturing technologies have the capability to significantly improve the cost, schedule, and quality associated with manufacturing nuclear components. This panel will feature presentations from 6 panelists that are leading work around the world to progress the development of Advanced Manufacturing technology.

14:00 – 16:00
Advanced Manufacturing
Bouzy, 1st Floor
Chairs: Craig Stover, EPRI
Tomofumi Yamamoto, Mitsubishi Heavy Industries

Panelists:
Craig Stover, EPRI
Dr Michael Preuss, Nuclear Rolls-Royce University Technology Centre at the University of Manchester
Dr Will Kyffin, Nuclear Advanced Manufacturing Research Centre
Eleonora Lambridis, Westinghouse
Naoki Suda, Mitsubishi Heavy Industries

Eleonora Lambridis is the manager of Westinghouse's global open innovation program WeLink. In her role, she has the mission to explore and develop new technologies to the nuclear industry through collaboration with startups, small and medium sized enterprises (SMEs), and research centers. Eleonora has been an innovation leader for Europe Engineering for the past 3 years, and since 2010 has worked as an engineer and project manager for Westinghouse in various roles of increasing responsibility. She has an M.B.A. degree from the Solvay Brussels School of Management and Economics (Belgium) and a master degree in nuclear engineering from the University of Rome La Sapienza (Italy).
**14:00 – 16:00**  
Epernay, 1st Floor  
**SMRs & Advanced Technologies**

**Chairs:** Robert Stakenborghs, ILD Inc.  
Tian Lin, SNERDI  
Kohei Hisamochi, Hitachi GE

**Panelists:**  
Xujia Wang, SNERDI  
Dr Yu Liu, NPIC  
Dr Paolo Ferroni, Westinghouse  
Dr Kazuaki Kito, Hitachi GE

This panel will consist of seven global nuclear technology leaders in advanced and small modular reactors. They will present and discuss technology development progress and status on SMR, advanced reactors, High Temperature Gas Cooled (HTGC) Reactor, and other advanced reactor technologies.

**Panelists:**

**Xujia Wang**, CHINA. Director of General Technology Department, SNERDI.  
He graduated from Tsinghua University with master degree of nuclear science and technology. He has over ten years working experience in the fields of new reactor development/core thermal hydraulic design/accident analysis. He participated the project of CNP300/CAP1000 design, and is engaged on CAP1400/CAP1700 development. Now, he is also in charge of the development of advanced SMRs in SNERDI.

**Dr Yu Liu** is a Senior Research Engineer of NPIC (Nuclear Power Institute of China), and acts as the leader of thermal-hydraulic group at the design sub-institute. He obtained his BA and PhD in Nuclear Science and Technology from Tsinghua University, China in 2005 and 2010. He mainly works on thermal-hydraulic design and safety analysis of nuclear power plant. His interesting includes multi-physics and multi-scale coupling, CFD analysis and DNBR online monitoring. Also he is a member to develop self-reliant software of NPIC, which has been used for ACP100 (Small Modular Reactors of China) design.

**Dr Paolo Ferroni** is a Fellow Engineer in the Advanced Reactor Development group at Westinghouse Electric Company LLC. He is the technical lead for the Westinghouse Lead Fast Reactor that the company is pursuing as its Next Generation of high-capacity nuclear power plant technology. While at Westinghouse, Dr Ferroni has worked on several programs focused on the development of advanced technologies for both LWRs and non-LWRs, particularly in the area of advanced fuels and advanced reactor concepts. Dr Ferroni received a MS in Nuclear Engineering from Turin Polytechnic (Italy) and a PhD in Nuclear Engineering from the Massachusetts Institute of Technology (USA).

**Dr Kazuaki Kito** is a senior engineer of Hitachi-GE Nuclear Energy. He has been developing the plant system and thermal-hydraulics of BWRs and other innovative reactors, and he now mainly works on plant system design of a small modular BWR. He received Ph.D degree of engineering from the University of Tokyo in 1998.

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**14:00 – 16:00**  
Chalon, 1st Floor  
**Intelligent Technology Application in Nuclear Power Plants**

**Chairs:** Ke Tan, China Nuclear Power Engineering Co., Ltd  
Ken Canavan, Westinghouse

**Panelists:**  
Qingwei Shi, China Nuclear Control Engineering Co., Ltd.  
Ke Tan, China Nuclear Power Engineering Co., Ltd  
Dr Guanghui Su, Xi’an Jiaotong University  
Ken Canavan, Westinghouse

**Panelists:**

**Qingwei Shi** is currently the General Manager of China Nuclear Control Engineering Co., Ltd. and he is the Researcher-level senior engineer. Mr. Shi has long been engaged in the nuclear instrumentation industry and has extensive experience in nuclear instrumentation. He graduated from Huabei Electric Power University with a major in power system relay protection and automatic remote technology.

From 2000 to 2017, Mr. Shi worked as the Director of Instrument Control Office, Director of the Instrumentation Management Division, Assistant to the General Manager and Chairman of the Labor Union of Jiangsu Nuclear Power Co., Ltd.

Since 2017, he has been the General Manager of China Nuclear Control System Engineering Co., Ltd.

**Ke Tan** is the Deputy Director of State Key Laboratory of Nuclear Power Safety Monitoring Technology and Equipment and a Member of Artificial Intelligence 2.0 National Science and Technology Major Special Item Hybrid Enhancement Expert Committee. He is the Director Human Factors Engineering Laboratory Founded by NEA. He is the Deputy Director of the Joint Laboratory of Human Reliability and Human-Computer Interaction founded by China Astronaut Research and Training Center and China Guangdong Nuclear Power Engineering Co., Ltd. He is also in charge of HPR1000 MCR R&E.
Dr Guanghui Su is a professor of Xi'an Jiaotong University, and he is the winner of the National Science Foundation for Distinguished Young Scholars of China, Yangtze river scholars Distinguished Professor. He is the co-editor of ASME Journal of Nuclear Engineering and radiation Science and as TPC Chair of ICONE18 held in Xian 2010.

Ken Canavan is the chief technology officer (CTO) for Westinghouse Electric Company. He has strategic responsibility to drive next-generation technology and innovation solutions that align with the company’s global business strategy, and leads the effort to strengthen Westinghouse with regard to technology leadership development.

Previously, Ken served as director, Engineering, for Electric Power Research Institute (EPRI). While at EPRI, he turned industry needs into compelling research and development plans. These plans resulted in solutions to improve the safety and performance of the global nuclear fleet.

Prior to his work at EPRI, Ken was responsible for risk applications at Data Systems and Solutions, ERIN Engineering and Research, and GPU Nuclear. He also was a safety analysis engineer with Davis-Besse Nuclear Power Station in Ohio (USA).

Canavan has a bachelor’s degree in chemical engineering, with a nuclear engineering minor, from Manhattan College, New York.
## Sunday, July 22

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<td>Computational Fluid Dynamics (CFD)</td>
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<td>09:00 – 15:00</td>
<td>Thermal-Hydraulics Methods, Experimentation and Benchmarking</td>
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<td>Nuclear Codes and Standards</td>
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<td>09:00 – 12:00</td>
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<td>Part 2 – International Communication about Nuclear Power Operation and Safety Monitoring Technologies</td>
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<td>Probability Safety Assessment and Severe Accidents</td>
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<td>16:00 – 18:00</td>
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### FULL DAY WORKSHOPS

**09:00 – 15:00**

**Bouzy, 1st Floor**

**Computational Fluid Dynamics (CFD)**

**Chair:** Yassin Hassan, Texas A&M University, USA

**Co-Chairs:**
- Hiroyuki Yoshida, Japan Atomic Energy Agency, Japan
- Masahiro Furuya, CRIEPI, Japan
- Yassin Hassan, Texas A&M University, USA
- Frederick Moody, Retired: GE Nuclear and Professor: San Jose State University, USA
- Richard Schultz, ISU TAMU, USA
- Elia Merzani, Argonne National Laboratory, USA
- Sofiane Benhamadouche, EDF, France
- Sam Treasure, Rolls-Royce, UK
- Hiroyuki Yoshida, Japan Atomic Energy Agency, Japan

The CFD seminar will target young researchers and engineers to provide the basis and results for selection of several CFD applications for certain thermal-hydraulic problems. Wide variety knowledge and up-to-date information on CFD will be presented by foreign CFD specialists. The presentations may begin with the fundamental equations and numerical solution methods, and then continues to recent developments and some practice guidelines of CFD for nuclear engineering applications. Informal discussions and questions will be conducted.

**09:00 – 15:00**

**Epernay, 1st Floor**

**Thermal-Hydraulics Methods, Experimentation and Benchmarking**

**Chair:** Guoqiang Wang, Westinghouse Electric Company, USA

**Co-Chairs:**
- Jovica Riznic, Canadian Nuclear Safety Commission, USA
- Shripad Revankar, Purdue University, USA
- Guanghui Su, Xi’an Jiaotong University, China
- Hiroaki Son, Japan Atomic Energy Agency, Japan
- Frederick Moody, Retired: GE Nuclear and Professor: San Jose State University, USA
- Guoqiang Wang, Westinghouse Electric Company, USA
- Peter Gill, Wood, UK
- Asif Arastu, Unisont Engineering, Inc., USA
- Robert Stakenborghs, ILD Inc., USA

This workshop will present an overview of some of the key Thermal-Hydraulic methodologies, experimentation procedures and their applications to nuclear power plants. The relevant computer code model and theory will be described and real experimental work will be presented and discussed. Meanwhile, computer code simulations of experiments and benchmarking will also be presented. For exchanging information and experience purposes, this workshop is applicable to both students/professors and engineers in the relevant industry fields.
09:00 – 15:00  Reims, 1st Floor

Nuclear Codes and Standards

Chair: Clayton Smith, ASME Board of Nuclear Codes and Standards, USA
Co-Chair: John Bendo, ASME Nuclear Business Manager, USA
Speakers: Masaki Morishita, Japan Atomic Energy Agency, Japan
          Osamu Oyamada, Japan Nuclear Safety Institute, Japan
          Clayton Smith, ASME Board of Nuclear Codes and Standards, USA
          John Bendo, ASME Nuclear Business Manager, USA

This workshop will promulgate an open technical exchange of information and sharing of lessons learned in response to current codes and standards needs. All interested stakeholders will contribute toward the development and modification of codes, standards, and conformity assessment activities and help identify international collaboration efforts.

HALF DAY WORKSHOPS

09:00 – 12:00  Chalon, 1st Floor

Waterhammer Analysis

Chair: Asif Arastu, Unisont Engineering, Inc., USA
Co-Chair: Robert Stakenborghs, ILD Inc., USA
Speakers: Frederick Moody, Retired: GE Nuclear and Professor: San Jose State University, USA
          Asif Arastu, Unisont Engineering, Inc., USA
          Robert Stakenborghs, ILD Inc., USA

This workshop will present an overview of the fluid mechanics of classical waterhammer theory and its application to nuclear power plant systems. All known waterhammer mechanisms will be discussed together with the methods of simulating these. Real plant examples will be presented and discussed. Results of computer simulation of waterhammer solutions will be presented in the form of animations showing the movement of pressure and velocity waves. These greatly help in understanding the phenomena and the associated mechanisms. Fluid Structure Interaction (FSI) aspects will also be addressed.

09:00 – 12:00  Alsace, Mezzanine Floor

Part 1 – Communication for Nuclear Professionals

Chair: Leon Cizelj, Jozef Stefan Institute, Slovenia
Co-Chairs: Kirsty Gogan, CEO and Cofounder Energy for Humanity, UK
          Asif Arastu, Unisont Engineering, Inc., USA
Speakers: Leon Cizelj, Jozef Stefan Institute, Slovenia
          Nathan Paterson, ENS YGN Chairman & Customer Account Manager – Civil Nuclear, Rolls-Royce
          Kirsty Gogan, CEO and Cofounder Energy for Humanity, UK
          Steve Kidd, East Cliff Consulting, UK

Why would nuclear professionals need communication skills? We may start with the fact that nuclear professionals communicate a lot in their daily work. This is communication between peers, is part of the training and is superbly mastered by most of the professionals. Then, in the everyday life, better communication skills could lead to better and more satisfying relations with the people that we interact with. Finally, the nuclear professionals could further develop their already considerable communication skills to communicate about the nuclear technologies beyond their peers. The workshop will provide the insight in the basic communication techniques and traps that might then be used by the participants in the real life situation.

12:30 – 15:00  Alsace, Mezzanine Floor

Part 2 – International Communication about Nuclear Power Operation and Safety Monitoring Technologies

Chairs: Leon Cizelj, Jozef Stefan Institute, Slovenia
        Ke Tan, China Nuclear Power Engineering Co., Ltd
        Fei-Yue Wang, Institute of Automation, Chinese Academy of Sciences, China
Co-Chairs: Kirsty Gogan, CEO and Cofounder Energy for Humanity, UK
          Asif Arastu, Unisont Engineering, Inc., USA
          Fei-Yue Wang, Institute of Automation, Chinese Academy of Sciences
          Ke Tan, China Nuclear Power Engineering Co., Ltd, China
          Jian-Guang Zhao, China Nuclear Power Engineering Co., Ltd, China
          Yi-Ke Guo, Imperial College London, UK
          Hidekazu Yoshikawa, Kyoto University, Japan
          Mikael Mononen, STUDSVIK, Sweden
          Shengke Zhi, Wood, China

Speakers: Fei-Yue Wang, Institute of Automation, Chinese Academy of Sciences
          Ke Tan, China Nuclear Power Engineering Co., Ltd, China
          Jian-Guang Zhao, China Nuclear Power Engineering Co., Ltd, China
          Yi-Ke Guo, Imperial College London, UK
          Hidekazu Yoshikawa, Kyoto University, Japan
          Mikael Mononen, STUDSVIK, Sweden
          Shengke Zhi, Wood, China

Observing parameters and determining the operation safety state by people may lead to the failure in seeing the wood for the trees. There exist threshold definition risks, patrolling
risks and the “passivity in time and human negligence” during accident handing. The safe operation of the nuclear power plant highly relies on people, but it is unable to estimate the human reliability.

**Learning Objectives:**

This workshop will discuss the development of nuclear power operation safety state monitoring technology.

- Provide an overview of the research the nuclear safe state monitoring and evaluation technologies to reduce the probability of nuclear safety accidents
- Discuss new industry standards related to safe state monitoring and evaluation of nuclear power plants
- Discuss how to reduce human failures and anticipate equipment failures
- Discuss how to develop an intelligent, highly-reliable new generation of nuclear operation safety monitoring system

### 12:30 – 15:00

**Probability Safety Assessment and Severe Accidents**

**Chair:** Ivo Kljenak, Jozef Stefan Institute, Slovenia

**Co-Chairs:** Tian Wex, Xi’an Jiaotong University, China
Alexei Miassoedov, Karlsruhe Institute of Technology, Germany

**Speakers:**
- Ivo Kljenak, Jozef Stefan Institute, Slovenia
- Tian Wex, Xi’an Jiaotong University, China
- Yoshihisa Nishi, Central Research Institute of Electric Power Industry, Japan
- Koji Okamoto, University of Tokyo, Japan
- Guanghui Su, Xi’an Jiaotong University, China
- Yapel Zhang, Xi’an Jiaotong University, China
- Alexei Miassoedov, Karlsruhe Institute of Technology, Germany
- Po Hu, Shanghai Jiaotong University, China
- Park Huan Sun, Pohang University of Technology, Korea

This workshop contains two parts: Probability Safety Assessment and Severe Accidents. Development and application of PSA in NPPs will be introduced. The phenomenology of severe accidents will also be presented, including heat transfer in the melt pool and hydrogen generation and combustion in the containment. The treatment of severe accidents in nuclear engineering and corresponding management requirements will also be exchanged in this workshop. This workshop is applicable to students and engineers in the PSA and severe accidents fields.
SUNDAY, 16:00 – 18:00

Development and Verification of a New Nuclear Data Processing System NECP-Atlas

Jialong Xu1 Tiejun Zu1 Liangzhi Cao1 Hongchun Wu1
1. Xi’an Jia Tong University, Xi’an, China; 2. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China

Development and Application of a 2D/1D Fusion Code with Leakage Reconstruction Method

Liang Liang2 Zhouyu Liu1 Hongchun Wu2
Sheng Wang3 Qian Zhang4 Qiang Zhao1
1. Harbin Engineering University, Harbin, China; 2. Xi’an Jiao Tong University, Xi’an, China; 3. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China

A Neutron Transport Calculation Method for Deep Penetration and its Preliminary Verification

Wankui Yang1 Baoxin Yuan2 Songbao Zhang3
Haibing Guo1 Yuqiang Liu1 Li Deng3
1. China Academy of Engineering Physics, Mianyang, China; 2. Institute of Nuclear Physics and Chemistry, Mianyang, China; 3. Institute of Applied Physics and Computational Mathematics, Beijing, China

Development of Three-Dimensional Neutron Kinetics Code based on High Order Modal Expansion Method in Hexagonal-Z Geometry

Chao Guo1 Yu Liu1 Hangxing He1 Luguo Liu2 Xiaoyu Wang3
Sufang Xin1 Peiyong Li1 Hongsheng Yuan1 Xiaoli Wu2
1. North China Electric Power University, Beijing, China; 2. Nuclear Power Institute of China, Chengdu, China; 3. Institute of Nuclear Physics and Chemistry, Mianyang, China

Application of the Dynamic Rod Worth Measurement Method on WWER

Wenbo Zhao, Zhumin Jiang, Liangzi Wang, Chentian Wang, Yingrui Yu, Zhaohu Gong, Minxiao Zhong, Tongxian Liu, Hongzhi Xiang
Nuclear Power Institute of China, Chengdu, China

Nuclear Fuel and Material, Reactor Physics and Transport Theory

2-5 Reactor Physics: Methodology Development II

Sunday July 22 Room Talbot I 16:00 – 18:00

Session Chair: Hany Abdel-Khalik, Purdue University, USA

The Preserving Neutron Flux Properties Discrete Scheme for Multi-media Time-dependent Neutron Transport Equations

Zhengying Hong, Guangwei Yuan, Junxia Wei
Institute of Applied Physics and Computational Mathematics, Beijing, China

Analysis and Improvement of Global-Local Self-Shielding Calculation Scheme for AIC Control Rods

Jikui Li1 Tiejun Zu2 Liangzhi Cao1 Hongchun Wu1 Qingming He1
1. Xi’an Jia Tong University, Xi’an, China; 2. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China

Multi-dimensional Heterogeneous Resonance Integral Tables Generated for Embedded Self-shielding Method Towards Irregular Lattices

Qian Zhang1 Qiang Zhao1 Hongchun Wu2 Liangzhi Cao2 Zheng Zheng4
1. Harbin Engineering University, Harbin, China; 2. Xi’an Jiao Tong University, Xi’an, China; 3. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China; 4. Shanghai Nuclear Engineering Research and Design Institute Co. Ltd., Shanghai, China

Variational Optimization with Multi-Group Neutron Diffusion Equations: A Two-Group Diffusion Model Validated with Monte Carlo

Zafar Koreshi, Hamda Khan
Air University, Islamabad, Pakistan

A Space-time Parallel Method to Solve Space-Dependent Neutron Kinetics Equations in Hexagonal-Z Geometry

Zhizhu Zhang, Yun Cai, Xingjie Peng, Qing Li
Nuclear Power Institute of China, Chengdu, China

Parallel Computation of the Point Neutron Kinetic Equations using Parallel Revisionist Integral Deflected Correction

Yun Cai, Xingjie Peng, Qing Li, Zhizhu Zhang, Zhuming Jiang, Rui Guo
Nuclear Power Institute of China, Chengdu, China

Nuclear Fuel and Material, Reactor Physics and Transport Theory

2-8 Zirconium-based Materials and Zirconium Compounds

Sunday July 22 Room Cremant I 16:00 – 18:00

Session Chair: Carsten Schroer, Karlsruhe Institute of Technology (KIT), Germany

A Theoretical Model of the Stress Intensity Factor Threshold of DHC for Fuel Cladding Tube

Liang Chen, Lili Liu, Xiaoming Song, Hua Pang
Science and Technology on Reactor System Design Technology Laboratory, NPIC, Chengdu, China

Analyzing the Impact of Solutes on PKA Spectrum for Simulation of Neutron Induced-Radiation Damage in Zr-Based Metals

Guangbo Cai, Yadong Zhang, Xuyang Han, Jiapei Yu
China Institute of Atomic Energy, Beijing, China

Strength Limit of Thimble Tube with Material Plasticity under Bending Moment and Axial Compression Force

Hisashi Koike1 Masaji Mori1 Daisuke Fujiwara2 Takashi Shimomura2
1. Nuclear Development Corporation, Ibaraki, Japan; 2. Mitsubishi Nuclear Fuel Co., Ltd, Ibaraki, Japan

Effect of Final Annealing Temperature on Axial Creep Property of CZ Alloys

Lin Shi, Liutao Chen, Yang Xu, Changyuan Gao, Jun Tan, Yongjun Deng
China Nuclear Power Technology Research Institute Co., Ltd, Shenzhen, China

Investigation on Breakaway Oxidation Behavior of CZ Alloys

Changyuan Gao, Liutao Chen, Lin Shi, Yang Xu, Jun Tan, Yongjun Deng
China Nuclear Power Technology Research Institute Co., Ltd, Shenzhen, China

Oxidation Kinetics and Oxide Properties of Zirconium Hydride

Mingwang Ma, Lei Wang, Binghua Tang
Institute of Electronic Engineering, China Academy of Engineering Physics, Mianyang, China
Nuclear Fuel and Material, Reactor Physics and Transport Theory

2-10 Nuclear Fuel Safety and Performance Analysis II

Sunday July 22

Session Chair: Rong Liu, City University of Hong Kong, Hong Kong

Thermal and Mechanics Analysis Code of the PWR Nuclear Fuel Performance based on FEM [ICONE26-81295]

Yongbo Hui, Bo Zhang, Wenhua Zhang, Di Yen, Peichao Zhai
Xi’an Jiao Tong University, Xi’an, China

First Steps Towards the Development of a 3D Nuclear Fuel Behavior Solver with OpenFOAM [ICONE26-82381]

Alessandro Sciarolo1, Ivor Clifford1, Carlo Fiorina1, Andreas Pauz1,2
1. École polytechnique fédérale de Lausanne (EPFL), Lausanne, Switzerland;
2. Paul Scherrer Institute, Villigen, Switzerland

Creation of an OpenFOAM Fuel Performance Class based on FRED and Integration into the GeoF-3D Multi-Physics Code [ICONE26-81574]

Carlo Fiorina1, Konstantin Mikityuk2, Andreas Pauz1,2
1. École polytechnique fédérale de Lausanne (EPFL), Lausanne, Switzerland;
2. Paul Scherrer Institute, Villigen, Switzerland

Analysis on the Dynamic Buckling Behavior of the Spacer Grid Structure [ICONE26-82298]

Yan Guo1, Chenglong Gu1, Wei Tian1, Weicai Li1
1. China Nuclear Power Technology Research Institute Co., Ltd., Shenzhen, China;
2. China Nuclear Power Research Institute, Shenzhen, China

Analysis on Pellet-Cladding Interaction of Fuel Rod during Power Ramp of NHR200-II [ICONE26-81596]

Tianshan Kang, Songyang Li, Dingguo Wang, Yueyuan Jiang, Weihua Li
Tsinghua University, Beijing, China

Study on Variation of HPGE Detector Dead Layer Thickness and its Effect on the Measurements of the Detector Response and Samples Characterization using Monte Carlo Simulation [ICONE26-82098]

K. Abdelgawad1, Song Yushou2
1. Egyptian Nuclear and Radiological, Cairo, Egypt; 2. Harbin Engineering University, Harbin, China

Computational Fluid Dynamics (CFD)

9-3 Single-phase Flow

Sunday July 22

Session Chair: Kalyan Niyogi, Holtec International, USA

Session Co-Chair: Jinlan Gou, Wuhan 2nd Ship Design and Research Institute, China

Session Co-Chair: Shimpei Saito, University of Tsukuba, Japan

Prediction of Performance of Multi-stage Orifice Assembly using CFD Code [ICONE26-81186]

Kalyan Niyogi1, Stefan Anton1, Debabrata Mitra-Majumdar1

Numerical Simulation of the Performance of an Axial Compressor Operating with Supercritical Carbon Dioxide [ICONE26-81573]

Jinlan Gou1, Wei Wang1, Can Ma1, Yong Li1, Yuansheng Lin1, Huafeng Li1
1. Wuhan Second Ship Design and Research Institute, Wuhan, China; 2. Key Lab. on Steam Power System, Wuhan Second Ship Design and Research Institute, Wuhan, China

Large Eddy Simulations of a Coolant Flow in Spacer Grid Fuel Assemblies with a Spectral Element Solver [ICONE26-81892]

Haomin Yuan1, Vakhtang Makarashvili1, Elia Merzari2
1. Argonne National Laboratory, Lemont, IL, USA; 2. Argonne National Laboratory, Argonne, IL, USA
Decontamination & Decommissioning, Radiation Protection, and Waste Management

10-10  D&D General Session II
Sunday July 22  Room Reims  16:00 – 18:00
Session Chair: Vicky Lange, University College London, United Kingdom
Weibull Parameter Calculation for Evaluation of Radiological Characteristics of Hanul NPP Decommissioning  ICONE26-82692
Jongkuk Lee, Junghoon Lee, Kwan-Hee Lee, Sangmyeon Ahn
Korea Institute of Nuclear Safety, Daejeon, Korea
Development of Water Leak Visualization System based on 3D Ultrasonic Velocity Profiler  ICONE26-82614
Tomonori Ibara, Hideharu Takahashi, Hiroshige Kikura
1. Tokyo University of Marine Science and Technology, Tokyo, Japan; 2. Tokyo Institute of Technology, Tokyo, Japan
Diffusion of Cs+ Ions in Hardened Cement Paste Samples Simulating Altered Concrete at Fukushima Daiichi NPP  ICONE26-82570
Yuri Morishita, Hiroaki Takiya, Shingo Tanaka, Naoko Watanabe
1. Hokkaido University, Sapporo, Japan; 2. JAERI, Tsuruga, Japan
Hydrodynamics of Two-Phase Ionic Liquid Solvent Systems in Countercurrent Chromatography for Nuclear Fuel Reprocessing  ICONE26-82423
Vicky Lange, Panagiota Angelii, Leslie Brown
1. University College London, London, United Kingdom; 2. AECS Quikprep Ltd., Newquay, United Kingdom

Mitigation Strategies for Beyond Design Basis Events

11-2  Containment Issues: Cooling, Hydrogen, Fission Products
Sunday July 22  Room Epernay  16:00 – 18:00
Session Chair: Ivo Kijenak, Jozef Stefan Institute, Slovenia
Session Co-Chair: Yidan Yuan, CNNC China Nuclear Power Engineering Co., Ltd., China
Hydrogen Ignition Test in a 12m3 Tank with Steam  ICONE26-81729
Po Hu, Shuwei Zhai
Shanghai Jiao Tong University, Shanghai, China
Preliminary Analysis of Hydrogen Behavior using GASFLOW-MPI in the OPR1000 Containment under a Severe Accident Condition  ICONE26-81788
JongWook Go, Taehyub Hong, MiRo Seo
Korea Hydro & Nuclear Power Co., Ltd, Daejeon, Korea
Study on Control Strategy of Hydrogen Risk in Small Containment under Severe Accident  ICONE26-81899
Zhiquang Zou, Ming Zhang, Huahuan Peng, Liqiang Hou
1. Science and Technology On Reactor System Design Technology Laboratory, NPC, Chengdu, China; 2. Nuclear Power Institute of China, Chengdu, China; 3. Nuclear and Radiation Safety Center, Ministry of Environment Protection of P.R.China, Beijing, China
Assessment of Radiological Source Term Releasable Potentials for Severe Accident Scenarios in a PWR SFP  ICONE26-81633
Kwang-il Ahn, Jae-UK Shin
1. Korea Atomic Energy Research Institute, Daejeon, Korea; 2. RETech, Hwaseong, Korea
Investigation on Fission Products Release Mitigated by In-Containment Relief Valve under SGTR Accident  ICONE26-82161
Taeseok Kim, Wonjun Choi, Joongoo Jeon, Nam Kyung Kim, Sung Joong Kim
Hanyang University, Seoul, Korea
Numerical Study of Water Droplet Heat Removal and Dynamics during its Impact onto the Micro-Pillar Array at Elevated Temperature  ICONE26-81171
Beni Mehrdad Shahmohammadi, Shangzhen Xie, Jiyun Zhao
City University of Hong Kong, Kowloon, Hong Kong

Student Paper Competition

16-6  Neutronics Analysis and Reactor Physics I
Sunday July 22  Room Fronsac  16:00 – 18:00
Session Chair: Fanny Vitullo, École polytechnique fédérale de Lausanne (EPFL) and Paul Scherrer Institute (PSI), Switzerland
Session Co-Chair: Kyle Britton, Virginia Commonwealth University, USA
The Deep-Coupling and Preprocessed Photon Transport based on RMC Codes  ICONE26-81036
Qingquan Pan, Kan Wang
Tsinghua University, Beijing, China
Statistical Burnup Distribution of Moving Pebbles in HTR-PM Reactor  ICONE26-81032
Fanny Vitullo, Jiri Krepel, Jarmo Kalilainen, Horst-Michael Prasser
1. École polytechnique fédérale de Lausanne (EPFL) and Paul Scherrer Institute (PSI), Switzerland; 2. Paul Scherrer Institute (PSI), Villigen, Switzerland; 3. ETH Zürih, Zürich, Switzerland; 4. École polytechnique fédérale de Lausanne (EPFL) and Paul Scherrer Institute (PSI), Lausanne, Switzerland
EPR: Burnable Absorber Optimization  ICONE26-81215
Michal Zeman, Jiri Zavorka, Radek Skoda
Czech Technical University, Prague, Czech Republic
Coupling Dependence of Multiple Operating Parameters on Burnup Credit Calculations for BWR Spent Fuel Assemblies  ICONE26-82156
Shang-Chien Wu, Der-Sheng Chao, Jenq-Horn Liang
National Tsing Hua University, Hsinchu, Taiwan
A Neutronics Feasibility Study of the TRIGA LEU Fuel in the 20MWT NIST Research Reactor  ICONE26-82433
Kyle Britton, Zeyun Wu
Virginia Commonwealth University, Richmond, VA, USA
Student Paper Competition

16-11 Nuclear Safety and Accident Analysis I

Sunday July 22  Room: Lalande | 16:00 – 18:00

Session Chair: Jian Song, Xi’an Jiaotong University, China
Session Co-Chair: Qingwen Xiong, Xi’an Jiaotong University, China

Jian Song¹ Yingwei Wu¹ Wenxi Tian¹ Suizheng Qiu² Guanghui Su³
1. Xi’an Jiao Tong University, Xi’an, China; 2. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China

Study on Hydrogen Migration in Small Water Leak of Sodium-Cooled Fast Reactor  ICONE26-81314
Xinjie Deng, Xuewu Cao
Shanghai Jiao Tong University, Shanghai, China

Investigation on Methods for Uncertainty Quantification of Constitutive Models and the Application in BEPU  ICONE26-81425
Qingwen Xiong, Junli Gou, Jianqiang Shan
Xi’an Jiao Tong University, Xi’an, China

Study on Factors Affecting CHF based on Factorial Analysis in Narrow Rectangular Channel under Natural Circulation  ICONE26-81863
Zichao Li¹ Zhou Tao² Shun Shi¹ Amir Haider¹ Bing Li¹ Zejun Xiao²
1. North China Electric Power University, Beijing, China; 2. Huautong Pressuried Water Reactor Technology Corporation, Ltd., Beijing, China

Experimental Research on the Flow Resistance and Heat Transfer Characteristics in Rod Bundle Channel  ICONE26-82195
Zhiqiang Zhu, Chunping Tian, Changqi Yan, Jianjun Wang, Tingting Ren, Zehua Guo
Harbin Engineering University, Harbin, China

Student Paper Competition

16-14 Thermalhydraulics I

Sunday July 22  Room: Mouton Cadet | 16:00 – 18:00

Session Chair: Ayumi Kitano, Kobe University, Japan
Session Co-Chair: Elvira F. Tanjung, Kyungpook National University, Korea

Simulation Research on Thermal-Hydraulic Performance of a Natural Circulation Integrated Pressurized Water Reactor  ICONE26-81059
Yanan Zhao, Minjun Peng, Genglei Xia, Lianxin Lv
Harbin Engineering University, Harbin, China

Numerical Investigation on the Heat Transfer Enhancement Behavior outside Longitudinal Finned Tubes  ICONE26-81283
Yujia Zhou, Hanliang Bo, Jingyu Du
Tsinghua University, Beijing, China

Boiling Visualization and Critical Heat Flux (CHF) Phenomena on PCB in a Saturated Pool at Various Surface Orientations  ICONE26-81382
Elvira F. Tanjung, Daeseong Jo
Kyungpook National University, Daegu, Korea

Transient Heat Transfer for Helium Gas at Various Flow Decay Time Constants and Heat Generation Rates  ICONE26-81391
Qiusheng Liu¹ Ayumi Kitano² Katsuya Fukuda¹ Makoto Shibahara¹
1. Kobe University, Kobe, Japan; 2. Kobe University, Amagasaki-shi, Japan

Kenta Fujikami, Tetsuzki Takeda, Shumpei Funatani
University of Yamanashi, Kofu, Japan
Monday, July 23

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<td>Coffee Break</td>
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<td>Plenary Session – Industry Leadership Forum</td>
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<td>16:00 – 16:30</td>
<td>Poster Session and Coffee Break</td>
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<td>16:30 – 18:30</td>
<td>Technical Sessions</td>
<td>See pages 41 through 45 for session titles, authors and locations</td>
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<td>18:30 – 20:30</td>
<td>Opening Reception</td>
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**KEYNOTE SPEAKER ONE:**

**The UK’s Future Power Mix – the Role for Nuclear**

**Tom Greatrex**, CEO of the Nuclear Industry Association, UK

The ongoing and ever-shifting debate about how to provide a secure, reliable, and affordable low carbon future power mix has got noisier, more entrenched and less objective as real decisions start having to be made – making it harder for industry, investors and government to deliver their part, and risking a more expensive outcome for consumers and taxpayers. With a putative industrial strategy aiming to drive jobs and growth in all parts of the country, deliver new energy infrastructure and exportable technology, this keynote will explore whether it now time to re-cast and renew the tired old debate of gas v nuclear v renewable v consumption into a coherent approach for the future and recognise the integral role civil nuclear power has to play in meeting energy, industrial and economic objectives alongside – not in place of – other forms of generating power.

Formerly MP for Rutherglen and Hamilton West, Tom was shadow energy minister from 2011 – 2015 and the opposition’s lead spokesman on nuclear energy, electricity market reform, smart grid and metering, carbon capture and storage, interconnection and both onshore and offshore oil and gas.

Leading the scrutiny of the Energy Act and the Infrastructure Act in the last Parliament, he secured a number of amendments to the proposed legislation. He also served as a member of the Energy Select Committee from 2010 and from 2007-2010 was a policy adviser in the Scotland Office, including on energy.

Since 2015, he has been an independent policy analyst working in the energy sector for a range of clients, a frequent media commentator on energy issues, and a regular columnist for Utility Week. In a varied prior career, he was Director of Corporate Affairs for the NHS in Scotland, a chief officer in local government and a GMB trade union official in England. Outside of work his main interests are family, football (Fulham) and film.
KEYNOTE SPEAKER TWO:
New Nuclear Plants can Compete Against Fossil Energy (and Complement Renewables) if Best Practices Used

Kirsty Gogan, CEO, Energy for Humanity, UK

New nuclear plants can be a cost-competitive part of the solution to global warming if best in class planning and construction practices are followed, according to a new study released this week. No new technology is required, the study found, although new technologies could reduce the nuclear plant costs further.

The year-long study, commissioned by the UK-based Energy Technologies Institute, reviewed cost drivers at 33 nuclear plants recently built or under construction around the world. It concluded that best in class management and construction techniques alone could reduce the cost of new conventional water-cooled nuclear plants even in Europe and North America to $4,000/kw or $60/MWH – a level which the study shows has already been achieved or beaten by South Korea and Japan, as well as China and Russia. That would make new nuclear plants competitive with new gas fired plants even in the United States, which has the world’s lowest gas electricity costs. Plants built to this price point could also provide competitively priced flexible power to complement wind, solar and other renewable energy, with no emissions.

Kirsty Gogan is co-founder and executive director of Energy for Humanity (EFH), a UK-and Switzerland-based non-profit organisation with a global outlook focused on solving climate change and enabling universal access to modern energy services. Future leaders will need all tools at their disposal to solve global challenges including air pollution and energy security, whilst providing low cost, clean power to billions of people and improving life chances for women and children throughout the world.

In pursuit of these goals, Energy for Humanity (EFH) strongly advocates for evidence-based, whole-system, and technology-inclusive solutions in pursuit of the best (meaning, fastest, most cost-effective, most feasible) outcomes for people and nature. Our work includes running projects in multiple countries, including oversight of a successful campaign to prevent premature closure of the Swiss nuclear fleet in 2016. EFH led a delegation of the world’s most highly regarded climate scientists to Paris COP21 in order to make the case for nuclear to be recognised as a climate solution. EFH was subsequently shortlisted for the Business Green Leaders “Green NGO of the Year” Award in 2016.

In 2017, at COP23, EFH published a new report on European Climate Leadership 2017 and presented a new study on Decarbonizing Cities with Advanced Nuclear. Ms. Gogan is also founding director of CleanTech Catalyst (a consultancy specialising in climate and energy), recently commissioned by the Energy Technologies Institute to lead the Nuclear Cost Drivers Study in partnership with Lucid Strategy (based in Cambridge, MA). Ms. Gogan is regularly invited as an expert speaker on science communication, nuclear competitiveness and innovation to high profile events around the world. She has more than 15 years’ experience as a senior advisor industry, non-profits and Government, including at 10 Downing St, the Office of the Deputy Prime Minister, and the Department of Energy and Climate Change.

10:00 – 10:30 Chablis Suite, Ground Floor
COFFEE BREAK

10:30 – 12:30 Cremant, 1st Floor
PLENARY SESSION:
INDUSTRY LEADERSHIP FORUM

Plenary session sponsored by

Leon Cizelj, Chair ICONE26 Steering Committee, Jožef Stefan Institute, ASME
Zhi Wang, Co-Chair ICONE26, Deputy Secretary-General of CNS
Nobuyuki Ueda, Chair ICONE26, Vice President, CRIEPI, JSME
Robert Stakenborghs, Chair ICONE26 Steering Committee, ASME

SPEAKER ONE:
Nuclear Energy Powering China’s Green Development

Zengguang Lei, Vice President of Chinese Nuclear Society (CNS), Chief Engineer of China National Nuclear Corporation (CNNC), China

Today, while Chinese entering new era, nuclear energy will play an irreplaceable role along with other green energy sources, and it is also considered as an important choice for promoting green development and building a beautiful China.

With the promotion of people living quality, the innovation and development of advanced nuclear energy technology are embracing a new round of precious historical opportunities.

During the process of developing the safe, efficient and innovative nuclear energy, the following achievements have been made such as the successful implementation of “Hualong One” (HPR 1000) nuclear power technology demonstration project, the public acceptance of innovative concepts and demonstration projects of the “Linglong One” (ACP 100) and “Yanlong” (DHR 400).
We believe that nuclear energy is a clean and green energy. The innovative development of nuclear energy technology will secure and sustain a beautiful ecological environment.

In 1986, he graduated from Tsinghua University, with a Master’s Degree in Isotope Separation. And in 2006, Mr. Lei gained his doctor degree majoring in Nuclear Engineering and Technology in Department Of Engineering Physics, Tsinghua University.

Mr. Lei started his career at the Technology Section in Shaanxi Uranium Enrichment Company, holding positions including Assistant Engineer, Engineer and Senior Engineer. In 1997, Mr. Lei became Chief Engineer of the Company and was Vice President in 2001.

In 2002, he was President of Research Institute of Physical-Chemical Engineering of Nuclear Industry. In 2002, he joined Research Institute of Physical-Chemical Engineering of Nuclear Industry as its President. Since 2010, he has been Chief Engineer of CNNC and Vice President of CNS.

**SPEAKER TWO:**

**Overcoming Economic Challenges and Building Enduring Value: A U.S. Nuclear Plant Operator's Perspective**

Christopher Mudrick, Senior Vice President, Exelon, USA

U.S. nuclear plants are facing a perfect storm of economic challenges, including flat electricity demand, rising nuclear costs, increased natural gas supply, aging transmission system constrains and a lack of carbon policy. This presentation will provide an overview of these challenges, as well as the solutions nuclear operators are driving to build enduring value for struggling facilities.

Chris is responsible for the oversight of Exelon’s Northeast nuclear facilities, Calvert Cliffs, James A. FitzPatrick, Nine Mile Point, and R.E. Ginna, which together produce 5,300 megawatts of clean, reliable energy. Exelon’s 14 nuclear facilities in total generate more than 22,000 megawatts of zero-carbon electricity. Exelon Nuclear is the third largest nuclear fleet in the world and the largest in America with nearly 20 percent of the nation’s nuclear generating capacity.

Chris has more than 30 years of progressive experience in plant operations in support of nuclear power stations, including his current responsibilities in Exelon Nuclear. Prior to his current position, Chris was the Senior Vice President Mid-Atlantic Operations for the Exelon Nuclear Sites: Limerick, Peach Bottom, Oyster Creek, and Three Mile Island. Previous positions include the Sr. Vice President Operations Support, Site Vice President and Plant Manager Limerick Generating Station.

Chris holds a Bachelor of Science degree in Electrical Engineering from Lehigh University. He was licensed by the NRC as a Senior Reactor Operator at Limerick. In 2008, he completed the Exelon Leadership Institute at Northwestern University. Chris completed the Harvard Business School Advanced Management Program in 2015. He is a licensed professional engineer in the state of Pennsylvania and is a member of the American Nuclear Society.

Chris lives in West Chester, PA with his wife Jeanne and their four children.

**SPEAKER THREE:**

**Public Engagement on Nuclear Energy**

Andrew Sherry, Chief Scientist and Technology Officer, NNL, UK

Access to affordable, reliable and clean energy is fundamental to modern life and there is now broad political support for nuclear power within a diverse low carbon energy mix. In the UK, public opinion polls reveal support for nuclear energy as part the mix, but factors including cost, environmental impact and waste management can influence this. In other countries, the public’s views vary widely.

However, the challenge of public perception of an industry is not unique to nuclear. Often, large infrastructure projects generate public concern for all sorts of reasons. Safety is often a consideration, generally alongside other factors that can include the inconvenience of a construction project, the impact on house prices, trust in the developers, etc. Such issues arise with projects that include nuclear plants, fracking projects, railway lines, incinerators, prison construction and recycling facilities. Given this commonality, it is important that the nuclear sector not only learns from other sectors, but considers how to lead the way in public engagement.

This presentation will consider factors that can help the nuclear sector engage more effectively with the public: learning from the past and from other sectors regarding public engagement on large infrastructure projects; developing more effective and meaningful engagement with civil society to build confidence and trust; and the ongoing need to educate the nuclear workforce and ensure the younger generation enter our sector with the best understanding of, and attitude towards, public engagement.

Professor Andrew Sherry was appointed as NNL’s Chief Scientist in January 2015, joining NNL from The University of Manchester where he was Director of the Dalton Nuclear Institute. Previously he was Director of the University’s Materials Performance Centre, held a Royal Society Industry Fellowship, and was a senior consultant in the nuclear industry working within the field of materials and structural integrity.

Andrew led the establishment of the flagship Dalton Cumbrian Facility, a partnership with the Nuclear Decommissioning Authority to create a centre of excellence in radiation science and engineering decommissioning research, and led the collaboration with Sheffield University to create the Nuclear Advanced Manufacturing Research Centre. He was also Programme Director for the £8 million “New Nuclear Manufacturing” research programme funded by the Engineering and Physical Research Council, the Universities of Manchester and Sheffield and Rolls-Royce.

Andrew has been a member of both the UK Nuclear Industry Council
and the UK Nuclear Innovation Research Advisory Board. He provides independent advice on strategic and technical aspects of nuclear power and has advised international nuclear bodies including CEA, INL and the Korea Atomic Energy Research Institute.

**SPEAKER FOUR: Japan’s Nuclear Energy Policy**

Shinjiro Takeda, Ministry of Economy, Trade and Industry (METI), Japan

The official view of the Japanese government on nuclear power is that it is an important base-load power source as a low carbon and quasi-domestic energy source, contributing to stability of energy supply-demand structure, on the major premise of ensuring of its safety, because of the perspectives; 1) superiority in stability of energy supply and efficiency, 2) low and stable operational cost and 3) free from GHG emissions during operation. The presentation will explain the current status of nuclear energy in Japan and some key challenges. Among them is nuclear innovation. Developing reactors with safety, economy, and flexibility is expected to be an important key.

Shinjiro Takeda is Director of Office for the International Nuclear Energy Cooperation and Office for Nuclear Technology and Human Resources Agency for Natural Resources and Energy Ministry of Economy, Trade and Industry (METI). Previously he was Director of Office for the Nuclear Technology, Safety and Human Resources Agency for Natural Resources and Energy. From 2014 to 2016 he was Deputy Director Policy Planning and Coordinator Division Minister’s Secretariat. From 2012 to 2014 he was Deputy Director of the Nuclear Energy Policy Division for the Agency for Natural Resources and Energy. From 2011 to 2012 he was Deputy Director of the Nuclear Emergency Response Headquarters for the Fukushima accident. In 2000 he joined the Ministry of International Trade and Industry (MITI).

He received an MBA from SAID Business School at the University of Oxford in 2007. In addition he received an L.L.M. from the School of Law at Duke University. He also was Faculty of Law at the University of Tokyo from 1996 to 2000.

12:30 – 14:00 LUNCH

Chablis Suite, Ground Floor

14:00 – 16:00 PANEL SESSION

See pages 18 and 19 for panel session details.

**14:00 – 16:00 TECHNICAL SESSIONS**

**Operations & Maintenance, Engineering, Modifications, Life Extension, Life Cycle and Balance of Plant**

1-1 System Transient Analysis

**Monday July 23**

Room Bourg | 14:00 – 16:00

Session Chair: Robert Stakenborghs, ILD Power, USA

The Effects of Compressibility and Piping Geometry on Steamhammer Loads ICONE26-81003

Robert Stakenborghs, Frederick J Moody

1. ILD Power, Baton Rouge, LA, USA; 2. Independent Consultant, Turlock, CA, USA

Residual Unbalanced Mass Determination of an AMBs Controlled Rotor based on Control Current Analysis of the Feedback Loop ICONE26-81575

Tianpeng Fan, Zhe Sun, Xiaoshen Zhang, Xunshi Yan, Jingjing Zhao, Zhengang Shi

Tsinghua University, Beijing, China

Research on Resistance Characteristics and Detailed Flow Field of Eccentric Orifice Plate ICONE26-81789

Gao Chang, Zhang Kun, Li Xu Dong, Zhang Ao, Xu kaili

China Nuclear Power Operation Technology Corporation, Ltd, Wuhan, China

A New Method of Integrating the RELAP5 to the RINSIM Simulation Platform ICONE26-82016

Chao Tan, Victor Quiroga, Zheng Fu, Zhengquan Xie


**Study on NPP Reactivity Accident Operating Strategy Design based on Function Analysis and Task Analysis Technology** ICONE26-81478

Yu Aimin, Xu Zhao, Du Yu, Sun Qian

China Nuclear Power Engineering Co., Ltd., Beijing, China

14:00 – 16:00 TECHNICAL SESSIONS

**Nuclear Fuel and Material, Reactor Physics and Transport Theory**

2-1 Nuclear Fuel Safety and Performance Analysis I

**Monday July 23**

Room Muscadet | 14:00 – 16:00

Session Chair: Hakan Ozaltun, Idaho National Laboratory, USA

Royal Military College of Canada Contribution to IAEA CRP# T12027 “Use of Neutron-Absorbers to Improve CANDU Reactor Operating Margins” ICONE26-81013

Paul K. Chan

Royal Military College of Canada, Kingston, ON, Canada


Huan-huan Qi, Zhi-peng Feng, Nai-bin Jiang, Qian Huang, Xuan Huang

Nuclear Power Institute of China, Chengdu, China
Experimental Research and Development of Safety Analysis Systems for Advanced Types of Fuel Rods  
**ICONE26-82387**
National Research Nuclear University MEPhI (Moscow Engineering Physics Institute), Moscow, Russia

Influence of Xe-135 Dynamic Behavior on Core Operation Safety for a Molten Salt Reactor  
**ICONE26-82352**
Jianhui Wu, Xiaoxiao Li, Jifeng Hu, Chunyan Zou, Chenggang Yu, Xiangzhou Cai, Jingen Chen
Shanghai Institute of Applied Physics, Shanghai, China

Assessment of Failure Modes of Monolithic Fuel Plates  
**ICONE26-82437**
Hakan Ozaltun, Pavel G. Medvedev, Barry H. Rabin
Idaho National Laboratory, Idaho Falls, ID, USA

Finite Element Analysis for Fuel Assembly Structural Behavior  
**ICONE26-81621**
Youngik Yoo, Kyounghong Kim, Kyongbo Eom, Seongki Lee, Jongsung Yoo
KEPCO Nuclear Fuel, Daejeon, Korea

### Plant Systems, Structures, Components, and Materials

#### 3-6 Experimental Design

**Monday July 23**  
Session Chair: Qianfeng Liu, Institute of Nuclear and New Energy Technology, Tsinghua University, China

**Experimental Study of Motion-Resistance Force of Hydraulic Cylinder of CRHDM**  
**ICONE26-81214**
Qianfeng Liu¹ Yuzheng Li² Huang Zhang² HanLiang Bo²  
1. Institute of Nuclear and New Energy Technology, Tsinghua University, Beijing, China; 2. Tsinghua University, Beijing, China

**Experimental Study and Analysis of the Deformable Pipe of CRHDM**  
**ICONE26-81281**
Yuzheng Li¹ Huang Zhang² Qianfeng Liu² HanLiang Bo¹  
1. Tsinghua University, Beijing, China; 2. Institute of Nuclear and New Energy Technology, Tsinghua University, Beijing, China

**Grounded Control Rod Position Measurement with Two-Electrode Capacitance Sensor**  
**ICONE26-81362**
Guang Hu¹ Benke Qin² HanLiang Bo²  
1. Institute of Nuclear and New Energy Technology, Tsinghua University, Beijing, China; 2. Tsinghua University, Beijing, China

**Demonstrative HEAF (High Energy Arcing Fault) Fire Tests of High and Low Voltage Switchgears of Nuclear Power Plants**  
**ICONE26-82296**
Koji Shirai¹ Koji Tasaka² Ji Junghoon² Tsukasa Miyagi¹ Iswawa Mikimasa³  
1. CRIEPI, Tokyo, Japan; 2. CRIEPI, Abo, Japan; 3. CRIEPI, Yokosuka, Japan

**Experimental Research on the Fluid Induced Forces of Clearance Flow in Canned Motor Reactor Coolant Pump**  
**ICONE26-82296**
Rui Xu, Yaoyu Hu, Yun Long, Junjian Yin, Wang Dezhang
Shanghai Jiao Tong University, Shanghai, China

**WATCH Loop Development and Commissioning Tests**  
**ICONE26-82626**
William A. Byers¹ Guoqiang Wang²  
1. Westinghouse, Pittsburgh, PA, USA; 2. Westinghouse Electric Company LLC, Murrysville, PA, USA

### Instrumentation and Control (I&C) and Influence of Human Factors

#### 4-1 Design and Reliability of DCS

**Monday July 23**  
Session Chair: Victor Morokhovskyi, Framatome GmbH, Germany
Session Co-Chair: Yang Huang, CNPRI, China

**Internal Vibration Source Analysis of AMB-Rotor System in HTR-PM Primary Helium Circulator**  
**ICONE26-81339**
Jinpeng Yu, Lei Zhao
Tsinghua University, Beijing, China

**Multi-Diversity for FPGA Platform Based NPP &C Systems: New Possibilities and Assessment Technique**  
**ICONE26-82377**
Vyacheslav Kharchenko¹ Andriy Kovalenko¹ Kostiantyn Leontiev¹ Artem Panarin¹ Vyacheslav Duzhy¹  
1. RFC Radly, Kropyvnytsev, Ukraine; 2. National Aerospace University “KhAI” named after N.E. Zhukovsky, Kharkiv, Ukraine

**Design Optimization of Modernization of I&C System using Digital Technology in NPPs**  
**ICONE26-82498**
Longqiang Zhang, Jiahong Yao, Weining Zhao, Weijun Huang
State Key Laboratory of Nuclear Power Safety Monitoring Technology and Equipment, Shenzhen, China

**Design and Feasibility Analysis of the Electricity Generation System based on Residual Heat**  
**ICONE26-82558**
Zhe Dong, Miao Liu, Yifei Pan
Tsinghua University, Beijing, China

### Advanced Reactors and Fusion Technologies

#### 5-1 Fusion Technology I

**Monday July 23**  
Session Chair: Mauro Cappelli, ENEA, Italy

**Energy Calibration of Scintillator Detectors in Different Neutron Diagnostic System on Tokamak**  
**ICONE26-81190**
Zhijiang Cui
Tsinghua University, Beijing, China

**Neutronic Study on a New Concept of Accelerator Driven Subcritical System in China**  
**ICONE26-81329**
Jinyang Li, Long Gu, Cunfeng Yao, Dawei Wang, Tianji Peng, Yanlei Zhu
Institute of Modern Physics, Chinese Academy of Sciences, Lanzhou, China

**A Mathematical Link between the Natural Energy of Stars and Fission**  
**ICONE26-81093**
Brenda Bayles
Bayles Farms, Toronto, KS, USA

**Systems Engineering Approach for Pre-Conceptual Design of DEMO Diverter**  
**ICONE26-82421**
Domenico Marzullo¹ Danilo Nicola Dongiovanni² Jeong Ha You³  
1. CREATE Consortium - University of Naples Federico II, Napoli, Italy; 2. ENEA, Frascati, Italy; 3. Max Planck Institute for Plasma Physics, Garching, Germany
Nuclear Safety, Security, and Cyber Security

6-1 Nuclear Safety
Monday July 23

Session Chair: Jovica Riznic, Canadian Nuclear Safety Commission, Canada

Nuclear Facility Safety Enhancement using Sandia National Laboratories’ Computer Codes
David L.Y. Louie

Sandia National Laboratories, Albuquerque, NM, USA

Safety Analysis Model of DUCG based on FMEA/FTA
Zhenzu Zhou, Yao Nie, Chunling Dong, Qin Zhang

Taiyuan University of Technology, Beijing, China

A Critical Experimental Study of Bubble Effect in the Process of Spent Fuel Dissolving
Zhou Xiaoping, Liang Shuhong, Zhaodong Xia
China Institute of Atomic Energy, Beijing, China

Muon Tomography for Measuring Amount of Nuclear Materials in Fuel Debris
Tsukasa Sugita1 Haruo Miyadera2 Kenichi Yoshioka1 Naoto Kume2

A New Safety Analysis Method of Control Rod Ejection Accident in PWR NPP based on the Failure of Causal Relationship
Shi-Yu Yan1 Hua Liu1 Zhaohui Liu2 Xiao-hua Yang1 Meng Li2 Zhi Chen4
1. University of South China, Hengyang, China; 2. School of Electrical Engineering, University of South China, Hengyang, China; 3. School of Computer, University of South China, Hengyang, China; 4. Nuclear Power Institute of China, Chengdu, China

Numerical Research on Shock Resistance Safety Analysis of Ship Power Plant Valve
Jun Wu, Fan Bai, Yong Liu, Xingsheng Lao, Chunhui Dai

Wuhan Second Ship Design and Research Institute, Wuhan, China

Thermal-Hydraulics and Safety Analyses

8-1 Boiling Heat Transfer and Behavior I
Monday July 23

Session Chair: Chuanxin Peng, Nuclear Power Institute of China, China

Experimental Investigation on Critical Heat Flux in Horizontal Tube
Chuanxin Peng, Yuanfeng Zan

Nuclear Power Institute of China, Chengdu, China

A Simplified Force-Balance Model to Predict Bubble Departure Diameter in Horizontal Flow Boiling
Jingyu Du, Chenru Zhao, HanLiang Bo, Yujia Zhou
Tsinghua University, Beijing, China

A Visual Experiment of Single Bubble Growth Processes in a Vertical Rectangular Channel
Ning Cheng, Yun Guo, Changhong Peng
University of Science and Technology of China, Hefei, China

Subcooled Flow Boiling Inception and Heat Transfer of Water in a Circular Tube under Pulsatile Flow
Hongsheng Yuan1 Sichao Tan2 Kun Cheng3 Xiaoli Wu1 Chao Guo3 Mingjun Zhong1
1. Science and Technology on Reactor System Design Technology Laboratory, Nuclear Power Institute of China, Hefei, China; 2. Harbin Engineering University, Harbin, China; 3. North China Electric Power University, Beijing, China

Study on the Prediction of DNB-Type Critical Heat Flux in Rod Bundle under Motion Conditions
Siyang Huang1 Xiaoyan Wang1 Wenxi Tian1 Ronghua Chen1 Junmei Wu1 Guanghui Su1 Suizheng Qiu2
1. Xi’an Jiao Tong University, Xi’an, China; 2. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China

Experimental Study of Quench Temperature during Reflood Phase
Jinju Wang, Jun Wang, Yuanfeng Zan, Yanping Huang
Nuclear Power Institute of China, Chengdu, China

Codes, Standards, Licensing, and Regulatory Issues

7-1 Regulatory Interactions with Codes and Standards I
Monday July 23

Session Chair: John Bendo, ASME, USA

The Role of the NRC in License Renewals
Samuel Miranda

Independent Author, Silver Spring, MD, USA

Technical Insights of SSR-2/1 Safety of Nuclear Power Plants: Design (Rev.1)
Hua Zheng, Shuhong Wu

China Nuclear Power Design Co., Ltd. (Shenzhen), Shenzhen, China

ACRS: Enduring Legacy Contributing to Reactor Safety
Hossein Nourbakhsh

U.S. Nuclear Regulatory Commission, Washington, DC, USA

NQA-1 Certification: Distinction in the Nuclear Industry
Chris Mahler1 Clayton Smith2
1. ASME, New York, NY, USA; 2. Smith Associates Consulting Group LLC, Simpsonville, SC, USA

AFCDN RCC-F: A New Standard for the Fire Protection Design of New Built Light Water Nuclear Power Plants
Bernard Gautier, Mickael Cesbron, Richard Tulinski
EDF SEPTEN, Lyon, France

Regulatory Perspective on the Fitness-for-Service Requirements for the Pressure Tube to Calandria Tube Contact in CANDU Reactors
Sankar Laxman, John Jin

Canadian Nuclear Safety Commission, Ottawa, ON, Canada
**Development of an Optimized Transport Solver in SARAX for Fast Reactor Analysis**

Zhi Tao Xu, Hong Chun Wu, You Qi Zhang, Ming Tao He

1. Xi'an Jiao Tong University, Xi'an, China; 2. China Nuclear Power Technology Research Institute, Shenzhen, China

**Low-Cycle Strength of Elements of Constructions**

Alexander Zvorykin, Roman Popov, Mykola Bobyr, Igor Pioro

1. National Technical University of Ukraine, Kiev, Ukraine; 2. University of Ontario Institute of Technology, Oshawa, ON, Canada; 3. National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”, Kiev, Ukraine

**Analysis of U02-BeO Fuel Performance during Normal Conditions and RIA**

Yanan He, Ying Wei Wu, Shi Hui Wang, Bowen Qu, Guang Hui Su

1. Xi'an Jiao Tong University, Xi'an, China; 2. China Nuclear Power Technology Research Institute, Chengdu, China

**Student Paper Competition**

**16-2 Computational Fluid Dynamics I**

Monday July 23  Room Talbot | 14:00 – 16:00

Session Chair: Anastasiia Zvorykina, Otto von Guericke University Magdeburg, Germany
Session Co-Chair: Xiaohan Zhao, Xi'an Jiaotong University, China

**CFD Analysis of Supercritical-Water Flow and Heat Transfer in Vertical Bare Tube**

Anastasiia Zvorykina, Nataliai Falko

1. Otto von Guericke University Magdeburg, Magdeburg, Germany; 2. Institute of Engineering Thermophysics of National Academy of Sciences of Ukraine, Kiev, Ukraine; 3. University of Ontario Institute of Technology, Oshawa, ON, Canada

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**Reactor Baffle Cooling CFD Framework for Swelling Assessment**

Yulia Filonova, Vladislav Filonov, Yaroslav Dubyk

IPF-CENTRE Ltd., Kiev, Ukraine

**Hydraulic Characteristics Research on SG under Tube Plugging Operations using Fluent**

Xiaohan Zhao, Mingjun Wang, Wenhui Tian, Guanghui Su, Suizheng Qiu

1. Xi'an Jiao Tong University, Xi'an, China; 2. School of Nuclear Science and Technology, Xi'an Jiao Tong University, Xi'an

**A Criticality Evaluation of Fukushima Daiichi Unit 1 Fuel Debris**

Maria Freiria Lopez, Michael Buck, Joerg Starflinger

University of Stuttgart, Stuttgart, Germany

**Interface Tracking Simulations of Two-phase Flow Utilizing Adaptive Meshing Capabilities**

Joseph J. Cambarer, Igor A. Bolotov

North Carolina State University, Raleigh, NC, USA

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**Student Paper Competition**

**16-7 Neutronics Analysis and Reactor Physics II**

Monday July 23  Room Fronsac | 14:00 – 16:00

Session Chair: Luca Ratti, S.U.R.O./ University of Pisa, Czech Republic
Session Co-Chair: Yanan He, Xi'an Jiaotong University, China

**Neutronic Analysis for VVER-440 Type Reactor using PARCS Code**

Luca Ratti, Guido Mazzini, Marek Ruscak, Valerio Giusti

1. S.U.R.O./ University of Pisa, Prague, Czech Republic; 2. Centrum výzkumu u2 (Research Centre Rez), Husinec - Rez, Czech Republic; 3. University of Pisa - Dipartimento di Ingegneria Civile e Industriale, Pisa, Italy

**A Universal Adjoint-Weighted Algorithm for Geometric Sensitivity Analysis of K-Eigenvalue based on Continuous-Energy Monte Carlo Method**

Hao Li, Ganglin Yu, Shanhua Huang, Kan Wang

Tsinghua University, Beijing, China

**A Selective Pn Approach for the Solution of Even Parity Forward and Adjoint Neutron Transport Equation**

Mostafa Youssefi, E. Nouri, A. Zolfaghari, A. Minuchehr

Shahid Beheshti University, Tehran, Iran

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**Student Paper Competition**

**16-12 Nuclear Safety and Accident Analysis II**

Monday July 23  Room Lalande | 14:00 – 16:00

Session Chair: Yoshihisa Hiraki, Nagaoka University of Technology, Japan
Session Co-Chair: Derek Logtenberg, Canadian Nuclear Safety Commission, Physics and Fuel Division, Canada

**Convective Heat Transfer in CANDU Spent Fuel Racks after a Loss of Coolant**

Derek Logtenberg, Wade Grant, Paul K. Chan, Emily Corcoran

1. Canadian Nuclear Safety Commission, Physics and Fuel Division, Ottawa, ON, Canada; 2. Royal Military College of Canada, Kingston, ON, Canada

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**Investigation of Flammability of Hydrogen Gas with Diluent Gases under Severe Accident Conditions using CNFT Model**

Hanyang University, Seoul, Korea

**Numerical and Experimental Investigation on Core Assembly Thermal-Gradient-Induced Deformation of Sodium-Cooled Fast Reactor**

Zhihua He, Yu Cheng, Yang Wu, Guang Hui Su, Xin Zhi, Hai Peng

1. Xi'an Jiao Tong University, Xi'an, China; 2. School of Nuclear Science and Technology, Xi'an Jiao Tong University, Xi'an, China

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**Fronsac | 14:00 – 16:00**

**Talbot | 14:00 – 16:00**

**Lalande | 14:00 – 16:00**
**Student Paper Competition**

**16-15 Thermalhydraulics II**

**Monday July 23**

Session Chair: Victor Razumovskiy, National Technical University of Ukraine ‘KPI’, Ukraine

Session Co-Chair: Taro Sugimoto, University of Tsukuba, Japan

Modeling of Bubble Behavior in Low Void Fraction Subcooled Flow Boiling

Shintaro Sakamoto$^1$ Hiroki Ohori$^2$ Koji Enoki$^1$ Tomio Okawa$^2$

1. The University of Electro-Communications, Chouhi, Japan; 2. The University of Electro-Communications, Chiba, Japan;
3. The University of Electro-Communications, Tokyo, Japan

Numerical Analysis on Characteristic of Hydrogen Mixing and Stratification in a Containment Model

Ceng Peng, Lili Tong, Xuewu Cao

Shanghai Jiao Tong University, Shanghai, China

On Experimental and Computational Investigation of Heat Transfer Deterioration and Hydraulic Resistance in Annular Channel and SCWR 3-Rod Bundle

Vladislav Filonov$^1$ Yuliia Filonova$^2$ Victor Razumovskiy$^1$ Evgeniy Pis’mennyi$^1$

1. National Technical University of Ukraine ‘KPI’, Kyiv, Ukraine; 2. IPP-CENTRE Ltd., Kiev, Ukraine

**Research on Thermal Efficiencies of Various Power Cycles for GFRs and VHTRs**

Mohammed Mahdi$^1$ Roman Popov$^1$ Igor Piorov$^2$

1. Faculty of Energy Systems and Nuclear Science University of Ontario Institute of Technology, Oshawa, ON, Canada; 2. University of Ontario Institute of Technology, Oshawa, ON, Canada

**Visualization Study on Droplet-Entrainment in a High-Speed Gas Jet into a Liquid Pool**

Taro Sugimoto$^1$ Shimeki Saito$^1$ Akiko Kaneko$^1$ Yutaka Abe$^1$

1. University of Tsukuba, Tsukuba, Japan;
2. Japan Atomic Energy Agency, Oarai, Japan

**Study on Thermal-Hydraulic Characteristics of Vertical Narrow Rectangular Channel with Large Aspect Ratio under Transverse Uneven Heating**

Rulei Sun$^1$ Yichen Yang$^1$ Dalin Zhang$^1$ Jiawei Bian$^1$

1. Xi’an Jiao Tong University, Xi’an, China; 2. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China

**16:30 – 18:30**

**TECHNICAL SESSIONS**

**Operations & Maintenance, Engineering, Modifications, Life extension, Life Cycle and Balance of Plant**

**1-3 Equipment and System Design**

**Monday July 23**

Session Chair: Ron Smith, Nuvia, United Kingdom

Study on Advanced PWR NPP Safety Related Equipment Qualification Function Requirement Design Methodology

Zhao Xu$^1$ Miao Zhuang$^1$ Yi Ke$^1$

1. China Nuclear Power Engineering Co., Ltd., Beijing, China; 2. CAPE, Beijing, China

Classification Optimization for Waste Related Buildings and Structures of NPPS

Zongwen Hu, Yijie Qian, Li Fan

China Nuclear Power Engineering Co., Ltd., Beijing, China

**Characteristic Tests on Transition Core of HTR-10**

Liqiang Wei, Dongmei Ding, Ling Liu, Yucheng Wang, Xiaoming Chen, Feng Xie

Institute of Nuclear and New Energy Technology, Tsinghua University, Beijing, China

**Calculational-Experimental Monitoring of Radiation Damage Parameters on VVER Equipment and Their Application during Equipment Residual Life-Time Estimation**

Pavel Borodkin, Nikolay Khrennikov, Azamat Gazetdinov

Scientific and Engineering Centre for Nuclear and Radiation Safety, Moscow, Russia

**High Power VVER Design for European Countries**

Sergey Svetlov

JSC ATOMPROEKT, Saint Petersburg, Russia

**Interim Spent Fuel Storage Facility (ISFSF)**

Ron Smith$^1$ Chris Medlock$^2$

1. Nuvia, Didcot, United Kingdom; 2. Nuvia, Warrington, United Kingdom

**Nuclear Fuel and Material, Reactor Physics and Transport Theory**

**2-2 Reactor Physics: Sensitivity and Uncertainty Analysis**

**Monday July 23**

Session Chair: Wei Shen, Xi’an Jiaotong University, China

Enhancement of Stochastic Sampling Capability in RMC Code

Guannlin Shi$^1$ Yishu Qiu$^2$ Kan Wang$^1$

1. Tsinghua University, Beijing, China; 2. Department of Engineering Physics, Beijing, China

Propagation of Nuclear Data Uncertainties in PWR Pin-Cell Burnup Calculations via Stochastic Sampling

Luigi Mercatali, Youssef Alzaben, Victor Hugo Sanchez Espinoza

Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany
Towards Development of Uncertainty Library for Nuclear Reactor Core Simulation*  ICONE26-82385
Dongli Huang1 Hany Abdel-Khalik1 Ondrej Chvatal2 Guillermo Maldonado2
1. Purdue University, West Lafayette, IN, USA; 2. University of Tennessee, Knoxville, TN, USA

Uncertainty Evaluation and Sensitivity Analysis under Accident Scenarios*  ICONE26-81020
Daniel de Souza Gomes1 Antonio Teixeira E Silva2
1. Energy and Nuclear Research Institute (IPEN), São Paulo, SP, Brazil; 2. IPEN/CNEN-SP, São Paulo, SP, Brazil

Uncertainty Analysis for the BEAVRS PWR Full-Core Simulation with Depletion*  ICONE26-82638
Chenghui Wan1 Liangzhi Cao2 Wei Shen1
1. Xi’an Jiao Tong University, Xi’an, China; 2. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China

Practical Experience Gained from Operating the Lead-Bismuth Loop CORRIDA*  ICONE26-82513
Carsten Schroer1 Olaf Wedemeyer2 Valentyn Tsisar1
1. Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany; 2. Karlsruhe Institute of Technology (KIT), Institute for Applied Materials - Applied Materials Physics, Eggenstein-Leopoldshafen, Germany

Instrumentation and Control (I&C) and Influence of Human Factors

4-2 Safety of I&C Systems

Monday July 23
Room Cognac | 16:30 – 18:30

Session Chair: Hidekazu Yoshikawa, Harbin Engineering University, China
Session Co-Chair: Eugene Babeshko, RPC Radiy, Ukraine

Research on Nuclear Power Plant Safety Functional Requirements Analysis and Function Allocation*  ICONE26-82230
Jia Ming, Huang Huan, Zhang Xuegang
China Nuclear Power Design Co., Ltd. (Shenzhen), Shenzhen, China

The Security Vulnerability Analysis of Nuclear Power Digital Instrument Control Platform NASPIC*  ICONE26-81486
Hua Liu1 Zhaohui Liu2 Xiaoyang Li3 Meng Li3
1. School of Electrical Engineering, University of South China, Hengyang, China; 2. School of Computer, University of South China, Hengyang, China; 3. School of Nuclear Science and Technology, Guangzhou, China

Integrated Defense-in Depth DiD Risk Analysis System for Safety Operation of Nuclear Power Plants*  ICONE26-82639
Hidekazu Yoshikawa1 Yang Ming2
1. Harbin Engineering University, Harbin, China; 2. South China University of Science and Technology, Guangzhou, China

FMEDA and FIT-Based Safety Assessment of NPP I&C Systems Considering Expert Uncertainty*  ICONE26-82048
Alexander Yasko1 Eugene Babeshko2 Vyacheslav Kharchenko2
1. National Aerospace University, Kharkiv, Ukraine; 2. RPC Radiy, Kropyvnytskyi, Ukraine

Introduction of the Class1 FPGA Platform "Nu Coss S-Zero" for the UK ABWR*  ICONE26-82675
Shohei Nakamura, Hideo Harada, Masahiro Shiraiishi, Masashi Suenaga, Keisuke Yamamoto
Hitachi, Ltd., Hitachi-shi, Japan

Plant Systems, Structures, Components and Materials

3-11 Materials for advanced reactors

Monday July 23
Room Chalon | 16:30 – 18:30

Session Chair: Takashi Wakai, Japan Atomic Energy Agency, Japan
Session Co-Chair: Carsten Schroer, Karlsruhe Institute of Technology (KIT), Germany

Failure Assessment of Nuclear Graphite Component in TMSR*  ICONE26-82044
Y.T. Gao, Derek Zeng, Zhoutong He, Min Liu
Shanghai Institute of Applied Physics, Shanghai, China

Effect of Oxygen Concentration in Static Pb-Bi Eutectic on Corrosion Behavior of Aluminum-Alloyed Austenitic Steels at 550°C for 1000 H*  ICONE26-81713
Valentyn Tsisar1 Carsten Schroer2 Zhangjian Zhou2 Olaf Wedemeyer2
1. Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany; 2. School of Material Science and Engineering, University of Science and Technology Beijing, Beijing, China; 3. Karlsruhe Institute of Technology (KIT), Institute for Applied Materials - Applied Materials Physics, Eggenstein-Leopoldshafen, Germany

Research on Weld Cladding of Vessel in Molten Salt Reactor*  ICONE26-81857
Zhijun Li
Shanghai Institute of Applied Physics, CAS, Shanghai, China

The Security of I&C Systems

4-2 Safety of I&C Systems

Monday July 23
Room Cognac | 16:30 – 18:30

Session Chair: Hidekazu Yoshikawa, Harbin Engineering University, China
Session Co-Chair: Eugene Babeshko, RPC Radiy, Ukraine

Research on Nuclear Power Plant Safety Functional Requirements Analysis and Function Allocation*  ICONE26-82230
Jia Ming, Huang Huan, Zhang Xuegang
China Nuclear Power Design Co., Ltd. (Shenzhen), Shenzhen, China

The Security Vulnerability Analysis of Nuclear Power Digital Instrument Control Platform NASPIC*  ICONE26-81486
Hua Liu1 Zhaohui Liu2 Xiaoyang Li3 Meng Li3
1. School of Electrical Engineering, University of South China, Hengyang, China; 2. School of Computer, University of South China, Hengyang, China; 3. School of Nuclear Science and Technology, Guangzhou, China

Integrated Defense-in Depth DiD Risk Analysis System for Safety Operation of Nuclear Power Plants*  ICONE26-82639
Hidekazu Yoshikawa1 Yang Ming2
1. Harbin Engineering University, Harbin, China; 2. South China University of Science and Technology, Guangzhou, China

FMEDA and FIT-Based Safety Assessment of NPP I&C Systems Considering Expert Uncertainty*  ICONE26-82048
Alexander Yasko1 Eugene Babeshko2 Vyacheslav Kharchenko2
1. National Aerospace University, Kharkiv, Ukraine; 2. RPC Radiy, Kropyvnytskyi, Ukraine

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Shohei Nakamura, Hideo Harada, Masahiro Shiraiishi, Masashi Suenaga, Keisuke Yamamoto
Hitachi, Ltd., Hitachi-shi, Japan

Plant Systems, Structures, Components and Materials

3-11 Materials for advanced reactors

Monday July 23
Room Chalon | 16:30 – 18:30

Session Chair: Takashi Wakai, Japan Atomic Energy Agency, Japan
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Failure Assessment of Nuclear Graphite Component in TMSR*  ICONE26-82044
Y.T. Gao, Derek Zeng, Zhoutong He, Min Liu
Shanghai Institute of Applied Physics, Shanghai, China

Effect of Oxygen Concentration in Static Pb-Bi Eutectic on Corrosion Behavior of Aluminum-Alloyed Austenitic Steels at 550°C for 1000 H*  ICONE26-81713
Valentyn Tsisar1 Carsten Schroer2 Zhangjian Zhou2 Olaf Wedemeyer2
1. Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany; 2. School of Material Science and Engineering, University of Science and Technology Beijing, Beijing, China; 3. Karlsruhe Institute of Technology (KIT), Institute for Applied Materials - Applied Materials Physics, Eggenstein-Leopoldshafen, Germany

Research on Weld Cladding of Vessel in Molten Salt Reactor*  ICONE26-81857
Zhijun Li
Shanghai Institute of Applied Physics, CAS, Shanghai, China

The Compatibility of Nuclear Graphite with Molten Salt in the Molten Salt Reactor*  ICONE26-82065
Zhoutong He1 Hui Tang2 Can Zhang1 Y.T. Gao1 Huiluo Xia1 Xingtai Zhou2
1. Shanghai Institute of Applied Physics, Shanghai, China; 2. Shanghai Institute of Applied Physics, Chinese Academy of Sciences, Shanghai, China
Advanced Reactors and Fusion Technologies

5-2  Fission Reactors Design and Analyses
Monday July 23  Room Reims  16:30 – 18:30

Session Chair: Ivan Di Piazza, ENEA C.R. Brasimone, Italy

Experimental Tests with Non-Uniformly Heated 19-Pins Fuel Bundle Cooled by HLM  ICONE26-81216
Morena Angelucci1 Ivan Di Piazza2 Mariano Tarantino2 Ranieri Marinar1 Valerio Seremghini3 Giuseppe Polazzi2 1. University of Pisa, Pisa, Italy; 2. ENEA C.R. Brasimone, Camugnano, Italy

Research on Heat Transfer Characteristics of the Thermometric Sphere in HTR-10  ICONE26-81768
Shiyan Sun, Youjie Zhang, Yanzhu Zheng, Xiang Fang, Xiaoyong Yang Tsinghua University, Beijing, China

Core Design Study of Super FBR with Multiple-Axial Fuel Shuffling and Different Coolant Density  ICONE26-81501
Shogo Noda, Sukarman Sukarman, Akifumi Yamaji, Tetsuo Takei, Takanari Fukuda, Arisa Ayukawa Waseda University, Shinjuku-ku, Japan

A Framework and Model for Assessing the Design Point Performance, Off-Design Point Performance, Control, Economics and Risks of Brayton Helium Gas Turbine Cycles for Generation IV Nuclear Power Plants  ICONE26-81868
Arnold Gadh-Briggs1 Pericles Pilidis2 Theokilis Nikolaides2 1. Cranfield University & EGB Engineering UK, Cheshire, United Kingdom; 2. Cranfield University, Bedford, United Kingdom

Simulation of HTR-10 Anti-Compton HPGe Gamma-Ray Spectrometer with Geant4  ICONE26-81254
Cui Mao1 Liguang Zhang1 Yibao Liu1 Bing Xia1 ZaiZhao Yin1 Jiejuan Tong1 1. East China University of Technology, Nanchang, China; 2. Institute of Nuclear and New Energy Technology, Tsinghua University, Beijing, China; 3. Tsinghua University, Nanchang, China; 4. Tsinghua University, Beijing, China

Analysis of Enhanced Cooling for the EU-DEMO HCPB Breeding Blanket Modules using the GETTHEM Code  ICONE26-82416
Antonio Froio1 Fabio Cismondi2 Laura Savoldi3 Roberto Zanino3 1. Politecnico di Torino, Torino, Italy; 2. EUROfusion Consortium, Garching bei München, Germany; 3. Dipartimento Energia, Politecnico Di Torino, Torino, Italy

Nuclear Safety, Security, and Cyber Security

6-2  Nuclear Security- Security Culture
Monday July 23  Room Alsace  16:30 – 18:30

Session Co-Chair: David L.Y. Louie, Sandia National Laboratories, USA

The Benefits of Security Culture for Improving Physical Protection Systems at Detection and Radiation Measurement Laboratory  ICONE26-81054
Nia Febriyanti, Ari S. Prabowo, Haryono Budi Santosa, Herlina Zainal University of Gadjah Mada, Yogyakarta, Indonesia

Development of Malicious Hand Behaviors Detection Method by Movie Analysis  ICONE26-81643
Kazuyuki Demachi, Shi Chen The University of Tokyo, Tokyo, Japan

Review and Security Assessment of Red Oil Explosions in Evaporator  ICONE26-82221
Yiren Lian, Hongchao Sun, Chen Lei, Dongyuan Meng, Guoqiang Li, Dajie Zhuang, Shuting Sun, Jiangang Zhang China Institute for Radiation Protection, Taiyuan, China

Online Adversarial Learning of Reactor State  ICONE26-82372
Yeni Li, Elisa Bertino, Hany Abdel-Khalik Purdue University, West Lafayette, IN, USA

Anomaly Detection for I&C Networks of NPPs based on Deep Packet Inspection  ICONE26-82575
Jianghai Li1 Chao Guo1 Qianqian Jia1 XiaoJin Huang2 Huasheng Xiong2 1. Institute of Nuclear and New Energy Technology, Tsinghua University, Beijing, China; 2. Tsinghua University, Beijing, China

Study on Target Sets Identification Approach for Cyber-Attack against Nuclear Power Plants based on Vital Area Identification Method  ICONE26-82578
Yoshiki Kimura1 Kazuyuki Demachi2 Hirofumi Tomikawa1 Mistutoshi Suzuki1 1. Japan Atomic Energy Agency, Tokai-mura, Japan; 2. The University of Tokyo, Tokyo, Japan

Research on the Neutron Multiplicity Pulse Trains Computer Simulation  ICONE26-82262
Sufen Li, Quanhui Zhang, Yonggang Huo, Man Zhou X’ian Research Institute of High-Technology, X’ian, China

Codes, Standards, Licensing, and Regulatory Issues

7-2  Regulatory Interactions with Codes and Standards II
Monday July 23  Room Epernay  16:30 – 18:30

Session Chair: Clayton Smith, Smith Associates Consulting Group LLC, USA

The Backfit Rule’s Compliance Exception  ICONE26-81905
Samuel Miranda Independent Author, Silver Spring, MD, USA

KEPIC Code Case Review for Clamping Device and Weld-ovey Technology of Small Diameter Pipe Socket Welds  ICONE26-82603
So Young Jeon1 Myoungsung Sohn1 Geun-Suk Choi1 Hyun Jae Joo1 Lee Joon Eun1 Sanghoon Lee2 Cho Hongsook1 Gi Ho Sung4 1. Korea Electric Association, Seoul, Korea; 2. Korea Institute of Materials and Science (KIMS), Chungwon, Korea; 3. Kapco Kps, Seongnam-Si, Korea; 4. SUNG IL (SIM) Co., Ltd., Busan, Korea

Establishment of “Technical Guidelines for Watertight Facilities (JEAG4630-2016)”  ICONE26-81208

Nonlinear Analysis in Pressure Vessel Design Codes: Recommendations for Codified Rules Improvements  ICONE26-81095
Claude Faidy AFCEN-CF Integrity Engineering, Tassin, France
Decontamination & Decommissioning, Radiation Protection, and Waste Management

10-9  D&D General Session I

Monday July 23  Room: Cremant I  16:30 – 18:30
Session Chair: Kenji Matsuzaki, IRID, Toshiba Energy Systems & Solutions Corporation, Japan
Development of ROV to Investigate inside of Primary Containment Vessel at Fukushima Daiichi Unit 3  ICONE26-82197
Kenji Matsuzaki1 Norihito Nakamura2 Daiki Maruyama3 Yoichi Murai4
1. IRID, Toshiba Energy Systems & Solutions Corporation, Yokohama, Japan; 2. IRID, Tokyo, Japan
Process Study of Liquid Phase Catalytic Exchange Process for Water Detritiation  ICONE26-81258
Li Peilong, Xiong Renjin, Luo Deli, Song Jiangfeng, Luo Junhong, Guo Li, Zhang Zhi, Tang Tao
Institute of Materials, Chengdu, China
Laser Decontamination of Metal Surfaces  ICONE26-81864
Luisa Carvalho1 Wilfried Pacquant1 Michel Tabarant1
Morgan Daf1 Alexandre Sement2 Hicham Maskrot1
1. CEA, Gif sur Yvette, France; 2. ENSAM, Paris, France

Intensified Extraction of Uranium(VI) in Impinging-Jets Reactors  ICONE26-82361
Dimitrios Tsouliidis, Eduardo GarciaDiego Ortega, Wenyu Lyu, Panagioti Angeli
University College London, London, United Kingdom
Piezoelectric Nuclear Battery Driven by the Jet-flow: Reliable Dynamic Energy Conversion from Heat to Electricity  ICONE26-82697
Yi Zhou, Jiaqing He
Southern University of Science and Technology, Shenzhen, China

Nuclear Education and Public Acceptance

12-1  Nuclear Education and Public Acceptance I

Monday July 23  Room: Bouzy I  16:30 – 18:30
Session Chair: Asif Arastu, Unisont Engineering, Inc., USA
Session Co-Chair: Patricia Paviet, Department of Energy - Office of Nuclear Energy, USA
Generation IV International Forum Education and Training Webinars: Education Tools for the Next Generation Workforce  ICONE26-81027
Patricia Paviet
Department of Energy - Office of Nuclear Energy, Germantown, MD, USA
Numerical Simulation for Nuclear Engineering Education: A Case Study in a Course “Advanced Nuclear Reactor Thermal Analysis”  ICONE26-81042
Shanfang Huang, yaopeng Gong, Chao Li, RuiLong Liu, Jiagentang Wang, Kan Wang
Tsinghua University, Beijing, China
The Nuclear Technology Education Consortium: UK Nuclear Education to Meet the Global Workforce Demand  ICONE26-81044
John Roberts, The University of Manchester, Manchester, United Kingdom
Technical Workforce Education and Training Program at Abu Dhabi Polytechnic: Integration of Academia and Industry Requirements  ICONE26-82094
Anthony Hechanova, Abu Dhabi Polytechnic, Abu Dhabi, United Arab Emirates
15 Years of the European Nuclear Education Network (ENEN Association)  ICONE26-82611
Leon Cizelj1 Joerg Starlinger1 Veronique Decobert1
Behroz Bazargan-Sabet2 Filip Tuomisto3 Michèle Coeck4 Pascal Anzieu5
1. Jozef Stefan Institute, Ljubljana, Slovenia; 2. University of Stuttgart, Stuttgart, Germany; 3. Westinghouse Electric France, Orsay, France; 4. École des Mines de Nancy, Nancy, France; 5. Aalto University, Alto, Finland; 6. SCK•CEN, Mol, Belgium; 7. CEA-INSTN Institut national des sciences & techniques nucléaires, Gif sur Yvette, France; 8. The University of Manchester, Manchester, United Kingdom; 9. School of Physics & Astronomy, University of Birmingham, Birmingham, United Kingdom; 10. ENEN Association, Gif sur Yvette, France

Student Paper Competition

16-3  Computational Fluid Dynamics II

Monday July 23  Room: Talbot I  16:30 – 18:30
Session Chair: Wei Peng, Tsinghua University, China
Session Co-Chair: Mohammad A. Hawila, Texas A&M University, USA
CFD Investigation of Thermal-Hydraulic Behaviors in Full Reactor Core for Sodium-Cooled Fast Reactor  ICONE26-81626
Jing Chen1 Dalin Zhang1 Suiqheng Gqiu2 Kui Zhang3
Mingjun Wang4 Guanghui Su5
1. Xi’an Jiao Tong University, Xi’an, China; 2. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China
Computational Simulation of Hydrogen Permeation Experiment  ICONE26-82487
Xiao Wu1 WaiLam Chan2 Shanbin Shi3 Xiaodong Sun4 Richard Christensen5
1. University of Michigan, Ann Arbor, MI, USA; 2. University of Idaho, Idaho Falls, ID, USA
Numerical Research on Melt Pool Flow Characteristics under Rolling Condition  ICONE26-81994
Simin Luo1 Xin’an Wang2 Yaping Zhang3 Dalin Zhang1
Suiqheng Gqiu4 Guanghui Su5
1. Xi’an Jiao Tong University, Xi’an, China; 2. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China
Numerical Simulation of Bubble Dynamic under Ocean Conditions  ICONE26-81639
Chen Chong1 Mingjun Wang2 Wonxi Tian3 Suiqheng Gqiu2 Guanghui Su4
1. Xi’an Jiao Tong University, Xi’an, China; 2. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China
A Numerical Study of Particle Deposition through Fuel Pebble Bed in HTGR  ICONE26-81792
Qi Sun, Gang Zhao, Wei Peng, Suyuan Yu
Tsinghua University, Beijing, China
RCIC Turbo-Pump Scaling through CFD and Model Testing for the Texas A&M University NHTS Facility  ICONE26-81119
Mohammad A. Hawila, Karen V. Kirkland
Texas A&M University, College Station, TX, USA

Monday, 16:30 – 18:30
**Student Paper Competition**

**16-8  Nuclear Fuels and Materials I**  
Monday July 23  
Room Fronsac | 16:30 – 18:30

Session Chair: Wei Zhou, City University of Hong Kong, China  
Session Co-Chair: Darrell Cheu, Purdue University, USA

**Optimization of Fuel Storage in Spent Fuel Pool**  
ICONE26-81084
Xinyu Wang1 Richard Cable Kurwitz2 Zhijian Zhang1  
1. Harbin Engineering University, Harbin, China; 2. Texas A&M University, College Station, TX, USA

**Derivation of Critical Parameters of Betavoltaics**  
ICONE26-81109
Darrell Cheu1 Thomas Adams2 Shripad Revankar1  
1. Purdue University, West Lafayette, IN, USA; 2. Naval Surface Warfare Center, Crane Division, Crane, IN, USA

**Experimental Research on Energy Release and Fragments**  
Characteristics under Molten Materials Discharged into Liquid Sodium  
ICONE26-81400
Liang Hu1 Kui Ge1 Yaping Zhang1 Guanghui Su1 Wenxi Tian1 Suizheng Qiu2  
1. Xi’an Jiao Tong University, Xi’an, China; 2. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China

**Multiphysics Modeling of Fabrication Methods Effect on UO2-BeO Composite Fuels Performance**  
ICONE26-81429
Wei Zhou1 Wenzhong Zhou2  
1. City University of Hong Kong, Hong Kong, China; 2. City University of Hong Kong, Kowloon, Hong Kong

**The Influence of Pebble Placement on the Wake of Tandem Pebbles in a Free Stream**  
ICONE26-81884
Gerrit Butta1 Yassin Hassan2 Richard Cable Kurwitz3 Elia Merzari2  
1. Texas A&M University, College Station, TX, USA; 2. Argonne National Laboratory, Lemont, IL, USA

**Preliminary Research on the Oxidation Effect of the Carbon Steel Plate of Downward Facing Pool Boiling by Two-Dimensional Image**  
ICONE26-82019
Kai Wang1 Nejdet Erkan1 Koji Okamoto2  
1. University of Tokyo, Tokyo, Japan; 2. University of Tokyo, Ibaraki, Japan

**Student Paper Competition**

**16-13 Nuclear Safety and Accident Analysis III**  
Monday July 23  
Room Lalande | 16:30 – 18:30

Session Chair: Deeksha Gupta, Framatome GmbH, Germany  
Session Co-Chair: Tingtao Feng, Xi’an Jiaotong University, China

**Cyber Threat Scenarios for Electrical Systems of Nuclear Power Plants**  
ICONE26-82411
Deeksha Gupta, Edita Bajramovic, Mithil Parekh, Karl Waedt  
Framatome GmbH, Erlangen, Germany

**CANDU 6 Accident Analysis using RELAP/SCDAPSIM with the Integrated Uncertainty Package**  
ICONE26-82241
Roxana-Mihaela Nistor-Val1 Daniel Dupleac1 Ilie Prisescaru1  
Chris Allison2 M. Perez-Ferragut2 Judith Hohorst3  

**Numerical Research on Fuel Rod Progression during Core Degradation Process using MELCOR**  
ICONE26-81738
Tingtao Feng1 Wenxi Tian1 Ping Song1 Jun Wang2  
Mingjun Wang1 Guanghui Su1 Suizheng Qiu2

1. Xi’an Jiao Tong University, Xi’an, China; 2. University of Wisconsin, Madison, WI, USA; 3. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China

**Validation of CTF Void Predictions using the BFBT Database**  
ICONE26-81869
Nathan Porter1 Maria Avramova1 Vincent Mousseau2  
1. North Carolina State University, Raleigh, NC, USA; 2. Sandia National Laboratories, Albuquerque, NM, USA

**Condition Fault Tree: An Extension of Traditional Fault Tree to Handle Uncertainty**  
ICONE26-81243
Zhenxu Zhou, Qin Zhang  
Tsinghua University, Beijing, China

**Student Paper Competition**

**16-16 Thermalhydraulics III**  
Monday July 23  
Room Mouton Cadet | 16:30 – 18:30

Session Chair: Anna Fortova, Czech Technical University in Prague, Czech Republic  
Session Co-Chair: Yuki Nakamura, University of Tsukuba, Japan

**Comparison of Drift-Flux Models for Void Fraction Prediction in Sub-Channel of Vertical Rod Bundles**  
ICONE26-81435
Quan-yao Ren, Liang-ming Pan, Wen-xiong Zhou, Ting-pu Ye, Hang Liu, Song-song Li  
Chongqing University, Chongqing, China

**Pressure Drop Experiments of Liquid Sodium Flowing in a 7-Rod Bundle**  
ICONE26-81444
Yandong Hou1 Liu Wang1 Yingwei Wu1 Wenxi Tian1 Guanghui Su1 Suizheng Qiu1  
1. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China; 2. Xi’an Jiao Tong University, Xi’an, China

**Two Phase Flow Behavior during Pool Scrubbing**  
ICONE26-81497
Yuki Nakamura, Kota Fujiwara, Wataru Kikuchi, Shimpei Saito, Tomohisa Yuasa, Akiko Kaneko, Yutaka Abe  
University of Tsukuba, Tsukuba, Japan

**TREAT Transient Modeling and Impact of Graphite Thermal Scattering**  
ICONE26-81887
Nina C. Sorrell, Ayman I. Hawari  
North Carolina State University, Raleigh, NC, USA

**VVER 1000 Pressurizer System and Control Modelling in Dymola**  
ICONE26-81263
Anna Fortova1 Filip Jezeck2  
1. Czech Technical University in Prague, Prague, Czech Republic; 2. Czech Technical University in Prague, Faculty of Electrical Engineering, Prague, Czech Republic

**Two-Phase Flow Regime Identification using Fluctuating Force Signals under Machine Learning Techniques**  
ICONE26-81288
Yuta Saito, Shuicho Miwa, Shuhei Torisaki  
Hokkaido University, Sapporo, Japan

18:30 – 20:30  
Chablis Suite, Ground Floor

OPENING RECEPTION

See page 13 for details.
Tuesday, July 24

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<th>LOCATION</th>
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<td>08:30 – 10:00</td>
<td>Plenary Session – Current Status of Nuclear Power</td>
<td>Cremant, 1st Floor</td>
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<tr>
<td>10:00 – 10:30</td>
<td>Poster Session &amp; Coffee Break</td>
<td>Chablis Suite, Ground Floor</td>
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<tr>
<td>10:30 – 12:30</td>
<td>Technical Sessions</td>
<td>See pages 48 through 52 for session titles, authors and locations</td>
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<tr>
<td>12:30 – 14:00</td>
<td>Lunch</td>
<td>Chablis Suite, Ground Floor</td>
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<tr>
<td>14:00 – 16:00</td>
<td>Panel Sessions</td>
<td>See pages 19 through 23 for panel session details</td>
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<tr>
<td>16:00 – 16:30</td>
<td>Poster Session &amp; Coffee Break</td>
<td>Chablis Suite, Ground Floor</td>
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<tr>
<td>16:30 – 18:30</td>
<td>Technical Sessions</td>
<td>See pages 52 through 56 for session titles, authors and locations</td>
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<tr>
<td>19:00 – 22:00</td>
<td>Conference Banquet</td>
<td>Twickenham Stadium, Rose Suite Whitton Road, Twickenham</td>
</tr>
</tbody>
</table>

**PLENARY SESSION: CURRENT STATUS OF NUCLEAR POWER**

**SPEAKER ONE:**

**Current Status of Nuclear Power in China**

**Dongshan Zheng,** CEO of General Nuclear Internal Ltd (CGN UK)

This speaker will provide a global perspective on CGN and prospects for the Chinese and United Kingdom nuclear sector.

In 1984 after graduation, Dongshan joined Guangdong Nuclear Power Joint Venture Company Ltd (GNPJVC) and trained in France to be a safety technical advisor. In 2003, Mr Zheng, was appointed Deputy General Manager of Daya Bay Nuclear Power Operations & Management Co., Ltd. In 2004, Dongshan, became General Manager of Yangjiang Nuclear Power Co., Ltd. In 2005, appointed General Manager of China Nuclear Power Engineering Co., Ltd. Throughout 2008-2017, Dongshan has been Senior Vice President of China General Nuclear Power Corporation. From 2016 to present, Mr Zheng has been CEO of General Nuclear International Ltd (also known as CGN UK).

**SPEAKER TWO:**

**Transformative Efficiency: Innovation to Improve Operations and Maintenance**

**Ken Canavan,** Chief Technology Officer, Global Technology Services

Now more than ever, the nuclear industry is under pressure to reduce costs and increase production to remain a competitive power generation source. As obsolescence concerns continue to grow, so do costs associated with operations and maintenance. Heavy regulations and public perception have contributed to the slow pace of innovative solutions, but the industry is starting to see signs of a paradigm shift.

Westinghouse has been through several transformations in its esteemed 132-year history. As we emerge from our most recent one we have refocused our attention to creating innovative technologies that will drive the nuclear industry of tomorrow. Disruptive technologies that enhance safety, reliability and efficiency will transform the way we do business and help us to continue to provide clean energy to our customers around the globe.
Ken Canavan is the chief technology officer (CTO) for Westinghouse Electric Company. He has strategic responsibility to drive next-generation technology and innovation solutions that align with the company’s global business strategy, and leads the effort to strengthen Westinghouse with regard to technology leadership development.

Previously, Ken served as director, Engineering, for Electric Power Research Institute (EPRI). While at EPRI, he turned industry needs into compelling research and development plans. These plans resulted in solutions to improve the safety and performance of the global nuclear fleet.

Prior to his work at EPRI, Ken was responsible for risk applications at Data Systems and Solutions, ERIN Engineering and Research, and GPU Nuclear. He also was a safety analysis engineer with Davis-Besse Nuclear Power Station in Ohio (USA).

Canavan has a bachelor’s degree in chemical engineering, with a nuclear engineering minor, from Manhattan College, New York.

SPEAKER THREE:
Nuclear Energy in a Clean Energy Future

King Lee, Director, Harmony Programme, World Nuclear Association

Nuclear energy has a vital role to play in the global Clean Energy Future. To meet the growing demand for reliable, affordable and clean electricity we will need all low-carbon energy sources to work together as part of a diverse 24/7 mix.

The nuclear industry has developed a Harmony goal to provide 25% of the global electricity supplied by nuclear energy in 2050, resulting in a tripling of nuclear generation from its present level. This would require the construction of around 1000 GW of new nuclear capacity.

There are several barriers standing in the way of achieving the Harmony goal. The Harmony programme set out three objectives to overcome these challenges. Firstly, we should establish a level playing field in energy markets which drives investment in future clean energy. Secondly, we need to ensure harmonized regulatory processes to provide a more internationally consistent, efficient and predictable nuclear licensing regime, to facilitate significant growth of nuclear capacity and timely licensing of innovative designs. Thirdly we should create an effective safety paradigm focusing on genuine public wellbeing, where the health, environmental and safety benefits of nuclear are better understood and valued when compared with other energy sources.

Harmony and other international initiatives are essential to ensure high level multilateral dialogue and engagement of policy makers on the role of nuclear energy, working with renewables, as part of the clean energy future.

SPEAKER FOUR:
Hitachi-GE’s Challenges to Continuous Supply of Advanced Nuclear Technology

Yasunori Inada, General Manager, Hitachi-GE Nuclear Energy, Japan

Hitachi-GE has manufactured key nuclear components and constructed nuclear power plants for over fifty years. Current focused activities are 1) Safety enhancement and licensing for restart of existing nuclear power plants, 2) Recovery of Fukushima Daiichi Nuclear Power Station, 3) Decommissioning, 4) Fuel cycle, and 5) Construction projects of nuclear power plants including UK ABWR. In this presentation, summaries of these activities and the current status of HORIZON project are introduced. For the success of these projects, advanced technologies and skilled craft workers are keys. Examples of activities related to these keys are also shared in this presentation. In addition, Hitachi-GE’s vision for future plants is shared.

Yasunori Inada has obtained a master’s degree in Precision Mechanical Engineering from Tohoku University. He joined Hitachi, Ltd in 1992 and currently holds the position of General Manager of the Nuclear Power Business Development and Management Division.
Technical Sessions

Tuesday, 10:30 – 12:30

**Nuclear Fuel and Material, Reactor Physics and Transport Theory**

**2-3 Reactor Physics: Monte Carlo Methods and Calculations I**

*Tuesday July 24*

Room Reims | 10:30 – 12:30

Session Chair: Paul K. Chan, Royal Military College of Canada, Canada

Development of a Spatial Domain Decomposition Scheme for Monte Carlo Neutron Transport [ICONE26-82144]

Manuel Garcia1, Diego Ferraro1, Victor Hugo Sanchez Espinoza1, Luigi Mercatali1, Jaakko Leppänen2, Ville Valtavirta2

1. Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany; 2. VTT Technical Research Centre of Finland, Espoo, Finland

A Monte Carlo Method for Simulating Stochastic Neutron Fields in Criticality Transients [ICONE26-81595]

Qi Xu, Zhe Wang, Gang Xiao

JAPC, Beijing, China

One Step Method for Multigroup Adjacent Neutron Flux through Continuous Energy Monte Carlo Calculation [ICONE26-82185]

Xiaotong Shang, Guanlin Shi, Kan Wang

Tsinghua University, Beijing, China

Foreseen Capabilities, Bottlenecks Identification and Potential Limitations of Serpent MC Transport Code in Large-scale Full 3-D Burnup Calculations [ICONE26-82305]

Diego Ferraro1, Manuel Garcia1, Luigi Mercatali1, Victor Hugo Sanchez Espinoza1, Jaakko Leppänen2, Ville Valtavirta2

1. Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany; 2. VTT Technical Research Centre of Finland, Espoo, Finland

Research on Coupling Scheme of Monte Carlo Burnup Calculation in RMC [ICONE26-81140]

Wanlin Li, Kan Wang, Ganglin Yu, Yaodong Li

Tsinghua University, Beijing, China

Internal Coupling between Neutronics and Thermal-Hydraulics with RMC/CTF and Validation using VERA Benchmarks [ICONE26-82397]

Kaiwen Li, Shichang Liu, Juanjuan Guo, Kan Wang

Tsinghua University, Beijing, China

**Nuclear Fuel and Material, Reactor Physics and Transport Theory**

**2-6 Nuclear Fuel Safety and Performance Analysis IV**

*Tuesday July 24*

Room Cognac | 10:30 – 12:30

Session Chair: Paul K. Chan, Royal Military College of Canada, Canada

Fuel Cycle Economy of Accident Tolerant Fuel Assemblies [ICONE26-81384]

Duoqing Xu, Tong Liu, Heng Huang

China Nuclear Power Technology Research Institute Co., Ltd, Chengdu, China

Greatly Enhanced Thermal Conductivity of Fully Inert Matrix Dispersion Pellet (IMDP) Produced by Spark Plasma Sintering (SPS) Technique [ICONE26-82536]

Zhaodandan Ma1, Tong Liu2, Rui Li3, Maizhou Sun1, Zhwei Lu1

1. China Nuclear Power Technology Research Institute, Shenzhen, China; 2. China Nuclear Power Technology Research Institute Co., Ltd, Chengdu, China

Preliminary Study on Thermal Performance of Inert Matrix Disperse Pellet using FEA Method [ICONE26-82191]

Zhiwei Lu1, Yun Li3, Yongdong Zhang3, Lei Li1, Zhaodandan Ma1, Tong Liu2

1. China Nuclear Power Technology Research Institute, Shenzhen, China; 2. CGN, Chengdu, China; 3. CGN, Shenzhen, China; 4. China General Nuclear Power Technique, Shenzhen, China; 5. China Nuclear Power Technology Research Institute Co., Ltd, Chengdu, China

Effect of AL2O3 and SiC Content in Pack Cementation Powders on the Microstructure of SiC Coatings on HTR Graphite Spheres [ICONE26-81174]

Hongsheng Zhao, Ping Zhou, Ziqiang Li, Xiaoxue Liu, Kaihong Zhang, Taowei Wang, Bin Wu, Bing Liu

Tsinghua University, Beijing, China

Severe Accident Analysis for Reactor Core Applying SiC to Fuel Claddings and Channel Boxes [ICONE26-81923]

Hideki Horie1, Yutaaka Takeuchi1, Kenya Takiwaki1, Fumie Sebe2, Kazuo Kakihuchi1, Hisaki Sato1

1. Toshiba Energy Systems & Solutions Corporation, Yokohama, Japan; 2. Toshiba Corporation, Yokohama, Japan; 3. Toshiba, Yokohama, Japan

Experimental and Theoretical Investigation of Ignition Temperature and Vapor Explosion of the Aluminum-Water Reaction [ICONE26-82077]

Paul O. Biney1, Kevin Lee2

1. Prairie View A&M University, Mechanical Engineering Dept., Prairie View, TX, USA; 2. Prairie View A&M University, Prairie View, TX, USA

**Plant Systems, Structures, Components and Materials**

**3-8 High Temperature Components I**

*Tuesday July 24*

Room Chalon | 10:30 – 12:30

Session Chair: Brahim Nadri, Engineering Analysis Services Limited, UK

The Influence of Thermal Deformation on the Dynamic Characteristics of AMB Rotor of HTR-PM Helium Blower [ICONE26-81132]

Guohei Du, Jinping Yu, Hong Wang, Lei Zhao

Tsinghua University, Beijing, China

A Structural Integrity Assessment of a Nuclear Boiler Superheater Bifurcation at High Temperature [ICONE26-81167]

Brahim Nadri, Robert Wang

Engineering Analysis Services Limited, Altrincham, United Kingdom

Research on Structural Design and Analysis of S-CO2 Turbine Impeller [ICONE26-81267]

Jun Wu, Can Ma, Chunhui Dai, Zhenxing Zhao, Lu Dai, Zhouyang Liu

Wuhan Second Ship Design and Research Institute, Wuhan, China

Research About the Uniform Field Breakdown Strength of Helium Gas at High Temperature and Pressure in Millimeter-Scale Gaps [ICONE26-81293]

Qi You, Zhengang Shi, Xingnan Liu, Xunshi Yan, Guojun Yang

Tsinghua University, Beijing, China
Research on Auxiliary Bearing Structure with Buffer Shim based on LS-DYNA for Helium Circulator of HTR-10  
Guojun Yang, Zhe Sun, Xingnan Liu, Zhengang Shi  
Tsinghua University, Beijing, China

Finite Element Analysis of AMB Eddy-Current Loss in HTR-PM  
Primary Helium Circulator  
Jinpeng Yu, yan Zhou, Mo Ni, Guojun Yang, Lei Zhao  
Tsinghua University, Beijing, China

Advanced Reactors and Fusion Technologies

5-5  Fusion Technology II  
Tuesday July 24  
Room Bourg I  10:30 – 12:30

Session Chair: Hong Yu, Chinese Institute of Atomic Energy, China  
Session Co-Chair: Mauro Cappelli, ENEA, Italy

Conceptual Design of the Water Cooled Breeder Blanket for Both Phases of CFETR  
Songlin Liu, Xuebin Ma, Kechang Jiang, Min Li, Xiaokang Zhang  
Institute of Plasma Physics, Chinese Academy of Sciences, Hefei, China

The First CNS Commissioning Tests with Filling Deuterium with Reactor Power Operation in CARR  
Jianlong Li  
Chinese Institute of Atomic Energy, Beijing, China

The Characteristics Study of Helium-Xenon Mixture in Closed Brayton Cycle for Space Nuclear Reactor Power  
Xie Yang, Lei Shi  
Tsinghua University, Beijing, China

Recent Research Progress of CLF-1 Steel  
Hongbin Liao  
Southwestern Institute of Physics, Chengdu, China

Conceptual Design and Neutronics/Thermal-Hydraulic Coupling Optimization Analyses of Two Typical Helium Cooled Solid Breeder Blanket Modules for CFETR Phase II  
Shijie Cui1 Dalin Zhang1 Wenyi Wang2 Hongyu Chen 2 Chuan Li2  
1. Xi’an Jiao Tong University, Xi’an, China; 2. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China

First Principles Studies of Diffusion Behaviors of Tritium in HTR-PM Materials: from Framework to Preliminary Result  
Chao Fang1 Wenyi Wang1 Hongyu Chen1 Chuan Li1  
1. Tsinghua University, Beijing, China; 2. Institute of Nuclear and New Energy Technology, Tsinghua University, Beijing, China

Thermal–Hydraulics and Safety Analyses

8-2  Supercritical Fluids I  
Tuesday July 24  
Room Bouzy I  10:30 – 12:30

Session Chair: Wenxi Tian, Xi’an Jiaotong University, China

Numerical Study of Deteriorated Convection Heat Transfer of Supercritical Fluid Flowing through Vertical Mini Tube at Relatively Low Reynolds Numbers  
Chenru Zhao1 Zhen Zhang1 Qianfeng Liu2 HanLiang Bo1  
1. Tsinghua University, Beijing, China; 2. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China

Experimental Study of Supercritical CO2 Critical Flow through Short Tubes  
Yuan Zhou1 Xing Fan1 Yangle Wang1 Jingtan Chen 1  
Yunpeng Huang1 Junfeng Wang2  
1. Sichuan University, Chengdu, China; 2. Nuclear Power Institute of China, Chengdu, China

Analytical Study of Supercritical Water Flow in Two Heated Parallel Channels with Wall Heat Effects  
Dhanashree Ghadge, Vijay Chatoorgoon  
University of Manitoba, Winnipeg, MB, Canada

Numerical Investigation on Maldistribution of Supercritical CO2 Flow inside Printed Circuit Heat Exchanger  
Qi Xiao1 Hanbing Ke1 Yongquan Li1 Zhenxing Zhao1 Meng-Ran Liao2  
1. Wuhan Second Ship Design and Research Institute, Wuhan, China; 2. Key Lab. on Steam Power System, Wuhan Second Ship Des. & Res. Ins., Wuhan, China

Numerical Investigation on Conjugate Heat Transfer of Supercritical CO2 in Rolling Motion  
Zhenxing Zhao1 Meng-Ran Liao1 Yong Liu1 Qi Xiao1 XingSheng Lao1 Jun Wu1 Wei Wang1  
1. Wuhan Second Ship Design and Research Institute, Wuhan, China; 2. Key Lab. on Steam Power System, Wuhan Second Ship Des. & Res. Ins., Wuhan, China

Codes, Standards, Licensing, and Regulatory Issues

7-3  New Methodology for Codes and Standards  
Tuesday July 24  
Room Epernay I  10:30 – 12:30

Session Chair: Claude Faidy, AFCEN-CF Integrity Engineering, France

New Needs of Fracture Mechanic Analysis at Design and Operation Level: Status of French Nuclear Mechanical Codes  
Claude Faidy  
AFCEN-CF Integrity Engineering, Tassin, France

Effect of Rolling Motion on Flow Instability of Parallel Rectangular Channels of Natural Circulation  
Xiaoyan Wang1 Siyang Huang1 Wenyi Tian1  
Lie Chen1 Suizheng Qiu2 Guanghui Su1  
1. Xi’an Jiao Tong University, Xi’an, China; 2. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China

Study on Supervision Mode of Floating Nuclear Power Plant with Small Modular Reactor  
Lei Wan, Guiyong Li, Min Rui, Yong Kang Liu, Yue Yang  
China Nuclear Power Technology Research Institute, Shenzhen, China

Development of a Standard for Fusion Needs: Example of Introduction of Eurofer in RCC-MRx  
Jorge Enrique Muñoz García1 pierre lamagnere2  
Thierry Lebarbe3 Cécile Petesch3 Yves Lejeail3  
1. French Alternative Energies and Atomic Energy Commission, Gil sur Yvette, France; 2. CEA Cadarache, Saint Paul Lez Durance, France; 3. CEA, Gil Sur Yvette, France; 4. CEA Saclay, Gil sur Yvette, France; 5. French Alternative Energies and Atomic Energy Commission, Saint Paul Lez Durance, France

Main Evolutions of the RCC-C Design and Construction Code for Fuel Assemblies since 2015  
Marc Ton-That1 Christine Vauglin2 Gilbert Trillon3  
1. EDF, Lyon, France; 2. AREVA NP, Lyon, France; 3. EDF, Saint Denis, France
Computational Fluid Dynamics (CFD)

9-1 Vibration Analysis
Tuesday July 24 Room Alsace I 10:30 – 12:30
Session Chair: Afaque Shams, Nuclear Research and Consultancy Group, Netherlands
Session Co-Chair: Junjie Dang, China Nuclear Power Engineering Co., LTD, China
Session Co-Chair: Junrong Wang, Wuhan 2nd Ship Design and Research Institute, China

Study on Flow Induced Vibration Analysis and Evaluation for Heat Transfer Tube of Steam Generator in Two Phase Flow
ICONE26-81537
Xuan Huang, Huan-huan Qi, FengChun Cai, Zhi-peng Feng, Shuai Liu, Qian Huang
Nuclear Power Institute of China, Chengdu, China

Study on Dynamic Characteristics and Flow Induced Vibration of Tube Bundles based on the Fluid Structure Coupling Method
ICONE26-81342
Zhi-peng Feng, Qian Huang, FengChun Cai, Xi lv, Shuai Liu, Xiaozhou jiang
Nuclear Power Institute of China, Chengdu, China

CFD Numerical Simulation of Water Hammer in a Vortex Diode
ICONE26-81790
Junrong Wang1 Zhiguo Wei1 Jinlan Gou 1 Qi Xiao1 Shao Dan Li1 Yong Li2
1. Wuhan Second Ship Design and Research Institute, Wuhan, China; 2. Key Lab. on Steam Power System, Wuhan Second Ship Design and Research Institute, Wuhan, China

Seismic Analysis and Design of HPR1000 Degassing Tower Liquid Cooler
ICONE26-82609
Junjie Dang1 Wenmo Li2 Chunming Wang1 Xingling Tang1
1. China Nuclear Power Engineering Co., Ltd., Beijing, China; 2. SPIC China Power Complete Equipment Co., LTD, Beijing, China

Computational Fluid Dynamics (CFD)

9-4 Thermal Mixing I
Tuesday July 24 Room Muscadet I 10:30 – 12:30
Session Chair: Afaque Shams, Nuclear Research and Consultancy Group, Netherlands
Session Co-Chair: Ivan Di Piazza, ENEA C.R. Brasimone, Italy
Session Co-Chair: Xiaomeng Dong, Harbin Engineering University, China

Synthesis of a CFD Benchmark for the Thermal Mixing in a Sharp Corner T-Junction with a Wall
ICONE26-81024
Afaque Shams1 Nicolas Edh2 Kristian Angelé3

Design of a Closely Spaced Rod Bundle for a Reference Direct Numerical Simulation
ICONE26-81049
Afaque Shams1 Tomasz Kwiatkowski2
1. Nuclear Research and Consultancy Group (NRG), Petten, Netherlands; 2. National Center for Nuclear Research, Otwock, Swierk, Poland

Numerical Investigation of the Effect of Spacer Grid and Mixing Vane on the Critical Heat Flux in Rod Bundle Channel
ICONE26-81284
Xiaomeng Dong, Guangliang Chen, Zhijian Zhang, Zhaofei Tian, Lei Li
Harbin Engineering University, Harbin, China

Post-Test CFD Analysis of Non-Uniformly Heated 19-Pin Fuel Bundle Cooled by HLM
ICONE26-81307
Ranieri Marinari1 Ivan Di Piazza2 Morena Angelucci3 Daniele Martelli4
1. University of Pisa, Pisa, Italy; 2. ENEA C.R. Brasimone, Camognano, Italy; 3. University of Pisa - Dipartimento di Ingegneria Civile ed Industriale (DIC), Pisa, Italy

Analysis on Flow Behavior in the Plenum of RPV of PWR
ICONE26-81547
Lei Huang1 Lu-lu Hao2 Hong Chen3 Jun Feng Xue2 Lili Tong1
1. Shanghai Jiao Tong University, Shanghai, China; 2. Fujian Fuzhou Nuclear Power Co., Ltd., Fuzhou, China

Computational Fluid Dynamics (CFD)

9-8 Turbulent and Transient Flow
Tuesday July 24 Room Cremant I 10:30 – 12:30
Session Chair: Riccardo Puragliesi, Paul Scherrer Institut / Laboratory for Reactor Physics and Systems Behaviour, Switzerland
Session Co-Chair: Naoyuki Onodera, Japan Atomic Energy Agency, Japan
Session Co-Chair: Youyou Xu, Institute of Plasma Physics, Chinese Academy of Sciences, China

Large Eddy Simulation of 5-Tube Bundle Helical Coil Steam Generator Test Section
ICONE26-82382
Mustafa A. Yildiz1 Elia Merzari2 Yassin Hassan1
1. Texas A&M University, College Station, TX, USA; 2. Argonne National Laboratory, Lemont, IL, USA

Assessment of Turbulence Models against Supercritical Hydrogen Flows in a Straight Tube
ICONE26-82235
Zhipeng Wang, Yu Ji, Jun Sun, Lei Shi
Tsinghua University, Beijing, China

Computational Fluid Dynamics as a Tool for Deriving Subchannel Model Parameters: The PSBT Case Study
ICONE26-81743
Riccardo Puragliesi1 Roman Mukin2 Ivor Clifford3
1. Paul Scherrer Institut / Laboratory for Reactor Physics and Systems Behaviour, Villigen, Switzerland; 2. Paul Scherrer Institute, Villigen, Switzerland; 3. PreussenElektra GmbH (former E.ON Kernkraft GmbH), Hannover, Germany

Acceleration of Plume Dispersion Simulation using Locally Mesh-Refined Lattice Boltzmann Method
ICONE26-82145
Naoyuki Onodera, Yasuhiro Idomura
Japan Atomic Energy Agency, Chiba, Japan

CFD Modelling of Loss of Vacuum Accident (LOVA) for CFETR
ICONE26-81970
Youyou Xu, Songlin Liu, Xiaoman Cheng, Xuebin Ma
Institute of Plasma Physics, Chinese Academy of Sciences, Hefei, China
An Experimental Study on Freeze Valve Performance in a Molten Salt Reactor (ICONE26-81679)
Indarta Kuncoro Aji1, Tokushima Tatsuya1
Motoyasu Kinoshita2, Tomio Okawa2
1. Dept. of Mechanical Engineering and Intelligent Systems, The University of Electro-Communications, Tokyo, Japan; 2. Research into Artifacts, Center for Engineering, The University of Tokyo, Chiba, Japan; 3. The University of ElectroCommunications, Tokyo, Japan

Electrochemical Measurement of Radio-Activated Metal under High Temperature Condition (ICONE26-81727)
Ryota Taguchi1, Tomonori Ishii2, Tatsuya Hazuku3
Tomoji Takamura1, Sho Kano1, Hiroaki Abe2
1. Tokyo University of Marine Science and Technology, Tokyo, Japan; 2. The University of Tokyo, Ibaraki, Japan

Inlet Passageway Optimization of Immediate Heat Exchanger in an HTGR (ICONE26-81801)
Jingdan Cui1, Kun Yuan1, Qi Sun2, Wei Peng2, Jie Wang3
1. Institute of Nuclear and New Energy Technology, Beijing, China; 2. Tsinghua University, Beijing, China; 3. INET, Tsinghua University, Beijing, China

**Student Paper Competition**

### 16-1 Advanced Reactors and Fusion Technologies

**Tuesday July 24**

Room: Talbot | 10:30 – 12:30

**Session Chair:** Lorenzo Basili, DICI - University of Pisa, Italy

**Session Co-Chair:** Paul WRigley, University of Derby, United Kingdom

**Preliminary Design Considerations of He-Xe Mixture Cooled Space Nuclear Reactor** (ICONE26-81226)
Tao Meng, Sichao Tan, Yuhae He, Kun Cheng, Dongdong Yuan
Harbin Engineering University, Harbin, China

**CFD Thermal Analysis of ITER Pressure Suppression Tanks** (ICONE26-82550)
Lorenzo Basili1, Rosa Lo Frano1, Marco Olcese1
Igor Sekachev1, Donato Aquaro2
1. DICI-University of Pisa, Pisa, Italy; 2. ITER Organization, St Paul lez Durance, France; 3. UNIP-DICI, Pisa, Italy

**Multi-Fluid Gas Turbine Components Scaling for a Generation IV Nuclear Power Plant Performance Simulation** (ICONE26-82373)
Emmanuel O. Osiwe1, Arnold Gad-Briggs2, Pericles Pilidis1
Theoklis Nikolaidis1, Suresh Sampath1
1. Cranfield University, Bedford, United Kingdom; 2. Cranfield University & EGB Engineering UK, Cheshire, United Kingdom

**Design for Plant Modularisation: Nuclear and SMR** (ICONE26-81760)
Paul WRigley1, Paul Wood2, Paul Stewart1, Richard Hall1, Dan Robertson2
1. University of Derby, Derby, United Kingdom; 2. Rolls-Royce, Derby, United Kingdom

**Expected Accuracy Range of Cost Estimates for Small Modular Reactors at the Early Concept Design Stage** (ICONE26-81799)
Amritpal Agar1, Andy J Fry2, Martin J. Goodfellow2
Yee Mey Goh1, Linda Newnes3
1. Loughborough University, Leicestershire, United Kingdom; 2. Rolls-Royce, Derbyshire, United Kingdom; 3. University of Bath, Bath, United Kingdom

**Student Paper Competition**

### 16-5 Nuclear Components, Nuclear Waste and Radiation II

**Tuesday July 24**

Room: Lalleld | 10:30 – 12:30

**Session Chair:** Christina Petlowany, The University of Texas at Austin, USA

**Session Co-Chair:** Indarta Kuncoro Aji, Dept. of Mechanical Engineering and Intelligent Systems, The University of Electro-Communications, Japan

**Dose Minimization Game for Smartphones** (ICONE26-82457)
Nolan Stelter, Arnab Das, Zahra Hanifah, Rizwan Uddin
University of Illinois, Urbana, IL, USA

**Cyclic Plasticity Behavior of 90° Back-to-Back Pipe Bends under Cyclic Bending and Steady Pressure** (ICONE26-82386)
Nak-Kyun Cho, Haofeng Chen
University of Strathclyde, Glasgow, United Kingdom

**Virtual Fixture Augmentation of Operator Selection of Non-Contact Material Reduction Task Paths** (ICONE26-82398)
Andrew Sharp, Christina Petlowany, Mitch Pryor
The University of Texas at Austin, Austin, TX, USA
Student Paper Competition
16-17 Thermalhydraulics IV
Tuesday July 24
Room Mouton Cadet
10:30 – 12:30
Session Chair: Sarah Morgan, Virginia Commonwealth University, USA
Session Co-Chair: Jiawei Bian, Xi’an Jiaotong University, China

Experimental Study on Spray Pattern of Pressure-Swirl Nozzle in Reactor Containment
ICONE26-81505
Jiawei Bian1 Dalin Zhang1 Ruiyu Sun1 Yingwei Wu1 Wenzhi Tian1 Guanghu Su1 Suizheng Qiu2 1. Xi’an Jiao Tong University, Xi’an, China; 2. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China

Flow and Temperature Fields Measurement inside Rod Bundle by the Combined Use of PIV and LIF Technique
ICONE26-81526
Li Xing, Sichao Tan, Zhengpeng Mi, Pei Yao Qi, Yunlong Huang Harbin Engineering University, Harbin, China

Validation of a Code and Effect of Turbulence Model on Predicting Thermal Stratification Phenomena in the Upper Plenum of SFR
ICONE26-81551
Shibao Wang1 Dalin Zhang1 Chenglong Wang1 Ping Song1 Jing Chen1 Suizheng Qiu1 Guanghu Su1 1. Xi’an Jiao Tong University, Xi’an, China; 2. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China

Thermal Stratification Modeling for Sodium-Cooled Fast Reactors: A Status Update
ICONE26-82364
Sarah Morgan1 Sama Bilbao y Leon2 Mark Anderson2 Matthew Bucknor2 Matthew Schreiber2 Liangyu Xu4 1. Virginia Commonwealth University, Richmond, VA, USA; 2. Argonne National Laboratory, Lemont, IL, USA; 3. University of Wisconsin, Madison, WI, USA; 4. Massachusetts Institute of Technology, Cambridge, MA, USA

Penetration Behavior of Liquid Jet Falling into a Shallow Pool
ICONE26-81993
Fumihito Kimura1 Hirokazu Yoshida2 Akiko Kaneko2 Yutaka Abe3 1. Tsukuba University, Tsukuba, Japan; 2. Japan Atomic Energy Agency, Tokai-mura, Japan; 3. University of Tsukuba, Tsukuba, Japan

Rewetting Analysis of Hot Moving Surface by Round Water Jet Impingement
ICONE26-81873
Avadhesh Kumar Sharma, Mayank Modak, Santosh Kumar Sahu, Indian Institute of Technology Indore, Indore, MP, India

12:30 – 14:00
Chablis Suite, Ground Floor
LUNCH

14:00 – 16:00
PANEL SESSIONS
See pages 19 through 23 for panel session details.

16:00 – 16:30
POSTER SESSION & COFFEE BREAK

16:30 – 18:30
TECHNICAL SESSIONS

Operations & Maintenance, Engineering, Modifications, Life extension, Life Cycle and Balance of Plant
1-2 Equipment Reliability
Tuesday July 24
Room Reims
16:30 – 18:30
Session Chair: Judith Carol Westphal, BEA, USA

Comprehensive Analysis of Main Feedwater Isolation Improvement in Tianwan NPP
ICONE26-81172
Wang Cuiyun, Pi Yue, Zhao Jiaming
China Nuclear Power Engineering Co., Ltd., Beijing, China

Reliability Evaluation for Steam Generator in a Sodium-Cooled Fast Reactor
ICONE26-81183
Yi Huang1 Zhang Tian-yi1 Wang Jun1 Yuan Yu-chen1 Dong Xin2 1. China Institute of Atomic Energy, Beijing, China; 2. Dongfang Electric, Chengdu, China

On the Use of Robust Command Shaping for Vibration Reduction during Remote Handling of Large Components in Tokamak Devices
ICONE26-82346
Stanislao Grazioso, Giuseppe Di Gironimo
University of Naples Federico II, Naples, Italy

Replacement of a Hot Cell Window at the Hot Fuel Examination Facility
ICONE26-82422
Judith Carol Westphal1 Ronald Johansen2 J. D. Kelly1 1. BEA, Idaho Falls, ID, USA; 2. Inl/battelle Energy Alliance, Idaho Falls, ID, USA

A Non-Contact Ultrasonic Sensor for General Corrosion Inspection of Thin Plates
ICONE26-82560
Akinori Tamura1 Masahiro Miki1 Naoyuki Kono2 Hiroshi Okazawa2 Shinobu Okido2 Chenghuan Zhong3 Erik Fabre3 Anthony J. Croxford4 Paul D. Wilcox4 1. Hitachi Ltd., Hitachi, Japan; 2. Hitachi-GE Nuclear Energy Ltd., Hitachi, Japan; 3. Inductosense, Bristol, United Kingdom; 4. University of Bristol, Bristol, United Kingdom

Filtration Technology Research of Graphite Dust produced in Spent Fuel Transportation Process in HTR-PM
ICONE26-81022
Jinhua Wang, Bing Wang, Bin Wu, Yue Li, Hailao Wang
Tsinghua University, Beijing, China

Plant Systems, Structures, Components and Materials
3-9 High Temperature Components II
Tuesday July 24
Room Chalon
16:30 – 18:30
Session Chair: Jinhua Wang, Tsinghua University, China

Filtration Technology Research of Graphite Dust produced in Spent Fuel Transportation Process in HTR-PM
ICONE26-81022
Jinhua Wang, Bing Wang, Bin Wu, Yue Li, Hailao Wang
Tsinghua University, Beijing, China
Verification of Alarm Displays for the Nuclear Power Plant with Two Modular High-Temperature Gas-Cooled Reactors  
Qianqian Jia¹ Chao Guo¹ Jiaobu Li¹ Ronghong Qu¹
1. Tsinghua University, Beijing, China; 2. Institute of Nuclear and New Energy Technology, Tsinghua University, Beijing, China

Reliability Index Assessment for Digital Instrumentation and Control Systems of High Temperature Gas-Cooled Reactors  
ICONE26-82636
Wei Wang¹ Jiejuan Tong² Jun Zhao²
1. Politecnico di Milano, Milano, Italy; 2. Institute of Nuclear and New Energy Technology, Tsinghua University, Beijing, China; 3. Tsinghua University, Beijing, China

Nuclear Safety, Security, and Cyber Security  
6-4 Nuclear Accidents I  
Tuesday July 24  
Room Alsace | 16:30 – 18:30
Session Chair: TBA

Research on Source Inversion for Nuclear Accidents based on Variational Data Assimilation with the Dispersion Model Error  
ICONE26-81094
Yun Liu¹ Xinjian Liu¹ Hong Li² Sheng Fang² Jingyuan Qu²
1. China Nuclear Power Engineering Co., Ltd., Beijing, China; 2. Tsinghua University, Beijing, China

Comparison of Several Common Nuclear Accidents Consequences Prediction Models  
ICONE26-82628
Yuan Biao, Mei Xu, Xiaobing Geng, Wang Liangyu, Liujun Zhang
Institute of NBC Defense, PLA Army, Beijing, China

Development of Hydrogen Treatment System in Severe Accident: Part 5 - Effect of Steam Flow on Performance of a Hydrogen Treatment Unit with Metal Oxides  
ICONE26-81386
Chikako Ikawa¹ Tsukasa Sugita² Akira Yamada³

Development of Hydrogen Treatment System in Severe Accident: Part 4 - Study of Fission Products and Steam Effect on Hydrogen Treatment Characteristics  
ICONE26-81759
Akira Yamada¹ Chikako Ikawa² Motoshige Yagyu³

Numerical Impact Simulation of Aircraft into Reinforced Concrete Walls with Different Thickness  
ICONE26-82616
Kazuma Hirotsuka¹ Hidekazu Takazawa² Katsumasa Miyazaki³
1. Hitachi Ltd, Hitachi-shi, Japan; 2. Hitachi-GE Nuclear Energy, Ltd., Hitachi-eshi, Japan

Study on Factors Influencing the Diffusion and Migration of Radionuclide Offshore in Nuclear Power Plant Accidents  
ICONE26-81165
Zichao Li, Zhao Tao, Xuemeng Qin, Amir Haider, Bing Li, Juan Chen
North China Electric Power University, Beijing, China
Codes, Standards, Licensing, and Regulatory Issues

7-4 The Importance of Codes and Standards

Tuesday July 24 Room Epernay I 16:30 – 18:30

Session Chair: Venesa Watson, Framatome GmbH, Germany

ASME Certification: Demand the Mark! Iicone26-82272
Jon Labrador1 Paul Langi Clayton Smith2
1. ASME, New York, NY, USA; 2. Smith Associates Consulting Group LLC, Simpsonville, SC, USA

Example of Graded and Lifecycle Phase-Specific Security Controls for Nuclear I&C and EPS Use Cases Iicone26-81601
Venesa Watson1 Edita Bagravamic2 Xinmin Lou2 Karl Waedt1
1. Framatome GmbH, Erlangen, Germany; 2. Friedrich-Alexander-University Erlangen-Nuremberg, Erlangen, Germany; 3. Bielefeld University, Bielefeld, Germany

A Demonstration of Practical Elimination of Early or Large Fission Product Release for the UK ABWR Generic Design Assessment Iicone26-82045
Ming Leang Ang1 Hiromasa Chitose2 Hirokawa Naoki2
Nuh Mohamud1 Rysuke Kimura2

Session Chair: Francesco Di Lecce, Politecnico di Torino, Italy

What is a “Known and Established” Standard? Iicone26-81901
Samuel Miranda
Independent Author, Silver Spring, MD, USA

The Quality Experience Feedback in Nuclear Fuel Manufacture Iicone26-81374
MengYao Tong, Li FangGang
CNNC JianZhong Nuclear Fuel Co. Ltd., YIBin City, China

Thermal-Hydraulics and Safety Analyses

8-24 Advanced Reactors

Tuesday July 24 Room Talbot I 16:30 – 18:30

Session Chair: Francesco Di Lecce, Politecnico di Torino, Italy

CFD-Based Correlation for Forced Convection Heat Transfer in Circular Ducts of Internally Heated Molten Salts Iicone26-82507
Francesco Di Lecce1 Antonio Cammi1 Sandra Dulla1
Carlo Fiorina1 Stefano Lorenzi2 Piero Ravetto1
1. Politecnico di Torino, Torino, Italy; 2. Politecnico di Milano, Milano, Italy; 3. École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland

Numerical Study of Supersonic Film Cooling in Diverging Section of Nuclear Rocket Laval Nozzle Iicone26-81806
Xiaokai Sun1 Ping Ye2 Peikue Xiang3 Wei Peng1 Jie Wang2
1. Tsinghua University, Beijing, China; 2. INET, Tsinghua University, Beijing, China

A Computational Study of Strongly Heated Internal Hydrogen Flow under Non-Uniform Heat Flux Iicone26-82356
Yu Ji, Jun Sun, Lei Shi
Tsinghua University, Beijing, China

Sensitivity Analysis of the SBLOCA Induced Sever Accident for a Natural Circulation Small Modular Reactors Iicone26-82267
Longze Li1 Yapei Zhang2 Jue Wang1 Guanghui Su1
1. Wuhan Second Ship Design and Research Institute, Wuhan, China; 2. Xi’an Jiao Tong University, Xi’an, China

Simulation of Core Thermal Response during a Station Blackout Initiated Severe Accident in China Small Modular Reactor by MELCOR Iicone26-82293
Shasha Yin1 Suizheng Ou2 Wei Huang1 Zhihui Chen1 Ye Tian1 Yajing Tian1
1. Nuclear Power Institute of China, Chengdu, China; 2. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China

Session Chair: Yixiang Liao, Helmholtz-Zentrum, Germany

Session Chair-Co-Chair: Kei Ito, Kyoto University, Japan

Session Chair-Co-Chair: Mingjun Zhong, Nuclear Power Institute of China, China

Modelling of Submerged-Vortex Behavior Near Wall Boundary Iicone26-82586
Kei Ito1 Toshiki Ezure2 Daisuke Ito1 Yasushi Saito1
1. Kyoto University, Kumatori, Japan; 2. Japan Atomic Energy Agency, Oarai, Japan

CFD Modelling of Flashing Instability in Natural Circulation Cooling Systems Iicone26-81787
Yixiang Liao1 Christoph Schuster2 Suqing Hu3 Dirk Lucas2
1. Helmholtz-Zentrum, Dresden, Germany; 2. Technische Universität Dresden, Dresden, Germany; 3. Helmholtz-Zentrum Dresden - Rossendorf, Dresden, Germany

A More Consistent Formulation of Momentum Closures for Turbulent Bubbly Flow in CFD Iicone26-82436
Emilio Baglietto1 Brian Castel2 Nazar Lubchenko1
Ben Magolan1 Rosemary Sugrue2
1. Massachusetts Institute of Technology, Cambridge, MA, USA; 2. Jensen Hughes, Rockville, MD, USA

A Multi-Fluid Model Coupled with Interface Tracking Method for Simulation of Liquid Jet Breakup Iicone26-82547
Mingjun Zhong1 Yuan Zhou2
1. Nuclear Power Institute of China, Chengdu, China; 2. Sichuan University, Chengdu, China

Computational Fluid Dynamics (CFD)

9-6 Bubbles

Tuesday July 24 Room Muscadet I 16:30 – 18:30

Session Chair: Xiyang Liao, Helmholtz-Zentrum, Germany

Session Chair-Co-Chair: Kei Ito, Kyoto University, Japan

Session Chair-Co-Chair: Mingjun Zhong, Nuclear Power Institute of China, China

CFD Modelling of Flashing Instability in Natural Circulation Cooling Systems Iicone26-81787
Yixiang Liao1 Christoph Schuster2 Suqing Hu3 Dirk Lucas2
1. Helmholtz-Zentrum, Dresden, Germany; 2. Technische Universität Dresden, Dresden, Germany; 3. Helmholtz-Zentrum Dresden - Rossendorf, Dresden, Germany

A More Consistent Formulation of Momentum Closures for Turbulent Bubbly Flow in CFD Iicone26-82436
Emilio Baglietto1 Brian Castel2 Nazar Lubchenko1
Ben Magolan1 Rosemary Sugrue2
1. Massachusetts Institute of Technology, Cambridge, MA, USA; 2. Jensen Hughes, Rockville, MD, USA

A Multi-Fluid Model Coupled with Interface Tracking Method for Simulation of Liquid Jet Breakup Iicone26-82547
Mingjun Zhong1 Yuan Zhou2
1. Nuclear Power Institute of China, Chengdu, China; 2. Sichuan University, Chengdu, China

Computational Fluid Dynamics (CFD)

9-7 Flow Through Complex Structures I

Tuesday July 24 Room Crement | 16:30 – 18:30

Session Chair: Afaque Shams, Nuclear Research and Consultancy Group, Netherlands

Session Chair-Co-Chair: Matthew D. Eaton, Imperial College London, United Kingdom

Session Chair-Co-Chair: Elia Merzari, Argonne National Laboratory, USA

Assessments of Different Turbulence Models in Predicting the Performance of a Butterfly Valve Iicone26-82376
Yu Duan1 Matthew D. Eaton1 Michael J. Bluck1 Christopher Jackson2
1. Imperial College London, London, United Kingdom; 2. Rolls-Royce, Derby, United Kingdom
**Coupled Calculation on Fluid Structure Interaction in Plate-Type Fuel Element**
[ICONE26-82418]
Yiqi Yu1 Elia Merzari1 Jerome Solberg2
1. Argonne National Laboratory, Lemont, IL, USA; 2. LLNL, Livermore, CA, USA

**Partially Averaged Navier-Stokes Turbulence Modeling of Flow in 5x5 PWR Fuel Assembly with Spacer Grid**
[ICONE26-82366]
Giacomo Busco, Yassin Hassan
Texas A&M University, College Station, TX, USA

**A Second Generation STRUCTure Resolving URANS Model for Advanced Reactor Design Applications**
[ICONE26-82435]
Emilio Baglietto, Michael Acton, Jinyong Feng, Liangyu Xu
Massachusetts Institute of Technology, Cambridge, MA, USA

**Numerical Simulation on the Flow through the Inlet Hole of Fuel Assembly in a Fast Reactor**
[ICONE26-82605]
Yu Wang, Daogang Lu, Yidan Han, Haiqi Qin, Dawen Zhong
North China Electric Power University, Beijing, China

**Decontamination & Decommissioning, Radiation Protection, and Waste Management**

**10-1 Radiation Detection and Protection**

**Tuesday July 24**

**Room: Bourg**

**16:30 – 18:30**

**Session Chair:** Anthony Hechanova, Abu Dhabi Polytechnic, United Arab Emirates

**Session Co-Chair:** Yan Li, China Institute of Atomic Energy, China

**Modeling of Cerenkov-based Fiber-Optic Gamma-Ray Radiation Sensor using Monte Carlo Simulation**
[ICONE26-81754]
Hwa Jeong Han, Byung Gil Park, Beom Kyu Kim, Ji Hye Park, Won Ki Kim
Soongchunhyang University, Asan-si, Korea

**Electric Field Simulation of Ionization Chamber used in Tritium Measurement in Tail Gas of Molten Salt Reactor**
[ICONE26-82026]
Q Oian, Guanghua Wang, Yu Huang, Youshi Zeng, Guangliang Bao, Shengwei Wu, Wei Liu
Shanghai Institute of Applied Physics, Chinese Academy of Sciences, Shanghai, China

**Buildup and Decay Analysis of Corrosion Products Activity in Primary Coolant Loop of AP-1000**
[ICONE26-81388]
Fiaz Mahmood, Huasi Hu, Liangzhi Cao
School of Nuclear Science and Technology, Xi’an Jiaotong University, Xi’an, China

**The Radiation Protection Design of PWR Spent Fuel Dry Storage Facility**
[ICONE26-81552]
Liming Huang, Shouhai Yang, Jie Liu
China General Nuclear Power Group, Shenzhen, China

**Radiation Protection Calculation and Optimization for Shielding Design around the Refueling Pipelines of HTR-PM**
[ICONE26-82581]
Sheng Fang, Hong Li, Wenqian Li
Tsinghua University, Beijing, China

**Separation Area Head End Stack**
[ICONE26-82707]
John Ball1 Chris Medlock2
1. Nuvia, Moor Row, United Kingdom; 2. Nuvia, Warrington, United Kingdom

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**Nuclear Education and Public Acceptance**

**12-2 Nuclear Education and Public Acceptance II**

**Tuesday July 24**

**Room: Bouzy**

**16:30 – 18:30**

**Session Chair:** Yassin Hassan, Texas A&M University, USA

**Session Co-Chair:** Elia Merzari, Argonne National Laboratory, USA

**The International Nuclear Management Academy**
[ICONE26-81124]
John Roberts
The University of Manchester, Manchester, United Kingdom

**3D Immersive Display Application for Nuclear Education and Public Acceptance**
[ICONE26-81161]
B.L. Luk1 Miu Ling Lam1 Ting Hsuan Chen1 Jiyun Zhao1 Suet Man Tsui1 Ching-chang Chieng2
1. City University of Hong Kong, Kowloon, Hong Kong; 2. National Taing Hua University, Hsinchu, Taiwan

**The ENEN+ Project: Attracting, Retaining and Developing New Nuclear Talents beyond Academic Curricula**
[ICONE26-82612]
Leon Cizelj1 Csilla Pesznyak2 Behrooz Bazargan-Sabet3 Abdesselam Abdelouss4 Filip Tuimost5
Michèle Coeck1 Pedro Diegoz Porras1
1. Jozef Stefan Institute, Ljubljana, Slovenia; 2. Budapesti Műszaki és Gazdaságtudományi Egyetem, Budapest, Hungary; 3. École des Mines de Nancy, Nancy, France; 4. IMT Atlantique Brehat-Pays de la Loire, Nantes, France; 5. Aalto University, Alto, Finland; 6. SCK•CEN, Mol, Belgium; 7. ENEN Association, Gift sur Yvette, France

**CORONA Academy - Nuclear Education and Training**
[ICONE26-82661]
Adela Klepakova
Centrum výzkumu Rež s.r.o., Husinec - Rez, Czech Republic

**ANDE-1 Certification: Excellence through a Systematic Approach to Training and Performance Based Qualification**
[ICONE26-82519]
Paul Lang1 Clayton Smith2
1. ASME, New York, NY, USA; 2. Smith Associates Consulting Group LLC, Simpsonville, SC, USA

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**Student Paper Competition**

**16-4 Nuclear Components, Nuclear Waste and Radiation I**

**Tuesday July 24**

**Room: Lalande**

**16:30 – 18:30**

**Session Chair:** Adam Drescher, University of Texas at Austin, USA

**Session Co-Chair:** Marco Di Filippo, Swiss Federal Institute of Technology in Zurich, Switzerland

**Operational Impacts and Consequences of Piping Component Failure: a Review of Operating Experience Data as Recorded in CODAP**
[ICONE26-81001]
Braedon Carr1 Bengt Lydell2 Jovica Riznic3
1. University of Ontario Institute of Technology, Oshawa, ON, Canada; 2. Sigma-Phase Inc, Vail, AZ, USA; 3. Canadian Nuclear Safety Commission, Ottawa, ON, Canada

**Analysis of Major Group Structures used for Nuclear Reactor Simulations**
[ICONE26-81445]
Marco Di Filippo1 Jiri Krepel2 Konstantin Mikityuk3 Horst-Michael Prasser4
1. Swiss Federal Institute of Technology in Zurich, Zürich, Switzerland; 2. Paul Scherrer Institute (PSI), Villigen, Switzerland; 3. ETH Zürich, Zürich, Switzerland
**Study on Current Status and Future Developments in Nuclear Power Industry of the World**

Roman Pioro¹ Igor Pioro² Alexander Zvorykin³ Rachid Machrafi²
1. Lomonosov Moscow State University, Moscow, Russia; 2. University of Ontario Institute of Technology, Oshawa, ON, Canada; 3. National Technical University of Ukraine, Kiev, Ukraine

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**Research of Fast Modeling and Simulating Platform for Nuclear Power Plant Secondary Loop**

Meijie Gong, Minjun Peng, Haishan Zhu
Harbin Engineering University, Harbin, China

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**Revamping of a Graduate Radiochemistry Course for Nuclear Forensics Applications**

Adam Drescher, Brandon De Luna, Marjolein Pasman, Derek Haas, Sheldon Landsberger
University of Texas, Austin, TX, USA

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### Student Paper Competition

**16-18 Thermalhydraulics V**

**Tuesday July 24**

**Room Mouton Cadet | 16:30 – 18:30**

**Session Chair:** Yuki Kamata, University Of Tsukuba, Japan

**Session Co-Chair:** Alexander Zvorykin, National Technical University of Ukraine, Ukraine

**Heat Transfer to Supercritical Water (Liquid-Like State) Flowing in a Short Vertical Bare Tube with Upward Flow**

Alexander Zvorykin¹ Mohmmed Mahdi²
1. National Technical University of Ukraine, Kiev, Ukraine; 2. Faculty of Energy Systems and Nuclear Science University of Ontario Institute of Technology, Oshawa, ON, Canada; 3. University of Ontario Institute of Technology, Oshawa, ON, Canada

**Study on Gas Entrainment from Unstable Drifting Vortexes on Liquid Surface**

Moe Hirakawa¹ Yuichiro Kikuchi¹ Takaaki Sakai²
1. Tokai University, Hiratuka-shi, Japan; 2. Tokai University, Kanagawa, Japan

**Pressure Dependence of Two Phase Flow Behavior of Stagnant Water in a Vertical Pipe during Steam Injection**

Naoto Kitahara, Yasunori Yamamoto, Tadashi Narabayashi, Go Chiba
Hokkaido University, Sapporo, Japan

**Study on Flow Structure in a Supersonic Steam Injector**

Yuki Kamata, Masaya Fujishiro, Akiko Kaneko, Yutaka Abe
University of Tsukuba, Tsukuba, Japan

**Experimental Study on Bubble Bursting and Droplet Releasing Characteristics under Different Liquid Phase Conditions**

Hao Chen, Haifeng Gu, Xiang Yu, Yanmin Zhou, Zhongning Sun, Jimin Wen
Harbin Engineering University, Harbin, China

**Relationship between Void Fraction and Electrical Characteristics in Gas-Liquid Two Phase Flow**

Yuya Takakura¹ MinHo Jeon¹ Masahiro Takai¹
1. Chiba University, Chiba, Japan; 2. Aichi Tokai Denki Co. Ltd., Aichi, Japan

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**Student Paper Competition**

**16-22 Measurement, Instrument and Control II**

**Tuesday July 24**

**Room Fronsac | 16:30 – 18:30**

**Session Chair:** Shifali Singh, Commissariat à l’Énergie Atomique et aux Énergies Alternatives (CEA), Cadarache, France

**Session Co-Chair:** Hironobu Kiuchi, Tokyo Institute of Technology, Japan

**Modelling of X-Ray Radioscopy for Phase Topology Estimation during Corium Sodium Interaction**

Shifali Singh, Nathalie Cassiault-Louis, Christophe Jourenteau, Magali Zabiego, Nicolas Estre, Leonie Tamagno
Commissariat à l’Énergie Atomique et aux Énergies Alternatives (CEA), Cadarache, St Paul lez Durance, France

**Axial Flux Wire Measurements at the McMaster Nuclear Reactor**

Liz MacConnachie, David Novog, Simon E. Day
McMaster University, Hamilton, ON, Canada

**Dynamic Analysis of Flexible Rotor Suspended by Active Magnetic Bearings with LQR Controller**

Yixin Su, Yanhui Ma, Qian Shi, Suyuan Yu
Tsinghua University, Beijing, China

**Fundamental Study on Development of Air-Coupled Ultrasonic Imaging Measurement for Fuel Debris Inspection**

Hironobu Kiuchi¹ Shun Kimura¹ Hamdani Ari¹ Hideharu Takahashi¹
Hiroshige Kikura¹ Daisuke Sasa¹ Shuichi Ohmori¹
1. Tokyo Institute of Technology, Tokyo, Japan; 2. Tokyo Electric Power Company Holdings, Inc., Yokohama, Japan

**A Control Method for Combined Cycle Coupled with HTGR at Part Load**

Xinhe Qu¹ Xiaoyong Yang¹ Gang Zhao¹ Jie Wang²
1. Tsinghua University, Beijing, China; 2. INET, Tsinghua University, Beijing, China

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**19:00 – 22:00**

Twickenham Stadium, Rose Suite

**CONFERENCE BANQUET**

See page 13 for details.
# Plenary Session: Future of Nuclear Power

**Clayton Smith**, Organizing Committee Chair ICONE26, ASME  
**Xiaohang Wang**, Plenary Session Co-Chair, CNS, Vice President, Global Marketing and International Cooperation of SNPTC  
**Tetsuaki Takeda**, Plenary Session Co-Chair, JSME  
**Jovica Riznic**, Organizing Committee Co-Chair ICONE26, Canadian Nuclear Safety Commission, ASME

## Speaker One:

**Industrialization Application of the 3rd Generation Nuclear Power Technology**

**Fengxue Wang**, Vice President of CNS, Chief Nuclear Officer of State Power Investment Corporation (SPIC), President of State Nuclear Power Technology Corporation (SNPTC), China

Developing low-carbon clean energy has become international consensus to tackle the deterioration of global ecological environment. As clean low-carbon base-load energy which can replace thermal power in a large scale, nuclear power plays a critical role in the process of global energy transformation and upgrading towards low carbonization. Due to energy endowment limitation in China, developing nuclear power safely and efficiently has always been the major direction of the nation’s energy strategy. As the implementation unit of the first batch of AP1000 programs, and as the developer and owner of the world’s leading 3rd generation passive PWR technology — CAP1400, State Power Investment Corporation (SPIC) will persist in innovative development, differential development and synergetic development, accelerate the industrialization and scale of the 3rd generation nuclear power in China by continuously promoting safety and economy in association with our extensive cooperation partners. SPIC will also actively promote the application of CAP1400 technology in global market and provide new solutions to transformation and upgrading of nuclear power from the 2nd generation to the 3rd generation. Meanwhile, SPIC will accelerate the innovation of new types of nuclear energy technology such as small scale reactors and the 4th generation reactors, so as to meet the needs of a more extensive application and higher safety requirements.

Mr. Fengxue Wang took office as Chief Nuclear Officer of State Power Investment Corporation (SPIC) and President of State Nuclear Power Technology Corporation (SNPTC) in April 2017.  
Mr. Wang started his career with Yuanbaoshan Power Plant in Inner Mongolia since 1982, worked successively as Director, Deputy Chief Engineer, and Chief Engineer.  
In March 2002, he was appointed as General Manager of Chifeng Thermal Power Plant in Inner Mongolia Province. During November 2004 to October 2005, he served as Vice President and Chief Engineer of China Power Investment Group Northeast Branch.  
From October 2005 to November 2007, he served as Chairman of Jilin Electric Power Company Ltd. and General Manager of Jilin Energy and Transportation Corporation. Besides that, he also served as President of China Power Investment Group Northeast Branch since November 2007.  
From March 2008 to February 2017, Mr. Wang served as the President of Shandong Nuclear Power Company. He was nominated as the Senior Vice President of SNPTC in July 2015. He worked as the Acting President and Board Member of SNPTC and Executive Director of China Power New Energy Development Company Ltd during February to April 2017. Then he was appointed as Chief Nuclear Officer of State Power Investment Corporation (SPIC) and President of State Nuclear Power Technology Corporation (SNPTC) in April 2017.  
Mr. Wang has a Master Degree in Power System and Automation from North China Electric Power University and is a senior engineer.
Nathan Paterson, ENS YGN Chairman & Customer Account Manager – Civil Nuclear, Rolls-Royce

The world is hungry for energy with constant increasing demand year on year. Nuclear power is seen by many as fundamental in its function to deliver clean, secure and reliable energy within the world’s low-carbon energy mix. New nuclear infrastructure programmes, reactor designs, fleet refurbishments and step changes in ways of manufacture and operation are required for strategic long term sustainable growth.

This presents both opportunities and challenges surrounding nuclear power; innovative technology development; deployment and financing. The young professionals working their way through the industry and the generations of new entries to come will play a massive part if structuring the delivery of these areas for decades to come. Modern factors, areas of motivation and the view points of the young generation will be explored through this presentation.

Nathan is responsible for management, business development, engagement and deployment for key civil nuclear accounts in Europe and International areas at Rolls-Royce Civil Nuclear.

Previously he has been part of the delivery of new reactor designs for Naval Prolusion covering engineering governance and delivery of V&V strategy areas.

Prior to that he lead aspects of safety design, internal and external hazard analysis, and harsh environmental assessment for Through-life nuclear safety justifications.

He is the Chairman of the European Young Generation Network (YGN) which brings together the YGNs of 21 member countries of ENS. He leads the committee’s operation and strategy covering a number of activities to help support the sustainable growth of the nuclear industry and associated academic communities.

He collaborates on programmes including; the nuclear skills delta; infrastructure and capacity building; diversity within the industry; nuclear as part of the solution to fight climate change and public engagement on nuclear technologies to name a few.

Professor Koji Okamoto got his Master Degree of Engineering from the University of Tokyo in 1985. He worked at Mitsubishi Heavy Industries Ltd. as a researcher for Fast Breeder Reactor, Monju. In 1988, he returned to the University of Tokyo as a research associate at Department of Nuclear Engineering. After he got Ph.D in 1992, he had been promoted to be an Associate Professor in 1993. In 2004, he was a full professor at Department of Quantum Engineering and Systems Science, the University of Tokyo. His major is Thermal-Hydraulics and Nuclear Safety. He published more than 100 referred papers in the field of Fluid Engineering and Nuclear Engineering. He had several patents related to nuclear systems in US and Japan. He is an editor of Measurement Science and Technology, Institute of Physics, for more than 10 years. After Fukushima-Daiichi NPP accidents, he moved to Nuclear Professional School of the University of Tokyo. He explained to the public about the detail of the accident at several TV programs, including NHK and so on. He was a member of accident evaluation committee at Atomic Energy Society of Japan.

Currently his research interests include Safety Improvements of Nuclear Power Plants, Advanced Nuclear Systems, Severe Accident Researches and Decommissioning activities of normal shutdown NPP and/or Fukushima-Daiichi NPP. He was a chair of the Nuclear System Decommissioning sub-working group at Ministry of Education, Science, Sports and Culture (MEXT). He also worked as an executive committee member of Nuclear Damage Compensation and Decommissioning Facilitation Cooperation (NDF). He was a Division Head of Power Energy Systems, Japanese Society of Mechanical Engineers (JSME). From April, 2018, he also works as a Director General of Collaborative Laboratory for Advanced Decommissioning Sciences (CLADS) in Japan Atomic Energy Agency (IAEA).
**SPEAKER FOUR:**

**TERA of Nuclear Gas Turbines to Improve Economics and Meet Decarbonisation Targets by 2050**

**Pericles Pilidis**, Professor of Cranfield University, UK, Head of Power and Propulsion Department, Centre for Propulsion Engineering

Nuclear Energy has a significant role to play in delivering a long-term objective of a secure, low carbon and affordable energy, which can compete economically with other established generation sources but more important, meet decarbonisation targets for 2050. To achieve these targets, significant challenges need to be met in the short term such as complementing the portfolio of design by including high efficiency Brayton cycles provided by a gas turbine to boost thermal efficiency. Helium gas turbines are a very promising option as the Power Conversion Units (PCUs) for Generation IV Nuclear Systems. The presentation will be focused on three areas related to the PCU. The first will be to outline the design performance characteristics. The second section will indicate the importance of thermal efficiency and specific power from a technical and an economic point of view. The third element of the talk will offer some speculative suggestions regarding installation opportunities.

Professor Pilidis completed a doctorate in Gas Turbine Engineering at Glasgow University. His first employment was with the British Caledonian group in the gas turbine overhaul business. He joined Cranfield in 1986 as a lecturer and was promoted to the Director of the Thermal Power Masters course and Head of the Gas Turbine Engineering Group. In 2006 he was appointed Head of the Power and Propulsion Department.

Over the years, he has applied performance modelling techniques to understand issues of relevance to operation, maintenance, control and technoeconomic environmental risk analysis (TERA).

Professor Pilidis has organised and contributed to many international teaching and applied research programmes in the power, gas, oil and aviation industries. Much of his research has been focused on the needs of equipment users in various countries. He has acted as a consultant to several organisations and his active contributions have resulted in many international honours. He is a Fellow of the Royal Aeronautical Society, Fellow of the Higher Education Academy and was Chairman of the ASME Cycle Innovations.

Throughout his career at Cranfield, he has supervised 150+ postgraduate students.
Instrumentation and Control (I&C) and Influence of Human Factors

4-5  I&C Simulation Models and Systems

Wednesday July 25  Room Cognac | 10:30 – 12:30

Session Chair: Dr. Antonio Ciriello, Framatome GmbH, Germany
Session Co-Chair: Duo Li, Tsinghua University, China

Design and Development of Virtual DCS Debugging and Research Platform based on NPP Simulation Model

Platform ICONe26-81122
Caike Zhang, JingWen Qi, Chun Liu, Chenglong Xie, Peibang Liu, Ming Qu
China Nuclear Power Operation Technology Corporation. LTD, Wuhan, China

Application of Virtual Reality Technology in Nuclear Power Plant Control Room Simulator

ICONe26-81163
Xiyun Li, Xi Wang, Chenchen Liang, Shaohua Wang
1. China Nuclear Power Engineering Co., Ltd., Beijing, China; 2. China National Nuclear Corporation, Beijing, China

Simulated Training Instrument of Nuclear Radiation Reconnaissance based on an Improved Ellipse Numerical Model

ICONe26-81250
Shujun He, Manchun Liang, Guofeng Su, J.T He
Tsinghua University, Beijing, China

Evaluation of Electromagnetic Fields from Wireless Technologies in a Nuclear Plant

ICONe26-82290
Mauro Cappelli, Vanni Lopresto, Riccardo Cecchi, Gaetano Marrocco
1. ENEA, Frascati, Italy; 2. ENEA, Rome, Italy; 3. University of Tor Vergata, Rome, Italy

Advanced Load Following Control with Predictive Reactivity Management (ALFC-PREDICTOR)

ICONe26-82678
Víctor Morokhovskiy
Framatome GmbH, Erlangen, Germany

Advanced Reactors and Fusion Technologies

5-4  Advanced Reactors General

Wednesday July 25  Room Bourg | 10:30 – 12:30

Session Chair: Takanori Sugawara, Japan Atomic Energy Agency, Japan
Session Co-Chair: Xian-Gang Fu, CNPRI, China
Session Co-Chair: Takaaki Sakai, Tokai University, Japan

Design Study of Beam Window for Accelerator-Driven System with Subcriticality Adjustment Rod

ICONe26-81233
Takanori Sugawara, Yuta Eguchi, Hironori Oosabu, Hiroki Ikamote, Hiroki Matsuda, Kazufumi Tsujimoto
Japan Atomic Energy Agency, Tokai, Japan

Structural Analysis and Manufacturing of HL-2M Vacuum Vessel and Support Structures

ICONe26-81273
Yuncong Huang, Hong Ran, Jiali Hou, Zeng Cao, Binbin Song
Southwestern Institute of Physics, Chengdu, China

Design of Steam Generator Accident Protection System for Sodium Cooled Fast Breeder Reactor

ICONe26-81298
Xu Yeqiang
China Institute of Atomic Energy, Beijing, China

Application of Similarity Law in Electrical Device Design in Helium for High Temperature Gas-Cooled Reactor

ICONe26-82520
Xiaohuan Chen, Yinan Geng, Jie Wang
1. Tsinghua University, Beijing, China; 2. INET, Tsinghua University, Beijing, China

Feasibility Study of a New Fabrication Method for the Li,SiO, Pebbles

ICONe26-82598
Rosa Lo Frano, Monica Puccini, Eleonora Stefanelli
Stefano Malquori, Matteo Luppichini, Claudio Grima
Stefania De Sanctis, Sandra Vitali, Donato Aquirato
1. DICI-University of Pisa, Pisa, Italy; 2. Industrie Bitossi, Sovigliana, Italy; 3. University of Pisa, Pisa, Italy

Strategy and R&D Status of China Lead-based Reactor

ICONe26-82613
Yican Wu, Lijun Hu, Zhumin Zhao, Yong Song, Qunying Huang
Tao Zhou, Sheng Gao, Chao Liu, Yunqing Bai, Chunjing Li, Ang Wang
1. Institute of Nuclear Energy Safety Technology, Chinese Academy of Sciences, Hefei, China; 2. Key Laboratory of Neutronics and Radiation Safety, Institute of Nuclear Energy Safety Technology, Hefei, China

Nuclear Safety, Security, and Cyber Security

6-6  Emergency Preparedness

Wednesday July 25  Room Mouton Cadet | 10:30 – 12:30

Session Chair: Daming Liu, IAEA, Austria
Session Co-Chair: Wang Cong, Naval University of Engineering, China
Session Co-Chair: Akira Yamada, Toshiba Energy Systems & Solutions Corporation, Japan

Study on Offsite Emergency Preparedness for the Industry

ICONe26-81166
Henchong Ding, Ding Jie, Tian Jian
1. Tsinghua University, Beijing, China; 2. Institute of Nuclear and New Energy Technology, Tsinghua University, Beijing, China

The Design of a Nuclear Emergency Decision Deduction and Training Platform

ICONe26-81691
Ke Li, Manchun Liang, Guofeng Su, Jie Yang, Jingtao He, Shujun He
1. Tsinghua University, Beijing, China; 2. Geosafety Company, Beijing, China

Study on Emergency Planning Zone Determination for CAP200 Small Modular Reactor

ICONe26-81071
Xuan Wang, Fenglei Du, Te Tang, Dawei Sun
Shanghai Nuclear Engineering Research & Design Institute, Shanghai, China

Research on Optimization of Ingestion Emergency Planning Zone Sizing

ICONe26-81285
Mengxi Wang, Na Xue, Xinjian Liu
China Nuclear Power Engineering Co., Ltd., Beijing, China

The Design of Data Structure and Interface for Nuclear Emergency Assessment and Decision Support System

ICONe26-81885
Yapeng Yang, Hong Wei, Zongyang Feng
1. China Institute for Radiation Protection, Taiyuan, China; 2. China National Nuclear Power Co., Ltd, Beijing, China

Data-Driven Fault Diagnosis for Nuclear Power Plant: The Implicit Model Approach

ICONe26-82473
Zhaoxu Chen, Xianling Li, Zhiwu Ke, Mo Tao, Yi Feng
Wuhan Second Ship Design and Research Institute, Wuhan, China
Codes, Standards, Licensing, and Regulatory Issues

7-5 Personnel Certifications, Regulatory Influence, and Computer Codes

Wednesday July 25 | Room Epernay I 10:30 – 12:30

Session Chair: Samuel Miranda, Independent Author, USA

Discussion on Personnel Qualification System of Korea Electric Power Industry Code (KEPIC) icone26-82080
Su yeon Park, Myoungsung Sohn, Hyun Jae Joo, Lee Jong Eun
Korea Electric Association, Seoul, Korea

ASME Nondestructive Examination and Quality Control Central Qualification and Certification Program icone26-82280
Clayton Smith1 Paul Lang2
1. Smith Associates Consulting Group LLC, Simpsonville, SC, USA; 2. ASME, New York, NY, USA

“Begging the Question” in Licensing Basis Accident Analyses icone26-81902
Samuel Miranda
Independent Author, Silver Spring, MD, USA

Comprehensive Safety Simulation of “Pengze” NPP based on Virtual4DS icone26-82624
Tao He, Xiaolei Zheng, Liwei Chen, Leiming Shang, Pengcheng Long
Key Laboratory of Neutronics and Radiation Safety, Institute of Nuclear Energy Safety Technology, Hefei, China

NECP-Bamboo: A PWR-core Nuclear Design Code System icone26-81117
Yunzha Li1 Hongchun Wu1 Liangzhi Cao2
1. Xi’an Jiao Tong University, Xi’an, China; 2. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China

Thermal-Hydraulics and Safety Analyses

8-9 Modeling NPPs Using System Analysis Software I

Wednesday July 25 | Room Reims I 10:30 – 12:30

Session Chair: Anwar Hussain, PIEAS, Pakistan

Investigation on Thermal-Hydraulic Parameters and Instability under Two Different Heating Conditions based on RELAP5 Code icone26-82268
Zhaoyang Xiu1 Zhiwei Zhou1 Tianji Peng2
1. Tsinghua University, Beijing, China; 2. Institute of Modern Physics, Chinese Academy of Sciences, Lanzhou, China

The Simulation Research of Noncondensable Gas to Condensation in Secondary Side Condenser of Floating Nuclear Power Plant based on RELAP5 icone26-82222
Siwei Yan, Chunmei Li, Tiebo Liang, Jing Zhao, Chengming Hao, Yu Wang
Nuclear Power Institute of China, Chengdu, China

Numerical Simulation on Primary Side of AP1000 Steam Generator by Porous Media Model icone26-82182
Hu Liqiang
China Institute of Atomic Energy, Beijing, China

Thermal-Hydraulics and Safety Analyses

8-12 Scaling and Seismic: Methodology, Development, and Application

Wednesday July 25 | Room Alsace I 10:30 – 12:30

Session Chair: Pavel Lobanov, Kutateladze Institute of Thermophysics, Russia

A Scaling Analysis for a General Passive Heat Removal System icone26-81133
Wei Li, Zhen Feng Qi, Qiang Guo, Yidan Yuan
China Nuclear Power Engineering Co., Ltd., Beijing, China

A Dimensional Analysis of Ex-Vessel Steam Explosion icone26-81303
Wei Li, Qiang Guo, Yidan Yuan
China Nuclear Power Engineering Co., Ltd., Beijing, China

Uncertainty Analysis of Scaling Calculations from LSTF Small Break LOCA Tests with Steam Generator Intentional Depressurization Applying to a Four-Loop PWR icone26-81920
Ikuo Kinoshita
Institute of Nuclear Safety System, Inc., Mikata-Gun, Fukui, Japan

Experimental Activities on Thermal Hydraulics of Heavy Liquid Metal Flow in Typical Elements of Nuclear Power Stations icone26-82407
Pavel Lobanov1 Oleg Kashinsky2 Alexandr Kurdyumov1 Aleksandr Svetonosov3 Nikolay Pribaturin2 Maksim Vorobyev3
1. Kutateladze Institute of Thermophysics, Novosibirsk, Russia; 2. Institute of Thermophysics, Novosibirsk, Russia

The Qualitative Analysis of Vertical Seismic Acceleration Effect on a Single Nuclear-Coupled Boiling Channel Natural Circulation Loop icone26-81230
Jin Der Lee1 Yuh-Ger Lin1 Shao-Wen Chen1 Chin Pan2 Jinn-Jer Peir1
1. National Tsing Hua University, Hsinchu, Taiwan; 2. City University of Hong Kong, Hong Kong, Hong Kong

Accident Progression and Reactor Safety Analysis in Case of Safety Systems Operation Failure in AP1000 SBLOCA icone26-82643
Anwar Hussain, Amjad Nawaz
PIEAS, Islamabad, Pakistan

Pressurized Thermal Shock (PTS) Transient Scenarios Screening Analysis with Trace icone26-81749
Roman Mukin1 Ivor Clifford1 Markus Niffenegger2 Hakim Ferroukhi2
1. Paul Scherrer Institute, Villingen, Switzerland; 2. Paul Scherrer Institut / Laboratory for Reactor Physics and Systems Behaviour, Villingen, Switzerland
Thermal-Hydraulics and Safety Analyses

8-15 Natural Circulation Experiments, Phenomena, and Analyses I

Wednesday July 25

Room Bouzy | 10:30 – 12:30

Session Chair: Chikako lwaki, Toshiba Energy Systems & Solutions Corporation, Japan

The Experimental Investigation of Steam Condensation with Non-Condensable Gas under Natural Convection
Xizhen Ma1 Wen Fu2 Haijun Jia2 Peiyue Li1 Jun Li2
1. Luoyang Ship Material Research Institute, Luoyang, China; 2. Tsinghua University, Beijing, China

COPRA Experiments on Melt Pool Behavior with Eutectic NaNO3-KNO3 Simulant
Yukun Zhou1 Yafei Zhang2 Simin Luo1 Zhichun Xu1
1. Xi’an Jiaotong University, Xi’an, China; 2. School of Nuclear Science and Technology, Xi’an Jiaotong University, Xi’An, China

Natural Convection Heat Transfer from Vertical 9x9 Rod Bundles in Liquid Sodium
Koichi Hata1 Gusheng Liu2 Takashi Nakajima3
1. Graduate School of Maritime Sciences, Kobe University, Kobe, Japan; 2. Kobe University, Kobe, Japan; 3. Kyoto University, Uji, Japan

Advanced Natural Circulation Reduced Order Model with Inclined Channel for Low Pressure Conditions
René Manthey, Alexander Knope, Carsten Lange, Christoph Schuster, Antonio Hurtado
Technische Universität Dresden, Dresden, Germany

Erbing Shi1 Chang Wang1 Rui Hao1 Lu Sun2 Genglei Xia2
1. China Ship Development and Desin Center, Wuhan, China; 2. Harbin Engineering University, Harbin, China

Experimental Study on Two-Phase Natural Circulation Flow Instability in Rod Bundle Channel under Low Pressure Condition
Kun Cheng, Sichao Tan, Zheng Liu, Tao Meng
Harbin Engineering University, Harbin, China

Numerical Investigation on the Characteristic of the Reverse Flow Phenomenon in a Z-Type Parallel Compact Heat Exchanger with Large Number of Tubes
Jian Zhou, Ming Ding, Haozhi Bian, Zhang Yinxing, Zhongning Sun
Harbin Engineering University, Harbin, China

Thermal-Hydraulics and Safety Analyses

8-21 Instability Experiments and Analyses

Wednesday July 25

Room Cremant | 10:30 – 12:30

Session Chair: Shuichiro Miwa, Hokkaido University, Japan

Effects of Parameters on the Two-Phase Flow Instability in a Microchannel
Yefei Liu, Yang Liu, Xing-Tuan Yang, Liqiang Pan
Tsinghua University, Beijing, China

Effect of the Jet Stability on Supersonic Steam Injector Operation
Shuichiro Miwa, Nozomu Akiyama, Takahiro Moribe, Hiroto Sakashtta
Hokkaido University, Sapporo, Japan

Phénix Transient Analysis for the Assessment of RELAP5-3D based on Dissymmetric Test Benchmark
Fabio Giannetti1 Vincenzo Narcisi1 Andrea Subioli1 Alessandro Del Nevo2
1. Sapienza University of Rome, Roma, Italy; 2. ENEA CR Brasimone, Camugnano, Italy

Stress and Fatigue Analysis of Thermal Shock for Cladding of Center Measurement Column Lower Head in the Fast Reactor under Shutdown Condition
Shu Zheng1 Daogang Lu1 Qiong Cao1 Chao Liu1 Yunlong Ding1 Yi Huang2
1. North China Electric Power University, Beijing, China; 2. China Institute of Atomic Energy, Beijing, China

Experimental Evaluation on Heat Transfer Characteristics of Sodium-to-Air Heat Exchanger with Helical Finned Tubes in a Cross Flow
Hyungmo Kim, Jaeyukk Eoh, Joou Kim, Ji-Young Jeong
Korea Atomic Energy Research Institute, Daejeon, Korea

Experimental Study on Two-Phase Natural Circulation Flow Instability in Rod Bundle Channel under Low Pressure Condition
Kun Cheng, Sichao Tan, Zheng Liu, Tao Meng
Harbin Engineering University, Harbin, China

Numerical Investigation on the Characteristic of the Reverse Flow Phenomenon in a Z-Type Parallel Compact Heat Exchanger with Large Number of Tubes
Jian Zhou, Ming Ding, Haozhi Bian, Zhang Yinxing, Zhongning Sun
Harbin Engineering University, Harbin, China

Thermal-Hydraulics and Safety Analyses

8-23 Fast Reactors: Experiments and Analyses I

Wednesday July 25

Room Lalande | 10:30 – 12:30

Session Chair: Chenglong Wang, Xi’an Jiaotong University, China

Numerical Simulation of Safety Rod and its Drive Mechanism in Sodium-Cooled Fast Reactor during Scram Action
Yan Li, Wenjun Hu, Iixia Ren
China Institute of Atomic Energy, Beijing, China

Development of the LMFBR Subchannel Analysis Code
ATHAS-LMR and Analysis of Blockage Accident
Peng Du, Jianguang Shan, Bo Zhang
Xi’an Jiaotong University, Xi’an, China

Development and Application of Multi-Physics Safety Analysis Code
Multi-Physics Safety Analysis Code for Advanced Liquid Metal Cooled Reactor
Chi Wang1 Xuebei Zhang2 Jingchao Feng3
1. University of Science and Technology of China, Hefei, China; 2. University of Science and Technology of China, Anhui, China

Development of Techniques for RCP Performance Verification Test and Optimization of Flow Stability
Seok Kim1 Byoung-Uhn Bae1 Yun-Je Cho1
1. Korea Atomic Energy Research Institute, Daejeon, Korea; 2. Korea Atomic Energy Research Institute, Taejon, Korea

Stress and Fatigue Analysis of Thermal Shock for Cladding of Center Measurement Column Lower Head in the Fast Reactor under Shutdown Condition
Shu Zheng1 Daogang Lu1 Qiong Cao1 Chao Liu1 Yunlong Ding1 Yi Huang2
1. North China Electric Power University, Beijing, China; 2. China Institute of Atomic Energy, Beijing, China

Phénix Transient Analysis for the Assessment of RELAP5-3D based on Dissymmetric Test Benchmark
Fabio Giannetti1 Vincenzo Narcisi1 Andrea Subioli1 Alessandro Del Nevo2
1. Sapienza University of Rome, Roma, Italy; 2. ENEA CR Brasimone, Camugnano, Italy
**Computational Fluid Dynamics (CFD)**

**9-2  Multi-phase flow Analysis I**

**Wednesday July 25  Room Fronsac | 10:30 – 12:30**

Session Chair: Ronghua Chen, Xi’an Jiaotong University, China  
Session Co-Chair: Jiazhi Li, The University of Tokyo, Japan  
Session Co-Chair: Shimpei Saito, University of Tsukuba, Japan  

Numerical Simulations on Hydrodynamic Process of Melt Jet Breakup and Fragmentation with the Two-Phase Lattice Boltzmann Method  
**ICONE26-81663**  
Shimpei Saito¹ Yutaka Abe¹ Akiko Kaneko¹ Alessio Festuccia² Alessandro De Rosì³ Kazuya Koyama⁴  
1. University of Tsukuba, Tsukuba, Japan; 2. University of Rome Tor Vergata, Rome, Italy; 3. Israel Institute of Technology, Haifa, Israel; 4. Mitsubishi FBR Systems, Inc., Shihiaya, Japan  

Enhancement of Pressure and Curvature Calculation for the Moving Particle Semi-Implicit Method  
**ICONE26-82205**  
Jiazhi Li, Sunghyon Jang, Akira Yamaguchi  
The University of Tokyo, Tokyo, Japan  

Advances in Modeling Critical Heat Flux in LWR Boiling Flows with the NEK-2P CFD Code  
**ICONE26-81910**  
Adrian Tenthner¹ Prasad Vegendla² Anamias Tomboulides³  
1. Argonne National Laboratory, Argonne, IL, USA; 2. Argonne National Laboratory, Lemont, IL, USA  

Improvement of Software BRT-CICERO Dedicated to Carbon Steel Flow-Accelerated-Corrosion Monitoring on Nuclear Power Plants – from Experiments to CFD Calculations  
**ICONE26-82588**  
Eloide Gipon¹ Marie-Pierre Moutrilité² Stephane Trevrin³ Corentin Masbou²  
1. EDF, Grenoble, France; 2. EDF DTG, Grenoble, France  

**Computational Fluid Dynamics (CFD)**

**9-14  Thermal Mixing II**

**Wednesday July 25  Room Muscadet | 10:30 – 12:30**

Session Chair: Afaque Shams, Nuclear Research and Consultancy Group, Netherlands  
Session Co-Chair: Mo Fei, Tsinghua University, China  
Session Co-Chair: Yann Le Moigne, Westinghouse Electric Sweden AB, Sweden  

Application of Vorticity Method in Auxiliary Impeller Optimization of HTR-PM Main Helium Fan  
**ICONE26-82559**  
Mo Fei, Zhang Youjie  
Tsinghua University, Beijing, China  

Preliminary Validation of the Detached Eddy Simulation Model in CFD Code GASFLOW-MPI  
**ICONE26-82402**  
Han Zhang¹ Yabing Li² Jianjun Xiao² Thomas Jordan¹  
1. Karlsruhe Institute of Technology, Karlsruhe, Germany; 2. Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany  

Unsteady CFD Analyses of the Thermal Mixing of the Feedwater in the Downcomer of a BWR  
**ICONE26-82179**  
Yann Le Moigne  
Westinghouse Electric Sweden AB, Västerås, Sweden  

Numerical Investigation of Mass Mixing in the Reactor Core of a Pebble  
**ICONE26-81722**  
Wei Lu, Xiaowei Li, Xinxin Wu  
Tsinghua University, Beijing, China  

**Innovative Nuclear Power Plant Design and SMRs**

**13-1  Small Modular Reactors-SMR Water Cooled**

**Wednesday July 25  Room Talbot | 10:30 – 12:30**

Session Chair: Jovica Riznic, Canadian Nuclear Safety Commission, Canada  
Session Co-Chair: Christopher Bell, Rolls-Royce PLC, United Kingdom  

Integrated Design of a Reactor Core for the Rolls-Royce Small Modular Reactor Project  
**ICONE26-81311**  
Simon de Haas¹ David Chu¹ Kevin Ellis¹ Matthew White¹ Ben Lindley²  
1. Rolls-Royce Nuclear, Derby, United Kingdom; 2. Wood, Darlington, United Kingdom  

We never built small modular reactors (SMRs), but what do we know about modularization in construction?  
**ICONE26-81604**  
Benito Mignacca, Giorgio Locatelli, Mahmoud Alaassar, Diletta Colette Invernizzi  
University of Leeds, Leeds, United Kingdom  

A Methodology to Determine SMR Build Schedule and the Impact of Modularisation  
**ICONE26-81550**  
Clara Lloyd, Anthony Roulstone  
University of Cambridge, Cambridge, United Kingdom  

A Combined Small Modular Reactor and Gas Turbine Cycle with Reheat  
**ICONE26-81002**  
Robert Stakenborgs, Gregory Kramer  
ILD Power, Baton Rouge, LA, USA  

The Canadian Nuclear Safety Commission: Readiness Activities to Regulate Small Modular Reactors  
**ICONE26-82620**  
Kevin Lee  
Canadian Nuclear Safety Commission, Ottawa, ON, Canada  

Approach to UK SMR Component Design  
**ICONE26-81188**  
Christopher Bell  
Rolls-Royce PLC, Derby, United Kingdom  

Proposed License Structure of Small Modular Reactor in China  
**ICONE26-81985**  
Hua Zheng, Shuhong Wei  
China Nuclear Power Design Co., Ltd. (Shenzhen), Shenzhen, China
12:30 – 14:00  Chablis Suite, Ground Floor  

**LUNCH**

**14:00 – 16:00  PANEL SESSIONS**

See pages 23 through 26 for panel session details.

**16:00 – 16:30  Chablis Suite, Ground Floor**  

**POSTER SESSION & COFFEE BREAK**

**16:30 – 18:30  TECHNICAL SESSIONS**

**Plant Systems, Structures, Components and Materials**

**3-10  Impact and Vibration Analyses**

**Wednesday July 25  Room Chalon I 16:30 – 18:30**

**Session Chair:** Akemi Nishida, Japan Atomic Energy Agency, Japan  
**Session Co-Chair:** Hakan Ozaltun, Idaho National Laboratory, USA

**Study on the Shaking Dynamic Response of Steam Generator LOCA**  
**ICONE26-81278**

Qian Huang, Xiaofei Yu, Huan-huan Qi, Nai-bin Jiang, FengChun Cai, Zhi-peng Feng  
Nuclear Power Institute of China, Chengdu, China

**Proposal of a Simple Evaluation Method for Sloshing Impact Pressure on Flat Roofs**  
**ICONE26-82562**

Shigeru Takaya1 Tatsuya Fujisaki2  
1. Japan Atomic Energy Agency, Ibaraki, Japan; 2. Key Lab. on Steam Power System, Wuhan Second Ship Design and Research Institute, Wuhan, China

**Optimal Design and Performance Simulation of a Novel Semi-Active Vibration Absorber for Pipeline System of NPP**  
**ICONE26-81741**

Zhiqiu Wei1 Jinlan Gou1 Shao Dan Li1 Lu Dai1 Meng-Ran Liao2  
1. Wuhan Second Ship Design and Research Institute, Wuhan, China; 2. Key Lab. on Steam Power System, Wuhan Second Ship Design and Research Institute, Wuhan, China

**Evaluation of Local Damage to Reinforced Concrete Panels Subjected to Oblique Impact of Rigid and Soft Missiles**  
**ICONE26-82615**

Akemi Nishida1 Minoru Nagai1 Haruji Tsubota2 Yinsheng Li3  

**Structural Dynamic Transient Analysis of Fire Protection System at a Nuclear Power Plant**  
**ICONE26-82627**

Milton Dong, Eugene Tom  
Unisont Engineering, Inc., Oakland, CA, USA

**Mechanical Impact Tests with EB Welded Joints Made with Fixing Bars of Nuclear Fuel Assembly**  
**ICONE26-82666**

Soo-sung Kim, Hyun-jung Kim, Yong-jin Jeong, Jong-man Park  
KAERI, Daejeon, Korea

**Instrumentation and Control (I&C) and Influence of Human Factors**

**4-6  I&C Modeling and Software**

**Wednesday July 25  Room Lalande I 16:30 – 18:30**

**Session Chair:** Dr. Antonio Cirillo, Framatome GmbH, Germany  
**Session Co-Chair:** Mauro Cappelli, ENEA, Italy

**Application of Monte Carlo Methods in Reactor Protection System Reliability Research**  
**ICONE26-81300**

Duo Li, Zhaojuan Hao, Shuqiao Zhou, Chao Guo  
Tsinghua University, Beijing, China

**A Research on System Error Correction for a High Temperature Hydrogen Detector based on Neural Network Technique**  
**ICONE26-81301**

Zhen Feng Qi, Yi Wang Zhang, Wei Li, Yidan Yuan  
China Nuclear Power Engineering Co., Ltd., Beijing, China

**Prediction and Sensibility Analysis for Nuclear Safety-Critical Software Reliability of DCS**  
**ICONE26-81647**

Ying Liu, Yafeng Wang, Bo Pang, Lei Tang, Bo Feng, Guohai Cao  
Nuclear Power Institute of China, chengdu, China

**Research on Algorithm of Sump Level Operator Assisted Support Program for PWR Nuclear Power Plant**  
**ICONE26-81714**

Qiao fen Liu, San ping Xiao, Yu Liu, Xichao Liu, Xulun Jiang  
China Nuclear Power Design Co., Ltd. (Shenzhen), Shanghai, China

**Advanced Reactors and Fusion Technologies**

**5-3  Modeling and Simulation I**

**Wednesday July 25  Room Epernay I 16:30 – 18:30**

**Session Chair:** Arnold Gad-Briggs, Cranfield University & EGB Engineering UK, United Kingdom  
**Session Co-Chair:** Hong Yu, Chinese Institute of Atomic Energy, China

**Neutronic Methodological Benchmarks with Simplified Geometries for the Gas Cooled Reactor Group Constant Generating Tools**  
**ICONE26-81427**

Emese Temesvari1 Balint Batki2 Milan Gren2  
1. MTA EK, Centre for Energy Research, Hungarian Academy of Sciences, Budapest, Hungary; 2. UJV Rez, Husinec - Rez, Czech Republic
Experimental Studies on the Thermal-Hydraulics of Dowtherm A through the Pebble Bed with Internal Heat Generation

Limin Liu1 Dalin Zhang2 Linfeng Li3 Yichen Yang2
Chenglong Wang2 Suizheng Qiu1
1. Xi’an Jiao Tong University, Xi’an, CA, USA; 2. Xi’an Jiao Tong University, Xi’an, China; 3. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China


Jin Wang, Donghui Zhang
China Institute of Atomic Energy, Beijing, China

A Review of Brayton Helium Gas Turbine Cycles for GFR and VHTR

Mariano Tarantino2 Nicola Forgione1
SIMMER-IV Code
Tube Rupture Event for MYRRHA Reactor in CIRCE Facility with Experimental and Numerical Analysis of Steam Generator

Jinlin Niu, Lidong Wang, Jiong Guo, Fu Li
Tsinghua University, Beijing, China

Modification of RELAP/SCDAPSIM/MOD4.0 for Liquid Metal in Contact with Noncondensable Gas

Qian Sun1 Tianji Peng2 Zhiwei Zhou1 Zhibin Chen3 Shisheng Wang4
1. Tsinghua University, Beijing, China; 2. Institute of Modern Physics, Chinese Academy of Sciences, Lanzhou, China; 3. Key Laboratory of Neutronics and Radiation Safety, Institute of Nuclear Energy Safety Technology, Hefei, China; 4. Institute of Nuclear Energy Safety Technology, Chinese Academy of Sciences, Hefei, China

Experimental and Numerical Analysis of Steam Generator Tube Rupture Event for MYRRHA Reactor in CIRCE Facility with SIMMER-IV Code

Alessio Pesetti1 Mariano Tarantino2 Nicola Forgione1
1. University of Pisa, Pisa, Italy; 2. ENEA C.R. Brasimone, Camugnano, Italy

Nuclear Safety, Security, and Cyber Security

6-8 Radiation Source and Field Detection I

Wednesday July 25 Room Mouton Cadet | 16:30 – 18:30
Session Chair: Giada Gandolfo, Sapienza University of Rome, Rome, Italy
Session Co-Chair: Fuliang Jiang, University of South China, Hengyang City, China

The Neutron Active Interrogation System for In-Field Detection of Transuranic-Based Radioactive Dispersal Devices for Security Applications

Nadia Cherubini1 Alessandro Dodaro1 Giada Gandolfo2 Giuseppe A. Marzo1 Luigi Le pore1 Ermanno Piccinelli2 Romolo Remetti2
1. ENEA, Rome, Italy; 2. Sapienza University of Rome, Rome, Italy

Experimental Study of Radon Exhalation Rate in Uranium-like Rock based on Closed Chamber Method

Fuliang Jiang, Xiaoliang Wang, Shuai Zhang, Xiangyang Li, Changshou Hong
University of South China, Hengyang, China

Noise Reduction Treatment and Analysis of Accumulated Radon Concentration in Uranium-like Rock based on Wavelet Theory

Fuliang Jiang, Wenxiao Yang, Ming Li, Xiangyang Li, Changshou Hong
University of South China, Hengyang, China

High Efficient Detritiation Catalysts for Fusion Safety

Quanwen Wu, Daqiao Meng, Wenhua Luo, Jinchun Bao, Jingwen Ba
China Academy of Engineering Physics, Mianyang, China

Diffusion Law and Simulation Analysis of Radon in Uranium Tailings based on Multiple Gauss Plume Model

Jiaxin Wang1 Guohua Wu1 Liguang Zhang2 Jingyuan Ou3 Jiejuan Tong2
1. Tsinghua University; Beijing, China; 2. Institute of Nuclear and New Energy Technology, Tsinghua University, Beijing, China

The Development of the Advanced Method for the Source Term Evaluation Applicable to the Dynamic PRA

Koichi Nakamura1 Sunghyon Jang2 Akira Yamaguchi2
1. Central Research Institute of Electric Power Industry, Kanagawa, Japan; 2. The University of Tokyo, Tokyo, Japan

Thermal-Hydraulics and Safety Analyses

8-5 Gas-cooled Reactor Experiments and Analyses

Wednesday July 25 Room Reims | 16:30 – 18:30
Session Chair: Rosa Le Frano, DICI - University of Pisa, Italy

A Numerical Study on Graphite Dust Deposition on Steam Generator Tubes in the High-Temperature Gas-Cooled Reactor (HTGR)

Mingzhe Wei, Yiyang Zhang, Zhu Fang, Xinxin Wu, Libin Sun
Tsinghua University, Beijing, China

The Cross-Flow Mixing Analysis of Quasi-Static Pebble Flow in Pebble Bed Reactor

Xiang Fang, Xing-Tuan Yang, Shengyao Jiang
Tsinghua University, Beijing, China

Study on the Turbulent Mixed Convection Phenomena inside the Air-Cooled RCCS Riser

Dong-Ho Shin1 Sin-Yeob Kim2 Chan Soo Kim2
Goon-cherl Park1 Hyoung Kyu Cho1
1. Seoul National University, Seoul, Korea; 2. Korea Atomic Energy Research Institute, Daejeon, Korea

Development of Single Pebble Benchmark Ex. I-2A for IAEA UAM CRP with MOOSE

Jinlin Niu, Lidong Wang, Jiong Guo, Fu Li
Tsinghua University, Beijing, China

Thermal-Hydraulics and Safety Analyses

8-11 Containment Related Experiments and Analyses

Wednesday July 25 Room Alsace | 16:30 – 18:30
Session Chair: Gonzalo Jimenez, Universidad Politécnica de Madrid (UPM), Spain

AP1000® Passive Cooling Containment Analysis of a Double-Ended LBLOCA with a 3D Gothic Model

Samanta Estevez-Albaja, Gonzalo Jimenez, Kevin Fernández-Costais, César Queral, Zuriñe Goñi
Universidad Politécnica de Madrid, Madrid, Spain
Thermal-Hydraulics and Safety Analyses

8-16 Fluid-Structure Interactions: Experiments and Analyses

Wednesday July 25

Session Chair: Rosa Lo Frano, DICI - University of Pisa, Italy

A Flow-Induced Vibration Study on the Multiple Rectangular Tubes Bundles for Steam Generator Outlet Pipes of HTR-PM

ICONE26-81229
Yu Song, Qin Zhou, jiaqiu Zhao, Yiyang Zhang, Xinxin Wu
Tsinghua University, Beijing, China

Experimental and Numerical Analysis of the Flow Field in the Integrated Valve for the Control Rod Hydraulic Drive System

ICONE26-81305
Junfei Jiang, Benke Qin, HanLiang Bo
Tsinghua University, Beijing, China

Thermal-Hydraulics and Safety Analyses

8-18 Condensation Phenomena, Experiments, and Analyses

Wednesday July 25

Session Chair: Ronghua Chen, Xi’an Jiaotong University, China

Numerical Simulation of Condensation Heat Transfer in Shell Side of Double Inlet Condenser

ICONE26-81370
Kailiy Li, Ruojun Xue, Zhaoheng Liu, Jinlin Sun, Le Liang
Harbin Engineering University, Harbin, China

Experimental Comparison on the Multi-Hole Steam Spraying Condensation Heat Transfer Characteristics

ICONE26-82518
Yuhao Zhang, Bin Ouyang, Yonglong Yuan, Daogang Lu
North China Electric Power University, Beijing, China

Modeling of Wall Condensation in the Presence of Noncondensable Gases for Representative Nuclear Reactor Accident Tests

ICONE26-82608
Sonia Benteboula, Frédéric Dabbene
1. Commissariat à l’Energie Atomique (CEA), GIF sur Yvette, France; 2. CEA Saclay, GIF sur Yvette, France

ICONE26-82631

ICONE26-81652
Guangdong Song, Lina Zhu, Liu Mengmeng
China Institute of Atomic energy, Beijing, China

Suppression Methods of Acoustic Noise Generated in Main Steam Stop Valve

ICONE26-82515
Shiro Takahashi1 Atsuuki Minenaga2 Eiji Ozaki2
1. Hitachi, Ltd., Hitachi Research Laboratory, Hitachi, Japan; 2. Mitsubishi Hitachi Power Systems, Ltd., Nagasaki, Japan


ICONE26-82683
Ryo Morita1 Shiro Takahashi1 Shun Watanabe1 Noriyuki Takamura3
1. Central Research Institute of Electric Power Industry, Kanagawa, Japan; 2. Hitachi, Ltd., Hitachi Research Laboratory, Hitachi, Japan; 3. Hitachi GE Nuclear Energy, Hitachi-shi, Japan

Thermal-Hydraulics and Safety Analyses

8-13 Aerosols and Spent Fuel Pool Related Experiments and Analyses

Wednesday July 25

Session Chair: Haomin Sun, Japan Atomic Energy Agency, Japan

Detailed Experimental and Analytical Study on Long Two-Phase Closed Thermosiphons Related to Passive Spent-Fuel Pool Cooling

ICONE26-81726
Claudia Grass1 Anne Kruesenberg2 Rudi Kulenovic1 Fabian Weyermann2 Joerg Starflinger3 Andreas Schaffrath4

Experimental Study of Aerosol Behavior during Pool Scrubbing: Part 1 - Visualization Measurement of Aerosol Particle in a Single Rising Bubble

ICONE26-81838
Kota Fujiwara, Wataru Kikuchi, Yuki Nakamura, Shimpel Saito, Tomohisa Yuasa, Akiko Kaneko, Yutaka Abe
University of Tsukuba, Tsukuba, Japan

Experimental Investigation on Dependence of Decontamination Factor on Aerosol Number Concentration in Pool Scrubbing under Normal Temperature and Pressure

ICONE26-81638
Haomin Sun1 Shinnichi Machida2 Sibamoto Yasutaro2

Experimental Study of Aerosol Behavior during Pool Scrubbing: Part 2 - Decontamination of Aerosol Particle in Two Phase Flow

ICONE26-81659
Wataru Kikuchi, Kota Fujiwara, Yuki Nakamura, Shimpel Saito, Tomohisa Yuasa, Akiko Kaneko, Yutaka Abe
University of Tsukuba, Tsukuba, Japan

Thermal-Hydraulics and Safety Analyses

8-12 Aerosols and Spent Fuel Pool Related Experiments and Analyses

Wednesday July 25

Session Chair: Tomohisa Yuasa, Akiko Kaneko, Yutaka Abe

Kota Fujiwara, Wataru Kikuchi, Yuki Nakamura, Shimpel Saito, Tomohisa Yuasa, Akiko Kaneko, Yutaka Abe
University of Tsukuba, Tsukuba, Japan

Experimental Study of Aerosol Behavior during Pool Scrubbing: Part 1 - Visualization Measurement of Aerosol Particle in a Single Rising Bubble

ICONE26-81838

Experimental Investigation on Dependence of Decontamination Factor on Aerosol Number Concentration in Pool Scrubbing under Normal Temperature and Pressure

ICONE26-81638

Thermal-Hydraulics and Safety Analyses

8-11 Aerosols and Spent Fuel Pool Related Experiments and Analyses

Wednesday July 25

Session Chair: Tomohisa Yuasa, Akiko Kaneko, Yutaka Abe

Kota Fujiwara, Wataru Kikuchi, Yuki Nakamura, Shimpel Saito, Tomohisa Yuasa, Akiko Kaneko, Yutaka Abe
University of Tsukuba, Tsukuba, Japan

Experimental Study of Aerosol Behavior during Pool Scrubbing: Part 1 - Visualization Measurement of Aerosol Particle in a Single Rising Bubble

ICONE26-81838

Experimental Investigation on Dependence of Decontamination Factor on Aerosol Number Concentration in Pool Scrubbing under Normal Temperature and Pressure

ICONE26-81638

Thermal-Hydraulics and Safety Analyses

8-10 Aerosols and Spent Fuel Pool Related Experiments and Analyses

Wednesday July 25

Session Chair: Tomohisa Yuasa, Akiko Kaneko, Yutaka Abe

Kota Fujiwara, Wataru Kikuchi, Yuki Nakamura, Shimpel Saito, Tomohisa Yuasa, Akiko Kaneko, Yutaka Abe
University of Tsukuba, Tsukuba, Japan

Experimental Study of Aerosol Behavior during Pool Scrubbing: Part 1 - Visualization Measurement of Aerosol Particle in a Single Rising Bubble

ICONE26-81838
Non-Condensable Gas Plugging and Mixing Behavior in PWR Steam Generator Tubes during Reflux Condensation ICOME26-82350
Filip Janasz1 Horst-Michael Prasser2 Detlef Suckow3 Marton Szogradi2
1. ETH Zurich, Zürich, Switzerland; 2. Paul Scherrer Institute, Villigen, Switzerland; 3. VTT Technical Research Centre of Finland, Espoo, Finland

Analysis of the Condensation Model used in Severe Accident Integral Codes ICOME26-82020
Yiming Zhu, Zhuo Liu, Xiaoming Yang
China Nuclear Power Engineering Co., Ltd., Beijing, China

Computational Fluid Dynamics (CFD)
9-11 Multi-phase Flow Analysis II
Wednesday July 25 Room Fronsac 16:30 – 18:30
Session Chair: Yann Le Moigne, Westinghouse Electric Sweden AB, Sweden
Session Co-Chair: Paridhi Goel, Homi Bhabha National Institute, Mumbai, India; Bhabha Atomic Research Centre, Mumbai, India
Session Co-Chair: Elia Merzari, Argonne National Laboratory, USA

Numerical Study of Effect of Contact Angles on Flow Boiling Employing Thermal LBM Simulation ICOME26-81569
Tengzhen Sun1 Qian Liu2 Gai1 Xing-Tuan Yang2 Jiyuan Tu1 Shenyao Jiang2
1. Institute of Nuclear and New Energy Technology, Tsinghua University, Beijing, China; 2. Tsinghua University, Beijing, China

3D Modelling of Hydrogen-Air-Steam Mixture Combustion within the Framework of Nuclear Power Plant Safety Substantiation ICOME26-82641
Vitaly Kotov
JSC ATOMPROEKT, Saint Petersburg, Russia

UK Nuclear New Build Programme: Funded Decommissioning Planning ICOME26-82708
Aujas Mistry, Chris Medlock
Nuvia, Warrington, United Kingdom

Decontamination & Decommissioning, Radiation Protection, and Waste Management
10-2 Radioactive Waste
Wednesday July 25 Room Bourg 16:30 – 18:30
Session Chair: Massimo Sepielli, ENEA, Italy
Session Co-Chair: Hideharu Takahashi, Tokyo Institute of Technology, Japan
Overview of the U.S. Department of Energy Advanced Waste Forms Development ICOME26-81017
Patricia Paviět1 Kimberly Gray1 John Vienna2
1. Department of Energy - Office of Nuclear Energy, Germantown, MD, USA; 2. Pacific Northwest National Laboratory, Richland, WA, USA

Application of Clearance in Controlling Radioactive Waste of Nuclear Power Plant ICOME26-81048
Qiang Wu1 LiQingDu Wang1 Chen Jiang2 GuangLai Zhou1
1. China Institute for Radiation Protection, TaiYuan, China; 2. FuQing Nuclear Power Plant, Fuzhou, China

Free Release of Radioactive Waste Containing Very Low Level Waste and Short Lived Radionuclides at Nucleco ICOME26-82039
Alessandro Dodaro, Claudio Andreozzi, Battistina Bianchilli, Filippo Gagliardi, Egidio Mauro, Monica Sisti
Nucleco S.p.A., Rome, Italy

In Situ Measurement Technique of Low-Energy Υ-Contaminated Waste Sorting ICOME26-81341
Yue WeiHong, Xu YuQiang
China Institute of Atomic Energy, Beijing, China

Innovative Nuclear Power Plant Design and SMRs
13-2 Sodium Cooled Reactors
Wednesday July 25 Room Talbot 16:30 – 18:30
Session Chair: Kenta Ichikawa, Mitsubishi FBR Systems, INC., Japan
Session Co-Chair: Bin Hou, China Institute of Atomic Energy, China
Estimation of Mitigation Effects of Sodium Nanofluid for SGTR Accidents in SFR ICOME26-81309
Kenta Ichikawa1 Naoki Yoshioka2 Hironori Kanda2
1. Mitsubishi FBR Systems, Inc., Tokyo, Japan; 2. Japan Atomic Energy Agency, Ibaraki, Japan
Geometry Survey on the Convex Shaped Core for Recriticality Prevention against CDA in Sodium-Cooled Fast Reactor  
ICONE26-81331  
Keiko Chitose1 Yoshiaki Tachi2 Toshio Wakabayashi1 Naoyuki Takaki1  
1. Tokyo City University, Tokyo, Japan; 2. Japan Atomic Energy Agency, Higashi Ibaraki, Japan; 3. Tohoku University, Sendai, Japan

Controller Design of a LFR Demonstrator Steam Generator using Active Disturbance Rejection Control Method  
ICONE26-81883  
Mohammed Khalid, Zhou Shiliang, Shen Cong  
North China Electric Power University, Beijing, China

Numerical Study on the Two-Phase Flow for a Gas/Liquid Metal Magnetohydrodynamic Generator  
ICONE26-82231  
Meng-Ran Liao1 Chunhui Dai1 Can Ma2 Yong Liu2  
1. Key Lab. on Steam Power System, Wuhan Second Ship Des. & Res. Ins., Wuhan, China; 2. Wuhan Second Ship Design and Research Institute, Wuhan, China

Risk Assessments and Management

14-1 Risk Assessment and Management I

Wednesday July 25

Room Cognac 16:30 – 18:30

Session Chair: Hidemasa Yamano, Japan Atomic Energy Agency, Japan  
Session Co-Chair: Mahesh Pandey, University of Waterloo, Canada

Probabilistic Analysis of Creep-Induced SGTR for NPP  
ICONE26-81032  
Wenjing Li, Wentao Zhu, Xinli Yu, Wei Wei  
China Nuclear Power Engineering Co., Ltd., Beijing, China

Level 1 PRA for External Vessel Storage Tank of Japan Sodium-cooled Fast Reactor in Scheduled Refueling  
ICONE26-81079  
Hidemasa Yamano1 Kenichi Naruto2 Kenichi Kurisaka3  

Calibration of Inspection Strategies in Support of Aging Management Programs: A Probabilistic Approach  
ICONE26-81115  
Mahesh Pandey, Mikko Jyrkama  
University of Waterloo, Waterloo, ON, Canada

Study on Description of Plant Status at Fukushima Accident by Emergency Action Level  
ICONE26-81127  
Kazufumi Nagashima, Nakahiro Yasuda  
Fukui University, Tsuruga-shi, Japan

Standby Equipment Reliability Data Analysis on Risk Monitor of Nuclear Power Plant  
ICONE26-82590  
Yingfei Ma, Zhijian Zhang, He Wang, Sijuan Chen, Anqi Xu, Gangyang Zheng  
Harbin Engineering University, Harbin, China
Thursday, July 26

Time | Title | Location
--- | --- | ---
08:30 – 10:30 | Technical Sessions | See pages 69 through 73 for session titles, authors and locations
10:30 – 11:00 | Coffee Break | Chablis Suite, Ground Floor
11:00 – 13:00 | Technical Sessions | See pages 74 through 78 for session titles, authors and locations
13:00 – 14:00 | Lunch | Chablis Suite, Ground Floor
14:00 – 16:00 | Technical Sessions | See pages 78 through 83 for session titles, authors and locations
16:00 – 16:30 | Coffee Break | Chablis Suite, Ground Floor
16:30 – 18:30 | Technical Sessions | See pages 83 through 87 for session titles, authors and locations

08:30 – 10:30

TECHNICAL SESSIONS

Nuclear Fuel and Material, Reactor Physics and Transport Theory

2-7 Future Reactor Concepts and Innovative Nuclear Applications

**Thursday July 26**

Session Chair: Thomas Adams, Naval Surface Warfare Center, Crane Division, USA

Session Co-Chair: Carsten Schroer, Karlsruhe Institute of Technology (KIT), Eggenstein-Leopoldshafen, Germany

**Modular Boiling Water Reactor Concept** [ICONE26-81196]
Yi Liao¹, Wang Cong², Lei Chen¹
1. Wuhan Second Ship Design and Research Institute, Wuhan, China; 2. Naval University of Engineering, Wuhan, China

**Conceptual Core Design of HAPPY200 Reactor** [ICONE26-82125]
Xiaosheng Li, Linsen Li, Lianghui Peng, Xiaosong Chen, Zhaocan Meng, Yaodong Chen
State Power Investment Central Research Institute, Beijing, China

**Preliminary Neutron Simulation of Ceramic Fast Reactor** [ICONE26-81474]
Xuesong Yan¹, Xunchao Zhang², Yaling Zhang², Lei Yang², Wenshan Duan²
1. Joint Laboratory of Atomic and Molecular Physics of NWNU & IMPACAS, Northwest Normal University, Lanzhou, China; 2. Institute of Modern Physics, Chinese Academy of Sciences, Lanzhou, China

**Criticality Safety Issues in Nuclear Design of HP-SMTCs Space Reactor** [ICONE26-82244]
Songyang Li, Dingqiu Wang, Yueyuan Jiang, Weihua Li, Wenli Guo
Tsinghua University, Beijing, China

**Experimental and Modeling Research on Leading Betavoltaic Technology** [ICONE26-82475]
Thomas Adams¹, Shripad Revankar², Darrell Cheu²
Peter Cabauy³, Bret Elkind⁴, Jesse P. Grant⁵
1. Naval Surface Warfare Center, Crane Division, Crane, IN, USA; 2. Purdue University, West Lafayette, IN, USA; 3. City Labs, Homestead, FL, USA; 4. City Labs, Inc / Johns Hopkins, Homestead, FL, USA

**Physics Design of Special Epithermal Neutron Beam based on Multi D-D Reaction Neutron Tubes** [ICONE26-81392]
Yi Yang¹, Yigu Li², Bin Zhao²
1. China Nuclear Power Engineering Co., Ltd., Beijing, China; 2. China Institute of Atomic Energy, Beijing, China

**Plant Systems, Structures, Components and Materials**

3-12 Seismic and Transient Analyses

**Thursday July 26**

Session Chair: Antony Hurst, EASL, United Kingdom

Session Co-Chair: Asif Arastu, Unisont Engineering, Inc., USA

**Analytical Study on Fragility Evaluation with Uncertainty against Fault Displacement for Nuclear Power Plant Buildings** [ICONE26-81072]
Kenshiro Ishiki¹, Hirokazu Tsuji², Minoru Kanechika¹, Yoshinori Mihara¹
1. Kajima Corporation, Tokyo, Japan; 2. Japan Nuclear Safety Institute, Tokyo, Japan

**Study on Methods for HCLPF Value of Nonlinear Supports System of Steam Generator** [ICONE26-81279]
FengChun Cai, Xianhui Ye, Qian Huang, Wenzheng Zhang
Nuclear Power Institute of China, Chengdu, China

**Influence of Gap Size on Added Mass for Spent Fuel Storage Rack** [ICONE26-82595]
Daogang Lu, Yu Liu, Shu Zheng
North China Electric Power University, Beijing, China

**Transient Analysis of Fire Protection System at a Nuclear Power Plant using Computer Code USLAM** [ICONE26-82622]
Asif Arastu¹, Eugene Tom²
1. Unisont Engineering, Inc., Castro Valley, CA, USA; 2. Unisont Engineering, Inc., Oakland, CA, USA
Nuclear Safety, Security, and Cyber Security

6-5 Security of SMRs and Advanced Reactors I
Thursday July 26  Room Bouzy | 08:30 – 10:30

Session Chair: Daming Liu, IAEA, Vienna, Austria

Session Co-Chair: Akira Yamada, Toshiba Energy Systems & Solutions Corp., Kawasaki, Japan

Session Co-Chair: Wang Cong, Naval University of Engineering, Wuhan, Hubei, China

Calculation of Core Damage Frequency Caused by Main Control Broad Fire in the Main Control Room for Small Momular Reactors
ICONE26-81467
Wanhong Wang, Changhong Peng, Yun Guo
University of Science and Technology of China, Hefei, China

Transient Thermal Behaviors of SBO Accident for a 200MW OFNP under Heaving Motion Conditions
ICONE26-81380
Yan Qi1 Simin Luo1 Yaping Zhang1 Liu Limin1 Guanhui Su1 Suizheng Qiu2
1. Xi’an Jiao Tong University, Xi’an, China; 2. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China

Research on the Passive Residual Heat Removal System of Floating Nuclear Plants
ICONE26-82219
Wang Cong1 Jue Wang2 Chen Hu2 Yi Liao2 Lei Chen2
1. Naval University of Engineering, Wuhan, China; 2. Wuhan Second Ship Design and Research Institute, Wuhan, China

Assessment of Control Room Radiological Habitability of High-Temperature Reactor Pebble-Bed Module in Shidaobay Multi-Reactor Nuclear Power Site
ICONE26-82446
Xinpeng Li, Sheng Fang
Tsinghua University, Beijing, China

Structural Redundancy Design and Reliability Analysis of Magnetic Bearing for HTGR Primary Helium Circulator
ICONE26-81336
Yangbo Zheng, Zhengang Shi, Xingnan Liu, Mo Ni, Guojun Yang
Tsinghua University, Beijing, China

Development of Boron Dilution Model in COBRA-EN
ICONE26-82269
Hao Yu1 Mingjun Wang1 Suizheng Qiu2 Wexi Tian1 Guanghui Su1
1. Xi’an Jiao Tong University, Xi’an, China; 2. School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China

Thermal-Hydraulics and Safety Analyses

8-5 Thermal-Hydraulic Experiments I
Thursday July 26  Room Reims | 08:30 – 10:30

Session Chair: Suizheng Qiu, School of Nuclear Science and Technology, Xi’an Jiaotong University, China

Experimental Study of a Micrometer-sized Droplet Impinging on a Smooth Heated Surface
ICONE26-81038
Zhen Zhang, Kai Chen, Peixue Jiang, Xing-Tuan Yang
Tsinghua University, Beijing, China

Development of Experimental Facility to Study Channel Disassembly Behaviour for Indian PHWR Reactor during Heatup
ICONE26-81312
Pradeep Sahoo1 Ankit Singh2
1. Botswana International University of Science & Technology - BLUST, Palapye, Botswana; 2. Indian Institute of Technology Roorkee, Roorkee, UK, India

Experimental Study on the Safety Injection Pump (SIP) Failure Accompanied by the Steam Generator Tube Rupture (SGTR)
ICONE26-81460
Yusun Park, Byoung-Uhn Bae, Jongrok Kim, Jae Bong Lee, Hae Min Park, Nam Hyun Choi, Kyuong Ho Kang
Korea Atomic Energy Research Institute, Daejeon, Korea

Turbulent Transverse Plane PIV Measurements on a Wire-Wrapped 61-Pin Hexagonal Fuel Bundle
ICONE26-81462
Nolan Go1 Philip Jones1 Thien D. Nguyen1 Rodolfo Vaghetto2 Yassin Hassan2
1. Texas &M Nuclear Engineering, College Station, TX, USA; 2. Texas A&M University, College Station, TX, USA

A Piezoelectric Droplet Generating Device for Experiment in Successive Droplets Impacting onto Solid Surface
ICONE26-81475
Jiaxin Li1 Huang Zhang1 Yuzheng Li1 Qianfeng Liu2 HanLiang Bo1
1. Tsinghua University, Beijing, China; 2. Institute of Nuclear and New Energy Technology, Tsinghua University, Beijing, China

Mechanism of Flashing Phenomena Induced by Microwave Heating
ICONE26-81699
Shunyu Fujita1 Yutaka Abe2 Akiko Kaneko2 Tomohisa Yuasa2
1. University of Tsukuba, Ibaraki, Japan; 2. University of Tsukuba, Tsukuba, Japan

Thermal-Hydraulics and Safety Analyses

8-14 Core Experiments, Phenomena, and Modeling
Thursday July 26  Room Alsace | 08:30 – 10:30

Session Chair: Mingjun Wang, Xi’an Jiaotong University, China

Research on the Physical Modelling for the Subchannel Analysis of PWR Core
ICONE26-81231
Guangliang Chen, Xiaomeeng Dong, Lei Li, Peizheng Hu, Thompson Appah, Zhaofei Tian, Zhijian Zhang
Harbin Engineering University, Harbin, China

Analysis of Flow Blockage of a Single Fuel Assembly in the JRR-3 20MW Research Reactor
ICONE26-81313
Yu-chuan Guo, Guanbo Wang, Dazhi Qian, Heng Yu, Bo Hu
China Academy of Engineering Physics, Mianyang, China

A Numerical Research of the Resistance Characteristics of the Bottom Nozzle in the Annular Fuel Assembly
ICONE26-82259
Minghui Pan, Minfu Zhao
China Institute of Atomic Energy, Beijing, China

Thermal Hydraulic Design of a Million Kilowatt Travelling Wave Reactor Core
ICONE26-82103
Lin Chao
China Institute of Atomic Energy, Beijing, China
Influence of Spacer Elements on Flow Distribution and Heat Transfer in Experimental Models of Fuel Assemblies
Nikolay Pribaturin1, Oleg Kashinsky1, Dmitry Kulikov2
Aleksandr Kurydymov3, Sergey Lezhnin2, Pavel Lobanov2, Julio Pacio3
Leonid Stoppel1, Aleksandr Svetonosov2, Thomas Wetzel1
1. Institute of Thermophysics SB RAS, Novosibirsk, Russia; 2. Kutateladze Institute of Thermophysics, Novosibirsk, Russia; 3. Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany

Thermal-Hydraulics and Safety Analyses

8-30 Thermal-hydraulic Experiments III
Thursday July 26 Room: Cremant I 08:30 – 10:30
Session Chair: Chikako Iwaki, Toshiba Energy Systems & Solutions Corporation, Japan

Experimental Nusselt Number in Rod Bundles Cooled by Heavy-Liquid Metals
ICONE26-82213
Julio Pacio1, Markus Daubner1, Thomas Wetzel1, Ivan Di Piazza2
Mariano Tarantino1, Daniele Martelli2, Morena Angelucci4
1. Karlsruhe Institute of Technology, Leopoldshafen, Germany; 2. ENEA C.R. Brasimone, Camugnano, Italy; 3. University of Pisa - Dipartimento di Ingegneria Civile ed Industriale (DICi), Pisa, Italy; 4. University of Pisa, Pisa, Italy

Effect of Subcooling and Nozzle Diameter on Heat Transfer Characteristics of Downward Facing Hot Surfaces using Mist
Jet
ICONE26-82211
Avadhesh Kumar Sharma, Monika Meena, Anirudh Soni, Santosh Kumar Sahu
Indian Institute of Technology Indore, Indore, MP, India

Experimental Study on the Interaction of Molten SN with Water
ICONE26-82204
Longkun He1, Pengfei Liu1, Xisi Zhang1, Wenjun Hu2, Bo Kuang1, Liangzhang Wei1
1. Shanghai Jiao Tong University, Shanghai, China; 2. China Institute of Atomic Energy, Beijing, China

Experimental Investigation and Flow Visualization of the Two-Phase Flow Instability at Low Vapor Quality in a Vertical Narrow Channel
ICONE26-82052
Liqiang Pan, Yang Liu, Weihua Li, Yefei Liu
Tsinghua University, Beijing, China

Investigation on Flow and Breakdown Characteristics under Horizontal Shear of Water Film Falling Down Vertical Corrugated Plate Dryer
ICONE26-81702
Wang Bo, Ruifeng Tian, Chen Bowen, Mao Feng
Harbin Engineering University, Harbin, China

Thermal-Hydraulics and Safety Analyses

8-36 Equipment Design Studies II
Thursday July 26 Room: Muscadet I 08:30 – 10:30
Session Chair: Hirofumi Takeda, Central Research Institute of Electric Power Industry, Japan

Development of Device for Detecting Helium Leak from Canister: Part 1 – Experiment on Temperature Behavior during Gas Leak from Canister of 1/4.5 Scale Cask Model
ICONE26-81477
Hirofumi Takeda1, Masanori Goto2
1. Central Research Institute of Electric Power Industry, Chiba, Japan; 2. Hitachizosen, Tokyo, Japan

Vapourisation and Condensation in the Feed-Water System in the Turbine Building: How the Phenomenon Arises and How it Can Be Avoided
ICONE26-81769
Thomas A. Probert
OKG AB, Oskarshamn, Sweden

The Effects of a Non-Condensable Gas on Pressurizer Insurge Transients under the High Pressure
ICONE26-81772
Bolong Wang, Weihua Li, Haijun Jia, Jun Li
Tsinghua University, Beijing, China

ALFRED Steam Generator Assessment: Design and Pre-Test Analysis of HERO Experiment
ICONE26-81824
Pierdomenico Lorusso1, Alessio Pesetti2, Mariano Tarantino3
1. University “La Sapienza”, Roma, Italy; 2. University of Pisa, Pisa, Italy; 3. ENEA C.R. Brasimone, Camugnano, Italy

Design and Distortion Analysis of Thermal-Hydraulics Test Facility for the Fuel Transfer Tube
ICONE26-81834
XiDao Mao1, Yang Liu2, Haijun Jia1, Qiang Guo1
1. China Nuclear Power Engineering Co., Ltd., Beijing, China; 2. Tsinghua University, Beijing, China

Evaluation of IET Facility Applicability on Simulating SBLOCA in Large-Scale Passive PWR Plant
ICONE26-82630
Haozheng Kong1, Bo Kuang1, Pengfei Liu1, Xia Lu1, Lifang Liu2, Bo Dong1, Yi Yao2
1. Shanghai Jiao Tong University, Shanghai, China; 2. State Power Investment Central Research Institute Nuclear Power Software Development Center, Shanghai, China

Computational Fluid Dynamics (CFD)

9-5 Heat Transfer
Thursday July 26 Room: Epernay I 08:30 – 10:30
Session Chair: Angel Papukchiev, Gesellschaft fuer Anlagen und Reaktorsicherheit (GRS) gGmbH, Germany

Experimental Validation of ANSYS CFX for Transient Flows with Heat Transfer in a Tubular Heat Exchanger
ICONE26-81104
Angel Papukchiev
Gesellschaft fuer Anlagen und Reaktorsicherheit (GRS) gGmbH, Garching, Germany
Mitigation Strategies for Beyond Design Basis Events

11-1 Core Cooling, Core Degradation and In-Vessel Melt Retention

Thursday July 26
Room Bourg | 08:30 – 10:30

Session Chair: Alexei Miasoedov, Karlsruhe Institute of Technology, Germany
Experimental Study on Flow Instability during Gravity-Driven Reflooding ICOME26-81736
Lili Tong1 Dandi Zhang1 Liqiang Hou2 Xiaoji Wang2
1. Shanghai Jiao Tong University, Shanghai, China; 2. Nuclear Power Institute of China, Chengdu, China

Reactor Core Cooling Performance of a Passive Endothermic Reaction Cooling System during Design and Non-Design Basis Accidents ICOME26-81896
Nathan R. Murray, Mitchell E. Sailsbery, Samuel E. Bischoff, Paul R. Wilding, Matthew J Memmott
Bingham Young University, Provo, UT, USA
Evaluation of the Kinetics of Molten Pool Stratification in Case of In-Vessel Melt Retention Strategy ICOME26-82243
Laure Carénéni, Florian Fichot
IRSN, Saint Paul lez Durance, France

A Revised Methodology to Assess In-Vessel Retention Strategy for High-Power Reactors ICOME26-82248
Florian Fichot1 Laure Carénéni1 Sevostian Bechta1 Walter Villanueva2
1. IRSN, St Paul lez Durance, France; 2. KTH, Stockholm, Sweden
Assessment of Scale-Down Models of SFR-RVCS ICOME26-82591
Koung Moon Kim1 Ji-Hwan Hwang2 Dong-Wook Jerng2 Ho Seon Ahn1
1. Incheon National University, Incheon, Korea; 2. Chung-Ang University, Seoul, Korea

Innovative Nuclear Power Plant Design and SMRs

13-3 Advanced Reactors I

Thursday July 26
Room Talbot | 08:30 – 10:30

Session Chair: Zhaocan Meng, State Power Investment Corporation Research Institute, China
Session Co-Chair: Hirota Noriaki, Japan Atomic Energy Agency, Japan
Comparative Study of Helium Turbine Brayton Cycle and Supercritical CO2 Brayton Cycle for HTGR ICOME26-81561
Gang Zhao1 Xiaoyang Yang1 Ping Ye2 Wei Peng1 Jie Wang2
1. Tsinghua University, Beijing, China; 2. INET, Tsinghua University, Beijing, China
A Concept of Intermediate Heat Exchanger for High-Temperature Gas Reactor Hydrogen and PowerCogeneration System ICOME26-81718
Hirota Noriaki1 Terada Atsuhiko1 Xing L. Yan1 Tanaka Kohei2 Otani Akihito2
1. Japan Atomic Energy Agency, Ibaraki-ken, Japan; 2. IHI Corporation, Yokohama, Japan
European Utility Requirements for Advanced LWR Issue of EUR Revision E and Ongoing Assessments  
Peter Chappell1 Guillaume Jacquart2 Olli Kymäläinen3 Giovanni Ferraro2  
1. EDF Energy, Bristol, United Kingdom; 2. EDF, DIPNN/SEPTEN, Lyon, France; 3. FORTUM, Helsinki, Finland

Status of District Heating Reactor and its Development Prospects in China  
Jing Zhao, Fei Xie, Zhihong Liu 
Tsinghua University, Beijing, China

Dynamic Modeling of the NSSS based on NHR200-II Nuclear Heating Reactor  
Zhe Dong, Yifei Pan, Miao Liu, Xiaojin Huang 
Tsinghua University, Beijing, China

Risk Assessments and Management  
14-2 Risk Assessment and Management II  
Thursday July 26  
Session Chair: Qinfang Zhang, Shanghai Nuclear Engineering Research & Design Institute, China  
Session Co-Chair: Meiru Liu, China Nuclear Power Engineering Co., LTD, China

A Review of Multi-Unit Nuclear Power Plant Probabilistic Risk Assessment Research  
Taotao Zhou, Mohammad Modarres, Enrique Droguett 
University of Maryland College Park, College Park, MD, USA

Evaluation of Core Damage Frequency of High Flux Engineering Test Reactor from Internal Events  
Jinlin Liu, Wanhong Wang, Changhong Peng, Yun Guo 
University of Science and Technology of China, Hefei, China

Study on Shutdown Fire PRA for Nuclear Power Plant  
Meiru Liu1 Qingnan Zhao1 Wei Dong1 Jinyan Du1 Lin Sun2  
1. China Nuclear Power Engineering Co., Ltd., Beijing, China; 2. Harbin Engineering University, Harbin, China

Design and Development of DeRisk: A Fault Tree Analysis Program Package  
Zhenxu Zhou, Hao Nie, Qin Zhang 
Tsinghua University, Beijing, China

Design and Development of the Platform for Significance Determination Process System for Nuclear Power Plant  
Qinfang Zhang1 Guoxu Zhang1 Zilong Wang2 Qi Dong1 Guofeng Tang3  
1. Shanghai Nuclear Engineering Research and Design Institute Co. Ltd., Shanghai, China; 2. CNNC Nuclear Power Operations Management Co. Ltd, Zhejiang, China

Computer Code Verification and Validation  
15-1 Methodologies, Protocols, and Strategies for Conducting V&V  
Thursday July 26  
Session Chair: Marco Lanfredini, GRNSPG-University of Pisa, Italy  
Session Co-Chair: Aaron Krueger, Texas A&M University, College Station, TX, United States

A Continuous Integration Platform for the Deterministic Safety Analyses Code System AC2  
Joachim Herb 
Gesellschaft für Anlagen- und Reaktorsicherheit (GRS) gGmbH, Garching bei München, Germany

Rigorous Code Verification: An Additional Tool to Use with the Method of Manufactured Solutions  
Aaron Krueger1 Vincent Mousseau2 Yassin Hassan2  
1. Texas A&M University, College Station, TX, USA; 2. Sandia National Laboratories, Albuquerque, NM, USA

Moving from V&V to V&V&C in Nuclear Thermal-Hydraulics  
Francesco D’Auria1 Marco Lanfredini2  
1. University of Pisa, Pisa, Italy; 2. GRNSPG-University of Pisa, Pisa, Italy

Two Stage Data Driven V&V for an Agile Thermohydraulic Analysis Method  
Christopher Bennett, Scott Adams, Nicholas Alexander 
Rolls-Royce, Derby, United Kingdom

The International Experimental Thermal Hydraulic Systems Database (TIETHYS): A New NEA Validation Tool  
Upendra Rohatgi1 James Dyrda2 Nicolas Soppera2  
1. Brookhaven National Laboratory, Upton, NY, USA; 2. Nuclear Energy Agency-OECD, Boulogne-Billancourt, France

Application of RELAP/SCDAPSIM/MOD4.1 to the Analysis of Advanced Reactor/Fluid Systems with Liquid Molten Salt in the Presence of Non-Condensable Gases  
Shuying Jiang1 Zheng Fu1 M. Perez-Ferragut2 Judith Hohorst1  
1. Innovative Systems Software, Idaho Falls, ID, USA; 2. Innovative Systems Software, Ammon, ID, USA
THURSDAY, 10:30 – 13:00

10:30 – 11:00

CHOBIS Suite, Ground Floor

COFFEE BREAK

11:00 – 13:00

TECHNICAL SESSIONS

Nuclear Fuel and Material, Reactor Physics and Transport Theory

2-11 Nuclear Fuel Safety and Performance Analysis III

Thursday July 26

Room Bourg | 11:00 – 13:00

Session Chair: Wenzhong Zhou, City University of Hong Kong, Hong Kong

Geometry Sensitivity of a CANDU Fuel Bundle on Dryout Power

ICONE26-81674

Joohwan Park, Jong Yeob Jung

KAERI, Taejon, Korea

Modeling for Gas Bubble Evolution in Nuclear Fuels

San-Qiang Shi, Zhihua Xiao

Department of Mechanical Engineering, Hong Kong, Hong Kong

Multiphysics Modeling of Thorium-Based (Th, U)O2 and (Th, Pu)O2 Fuel Performance in a Light Water Reactor

ICONE26-81237

Rong Liu, Jiejin Cai, Wenzhong Zhou, Ye Wang

1. South China University of Technology, Guangzhou, China; 2. City University of Hong Kong, Kowloon, Hong Kong

Preliminary Development of a TRISO Fuel Performance Analysis Code: FFAT

ICONE26-82242

Jian Li, Ding She, Lei Shi, Jing Zhao

Tsinghua University, Beijing, China

(1) An Era of Small and Medium Sized Reactors (SMRs) in Power Generation and Other Miscellaneous Use; (2) Evaluation of Triso Fuel Performance in PWRs

ICONE26-82645

Anwar Hussain, Amjad Nawaz

PIEAS, Islamabad, Pakistan

Experiences on Radioactive Materials Safe Transport in CIRP

ICONE26-82009

Jiangang Zhang, Guoqiang Li, Renze Wang, Hongchao Sun, Dajie Zhuang, Shuitang Sun, Dongyuan Meng

China Institute for Radiation Protection, Taiyuan, China

Plant Systems, Structures, Components, and Materials

3-13 Structural Materials

Thursday July 26

Room Chalon | 11:00 – 13:00

Session Chair: Carsten Schroer, Karlsruhe Institute of Technology (KIT), Germany

Session Co-Chair: Leon Cizelj, Jozef Stefan Institute, Slovenia

A Systematic Study of the Material Performance of Hot Isostatically Pressed Type 316L Stainless Steel Powder for the Civil Nuclear Sector

ICONE26-81438

William Kyffin, David Gandy, Barry Burdett

1. Nuclear AMRC, Rotherham, United Kingdom; 2. Electric Power Research Institute, Charlotte, NC, USA; 3. W B Burdett Associates, Truro, United Kingdom

Towards in situ Thermomechanical Property Monitoring during Ion Beam Irradiation: Benchmark Studies on Pure Copper

ICONE26-82014

Cody Dennett, Khalid Hatfar, Michael Short

1. Massachusetts Institute of Technology, Cambridge, MA, USA; 2. Sandia National Laboratories, Albuquerque, NM, USA

Quantifying Radiation Damage in Materials using Stored Energy Fingerprints

ICONE26-82403

Charles Hirst, Rachel Connick, Penghui Cao, Kangpyo So, R. Scott Kemp, Michael Short

Massachusetts Institute of Technology, Cambridge, MA, USA

Welded Joint Evaluation for Chromium Controlled Carbon Steel Piping to Improve FAC Resistance

ICONE26-81913

Yoshio Uemoto, Takahiro Kawabe, Hiroyuki Shibata, Shoh Tarasawa, Hiroshi Asano, Junya Kaneda

Hitachi-GE Nuclear Energy, Ltd., Hitachi-shi, Japan

Oxidation Behaviors of Titanium Hydride and its Effect on the Desorption of Hydrogen

ICONE26-82271

Lei Wang, Mingwong Ma, Binghua Tang

Institute of Electronic Engineering, China Academy of Engineering Physics, Mianyang, China

Comparison of the Oxide Films Formed on 308L and 309L Cladding Alloys in Simulated Pressurized Water Reactor Primary Water Environments

ICONE26-82662

Zhanpeng Lu, Qi Xiong

1. Shanghai University, Shanghai, China; 2. Shanghai University, School of Materials Science and Engineering, Shanghai, China

Nuclear Safety, Security, and Cyber Security

6-9 Radioactive Material Transport and Management

Thursday July 26

Room Epernay | 11:00 – 13:00

Session Chair: Kazuyuki Demachi, University of Tokyo, Tokyo, Japan

Session Co-Chair: Dongyuan Meng, China Institute for Radiation Protection, Taiyuan, Shanxi, China

Identification of Gas Accumulation Susceptibility in NPP’s Safety Related Systems and Operability Evaluation due to Gas Transportation

ICONE26-81074

Pei-Hsun Huang, Zhen-Yu Hung, Chao-Jen Li

Industrial Technology Research Institute, Hsinchu, Taiwan
Facilities and Experience on Impact Test of Packages for Radioactive Materials Transport

Guoqiang Li, Daijie Zhuang, Xuexin Wang, Dongyuan Meng, Jiangang Zhang, Hongchao Sun, Shutang Sun, Anping Ma
China Institute for Radiation Protection, Taiyuan, China

Preliminary Design of Unloading Device for MNSR LEU Conversion

Hao Qian, Yiguo Li, Peng Dan, Wu Xiaobao, Lu Jin, Hong Jingyan, Jinhua Zhang, Mengjiao Wang
China Institute of Atomic Energy, Beijing, China

Vibration Reduction Design for Radiation Material Transport Package with Finite Element Method

Dongyuan Meng, Shutang Sun, Hongchao Sun, Guoqiang Li, Lei Chen
China Institute for Radiation Protection, Taiyuan, China

Tests of the Package for the Transport of Natural Uranium Hexafluoride

Hongchao Sun, Guoqiang Li, Daijie Zhuang, Shutang Sun, Dongyuan Meng, Yiren Lian, Chen Lei, Jiangang Zhang
China Institute for Radiation Protection, Taiyuan, China

Segmented 3D Scanning Device and its Experimental Research

Suxia Hou, Chen Chen, Quanhu Zhang, Xianghua Su, Wenming Zuo
Xi'an High-tech Research Institute, Xi'an, China

Nuclear Safety, Security, and Cyber Security

6-10 Security of SMRs and Advanced Reactors II

Thursday July 26
Room Bouzy I 11:00 – 13:00

Session Chair: Hongxing Yu, Nuclear Power Institute of China, Chengdu, Sichuan Province, China
Session Co-Chair: Munemichi Kawaguchi, Japan Atomic Energy Agency, Tsuruga-shi, Japan

Evaluation Method of Response Reliability during an Accident and its Applicability to Fast Reactor Plants

Masaaki Suzuki1 Kazuyuki Demachi2
1. Tokyo University of Science, Chiba, Japan; 2. The University of Tokyo, Tokyo, Japan;
3. Japan Atomic Energy Agency, Ibaraki, Japan

Hangers and Supports Fault Analysis of High Temperature Sodium Pipelines for Sodium-Cooled Fast Reactor

Changzhi Xiao, Yuan Lu
China Institute of Atomic Energy, Beijing, China

Discussion About Sodium-Concrete Reaction in Presence of Internal Heater

Munemichi Kawaguchi1 Miyahara Shinya2 Uno Masayoshi2
1. Japan Atomic Energy Agency, Tsuruga-shi, Japan; 2. University of Fukui, Tsuruga-shi, Japan

Numerical Simulation of Debris Bed Relocation Behavior in Sodium-Cooled Fast Reactor

Chunming Teng, Bin Zhang, Jianqiang Shan
Xi'an Jiao Tong University, Xi'an, China

Tritium Transport Characteristics Analysis in Molten Salt Reactor under Transient Conditions

Hao Qin1 Chenglong Wang2 Suizheng Qiu2
1. Xi'an Jiao Tong University, Xi'an, China; 2. School of Nuclear Science and Technology, Xi'an Jiao Tong University, Xi'an, China

Sensitivity Analysis of Burnup Performance and Pu Mass Balance by Changing Core and Blanket Fuel Design of SFR for Flexible Pu Management Options

Rie Fujikawa1 Hiroshi Saga1 Chi Young Han2
1. Tokyo Institute of Technology, Tokyo, Japan; 2. Tokyo Institute of Technology, Meguro-ku, Japan

Thermal-Hydraulics and Safety Analyses

8-27 Boiling Heat Transfer and Behavior II

Thursday July 26
Room Alsace I 11:00 – 13:00

Session Chair: Roman Mukin, Paul Scherrer Institute, Switzerland

Sensitivity of CTF Solution to Subchannel Window Size

Roman Mukin1 Ivar Clifford1 Marcus Seidl1 Hakim Ferroukhi3
1. Paul Scherrer Institute, Villigen, Switzerland; 2. PreussenElektra GmbH (former E.ON Kernkraft GmbH), Hannover, Germany; 3. Paul Scherrer Institut / Laboratory for Reactor Physics and Systems Behaviour, Villigen, Switzerland

On the Liquid Film Flow Characteristics during the Rewetting in the Single Rod Air-Water System

Yuki Wada1 Dan Le2 Akira Satou1 Shibamoto Yasutomo2 Taisuke Yonomoto3
3. Japan Atomic Energy Agency, Naka, Japan

A Brief Review of Computational Intelligence Techniques for Critical Heat Flux Prediction

Botao Jiang1 Yanni Liu2
1. Xi'an Polytechnic University, China; 2. Xi'an Jiao Tong University, Xi'an, China

Experimental Investigation on Critical Heat Flux from Downward-Facing Flat Plate for Different Orientation Angles

Kuanghan Deng1 Yan Zhang1 Chenglong Wang1 Yaping Zhang1 Wenxi Tian1 Guanghui Su1 Suizheng Qiu1 Yun Wang3
1. Xi'an Jiao Tong University, Xi'an, China; 2. School of Nuclear Science and Technology, Xi'an Jiao Tong University, Xi'an, China; 3. Nuclear Power Institute of China, Chengdu, China

Experimental Study on the Critical Heat Flux of Nanofluid Flow Boiling under Different Conditions

Yun Wang1 Kuanghan Deng2 Junmei Wu1 Nina Yue1
1. Xi'an Jiao Tong University, Xi'an, China; 2. School of Nuclear Science and Technology, Xi'an Jiao Tong University, Xi'an, China

Transient Boiling and Cross Flow in 5x5 Rod Bundle with Rapid Heating

Hiroti Takiguchi1 Masahiro Furuya1 Takahiro Arai2 Kenetsu Shirakawa2
1. Central Research Institute of Electric Power Industry, Yokosuka, Japan;
2. Central Research Institute of Electric Power Industry, Kanagawa, Japan
Thermal-Hydraulics and Safety Analyses

8-28  Supercritical Fluids II

Thursday July 26  Room Muscadet  11:00 – 13:00

Session Chair: Shenghui Liu, Nuclear Power Institute of China, China

Analysis of Unsteady Flow in a Supercritical Carbon Dioxide Radial Compressor Stage  ICONE26-82183
Can Ma, Wei Wang, Jun Wu, Lu Dai
Wuhan Second Ship Design and Research Institute, Wuhan, China

An Experimental Study on a Straight-Channel Printed Circuit Heat Exchanger for Supercritical CO₂ Power Cycle Applications  ICONE26-81588
Aiwei Xu, Yanping Huang, Junfeng Wang
Nuclear Power Institute of China, Chengdu, China

Investigation of Supercritical CO₂ Thermal Hydraulic Characteristics in a Printed Circuit Heat Exchanger  ICONE26-81581
Wen Fu, Xizhen Ma, Peiyue Li, Minghui Zhang, Sheng Li
Luoyang Ship Material Research Institute, Luoyang, China

Numerical Investigation of Buoyancy Effect on Forced Convective Heat Transfer to Supercritical Carbon Dioxide Flowing in a Heated Tube  ICONE26-81450
Shenghui Liu, Yanping Huang, Guangxiu Liu, Junfeng Wang
Nuclear Power Institute of China, Chengdu, China

Thermal-Hydraulics and Safety Analyses

8-31  Thermal-hydraulic Modeling: 1st Principle Physics and Correlations II

Thursday July 26  Room Fronsac  11:00 – 13:00

Session Chair: Atsushi Kodama, Mitsubishi Heavy Industries, Ltd., Japan

Numerical Study on Streamwise Vorticity and Entrainment Enhancement of a Round Jet  ICONE26-81794
Bangming Li¹ Qi Xiao² Yong Li¹ Xu Hu¹ Wei Wang³
¹. Key Lab. on Steam Power System, Wuhan Second Ship Design and Research Institute, Wuhan, China; ². Wuhan Second Ship Design and Research Institute, Wuhan, China

Impairment of Local Heat Transfer of the Turbulent Mixed Convection in a Vertical Flat Plate  ICONE26-82010
Myeong-Seon Chae, Bum-Jin Chung
Kyung Hee University, Yongin-si, Korea

Development of Evaluation Method for Thermal Stratification by Cavity Flow in a Vertical Branch Pipe with Elbow and Horizontal Section: Experimental Results  ICONE26-81143
Atsushi Kodama, Yoshiteru Komuro, Keichi Hori,
Hironori Noguchi, Yoshiyuki Kondo, Koichi Tanimoto
Mitsubishi Heavy Industries, Ltd., Hyogo, Japan

Atsushi Kodama, Yoshiteru Komuro, Keichi Hori,
Hironori Noguchi, Yoshiyuki Kondo, Koichi Tanimoto
Mitsubishi Heavy Industries, Ltd., Hyogo, Japan

Analysis and Parallel Implementation of Transient Thermal Feedback in Neutron Kinetics Calculation  ICONE26-81442
Pingzhou Ming, Zhigang Li, Ping An, Wei Lu, Dong Liu, Hongxing Yu
Nuclear Power Institute of China, Chengdu, China

Developing an Accident Tolerant Fuel for Water-Cooled Reactors: Numerical Simulation and Validation of Natural Convection Heat Transfer and Transport in Packed Beds of Heated Microspheres  ICONE26-82456
Olgubenga O Noah, Johan Slabber, Josua P Meyer
University of Pretoria, Pretoria, South Africa

Thermal-Hydraulics and Safety Analyses

8-33  Modeling NPPs Using System Analysis Software II

Thursday July 26  Room Reims  11:00 – 13:00

Session Chair: Pavel Kral, UJV Rez (NRI), Czech Republic

Thermal Hydraulic Analyses for PTS Evaluation: Comparison of Temperature Fields at RPV Predicted by System TH Code and CFD Code  ICONE26-81007
Pavel Kral, Ladislav Vyskocil
UJV Rez (NRI), Husinec - Rez, Czech Republic

Effect of Ocean Conditions on Neutronic/Thermal-Hydraulic Coupling of IPWR  ICONE26-81080
Genglei Xia
Harbin Engineering University, Harbin, China

Probable Causes of Unexpected Multiple Destructions of Heat Exchanger Tubes of Some Low Pressure Reheaters on Nuclear Power Plants with VVER-1000  ICONE26-81083
Mikhail Gotovsky, Alexander A. Lanin, Vladimir E. Mikhailov,
Yuri G. Sukhorukov, Nikolay N. Trifonov
Polzunov Institute, Saint Petersburg, Russia

Research on Steam Generator False Water Level Calculation Improvement for PWR NPP Simulation Program  ICONE26-81128
Junying Hong¹ Zhao Xu²
¹. CNPE, Beijing, China; ². CNNC China Nuclear Power Engineering Co., Ltd.,
Beijing, China

A Simulation of Small Break Loss of Coolant Accident in Nuclear Heating Reactor based on RELAP5  ICONE26-81416
Meng Lu, Heng Xie
Tsinghua University, Beijing, China

Thermal Hydraulic Analysis of Pressurized Thermal Shock for Loviisa NPP using Apros Simulation Code  ICONE26-81558
Gintaras Zemulis¹ Pasi Junninen² Petri Kyömmäki³
¹. Fortum Power and Heat Oy, Espoo, Finland; ². Platom Oy, Mikkeli, Finland;
³. Fortum Power and Heat Oy/Loviisa NPP, Loviisa, Finland
Computational Fluid Dynamics (CFD)

9-9  Phase Change
Thursday July 26  Room Cremant | 11:00 – 13:00
Session Chair: Susumu Yamashita, Japan Atomic Energy Agency, Japan
Session Co-Chair: Gregory M. Cartland-Glover, Science and Technology Facilities Council, Scientific Computing Department, United Kingdom

Modelling Frozen Salt Films in a Molten Salt Fast Reactor
ICONE26-82210
Gregory M. Cartland-Glover1 Stefano Rolfo1 Dzianis Litskevich2
Alex Skil len2 David Emerson2 Bruno Merk2 Charles Moulinec1
1. Science and Technology Facilities Council, Scientific Computing Department, Warrington, United Kingdom; 2. STFC Daresbury Laboratory, Warrington, United Kingdom

CFD Analysis on Wall Boiling Model during Subcooled Boiling in Vertical Narrow Rectangular Channel
ICONE26-81554
Tingting Ren, Changyi Yan, Meiyue Yan, Shengli Yu
Harbin Engineering University, Harbin, China

CFD Modeling of Condensation inside Emergency Condensers of Passive Heat Removal Systems
ICONE26-81846
Amirhossein Moonesin Shabestary, Dirk Lucas, Eckhard Krepper
Helmholtz-Zentrum Dresden - Rossendorf, Dresden, Germany

Development of Numerical Simulation Method to Evaluate Molten Material Behaviors in Nuclear Reactors: Estimation of Fuel Debris Distribution in the Pedestal
ICONE26-82088
Susumu Yamashita, Hiroyuki Yoshida
Japan Atomic Energy Agency, Tokai-Mura, Japan

Validation of a CFD Code for the Analysis of Hydrogen Behaviors and Thermal Hydraulics in Containments
ICONE26-82192
Meilan Chen1 Zeming Zheng2
1. China Nuclear Power Technology Research Institute, Shenzhen, China; 2. Sun Yat Sen University, Guangzhou, China

CFD Simulations of Aerosol Dispersion and Agglomeration during the Laser Cutting of Fukushima Fuel Debris Simulants
ICONE26-82408
Thomas Gelain1 Emmanuel Porcheron1 Christophe Chagnot2 Damien Roulet3
1. IRSN, GIF sur Yvette, France; 2. CEA, GIF sur Yvette, France; 3. CEA, GIF sur Yvette, France

Decontamination & Decommissioning, Radiation Protection, and Waste Management

10-3  Decommissioning and Sources
Thursday July 26  Room Mouton Cadet | 11:00 – 13:00
Session Chair: Naoko Watanabe, Hokkaido University, Japan
Session Co-Chair: Giorgio Locatelli, University of Leeds, United Kingdom

iDROP: An Innovative Software Program to Design Nuclear Decommissioning Scenarios
ICONE26-81147
Caroline Chabal1 Vincent Perrot1 Mehdi Ben Mosbah1
Yves Soulabaie2 Jean-Claude Thieblemont2
Fabien Chaffard2 Yann Chevalier1 Laurent Chodorge1
1. CEA DEN, Bagneols sur Ceze, France; 2. CEA, Bagneols sur Ceze, France; 3. CEA, GIF sur Yvette, France

Applying Statistics to Improve the Performance of Nuclear Decommissioning Projects
ICONE26-81428
Diletta Colette Invernizzi, Giorgio Locatelli, Naomi J Brookes
University of Leeds, Leeds, United Kingdom

Cost Analysis for Decommissioning of Nuclear Power Plants with Uncertainties
ICONE26-82572
Naoko Watanabe1 Ryohi Miyoshi1 Tamotsu Kozaki1
Shingo Tanaka2 Satoshi Yanagihara2
1. Hokkaido University, Sapporo, Japan; 2. University of Fukui, Tsu numa-shi, Japan

Modelling on Source Term Calculation of Sodium Fast Reactor in Severe Accident and Normal Operating Condition
ICONE26-81241
Fenglong Wang
IAE, Beijing, China

An Inverse Method to Estimate Emission Rates of Multi-Radionuclides based on an Ensemble 4DVar Method with Local Gamma Dose Rate Measurements
ICONE26-81609
Xiaobing Geng, Mei Xu, Biao Yuan, Lijun Zhang
Institute of NBC Defense, PLA Army, Beijing, China

R&D Status on Safety Regulation related to Decommissioning of Nuclear Facilities in Korea
ICONE26-81678
Jungjoon Lee, Kyungwoo Choi
Korea Institute of Nuclear Safety, Daejeon, Korea

Innovative Nuclear Power Plant Design and SMRs

13-4  Advanced Reactors II
Thursday July 26  Room Talbot | 11:00 – 13:00
Session Chair: Hirota Noriaki, Japan Atomic Energy Agency, Japan

Extended Ultimate Response Measures for Offshore Nuclear Power Plant under Barge-Reactor Coupled Conditions
ICONE26-81159
Jue Wang1 Longze Li1 Chen Hu1 Wang Cong2
1. Wuhan Ship Design and Research Institute, Wuhan, China; 2. Naval University of Engineering, Wuhan, China

Preliminary LOCA Analysis of Heating-Reactor of Advanced Low-pressurized and Passive Safety System (HAPPY)
ICONE26-81271
Mian Xing, Zhaocun Meng, Xiaotao Liao, Canhui Sun, Shuming Zhang
State Power Investment Central Research Institute, Beijing, China

A Multi-Objective Optimization of the Reactor Power Plant
ICONE26-82239
Lei Chen1 Jia Zhen1 Wang Cong2 Gong Zili1 Yi Liao1 Chen Hu1
1. Wuhan Ship Design and Research Institute, Wuhan, China; 2. Naval University of Engineering, Wuhan, China

iB1350: Part 1 - A Generation III.7 Reactor iB1350 and Defense in Depth (Dd)
ICONE26-82428
Takashi Sato1 Keiji Matsumoto1 Kenji Hosomi1 Keisuke Taguchi1

iB1350: Part 2 - Level 1 PRA Considering Optimization of Safety Systems for the iB1350
ICONE26-82552
Go Tanaka, Takashi Sato, Yui Komori, Keiji Matsumoto
Toshiba Energy Systems & Solutions Corporation, Yokohama, Japan
CFD Validation with a PIV Provided Experimental Data for the Coolant Velocity Measurement in Reactor Vessel Down-Comer
Abdelgadir Eltayeb, Sichao Tan, Ayodeji A. Alaa, Nisrene M. Ahmed, Zhang Qi
Harbin Engineering University, Harbin, China

JSNT-S: A Parallel 3D Discrete Ordinates Radiation Transport Code on Structured Mesh
Tangpei Cheng1 Zeyao Mo2 Chao Yang2 Lili Wen2 Li Deng2
1. CAEP Software Center for High Performance Numerical Simulation, Beijing, China; 2. Institute of Applied Physics and Computational Mathematics, Beijing, China

Simulation of JAERI Downcomer Effective Water Head Experiments with WCOBRA/TRAC-TF2
Jeffrey Kobelak, Jun Liaa, Katsuhiko Ohkawa
Westinghouse Electric Company, Cranberry Twp., PA, USA

Thursday July 26
Room Chalon | 14:00 – 16:00

Technical Sessions

Plant Systems, Structures, Components, and Materials

3-3 Design Analyses I

Thursday July 26
Room Chalon | 14:00 – 16:00

Session Chair: Asif Arastu, Unisont Engineering, Inc., USA
Session Co-Chair: Ziduan (Joshua) Shang, Shanghai Nuclear Engineering R & D Institute (SNERDI), China

Study on the Mechanism and Characteristics of Transient Noise of the Steam Discharge Pipes
Lu Dai, Zhiguo Wei, Jun Wu, Yong Liu, Can Ma, Qi Xiao
Wuhan Second Ship Design and Research Institute, Wuhan, China

Design of the Sampling Measurement and Radiochemistry Lab in the Nuclear Island of HTR-PM
Mengqi Lou1 Wengen Li1 Feng Xie2 Jianzhu Cao3
1. Tsinghua University, Beijing, China; 2. Institute of Nuclear and New Energy Technology, Tsinghua University, Beijing, China; 3. Chinergy Company, LTD, Beijing, China

A Recommended Method for SC Wall Design-Evaluation Regarding the Elasto-Plastic Behavior under Beyond Design Basis Seismic Loading
Ziduan (Joshua) Shang, Xiaohua Yang, Yuguang Sun, Meng Chu
Shanghai Nuclear Engineering R & D Institute (SNERDI), Shanghai, China

The Design and Research on Steam Dump Valve in Turbine By-Pass System-A of ACP1000
Hou Ting, Yu Pei
China Nuclear Power Engineering Co., Ltd., Beijing, China

Thursday July 26
Room Cognac | 11:00 – 13:00

Session Chair: Ge Shiao, Shanghai Nuclear Engineering Research & Design Institute Co. Ltd, China

Dynamic Fault Tree Analysis based on Dynamic Uncertain Causality Graph
Zhenzu Zhou, Chunling Dong, Qin Zhang
Tsinghua University, Beijing, China

A PSA Case Study: Promoting the Reliability of the CRSS on the CMRR through the ATWS Mitigation System
Heng Yu, Guan-bo Wang, Da-zhi Qian, Yu-chuan Guo, Bo Hu
China Academy of Engineering Physics, Mianyang, China

The Necessity of Independent Configuration of the DC Power Supply System Used for Power Supply and Auxiliary Power Supply in Nuclear Power Plant
Zhang Zhichao
State Nuclear Power Demonstration Plant Co., Ltd, Rongcheng, China

Reliability Prediction for the Squib Valve of Advanced Passive PWR by Hardened Test Method
Ge Shiao, Qinfang Zhang
Shanghai Nuclear Engineering Research & Design Institute Co. Ltd, Shanghai, China

Incorporation of the Radioactive Interinfluence in Multi-Unit Seismic PRA
Shuhei Matsunaka1 Chikahiro Sato2 Manabu Watanabe3

Computer Code Verification and Validation

15-2 V&V of High Fidelity Numerical Tools

Thursday July 26
Room Lalande | 11:00 – 13:00

Session Chair: Timothy Valentine, Oak Ridge National Laboratory, USA
Session Co-Chair: Tangpei Cheng, CAEP Software Center for High Performance Numerical Simulation, China

OECD-NEA Expert Group on Multi-Physics Experimental Data, Benchmarks and Validation
Timothy Valentine1 Kostadin Ivanov2 Maria Avramova2 Alessandro Petruzzi3 Jean-Pascal Hudelot4 Upendra Rohatgi1 Kiri Velkov6
1. Oak Ridge National Laboratory, Oak Ridge, TN, USA; 2. North Carolina State University, Raleigh, NC, USA; 3. Nuclear and Industrial Engineering (NINE), Lucca, Italy; 4. CEA Cadarache, Saint Paul Lez Durance, France; 5. Brookhaven National Laboratory, Upton, NY, USA; 6. GRS, Garching bei München, Germany

A Discontinuous Finite Method for Neutron Transport Equations on 3-D Unstructured Grids
Junxia Wei, Shulin Yang
Institute of Applied Physics and Computational Mathematics, Beijing, China

Assessment of Time and Space High-Order Schemes for Two-Fluid Seven-Equation Two-Pressure Model using the Reversed Water Faucet Problem
Fei Chao, Jiangan Shang, Junli Gou, Pan Wu, Li Ge
Xi’an Jiao Tong University, Xi’an, China
Eulerian Two-Fluid Model for Aerosol Removal in Filtered Containment Venting Scrubbers
ICONE26–81506
Ji-Su Kim1 Jong Woon Park2 Minkyung Kim1
1. Dongguk University, Gyeongju, Korea; 2. Dongguk University, Dept. Nuclear & Energy Eng., Gyeongju, Korea

Advanced Reactors and Fusion Technologies
5–6 Fission Reactors Design and Analyses II
Thursday July 26
Room Bouy | 14:00 – 16:00
Session Chair: Rosa Lo Frano, Università di Pisa, Italy
Session Co-Chair: Jovica Riznic, Canadian Nuclear Safety Commission, Canada
The EUR Assessment Process and Highlights of the Compliance Analysis for the EU-APR Standard Design
ICONE26–81889
Cédric Declercq1 Andrew Ballard2 Giovanni Ferraro1 Anicet Touré1
1. Tractebel ENGIE, Brussels, Belgium; 2. Tractebel ENGIE, Manchester, United Kingdom; 3. EDF, DIPIN/SEPTEN, Lyon, France
An Instrument Established for the High Temperature Measurement of Ultraviolet-Visible Absorption Spectra of Molten Fluoride Salt Behaving As Coolant in the Molten Salt Reactor
ICONE26–82013
Hongtao Liu, Yiyang Liu, Tao Su
Shanghai Institute of Applied Physics (SINAP), Chinese Academy of Sciences (CAS), Shanghai, China
Development of Oxygen Sensors for Large HLM-Pool Reactor Systems
ICONE26–82232
Serena Bassini, Ivan Di Piazza, Mariano Tarantino
ENEA C.R. Brasimone, Camugnano, Italy
Thermal-Hydraulic Evaluation of Design Concept of Containment Pressure and Radioactivity Suppression System (CPRSS) for SMR
ICONE26–82671
Kyung Jun Kang1 Ji-Han Chun1 Han-Ok Kang1
Seong Su Jeon2 Soon-Joon Hong1
1. Korea Atomic Energy Research Institute, Daejeon, Korea; 2. FNC Technology, Yongin-si, Korea, 3. FNC Technology Co., Ltd., Gyeonggi-Do, Korea
Design and Safety Features Analysis of the 2MW Chinese Thorium Molten Salt Test Reactor TMSR-LF1
ICONE26–82689
Chong Zhou
Shanghai Institute of Applied Physics, Chinese Academy of Sciences, Shanghai, China

Nuclear Safety, Security, and Cyber Security
6–7 Nuclear Accidents II
Thursday July 26
Room Epernay | 14:00 – 16:00
Session Chair: Mohammad Pourgol Mohammad, Independent Consultant, Boston, MA, USA
Session Co-Chair: Deyang Xu, China Nuclear Power Technology Research Institute, Shenzhen, China
Development of Experimental Technology for Simulated Fuel-Assembly Heating to Address Core-Material-Relocation Behavior during Severe Accident
ICONE26–81411
Yuta Abe1 Yamashita Takuya2 Ikken Sato2
Toshio Nakagiri1 Akihiro Ishimi1 Yuki Nagae2
1. Japan Atomic Energy Agency, Oarai-machi, Japan; 2. Japan Atomic Energy Agency, JAERI, Oarai-machi, Japan
Preliminary Hazard Analysis of Uranium Hexafluoride Accident
ICONE26–81956
Chen Lei, Jiangang Zhang, Guoqiang Li, Shutang Sun, Dongyuan Meng, Ning Wang
China Institute for Radiation Protection, Taiyuan, China
LBLOCA Initiated Emergency Condition Analysis for a China Three-Loop PWR
ICONE26–81960
Ning Wang, Chen Lei, Jiangang Zhang, Yapeng Yang, Xiaoxiao Xu, Zongyang Feng, Linsheng Jia
China Institute for Radiation Protection, Taiyuan, China
Analysis of Hydrogen Source Term in Severe Accidents
ICONE26–82162
Deyang Xu, Meilan Chen
China Nuclear Power Technology Research Institute, Shenzhen, China
Study of Leakage Location for a Dry Storage of Spent Fuel under Accident Condition by Simulation of Radionuclide Diffusion
ICONE26–82606
Liwei Chen, Tao He, Chunhua Chen
Key Laboratory of Neutronics and Radiation Safety, Institute of Nuclear Energy Safety Technology, Hefei, China

Thermal-Hydraulics and Safety Analyses
8–3 Severe Accident Experiments and Analyses I
Thursday July 26
Room Mouton Cadet | 14:00 – 16:00
Session Chair: Guanghui Su, Xi’an Jiaotong University, China
Experimental Investigation on Steam Jet Condensation in Subcooled Water through Double Nozzle
ICONE26–81118
Weichao Li, Zhaoming Meng, Zhongning Sun, Jiaqing Liu
Harbin Engineering University, Harbin, China
Three-Dimensional Numerical Study on Pool Stratification Behavior in Molten Corium-Concrete Interaction (MCCI) with MPS Method

Xin Li1 Ikken Sato2 Akfumi Yamaji3 Guangtao Duan4

Simulation of Hydrogen Distribution due to In-Vessel Sear Accident in WWER-1000 NPP CONTAINment: A Comparison of CONTAIN and MELCOR Codes Results

Omid Noroozkhorravan, Massimiliano Gelino
Cardiff University, Cardiff, United Kingdom

Severe Accident Analysis with Spatial Discretized Model by MAAP: Part 1 - Parametric Study on Fukushima-Daiichi Unit-2

Kenichi Kanda1 Yoshihisa Nishi1 Kazuma Abe1 Satoshi Nishimura2 Koichi Nakamura3 Masahiro Furuya4 Atsushi U1
1. Central Research Institute of Electric Power Industry, Tokyo, Japan; 2. Central Research Institute of Electric Power Industry, Kanagawa, Japan; 3. Central Research Institute of Electric Power Industry, Yokosuka, Japan

Study on Thermal-Hydraulics Characteristics of the Flat and High-Thermal-Conductivity Core-Catcher

Daiki Takeyama1 Chikako Iwaki2 Mika Tahara1 Yoichi Onitsuka2
1. Toshiba Corporation, Yokohama, Japan; 2. Toshiba Energy Systems & Solutions Corporation, Yokohama, Japan

Severe Accident Analysis with Spatial Discretized Model by MAAP: Part 2 - Parametric Study on Fukushima-Daiichi Unit-3

Yoshihisa Nishi1 Kenichi Kanda1 Kazuma Abe1 Satoshi Nishimura2 Koichi Nakamura3 Masahiro Furuya4 Atsushi U1
1. Central Research Institute of Electric Power Industry, Tokyo, Japan; 2. Central Research Institute of Electric Power Industry, Kanagawa, Japan; 3. Central Research Institute of Electric Power Industry, Yokosuka, Japan

Thermal-Hydraulics and Safety Analyses

8-29 Thermal-hydraulic Experiments II

Thursday July 26 Room Alsace | 14:00 – 16:00

Session Chair: Yingwei Wu, Xi’an Jiaotong University, China

X-Ray CT Visualization of Boiling Two-Phase Flow and Precipitation Profile of Sea Water and Borated Water in 5x5 Heated-Rod Bundle

Masahiro Furuya1 Hiroki Takiguchi1 Takahiro Arai2 Riichiro Okawa1
1. CRIEPI, Yokosuka, Japan; 2. CRIEPI, Kanagawa, Japan

An Experimental Study of Liquid Flooding in Vertical Large Scale Rectangular Channel with the Counter-current Flow of Air and Water Film

Kashuai Du, Po Hu, Shuwei Zhai, Xiaojie Yang, Weibo Wang
Shanghai Jiao Tong University, Shanghai, China

Time-Resolved Velocity Measurements in a Matched Refractive Index Facility of Randomly Packed Spheres

Ethan Kappes1 Thien D. Nguyen2 Mateusz Marciniak3 Stephen King4 Yasins Hassan5 Victor Ugaž6 Andrew Mills1 Robert Muyskens7
1. Texas A&M University, College Station, TX, USA; 2. Texas A&M Nuclear Engineering, College Station, TX, USA

Thermal-Hydraulics and Safety Analyses

8-32 Thermal-Hydraulic Modeling: 1st Principle Physics and Correlations III

Thursday July 26 Room Fronsac | 14:00 – 16:00

Session Chair: John Crepeau, University of Idaho, USA

The Effect of Functional Spacers on the Liquid Film Thickness and Dryout in a BWR Fuel Bundle Model

Christian Bolesch1 Lukas Robers1 Robert Zboray2 Horst-Michael Prasser3
1. ETH Zurich, Zürich, Switzerland; 2. Pennsylvania State University, University Park, PA, USA

Study on the Influence of the Heating Condition on the Pressure Drop Characteristics of the Two-Phase Flow in the Circular Tube

Tianzhou Xie, Jianjun Xu, Bingde Chen, Wei Bao
Nuclear Power Institute of China, Chengdu, China

Fourier-Bessel Series Model for the Stefan Problem with Internal Heat Generation in Cylindrical Coordinates

Lyudmyla Barannyk1 John Crepeau2 Patrick Paulus3 Ali Siahpush8
1. University of Idaho, Moscow, ID, USA; 2. Southern Utah University, Cedar City, UT, USA

Countercurrent Flow Limitation at Sharp-edged Upper End in Vertical Pipes

Michio Murase1 Koji Nishida2 Akio Tomiyama3

Interfacial Drag Force Improvement in Two-fluid Model

Longxiang Zhu, Jianqiang Shan
Xi’an Jiao Tong University, Xi’an, China

First Attempt to Determine a Critical Heat Flux Correlation for Thermalhydraulic System Codes

Christopher Herer, Antoine Lejosne
IRSN, Fontenay Aux Roses, France
Thermal-Hydraulics and Safety Analyses

8-35   Modeling NPPs Using System Analysis Software IV

Thursday July 26  Room Reims | 14:00 – 16:00
Session Chair: Kai Kosowski, PreussenElektra GmbH (former E.ON Kernkraft GmbH), Germany

External Hazard Coinciding with Small Break LOCA Thermohydraulic Calculation with System Code ATHLET
ICONE26-81815
Kai Kosowski, Marcus Seidl
PreussenElektra GmbH (former E.ON Kernkraft GmbH), Hannover, Germany

Feasibility Assessment of Air-Cooling System as an Ultimate Heat Sink of the ATOM System
ICONE26-81845
Doyoung Shin¹ Gwang Hyeok Seo¹ Min Wook Na¹
Sung Joong Kim¹ Yonghee Kim² Jeongik Lee²
¹. Hanyang University, Seoul, Korea; ². Korea Advanced Institute of Science and Technology, Daegu, Korea

Assessment of RELAP/SCDAPSIM for Turbine Trip Transient in NuScale-SMR
ICONE26-81861
Katarzyna Skolik¹ Anuj Trivedi² M. Perez-Ferragut² Chris Allison²
¹. AGH University of Science and Technology, Cracow, Poland; ². Innovative Systems Software, Ammon, ID, USA

Bleed and Feed Analysis for Loss of Secondary Heat Sink to Support the Development of EOIs
ICONE26-81933
Changjiang Yang, Shuliang Huang, Jingxiang Zhan
China Nuclear Power Engineering Co., Ltd., Beijing, China

Development of Self-Reliant Thermal Hydraulic and Safety Analysis Software for NPP Design
ICONE26-82031
Yu Liu, Jian Deng, Junjie Pan, Zongjian Lu
Nuclear Power Institute of China, Beijing, China

Hydrodynamic Loads Calculation of Pressurizer Safety Valve Discharge Piping using RELAP / SCDAPSIM
ICONE26-82035
Shuying Jiang, Zheng Fu, Judith Hohorst
Innovative Systems Software, Idaho Falls, ID, USA

The Choose of Decay Heat Removal Systems of SFR
ICONE26-81563
Nina Yue¹ Rong Cai¹ Yun Wang¹ Suizheng Qiu² Dalin Zhang³
¹. Nuclear Power Institute of China, Chengdu, China; ². School of Nuclear Science and Technology, Xi'an Jiao Tong University, Xi'an, China; ³. Xi'an Jiao Tong University, Xi'an, China

Effects of Pump Transient Characteristic Model on Safety Analysis of Sodium-Cooled Fast Reactor
ICONE26-82497
Young-Min Kwon, Bao Truong
TerraPower LLC., Bellevue, WA, USA

Computational Fluid Dynamics (CFD)

9-10   Flow Through Complex Structures II

Thursday July 26  Room Cremant | 14:00 – 16:00
Session Chair: Afaque Shams, Nuclear Research and Consultancy Group, Netherlands
Session Co-Chair: Laurent De Moerloose, Ghent University, Belgium
Session Co-Chair: Pei Shen, City University of Hong Kong, Hong Kong

Numerical Simulations on Throttle Characteristic with Large Pressure Drop and Optimal Design of the Orifice Plate
ICONE26-81191
Chen Hu¹ Yue Wang¹ Wang Cong² Zili Gong¹ Zhen Jia¹ Amnin Yuan² Lei Chen¹ Yi Liao³
¹. Wuhan Second Ship Design and Research Institute, Wuhan, China; ². Naval University of Engineering, Wuhan, China

Numerical Simulation of Thermal Hydraulic Phenomena during Spray Injection using Lagrangian and Eulerian Approaches
ICONE26-81622
Taehyub Hong, JongWook Go, MiRo Seo
Korea Hydro & Nuclear Power Co., Ltd, Daegu, Korea

Numerical Study of the Amplitude and the Convection Speed of Periodic Large-Scale Vortices in a Square Array of Cylinders Subjected to Axial Flow
ICONE26-81730
Laurent De Moerloose, Jeroen De Ridder, Jan Vierendeels, Joris Degroote
Ghent University, Ghent, Belgium

Numerical Simulation of Corium Jet Breakup during Fuel-Coolant Interaction based on the ALISA Test Performed at KROTOS Test Facility
ICONE26-81818
Pei Shen¹ Wenzhong Zhou²
¹. City University of Hong Kong, Hong Kong, Hong Kong; ². City University of Hong Kong, Kowloon, Hong Kong

Development of Numerical Simulation Method to Evaluate Molten Material Behaviors in Nuclear Reactors: Preliminary Numerical Simulation for Molten Core Relocation Behavior in BWR and PWR Cores
ICONE26-82565
Yasuo Ose¹ Susumu Yamashita² Hiroyuki Yoshida²
¹. Yamato System Engineer Co., LTD., Ibaraki, Japan; ². Japan Atomic Energy Agency, Tokai-mura, Japan

Thermal-Hydraulics and Safety Analyses

8-38   Fast Reactors: Experiments and Analyses II

Thursday July 26  Room Bourg | 14:00 – 16:00
Session Chair: Dalin Zhang, Xi’an Jiaotong University, China

Development and Basic Verification of Decay Heat Removal Analysis Code of Sodium-Cooled Fast Reactor
ICONE26-81630
Ping Song¹ Dalin Zhang¹ Tangtao Feng¹ Shibiao Wang¹ Yapei Zhang¹ Mingjun Wang¹ Guanxue Qi²
¹. Xi’an Jiao Tong University, Xi’an, China; ². School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China

Structure Innovation and Thermal Hydraulics Analysis for Cold Trap of CEFR
ICONE26-81533
Chen Zugu, Xu Yijun, Qi Wen-jing
China Institute of Atomic Energy, Beijing, China

Thermal-Hydraulics and Safety Analyses

8-35   Modeling NPPs Using System Analysis Software IV

Thursday July 26  Room Reims | 14:00 – 16:00
Session Chair: Kai Kosowski, PreussenElektra GmbH (former E.ON Kernkraft GmbH), Germany

External Hazard Coinciding with Small Break LOCA Thermohydraulic Calculation with System Code ATHLET
ICONE26-81815
Kai Kosowski, Marcus Seidl
PreussenElektra GmbH (former E.ON Kernkraft GmbH), Hannover, Germany

Feasibility Assessment of Air-Cooling System as an Ultimate Heat Sink of the ATOM System
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Nuclear Power Institute of China, Chengdu, China

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Session Co-Chair: Pei Shen, City University of Hong Kong, Hong Kong

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Chen Hu¹ Yue Wang¹ Wang Cong² Zili Gong¹ Zhen Jia¹ Amnin Yuan² Lei Chen¹ Yi Liao³
¹. Wuhan Second Ship Design and Research Institute, Wuhan, China; ². Naval University of Engineering, Wuhan, China

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Ghent University, Ghent, Belgium

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Pei Shen¹ Wenzhong Zhou²
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Development of Numerical Simulation Method to Evaluate Molten Material Behaviors in Nuclear Reactors: Preliminary Numerical Simulation for Molten Core Relocation Behavior in BWR and PWR Cores
ICONE26-82565
Yasuo Ose¹ Susumu Yamashita² Hiroyuki Yoshida²
¹. Yamato System Engineer Co., LTD., Ibaraki, Japan; ². Japan Atomic Energy Agency, Tokai-mura, Japan

Thermal-Hydraulics and Safety Analyses

8-38   Fast Reactors: Experiments and Analyses II

Thursday July 26  Room Bourg | 14:00 – 16:00
Session Chair: Dalin Zhang, Xi’an Jiaotong University, China

Development and Basic Verification of Decay Heat Removal Analysis Code of Sodium-Cooled Fast Reactor
ICONE26-81630
Ping Song¹ Dalin Zhang¹ Tangtao Feng¹ Shibiao Wang¹ Yapei Zhang¹ Mingjun Wang¹ Guanxue Qi²
¹. Xi’an Jiao Tong University, Xi’an, China; ². School of Nuclear Science and Technology, Xi’an Jiao Tong University, Xi’an, China

Structure Innovation and Thermal Hydraulics Analysis for Cold Trap of CEFR
ICONE26-81533
Chen Zugu, Xu Yijun, Qi Wen-jing
China Institute of Atomic Energy, Beijing, China
Mitigation Strategies for Beyond Design Basis Events

THURSDAY, 14:00 – 16:00

**11-3  Ex-Vessel Phenomena**

**Thursday July 26**

**Room Muscade**

Session Chair: Alexei Miassoedov, Karlsruhe Institute of Technology, Germany

**Parametric Model for Ex-Vessel Melt Jet Breakup and Debris Bed Cooling**

ICONE26-81465

Kiyofumi Moriyama, Hyun Sun Park, Mooneon Lee, Jin Ho Park

POSTECH, Pohang, Korea

**Measurement of Dry-Out Heat Flux (DHF) of Debris Beds using a Non-Heating Experimental Methodology**

ICONE26-82028

Je-Young Moon, Bum-Jin Chung

Kyung Hee University, Yongin-si, Korea

**Evaluation of Explosivity from Fuel Coolant Interaction Experiments in the TROI Facility**

ICONE26-82029

Seong Wan Hong, Rae Joon Park

KAERI, Daejeon, Korea

The Effect of Initial Condition of Melt Jet on the Jet Breakup Phenomenon in the Subcooled Water Pool

ICONE26-82310

Woo Hyun Jung, Hyun Sun Park, Kiyofumi Moriyama, Moo Hwan Kim

POSTECH, Pohang, Korea

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**Innovative Nuclear Power Plant Design and SMRs**

**13-5  Molten Salt and Supercritical CO₂ Cooled Reactors**

**Thursday July 26**

**Room Talbot**

Session Chair: Anton Moisseytsev, Argonne National Laboratory, USA

Session Co-Chair: Rui Guo, Nuclear Power Institute of China, China

**Dynamic Control Analysis of the AFR-100 SMR SFR with a Supercritical CO₂ Cycle and Dry Air Cooling:**

Part I - Plant Control Optimization

ICONE26-82292

Anton Moisseytsev, James Sienicki

Argonne National Laboratory, Argonne, IL, USA

**Dynamic Control Analysis of the AFR-100 SMR SFR with a Supercritical CO₂ Cycle and Dry Air Cooling: Part II - Plant Control under Varying Ambient Conditions**

ICONE26-82295

Anton Moisseytsev, James Sienicki

Argonne National Laboratory, Argonne, IL, USA

**A Core Design of Innovative Breeder BWR**

ICONE26-82079

Rui Guo¹ Akifumi Yamaji² Yun Cai¹ Xingjie Peng¹

1. Nuclear Power Institute of China, Chengdu, China; 2. Waseda University, Shinjuku-ku, Japan

**Upgrade and Shakedown Test of a High Temperature Fluoride Salt Test Loop**

ICONE26-81222

Xiangbo Kong, Yuan Fu, Jianyu Zhang, Huiju Lu, Naxiu Wang

Shanghai Institute of Applied Physics, Chinese Academy of Science, Shanghai, China

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**Risk Assessments and Management**

**14-4  Risk Assessment and Management IV**

**Thursday July 26**

**Room Cognac**

Session Chair: Byunghyun Choi, Japan Atomic Energy Agency, Japan

Session Co-Chair: Daisuke Taniguchi, Hitachi-GE Nuclear Energy, Ltd., Japan

**Development of Fuel Route/Dropped Load PSA for UK ABWR**

ICONE26-82022

Daisuke Taniguchi¹ Yuki Ishiwatari¹ Hirokawa Naoki²


**Epistemic Uncertainty Quantification of Floor Responses for a Nuclear Reactor Building**

ICONE26-82034

Byunghyun Choi¹ Akemi Nishida¹ Yinsheng Li² Ken Muramatsu¹ Tsuyoshi Takada³

1. Japan Atomic Energy Agency, Chiba, Japan; 2. Japan Atomic Energy Agency, Ibaraki-ken, Japan; 3. Tokyo City University, Tokyo, Japan; 4. The University of Tokyo, Tokyo, Japan

**Study on PRA Procedure Considering Combination of Multiple Events using DQFM Methodology**

ICONE26-82086

Hirohisa Yamakawa¹ Hitoshi Muta¹

1. Tokyo City University, Setagaya-ku, Japan; 2. Tokyo City University, Yokohama, Japan

**Computer Code Verification and Validation**

**15-3  V&V of Systems Analysis Numerical Analysis Tools I**

**Thursday July 26**

**Room Lalande**

Session Chair: Run Luo, University of South China, China

**Stand-alone Containment Analysis of the Phébus FPT-3 Test with the ASTEC and the MELCOR Codes**

ICONE26-81139

Bruno Gentilotti¹ Sandro Paci²

1. D.I.C.I.-University of Pisa, Pisa, Italy; 2. University of Pisa - Dipartimento di Ingegneria Civile ed Industriale, Pisa, Italy

**Validation of Film Evaporation Model in GASFLOW-MPI**

ICONE26-81249

Yabing Li¹ Han Zhang² Jianjun Xiao¹

1. Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany; 2. Karlsruhe Institute of Technology, Karlsruhe, Germany

**Development of Neutronics and Thermal-Hydraulics Coupled Code for Accelerator Driven Subcritical Systems**

ICONE26-81276

Run Luo¹ Pengfei Wang² Xinyu Wei² Shripad Revankar³ Fuyu Zhao³

1. University of South China, Hengyang, China; 2. Xi’an Jiao Tong University, Xi’an, China; 3. Purdue University, West Lafayette, IN, USA
Development and Validation of a Correlation for Wet Resuspension Simulation  
Tobias Jankowski, Marco K. Koch  
Ruhr-Universität Bochum, Bochum, Germany

A Validation of RELAP on Predicting Nuclear Power Plant Phenomena  
Ji Soo Ahn1 Michael J. Bluck2 Matthew D. Eaton1 Christopher Jackson2  
1. Imperial College London, London, United Kingdom; 2. Rolls-Royce, Derby, United Kingdom

Uncertainty Analysis of Power Distribution for NESTOR based on the Double Latin Hypercube Sampling Method  
Hongkuan Liao, Qiong Li, Yingrui Yu, Yuying Hu, Lei Wu, Chenlin Wang, Jinyu Wang, Jinghui Wang, Peng Xiao  
Nuclear Power Institute of China, Chengdu, China

A Simplified Numerical Benchmark for Pool-Type Sodium Fast Reactors  
Stefan Radman1 Carlo Fiorina1 Konstantin Mikityuk2 Andreas Pau12  
1. École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland; 2. Paul Scherrer Institute, Villigen, Switzerland

16:00 – 16:30  Chablis Suite, Ground Floor  
COFFEE BREAK

16:30 – 18:30  TECHNICAL SESSIONS

Operations & Maintenance, Engineering, Modifications, Life extension, Life Cycle and Balance of Plant

1-5  Equipment Operation and Failure Analysis  
Thursday July 26  
Room Bourg | 16:30 – 18:30  
Session Chair: William A. Byers, Westinghouse, USA

The Influence of Centrifugal Pump Characteristics on Dynamic Loadings on Pipelines after Power Failure  
Jerzy Marcinkiewicz1 Krzysztof Karaskiewicz2 Claes Joheman2  
1. Forsmarks Kraftgrupp AB, Östhammar, Sweden; 2. Warsaw University of Technology, Warsaw, Poland; 3. Ringhals AB, Varöbacka, Sweden

The Evaluation of Nuclear Key Parameters according to Shutdown Length for Two Kinds of Cycle Strategy Cores  
Jongwoo Lee1 Hwansoo Kim1 Sang-Rin Shon1  
Sang-Rae Moon1 Ho-Choel Shin1  
1. KEPCO Nuclear Fuel, Deajeon, Korea; 2. KHNP Central Research Institute, Deajeon, Korea

First Generation Magnox Storage Pond Export  
Chris Medlock  
Nuva, Warrington, United Kingdom

Virtual Prototyping and Simulation of Robotic Devices and Maintenance Procedures for Remote Handling Activities in the Access Cell of DONES  
Stefano Papa1 Giuseppe Di Gironimo1  
Gioacchino Micciché2 Federica Casoria1  
1. University of Naples Federico II, Napoli, Italy; 2. ENEA, Brasimone, Italy

Plant Systems, Structures, Components and Materials

3-4  Design Analyses II  
Thursday July 26  
Room Chalon | 16:30 – 18:30  
Session Chair: Ziduan (Joshua) Shang, Shanghai Nuclear Engineering R & D Institute (SNERDI), China  
Session Co-Chair: John Sulley, Rolls Royce PLC, United Kingdom

Residual Stress Measurement of Sealing Glass based on Optical Fiber Sensing Technology  
Mingze Li, Zhichun Fan, Xingzhong Diao, He Yan  
Tsinghua University, Beijing, China

The Numerical Simulation of Residual Heat-Removal System’s Dead Leg Phenomena in Tianwan 5 and 6 Units  
Ma Huiyun, Sun Qi  
China Nuclear Power Engineering Co., Ltd., Beijing, China

Boric Acid Circulation Analysis of Chemistry and Volume Control System  
Sun Qi, Ma Huiyun, Wang Guangfei  
China Nuclear Power Engineering Co., Ltd., Beijing, China

Simulation and Analysis of Start-up and Shutdown Characteristics of Once-through Steam Generator  
Ye Shangshang, Xiaokun Wang, Hongyi Yang, Yihe Liu, Xiaoyan Yang, Yang Jun, Shaopu Qi, Lixia Wang  
China Institute of Atomic Energy, Beijing, China

Advanced Reactors and Fusion Technologies

5-7  Modeling and Simulation II  
Thursday July 26  
Room Bouzy | 16:30 – 18:30  
Session Chair: Rosa Lo Frano, Università di Pisa, Italy

Preliminary Neutronics and Thermal-Hydraulics Study on Thorium-Based HTR-PM with Outer Breeding Zone  
Guodong Wang, Bing Xia, Jiong Guo, Ding She, Lei Shi, Zuoyi Zhang  
Tsinghua University, Beijing, China

Analysis of Vibrations Due to the Steam Condensation at Sub-Atmospheric Condition  
Guglielmo Giambartolomei, Rosa Lo Frano, Daniele Del Serra, Dahmane Mazed, Donato Aquaro  
DIC-Università di Pisa, Pisa, Italy

Evaluation of Heat Removal during the Failure of the Core Cooling for New Critical Assembly  
Yuta Eguchi, Takenori Sugawara, Kenji Nishihara, Kazufumi Tsujimoto, Yujiro Tazawa  
Japan Atomic Energy Agency, Tokai, Japan
Thermal-Hydraulics and Safety Analyses

**8-4** Severe Accident Experiments and Analyses II  
**Thursday July 26**  
**Room Mouton Cadet | 16:30 – 18:30**

**Session Chair:** Yapei Zhang, Xi’an Jiaotong University, China

**Numerical Investigation of Heat Transfer Characteristics of Debris Bed after Severe Accident of SFR based on 1-D Heat Conduction Model**  
ICONE26-81296

Mengwei Zhang, Bin Zhang, Jianqiang Shan  
Xi’an Jiaotong University, Xi’an, China

**Injectable Sacrificial Material System to Contain Ex-Vessel Molten Corium in Nuclear Accidents**  
ICONE26-81440

David L.Y. Louie, Yifeng Wang, Rekha Rao, Alec Kucala, Jessica N. Kruchak  
Sandia National Laboratories, Albuquerque, NM, USA

**Liquid Film Flow on Vertical and Successive Inclined Plate Modeling Flow Channel of Molten Control Rod in Severe Accident**  
ICONE26-81698

Yutaro Hihara, Hideaki Monji, Yutaka Abe  
1. University of Tsukuba, Tsukuba, Japan; 2. Japan Atomic Energy Agency, Tokai-mura, Japan

**Designing and Establishing a Single-Rod Integrated LOCA Experiment Setup**  
ICONE26-82554

Chang Lee, Ashwini Kumar Yadav, Chang Hwan Shin, Kyung-doo Kim  
Korea Atomic Energy Research Institute, Daejeon, Korea

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**Thermal-Hydraulics and Safety Analyses**

**8-7** Thermal-hydraulic Modeling and Probabilistic Risk Assessment Related Analyses  
**Thursday July 26**  
**Room Epernay | 16:30 – 18:30**

**Session Chair:** Richard Underhill, Frazer-Nash Consultancy Ltd, United Kingdom

**Experimental Study on the Steam Line Break (SLB) Accident with the Steam Generator Tube Rupture (SGTR)**  
ICONE26-81458

Yusun Park, Byoung-Uhn Bae, Jongrok Kim, Jae Bong Lee, Hae Min Park, Nam Hyun Choi, Kyoung Ho Kang, Kyung-doo Kim  
Korea Atomic Energy Research Institute, Daejeon, Korea

**Non-LWR Model Development for the MELCOR Code**  
ICONE26-82415

Larry Humphries, Brad Beeny, David L.Y. Louie  
Hossein Esmaili, Michael Saffey  
1. Sandia National Laboratories, Albuquerque, NM, USA; 2. United States Nuclear Regulatory Commission, Washington, DC, USA

**The Monte Carlo Method in Radiative Heat Transfer of Heat Rejection Subsystem**  
ICONE26-81168

Pei Yao Qi, Sichao Tan, Li Xing, Zheng Liu, Xiu Chun Luan  
Harbin Engineering University, Harbin, China

**UK Nuclear Thermal Hydraulics Test Facility and Modelling Research**  
ICONE26-82696

Richard Underhill, Carolyn M Howlett, Jordan McIntosh  
Frazer-Nash Consultancy Ltd, Bristol, United Kingdom

**Thermal-Hydraulic Analysis of TOPAZ-II with Modified RELAP5**  
ICONE26-81735

Simiao Tang, Chenglong Wang, Guanghui Su, Suizheng Qi, Wenxi Tian  
1. Xi’an Jiaotong University, Xi’an, China; 2. School of Nuclear Science and Technology, Xi’an Jiaotong University, Xi’an, China
Decontamination & Decommissioning, Radiation Protection, and Waste Management

10-6  Dose and Radiation Effects

Thursday July 26  Room Alsace | 16:30 – 18:30

Session Chair: Junjun Chen, Tsinghua University, China
Session Co-Chair: Yuiko Motome, Japan Atomic Energy Agency, Japan

Analysis of Aerosol Emission and Dispersion during the Laser Cutting of Fukushima Fuel Debris Simulants  ICONE26-81531
Emmanuel Porcheron1 Samuel Peillon1 Thomas Gelain1
Christophe Chagnon2 Christophe Journeau2 Damien Roulet4
1. IRSN, Gif sur Yvette, France; 2. CEA, Gif sur Yvette, France; 3. Commissariat à l’énergie atomique et aux énergies alternatives (CEA), St Paul lez Durance, France; 4. ONET, Pierrelatte, France

Estimation of External Dose Volume Correction Factors based on Neural Network  ICONE26-81616
Junjun Chen1 Jingyuan Qu1 Junjun Gong2
1. Tsinghua University, Beijing, China;
2. Naval University of Engineering, Wuhan, China

The Dose Constraint Calculation of High Radioactivity Level Waste Canister Surface  ICONE26-82056
Yang Bo, Qianglin Wei, Hexi Wu, Luo Xujia, Yibao Liu
East China University of Technology, Nanchang, China

Valuation of the Radiation Effects of Residents Living around the NSRR under the External Hazards  ICONE26-82258
Yuiko Motome, Yoshiya Akiyama, Hiroyuki Murao
Japan Atomic Energy Agency, Tokai-mura, Japan

Design and Safety Analysis of a Kind of UO2 Pellets Transport Container  ICONE26-82291
Shutang Sun, Dongyuan Meng, Guoqing Li, Hongchao Sun, Dajie Zhuang, Jiangang Zhang, Chen Lei, Yiren Lian
China Institute for Radiation Protection, Taiyuan, China

Thermal-Hydraulics and Safety Analyses

8-39  Thermal-hydraulic Modeling: 1st Principle Physics and Correlations IV

Thursday July 26  Room Fronsac | 16:30 – 18:30

Session Chair: Yufeng Lv, China Institute of Atomic Energy, China

A Choking Model with Thermal Non-Equilibrium for Initially Subcooled Water  ICONE26-82207
Yufeng Lv, Minfu Zhao, Weiqing Li
China Institute of Atomic Energy, Beijing, China

Numerical Benchmark of the FRENETIC Multiphysics Code  ICONE26-82339
Ettore Guadagni1 Antonio Cammi1 Sandra Dulla1 Stefano Lorenzi1 Giuseppe Francesco Nallo1 Piero Ravetto1 Laura Savoldi1 Roberto Zanino1 1. Politecnico di Torino, Torino, Italy; 2. Politecnico di Milano, Milano, Italy; 3. Dipartimento Energia, Politecnico Di Torino, Torino, Italy

Numerical Study on Effect of Pressure on Behavior of Bubble Coalescence by using CMFD Simulation  ICONE26-82564

Development of a Thermal-Hydraulic Analysis Code for Helical Coiled Once-through Steam Generator  ICONE26-81945
Jun Huang, Haifu Ma, Jie Fan, Junli Gou, Jianqiang Shan
Xi’an Jiao Tong University, Xi’an, China

Development and Application of Level 3 PSA for the UK ABWR Generic Design Assessment  ICONE26-81469
Hironobu Iwanami1 Ming Leang Ang2 Tomoharu Hashimoto1 Liz Grindon1 Neil Harman5 Carmen Niculae2 1. Hitachi-GE Nuclear Energy, Ltd., Hitachi, Japan; 2. Horizon Nuclear Power, Gloucester, United Kingdom; 3. Wood PLC, Cheshire, United Kingdom

Decontamination & Decommissioning, Radiation Protection, and Waste Management
### Decontamination & Decommissioning, Radiation Protection, and Waste Management

**10-7 Decommissioning**

**Thursday July 26**

**Session Chair:** Hitoshi Mimura, UNION SHOWA K.K., Japan  
**Session Co-Chair:** Luisa Carvalho, CEA, France

Research on Deposition of Micro-Nano Aerosols in Rising Bubble under Pool Scrubbing Condition  
**ICONE26-81160**  
Yanmin Zhou¹ Halfeng Gu² Qianan Sun¹ Zhongning Sun¹ Jiqiang Su¹ Li Gaso¹ Qianchao Ma¹ Gan Zhu¹ Li Yingzhi¹  
1. Harbin Engineering University, Harbin, China; 2. China Nuclear Power Engineering Co, Beijing, China

Research Concept of Decommissioning Knowledge Management for the Fugen NPP  
**ICONE26-81229**  
Yasuyoshi Taruta¹ Satoshi Yanagihara² Yukihiro Iguchi³  

Evaluation of Adsorption Properties of U(VI) for Various Inorganic Adsorbents  
**ICONE26-81338**  
Hitoshi Mimura¹ Minoru Matsukura² Fumio Kurosaki³ Tomoya Kitagawa² Akira Kirishima° Nobuaki Sato¹ Daiki Kurokami¹  
1. UNION SHOWA K.K., Sendai, Japan; 2. UNION SHOWA K.K., Tokyo, Japan; 3. Tohoku University, Sendai, Japan

Development of Laser Cleaning for Metallic Equipment  
**ICONE26-81853**  
Luisa Carvalho, Wilfried Pacquentin, Michel Tabarant, Juliette Lambert, Alexandre Semerok, Hicham Maskrot  
CEA, Gif sur Yvette, France

Modification of Filtered Air Intake Flowrate to Improve Control Room Habilitability  
**ICONE26-81941**  
Xinli Liu¹ Weiping Shu¹ Mengxi Wang¹  
1. China Nuclear Power Engineering Co., Ltd., Beijing, China; 2. Tsinghua University, Beijing, China

An Effect of Bismuth Ion on the Reduction of Terbium Ion in Molten LiCl-KCl Eutectic Salt  
**ICONE26-82406**  
Beom Kyu Kim, Byung Gi Park, Hwa Jeong Han, Ji Hye Park, Won Ki Kim  
Soochunhyang University, Asan-si, Korea

### Mitigation Strategies for Beyond Design Basis Events

**11-4 Accident Analysis, Prevention and Mitigation**

**Thursday July 26**

**Session Chair:** Yidan Yuan, China Nuclear Power Engineering Corporation, China

Study on Protection against Large Commercial Aircraft Crash of HPR1000  
**ICONE26-81979**  
Xueshuang Zhang, Li Fan, Lilian Cai, Qianwen Liu  
China Nuclear Power Engineering Co., Ltd., Beijing, China

Evolution and Implementation of the Design Extension Conditions (DEC) Concept: Assessment of Selected Events  
**ICONE26-82593**  
Pavel Kral  
LUV Rez (NRÚ), Husevec - Rez, Czech Republic

Sensitivity Analysis of RCS Depressurization Strategy under a Postulated SGTR Accident in OPR1000  
**ICONE26-82074**  
Wonjun Choi, Taeseok Kim, Joongoo Jeon, Nam Kyung Kim, Sung Joong Kim  
Hanyang University, Seoul, Korea

Design Optimization of PERCS in RELAP5 using Parallel Processing and a Multi-Objective Non-Dominated Sorting Genetic Algorithm  
**ICONE26-82389**  
Paul R. Wilding, Nathan R. Murray, Matthew J Memmott  
Brigham Young University, Provo, UT, USA

### Innovative Nuclear Power Plant Design and SMRs

**13-6 Small Modular Reactors II**

**Thursday July 26**

**Session Chair:** Robert Stakenborghs, ILD Power, USA  
**Session Co-Chair:** Kevin Lee, Canadian Nuclear Safety Commission, Canada

Control Strategy Investigation for a Multi-Purpose Modular Small Pressurized Water Reactor with Once-through Steam Generators  
**ICONE26-81318**  
Qian Ma, Peiwai Sun  
Xi’an Jiao Tong University, Xi’an, China

Study on the Water Supply Scheme of a Small Modular Reactor  
**ICONE26-81811**  
Chunguan Zhou, Ruo bing Yang, Cheng Lu  
China Nuclear Power Engineering Co., Ltd., Beijing, China

Design and Non-Proliferation Viability of Small Modular Reactors  
**ICONE26-81651**  
Zafar Koreshi  
Air University, Islamabad, Pakistan

Hydrogen Risk Reducing Technology in Small Modular Reactor  
**ICONE26-81705**  
Yanlin Chen¹ Xuefeng Lv²  
1. China Nuclear Power Engineering Co., Ltd., Beijing, China; 2. North China Electric Power University, Beijing, China

Functional Additively Manufactured Surface Development and its Application within SMR Power Plants  
**ICONE26-82228**  
Joe Howard¹ Dan Robertson¹ Mark Whiting² Paul Wilson² Julie Yeomans²  
1. Rolls-Royce, Derby, United Kingdom; 2. University of Surrey, Guildford, United Kingdom
**Risk Assessments and Management**

**14-5  Risk Assessment and Management V**  
**Thursday July 26**  
Room Cognac | 16:30 – 18:30

Session Chair: Gerard Ratoka Lekhema, National Nuclear Regulator, South Africa  
Session Co-Chair: Hirokawa Naoki, Hitachi-GE Nuclear Energy, Ltd., Japan

**Discussion of Issues for Small Modular Reactor PSA**  
ICONE26-82157  
Tao Liu  
Tsinghua University, Beijing, China

**Comparative Analysis on the Reliability Estimating Method for the Components of Sodium-Cooled Fast Reactor Primary Pump with Extreme Small Scale Sample Test**  
ICONE26-82313  
Guo Xiaoxian, Gu Jipin, Xiao Lili, Pu Enshan, Zhang Jianxin, Liu Xueling  
China Institute of Atomic Energy, Beijing, China

**Real-Time Online Risk Monitoring and Management Method for Maintenance Optimization in Nuclear Power Plant**  
ICONE26-82472  
Anqi Xu, Zhijian Zhang, Huazhi Zhang, Min Zhang, He Wang, Yingfei Ma, Sijuan Chen, Yan Wang, Gangyang Zheng  
1. Harbin Engineering University, Harbin, China; 2. China Institute of Atomic Energy, Beijing, China

**High Reliability Micro-Grid for a Nuclear Facility Emergency Power Supply**  
ICONE26-82510  
Gerard Ratoka Lekhema, Willem A. Cronje, Ian Korir  
1. National Nuclear Regulator, Centurion, South Africa; 2. University of the Witwatersrand, Johannesburg, South Africa

**Overview of PSA for the UK ABWR Generic Design Assessment**  
ICONE26-82553  
Hirokawa Naoki, Yuki Ishiwatari, Daisuke Taniguchi, Kohei Hisamochi  

**System Safety Analysis Method based on Real-Time Online Risk Monitoring Technology**  
ICONE26-82563  
Sijuan Chen, Zhijian Zhang, He Wang, Min Zhang, Huazhi Zhang, Anqi Xu, Yingfei Ma, Gangyang Zheng  
Harbin Engineering University, Harbin, China

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**Computer Code Verification and Validation**

**15-5  V&V of Systems Analysis Numerical Analysis Tools III**  
**Thursday July 26**  
Room Lalande | 16:30 – 18:30

Session Chair: Nicola Forgione, University of Pisa, Italy  
Session Co-Chair: Heriberto Sánchez-Mora, Innovative Systems Software, USA

**Analysis Contour Plots in RELAP/SCDAPSIM/MOD 3.4 and Mod 4.1**  
ICONE26-81991  
Heriberto Sánchez-Mora, Carlos Chávez-Mercado, Chris Allison, Judith Hohorst  
1. Innovative Systems Software, Ammon, ID, USA; 2. Universidad Nacional Autónoma de México, Mexico City, Mexico; 3. Innovative Systems Software, Idaho Falls, ID, USA

**QUENCH-06 Experiment Post-Test Calculations and Integrated Uncertainty Analysis with RELAP/SCDAPSIM/MOD3.4 and MOD3.5**  
ICONE26-81912  
C. Allison, B. T. Le, G. Gerova, I. Spasov  
M. Perez-Ferragut, Judith Hohorst  

**Numerical Investigation of Corium Coolability in Core Catcher: Sensitivity to Modeling Parameters**  
ICONE26-81841  
Liancheng Guo, Andrei Rineiske  
Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany

**Verification of Shielding Calculation Capability of RMC with H. B. Robinson-2 Pressure Vessel Benchmark**  
ICONE26-81694  
Junjie Rao, Xiaotong Shang, Kan Wang  
Tsinghua University, Beijing, China

**Blind Simulations of NACIE-UP Experimental Tests by STH Codes**  
ICONE26-81343  
Nicola Forgione, Morena Angelucci, Gianluca Barone, Fabio Giannetti, Pierdomenico Lorasso, Thorsten Hollands, Angel Papukchiev, Massimiliano Polidori, Antonio Cervone, Ivan Di Piazza  
1. University of Pisa, Pisa, Italy; 2. Sapienza University of Rome, Roma, Italy; 3. University “La Sapienza”, Roma, Italy; 4. Gesellschaft für Anlagen- und Reaktorsicherheit (GRS), Garching, Germany; 5. ENEA, Bologna, Italy; 6. ENEA C.R. Brasimone, Camugnano, Italy

**Validation of Systems Code for beyond Prompt Critical Reactivity Excursions using SPERT III Test Facility Data**  
ICONE26-82680  
Alex Kirby  
Rolls-Royce Power Engineering PLC, Derby, United Kingdom
Track Chairs and Co-Chairs

Track 1 Operations & Maintenance, Engineering, Modifications, Life extension, Life Cycle and Balance of Plant

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- Koji Yamada, Chubu Electric Power Co., Inc., Nagoya, Japan
- Xinrong Liu, CNNC China Nuclear Power Engineering Co., Ltd., Beijing, China
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- Suizheng Qiu, School of Nuclear Science and Technology, Xi’An Jiaotong University, Xi’An, China
- Kan Wang, Tsinghua University, Beijing, China
- Satoshi Kurata, Japan Nuclear Safety Institute, Tokyo, Japan
- Deping Kong, China National Nuclear Power Co., Ltd. (CNNP), Zhejiang, China
- Scott Cairns, Rolls-Royce, Derby, United Kingdom

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- William A. Byers, Westinghouse, Pittsburgh, PA, United States
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- Kan Wang, Tsinghua University, Beijing, China
- Satoshi Kurata, Japan Nuclear Safety Institute, Tokyo, Japan
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- Scott Cairns, Rolls-Royce, Derby, United Kingdom

Track 2 Nuclear Fuel and Material, Reactor Physics and Transport Theory

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Min Xiao, China Nuclear Power Technology Research Institute/CGN, Shenzhen, China

Track 3 Plant Systems, Structures, Components and Materials

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- Yinbiao He, Shanghai Nuclear Engineering Research & Design Ins, Shanghai, China

Track 4 Instrumentation and Control (I&C) and Influence of Human Factors

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**Track 6 Nuclear Safety, Security, and Cyber Security**

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Track 9 Computational Fluid Dynamics

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Track 10 Decontamination & Decommissioning, Radiation Protection, and Waste Management

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Track 11 Mitigation Strategies for Beyond Design Basis Events

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Track 12 Nuclear Education and Public Acceptance

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Track 13 Innovative Nuclear Power Plant Design and SMRs

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Ibrahim Khamis, International Atomic Energy Agency, Vienna, Austria
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Track 14 Risk Assessments and Management

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Track 15 Computer Code Verification and Validation

CHAIR: Richard Schultz, Idaho State Univ & Texas A&M Univ, Pocatello, ID, United States
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Hyung Lee, Bettis Laboratory, West Mifflin, PA, United States
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Milorad Dzodzo, Westinghouse Electric Company, Cranberry Township, PA, United States
Joshua Kaizer, U.S. Nuclear Regulatory Commission, Abingdon, MD, United States
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Sanjeeb Pal, NA, Herndon, VA, United States
Upendra Rohatgi, Brookhaven National Laboratory, Upton, NY, United States
Sam Treasure, Rolls-Royce PLC, Derby, United Kingdom

Track 16 Student Paper Competition

CHAIR: Shripad Revankar, Purdue University, West Lafayette, IN, United States
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Jovica Riznic, Canadian Nuclear Safety Commission, Ottawa, ON, Canada
Igor A. Bolotnov, North Carolina State University, Raleigh, NC, United States
Shoaib Usman, Missouri University of Science and Technology, Rolla, MO, United States
## Track 17 Keynote, Plenary, Panels Sessions

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Lixin Shen, Chinese Nuclear Society, Beijing, China  
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## Track 18 Workshops

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Richard Schultz, Idaho State Univ & Texas A&M Univ, Pocatello, ID, United States  
Clayton Smith, Smith Associates Consulting Group LLC, Simpsonville, SC, United States
Le Corre, Jean-Marie
Le Moigne, Yann
Lee, B. T.
Lee, Dan
Letarouille, Thierry
Leydi, Michael
Lee, Chao
Lee, Chang
Lee, Kang Hoon
Lee, Jingkai
Lee, Jiru
Lee, Jonggi
Lee, Jongsu
Lee, Jongwo
Lee, Jungjoo
Lee, Myung-Ho
Lee, Sanghoon
Lee, Seungki
Lee, Chen
Lejeail, Yves
Lee, Kwan-Hee
Lee, Jin Der
Le Moigne, Yann
Lee, Mingze
Lei, Jinyang
Lei, Jiazhi
Lei, Xiyun
Lei, Xiaosheng
Lei, Xiangyang
Lei, Xingyang
Lei, Xiang
Lei, Xun
Lei, Xing
Lei, Xingwen
Lei, Xingwu
Lei, Xinyao
Lei, Xinyuan
Lei, Xinyu
Lei, Xintao
Lei, Xiangyang
Lei, Xiangming
Lei, Xiaorong
Lei, Xiaoli
Lei, Xiaolin
Lei, Xiaofeng
Lei, Xiaofang
Lei, Jie
Lei, Min
Li, Qing
Li, Hong
Li, Chuan
Li, Bing
Li, Bangming
Li, Mingze
Li, Liu
Li, Qianwen
Li, Qian
Li, Wen-Jing
Li, Wenming
Li, Wenbo
Li, Wenguo
Li, Wenhua
Li, Weiping
Li, Wei
Li, Weiqin
Li, Weiyao
Li, Weijian
Li, Weimin
Li, Wenbin
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Topics of Interest

A wide range of topics related to nuclear engineering will be covered using Keynote and Penary speakers and Panel Sessions. In particular, the conference will cover (but not limited to) the following topics:

- **Track 1** Operations & Maintenance, Engineering, Modifications, Life extension, Life Cycle and Balance of Plant
- **Track 2** Nuclear Fuel and Material, Reactor Physics and Transport Theory
- **Track 3** Plant Systems, Structures, Components and Materials
- **Track 4** Instrumentation and Control (I&C) and Influence of Human Factors
- **Track 5** Advanced Reactors and Fusion Technologies
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- **Track 8** Thermal-Hydraulics and Safety Analyses
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- **Track 10** Decontamination & Decommissioning, Radiation Protection, and Waste Management
- **Track 11** Mitigation Strategies for Beyond Design Basis Events
- **Track 12** Nuclear Education and Public Acceptance
- **Track 13** Innovative Nuclear Power Plant Design and SMRs
- **Track 14** Risk Assessments and Management
- **Track 15** Computer Code Verification and Validation
- **Track 16** Student Paper Competition

Publication Schedule

**Technical Paper**

- Submission of Abstract: September 28, 2018
- Author Notification of Abstract Acceptance: October 26, 2018
- Submission of Full-Length Draft Paper for Review: November 30, 2018
- Author Notification of Draft Paper Acceptance: January 18, 2019
- Submission of Revised Paper: February 1, 2019
- Author Notification of Revised Paper Acceptance: February 15, 2019
- Submission of Copyright Agreement: March 1, 2019
- Submission of Final Accepted Paper: March 1, 2019
- Author Registration: March 1, 2019

**Presentation Only (No Publication)**

- Submission of Extended Abstract: February 1, 2019
- Author Notification of Extended Abstract Acceptance: February 15, 2019
- Submission of Final Extended Abstract: March 1, 2019
- Author Registration: March 1, 2019

**Elsevier Index / Special issue in MEJ**

- The Elsevier indexes (Scopus and Compendex) will be given to the papers included in the ICONE27 proceedings.
- Special issue of ICONE27 will be published in Mechanical Engineering Journal (JSME). Details will be announced in the conference website.

About ICONE

The International Conference on Nuclear Engineering (ICONE) is the premier global conference held by the contribution of numerous professionals from companies, governments, academias and technical societies. The focus of ICONE is on the technical state-of-the-art and the current status of nuclear power around the world. Through the ICONE student program, the conference also fosters the development of future nuclear professionals.

Notes
Nuclear Power Institute of China (NPIC), a subsidiary to China National Nuclear Corporation (CNNC), is the only large-scale comprehensive R&D base in China incorporating reactor engineering research, design, test, operation and small batch production. NPIC is praised as the Cradle of Nuclear Engineering in China by Wu Bangguo, Chairman of the National People’s Congress of China.

Since its foundation in 1965, NPIC has established a complete research and development system, including nuclear power engineering design, equipment assembly and supply of NSSS, reactor operation and application research, reactor engineering test and research, nuclear fuel and material, isotope production, nuclear technology application research and services, etc.
Since Westinghouse helped pioneer the nuclear industry with the world’s first pressurized water reactor more than 60 years ago, we’ve remained committed to delivering innovative solutions for both future and existing clean energy markets.

Our research and development organization helps to cultivate our ever-growing portfolio of products and services to do so. The latest in development is the eVinci™ micro reactor. Particularly for remote locations, this next-generation, small nuclear energy generator is aimed at improving the reliability, resiliency and affordability of sustainable, low-maintenance power.

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