GLOBAL 2019
International Nuclear Fuel Cycle Conference

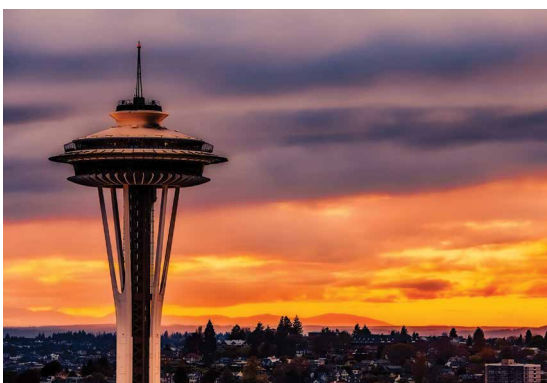
TOP FUEL | 2019
Light Water Reactor Fuel Performance Conference

ANS Meetings

ORGANIZED BY ANS IN COOPERATION AND THE SUPPORT OF:

Official Program

September 22-26, 2019
Seattle Washington USA
The Westin Seattle



GLOBAL 2019
International Nuclear Fuel Cycle Conference

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ANS Fuel Cycle and Waste Management Division

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TOP FUEL 2019 TECHNICAL SESSIONS

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Meeting Officials

Global 2019 International Nuclear Fuel Cycle Conference

GLOBAL GENERAL CHAIR
Dorothy Davidson
Orano

GLOBAL TECHNICAL PROGRAM CHAIR
Jack Law
Idaho National Laboratory

GLOBAL ASSISTANT TECHNICAL PROGRAM CHAIR
Jeffery Brault
Retired

GLOBAL ASSISTANT TECHNICAL PROGRAM CHAIR
Jared Johnson
ORNL

Top Fuel 2019 Light Water Reactor Fuel Performance Conference

TOP FUEL GENERAL CHAIR
John Strumpell
Framatome

TOP FUEL TECHNICAL PROGRAM COCHAIR
Randall Dunavant
Southern Nuclear

TOP FUEL TECHNICAL PROGRAM COCHAIR
Stephen Mazurkiewicz
Framatome

Daily Schedule

Sunday, September 22

4:00-7:00 pm	Registration	4th Floor Grand Foyer
6:00-8:00 pm	Opening Reception ***Sponsored by:*** orano	Cascade Ballroom

Monday, September 23

7:00 am-4:00 pm	Registration	4th Floor Grand Foyer
7:00 am-4:00 pm	Technology Expo	4th Floor Grand Foyer
7:00-8:00 am	Morning Continental Breakfast	4th Floor Grand Foyer
8:00-9:30 am	Plenary	Grand Ballroom III
9:30-9:45 am	Morning Coffee Break	4th Floor Grand Foyer
9:45 am-11:50 pm	Global 2019 Technical Sessions	
	• Off-Gas Capture	Grand Crescent
	• MOx Production and Uranium Separation	Cascade Ballroom IA
	• Advanced Reactors—Safety	Cascade Ballroom IB
	• Waste Management—I	Cascade Ballroom IC
	• International Collaboration and Research	Cascade Ballroom II
9:45 am-11:50 pm	Top Fuel 2019 Technical Sessions	
	• Advanced Fuel Designs—I	Grand Ballroom III
	• Development, Verification and Validation of Fuel Modeling Codes—I	Vashon I/II
	• Fuel Characteristics and Performance for Transportation and Interim/Long-Term Storage—I	St. Helens
12:00-1:30 pm	Luncheon with Speaker ***Sponsored by:*** framatome	Grand Ballroom I
1:30-5:30 pm	Global 2019 Technical Sessions	
	• Minor Actinide and Lanthanide Separations—I	Grand Crescent
	• Aqueous Technology Advances	Cascade Ballroom IA
	• Advanced Reactors—Components	Cascade Ballroom IB
	• Fuel Cycle Scenario Analysis—I	Cascade Ballroom IC
	• Vision to Enhance R&D and International Cooperation on Nuclear Fuel Cycle Activities–Panel	Cascade Ballroom II
1:30-3:05 pm	Top Fuel 2019 Technical Sessions	
	• Cladding and Structural Alloys Development—I	Grand Ballroom III
	• Fuel Modeling and Analysis—I	Vashon I/II
	• R&D Activities	St. Helens
3:35-3:50 pm	Afternoon Coffee Break	4th Floor Grand Foyer
3:50-5:30 pm	Top Fuel 2019 Technical Sessions	
	• Advanced Fuel Designs—II	Grand Ballroom III
	• Fuel Modeling and Analysis—II	Vashon I/II
	• Aging Issues	St. Helens

Daily Schedule

Tuesday, September 24

7:00 am-4:00 pm	Registration	4th Floor Grand Foyer
7:00 am-7:30 pm	Technology Expo	4th Floor Grand Foyer
7:00-8:00 am	Morning Continental Breakfast	4th Floor Grand Foyer
8:00-9:00 am	Plenary	Grand Ballroom III
9:00-9:15 am	Morning Coffee Break ***Sponsored by:*** Exelon Generation®	4th Floor Grand Foyer
9:15-11:45 am	Global 2019 Technical Sessions	
	• Sustainability of Nuclear Energy Systems–Panel	Grand Crescent
	• Molten Salt Technologies	Cascade Ballroom IA
	• Advanced Reactors —SMR	Cascade Ballroom IB
	• MSR Fuels and Fuel Cycle Issues	Cascade Ballroom IC
	• Progress in Fuel Cycle R&D International Collaborations—I–Panel	Cascade Ballroom II
9:15-11:45 am	Top Fuel 2019 Technical Sessions	
	• Cladding and Structural Alloys Development—II	Grand Ballroom III
	• Development, Verification and Validation of Fuel Modeling—II	Vashon I/II
	• Fuel Characteristics and Performance for Transportation and Interim/Long-Term Storage Session—II	St. Helens
11:45 am-1:00 pm	Lunch on own	
1:00-5:30 pm	Global 2019 Technical Sessions	
	• U.S. National Laboratory Glenn T. Seaborg Institutes Fuel Cycle Research–Panel	Grand Crescent
	• Advanced Safeguards	Cascade Ballroom IA
	• Advanced Reactors—Reactor Physics	Cascade Ballroom IB
	• Fuel Cycle Modeling and Simulation—I	Cascade Ballroom IC
	• Building Next Generation Nuclear; Enabling Succession Planning to Create and Maintain a Well Educated Workforce in the NE Sector–Panel	Cascade Ballroom II
1:00-3:35 pm	Top Fuel 2019 Technical Sessions	
	• Advanced Fuel Designs—III	Grand Ballroom III
	• Design and Analysis Methods—I	Vashon I/II
	• Transient Fuel Behavior and Criteria Session—I	St. Helens
3:30-3:45 pm	Afternoon Coffee Break ***Sponsored by:*** Exelon Generation®	4th Floor Grand Foyer
3:50-5:30 pm	Top Fuel 2019 Technical Sessions	
	• Cladding and Structural Alloys Development—III	Grand Ballroom III
	• Development, Verification and Validation of Fuel Modeling—III	Vashon I/II
	• Transient Fuel Behavior and Criteria—II	St. Helens
5:30-7:30 pm	Combined Poster Reception ***Sponsored by:*** Westinghouse	Grand Ballroom I

Daily Schedule

Wednesday, September 25

7:00 am-4:00 pm	Registration	4th Floor Grand Foyer
7:00-8:00 am	Morning Continental Breakfast	4th Floor Grand Foyer
8:00-11:45 am	Global 2019 Technical Sessions	
	• Modeling and Simulation of Advanced Technologies	Grand Crescent
	• Waste Form Technologies	Cascade Ballroom IA
	• Advanced Reactors-Reactor Concepts	Cascade Ballroom IB
	• Fuel Cycle Scenario Analysis—II	Cascade Ballroom IC
	• Progress in Fuel Cycle R&D International Collaborations—II–Panel	Cascade Ballroom II
8:00-9:15 am	Top Fuel 2019 Technical Session: Innovation in Nuclear–Panel	Grand Ballroom III
9:15-9:30 am	Morning Coffee Break	4th Floor Grand Foyer
9:30-11:45 am	Top Fuel 2019 Technical Sessions	
	• Fuel Rod, Fuel Cladding and Component Materials Behaviors—I	Grand Ballroom III
	• Fuel Behavior Modeling During Operation and Under Back-End Conditions	Vashon I/II
	• Transient Fuel Behavior and Criteria—III	St. Helens
11:45 am-1:00 pm	Lunch on own	
1:00-5:15 pm	Global 2019 Technical Sessions	
	• Pyrochemical Processing	Grand Crescent
	• Safety HLW	Cascade Ballroom IA
	• Monitoring and Lifetime Extension	Cascade Ballroom IA
	• Advanced Fuels/Targets/Materials—I	Cascade Ballroom IB
	• Trends in Nuclear Energy Fuel Cycles	Cascade Ballroom IC
1:00-3:30 pm	Top Fuel 2019 Technical Sessions	
	• Fuel Rod, Fuel Cladding and Component Materials Behaviors—II	Grand Ballroom III
	• Design and Analysis Methods—II	Vashon I/II
	• Transient Fuel Behavior and Criteria—IV	St. Helens
3:30-3:45 pm	Afternoon Coffee Break	4th Floor Grand Foyer
3:45-5:15 pm	Top Fuel 2019 Technical Sessions	
	• Fuel Rod, Fuel Cladding and Component Materials Behaviors—III	Grand Ballroom III
	• Fuel Operating Experience and Performance—I	Vashon I/II
	• Transient Fuel Behavior and Criteria—V	St. Helens
5:30-9:00 pm	Harbor Cruise	

Scan this code or visit your app store and download "Attendee Hub" to access the free Global Top Fuel App

NOTE: All session evaluations will be done in the app only.

If you already have Attendee Hub on your phone:

1. From the event homescreen, tap the three white lines icon on the top left.
2. Choose Switch Event, then **search globaltop** to find this meeting.

Once you have the app, follow the instructions below to log in.

An app invitation will be sent to the email that you used to register for the meeting by ANS Meetings. Open the invitation, tap **Verify Account**, then tap **Open App** to complete the verification and log in.

If you did not receive an invitation or deleted it, retrieve your verification code by opening Attendee Hub. On the top left of the event homescreen, **tap the three white lines icon.** Then tap **Log in for more features**, enter your name and tap **Next**. Tap **Resend Code** to have a verification code sent to your email address.

Sorry, the Global Top Fuel event will not be available in the app until September 16th.

If the app is not available for your device, use our online event guide at event.crowdcompass.com/globaltop

Daily Schedule

Thursday, September 26

7:00 am-4:00 pm	Registration	4th Floor Grand Foyer
7:00-8:00 am	Morning Continental Breakfast	4th Floor Grand Foyer
8:00-11:45 am	Global 2019 Technical Sessions	
	• Minor Actinide and Lanthanide Separations—II	Grand Crescent
	• Transportation	Cascade Ballroom IA
	• Disposition and Security of SNF	Cascade Ballroom IA
	• Advanced Reactors—Fuels and Materials	Cascade Ballroom IB
	• Fuel Cycle Modeling and Simulation—II	Cascade Ballroom IC
	• MSR Modeling and Simulation	Cascade Ballroom II
8:00-9:40 am	Top Fuel 2019 Technical Sessions	
	• Design and Analysis Methods—III	Vashon I/II
	• Fuel Operating Experience and Performance—II	St. Helens
9:40-9:55 am	Morning Coffee Break	4th Floor Grand Foyer
9:55-11:45 am	Top Fuel 2019 Technical Sessions	
	• Cladding and Structural Alloys Development—IV	Grand Ballroom III
	• Design and Analysis Methods—IV	Vashon I/II
	• Fuel Performance Reliability, Operations, and Maintenance Experience	St. Helens
11:45 am-1:00 pm	Lunch on own	
1:00-5:30 pm	Global 2019 Technical Sessions	
	• Advanced Aqueous Separations	Grand Crescent
	• Dry Storage	Cascade Ballroom IA
	• Advanced Fuels/Targets/Materials—II	Cascade Ballroom IB
	• MSR Chemistry	Cascade Ballroom IC
	• Waste Management—II	Cascade Ballroom II
1:00-3:30 pm	Top Fuel 2019 Technical Sessions	
	• Cladding and Structural Alloys Development—V	Grand Ballroom III
	• Fuel Operating Experience and Performance—III	St. Helens
3:30-3:45 pm	Afternoon Coffee Break	4th Floor Grand Foyer
3:45-5:30 pm	Top Fuel 2019 Technical Sessions	
	• Cladding and Structural Alloys Development—VI	Grand Ballroom III
	• Multi-Physics Coupling	Vashon I/II
	• Fuel Operating Experience and Performance—IV	St. Helens
6:00-9:00 pm	Closing Banquet	Grand Ballroom I

Friday, September 27

8:00 am-4:00 pm	Bison Workshop	St. Helens
9:30 am-2:00 pm	Social Tour: The Museum of Flight	

General Information

MEETING INFORMATION

Global is the leading international meeting on the nuclear fuel cycle held every other year, alternating between Asia, Europe and the US.

TopFuel is the preeminent international meeting on new developments in LWR fuel performance held every year, alternating between Asia, Europe and the U.S.

Bringing these two meetings together will give managers, scientists and engineers an opportunity to share ideas and enter into mutually beneficial collaborations.

REGISTRATION

ANS Registration Desk is located in the **Grand Foyer** on the **4th Floor**. You may register, purchase additional tickets for events or pick-up your badge and registration materials during the hours listed below. Name badges must be worn during all technical sessions, in the technology expo and events. Certain events require a ticket, and may entail an additional cost for guests or 1-Day registrants.

Sunday, September 22	4:00 pm – 7:00 pm
Monday, September 23	7:00 am – 4:00 pm
Tuesday, September 24	7:00 am – 4:00 pm
Wednesday, September 25	7:00 am – 4:00 pm
Thursday, September 26	7:00 am – 4:00 pm

LOUNGE

Fifth Avenue Room

Looking for a place to type a quick email? Need some space to spread out and chat with a colleague or two? The Fifth Avenue room will serve as a lounge for the duration of the Conference.

TECHNOLOGY EXPO & EXPO HOURS

Join us and visit with our exhibitors in the Technology Expo in the **Grand Foyer** on the **4th Floor**! Learn about new technology, products and services that are being offered. Breakfast and breaks will be hosted in the Expo. For more information or to view the floorplan and exhibitors see page 47.

Monday, September 23	7:00 am – 4:00 pm
Tuesday, September 24	7:00 am – 7:30 pm

ATTENDEE MEAL FUNCTIONS

Breakfast and Breaks will be provided to all registered meeting attendees, Monday-Thursday in the Grand Foyer.

Sunday Evening Reception: This reception is a ticketed event. Heavy hors d'oeuvres and beverages are included with a full meeting registration. Additional tickets are available for purchase.

Monday Luncheon with Speaker: Tickets for this luncheon are included with a full meeting registration. Additional tickets are available for purchase.

Tuesday Evening Reception/Poster Session: Heavy hors d'oeuvres are included with a full meeting registration. Available cash bar.

Thursday Evening Banquet with Speaker: This Banquet is a ticketed event. Dinner and wine are included with a full meeting registration. Available cash bar. Additional tickets are available for purchase.

MEETING PROCEEDINGS

Visit epubs.ans.org (login required) to access proceedings. The proceedings will be online on September 19. Meeting attendees can also purchase a CD or flash drive version for $50 plus shipping; contact scipubs@ans.org.

General Information

ABOUT ANS

Mission

ANS provides its members with opportunities for professional development. It also serves the nuclear community by creating a forum for sharing information and advancements in technology, and by engaging the public and policymakers through communication outreach.

Statement on Diversity

The American Nuclear Society (ANS) is committed, in principle and in practice, to creating a diverse and welcoming environment for everyone interested in nuclear science and technology. Diversity means creating an environment – both in ANS and in the profession – in which all members are valued equitably for their skills and abilities and respected equally for their unique perspectives and experiences. Diverse backgrounds foster unique contributions and capabilities, and so creation of an inclusive Society ultimately leads to a more creative, effective, and technically respected Society.

ANS believes that everyone deserves opportunities for learning, networking, leadership, training, recognition, volunteering in Society activities, and all the other benefits that involvement in the Society brings, regardless of age, color, creed, disability, ethnicity, gender identity and expression, marital status, military service status, national origin, parental status, physical appearance, race, religion, sex, or sexual orientation. The selection of a member to serve in ANS's volunteer leadership structure shall be based solely on the member's ability, interest and commitment to serve. In particular, ANS encourages members at each level of the Society and in each Professional Division and Technical Group to make special efforts to recruit underrepresented minorities and women to ensure that they are adequately represented in the Society.

Respectful Behavior Policy (Abbreviated)

The open exchange of ideas, freedom of thought and expression, and productive scientific debate are central to the mission of the American Nuclear Society (ANS). These require an open and diverse environment that is built on dignity and mutual respect for all participants and ANS staff members, and is free of bias and intimidation.

ANS is dedicated to providing a safe, welcoming, and productive experience for everyone participating in Society events and other Society activities regardless of age, color, creed, disability, ethnicity, gender identity and expression, marital status, military service status, national origin, parental status, physical appearance, race, religion, sex, or sexual orientation. Creation of a safe and welcoming environment is a shared responsibility held by all participants. Therefore, ANS will not tolerate harassment of or by participants (including ANS volunteer leaders and staff members) in any form. Disciplinary action for participants found to have violated this principle may include reprimand, expulsion from an event or activity with or without a refund, temporary or permanent exclusion from all ANS events and activities, suspension or expulsion from volunteer leadership positions or groups, and/or suspension or expulsion from Society membership, as appropriate.

If you or someone else experiences harassment, regardless of how you otherwise choose to initially handle the situation, you are encouraged to report the situation to ANS. It is possible that the behavior you experienced is part of a larger pattern of repeated harassment. Please alert ANS to behavior you feel to be harassment regardless of the offender's identity or standing in the Society.

The designated contact for reports at Global 2019 International Nuclear Fuel Cycle Conference and Top Fuel 2019 Light Water Reactor Fuel Performance Conference is ANS Vice President/President Elect, Mary Lou Dunzik-Gougar, PhD. She can be reached by email at mldg@isu.edu or by phone at 208-569-9915.

The complete Respectful Behavior Policy can be found at ans.org/about/rbp.

General Information

ANS CODE OF ETHICS

Preamble

Recognizing the profound importance of nuclear science and technology in affecting the quality of life throughout the world, members of the American Nuclear Society (ANS) are committed to the highest ethical and professional conduct.

Fundamental Principle

ANS members as professionals are dedicated to improving the understanding of nuclear science and technology, appropriate applications, and potential consequences of their use.

To that end, ANS members uphold and advance the integrity and honor of their professions by using their knowledge and skill for the enhancement of human welfare and the environment; being honest and impartial; serving with fidelity the public, their employers, and their clients; and striving to continuously improve the competence and prestige of their various professions.

ANS members shall subscribe to the following practices of professional conduct:

Principles of Professional Conduct

1. We hold paramount the safety, health, and welfare of the public and fellow workers, work to protect the environment, and strive to comply with the principles of sustainable development in the performance of our professional duties.
2. We will formally advise our employers, clients, or any appropriate authority and, if warranted, consider further disclosure, if and when we perceive that pursuit of our professional duties might have adverse consequences for the present or future public and fellow worker health and safety or the environment.
3. We act in accordance with all applicable laws and these Practices, lend support to others who strive to do likewise, and report violations to appropriate authorities.
4. We perform only those services that we are qualified by training or experience to perform, and provide full disclosure of our qualifications.
5. We present all data and claims, with their bases, truthfully, and are honest and truthful in all aspects of our professional activities. We issue public statements and make presentations on professional matters in an objective and truthful manner.
6. We continue our professional development and maintain an ethical commitment throughout our careers, encourage similar actions by our colleagues, and provide opportunities for the professional and ethical training of those persons under our supervision.
7. We act in a professional and ethical manner towards each employer or client and act as faithful agents or trustees, disclosing nothing of a proprietary nature concerning the business affairs or technical processes of any present or former client or employer without specific consent, unless necessary to abide by other provisions of this Code or applicable laws.
8. We disclose to affected parties, known or potential conflicts of interest or other circumstances, which might influence, or appear to influence, our judgment or impair the fairness or quality of our performance.
9. We treat all persons fairly.
10. We build our professional reputation on the merit of our services, do not compete unfairly with others, and avoid injuring others, their property, reputation, or employment.
11. We reject bribery and coercion in all their forms.
12. We accept responsibility for our actions; are open to and acknowledge criticism of our work; offer honest criticism of the work of others; properly credit the contributions of others; and do not accept credit for work not our own.

Plenary, Special Sessions & Events

SUNDAY, SEPTEMBER 22

Opening Reception
Time: 6:00-8:00 pm; **Location:** Cascade Ballroom

One ticket to the Opening Reception is included in the full meeting registration fee. Additional tickets can be purchased at the ANS Registration Desk. Heavy Hors D 'Oeuvres and beverages will be available. Several Fuel Cycle & Waste Management awards will be presented during the evening.

Sponsored by: orano

MONDAY, SEPTEMBER 23

Morning Plenary
Time: 8:00-9:30 am; **Location:** Grand Ballroom III
Moderator: Seth Grae *(President and Chief Executive Officer, Lightbridge)*

Speakers: Dr. Rita Baranwal *(Assistant Secretary for Nuclear Energy, U.S. Department of Energy)*
Gary Mignogna *(President and CEO of Framatome Inc)*
Jeff Latkowski, Ph.D. *(Senior Vice President, Innovation,TerraPower)*

Luncheon with Speaker: Impacts of Low Dose Radiation Regulation Across the Fuel Cycle
Time: 12:00-1:30 pm; **Location:** Grand Ballroom I

Dr. Dunzik-Gougar received her Ph.D. from Pennsylvania State University in 2003. Her research interests include the nuclear fuel cycle, systems modeling, spent fuel processing, and waste form development.

Speaker: Mary Lou Dunzik-Gougar Ph.D. *(Associate Professor and Associate Dean, ISU)*

Sponsored by: framatome

TUESDAY, SEPTEMBER 24

Morning Plenary
Time: 8:00-9:00 am; **Location:** Grand Ballroom III

Speakers: Stephen Cowne *(CNO URENCO)*
David Fletcher *(Head of Business Development, URENCO)*

Reception/Combined Poster Session
Time: 5:30-7:30 pm; **Location:** Grand Ballroom I

Stop by and join us for Hors D'oeuvres, cash bar, posters and networking! Global and Top Fuel Technical posters will be on display Tuesday evening. During this time, presenters will stand beside their posters to answer questions and informally discuss the topic of their poster. A complete list of posters can be found on pages 19-20 and 36-38.

Sponsored by: Westinghouse

Plenary, Special Sessions & Events

WEDNESDAY, SEPTEMBER 25

Harbor Cruise
Time: 5:30-9:00 pm **Price:** $95

Buses will be loading at the hotel lobby at 5:15 pm. Guests will enjoy panoramic views of Seattle on Argosy Cruises newest boat. The 3 decks offer interior and exterior seating, elevator accessibility and 2 full-service bars. The second deck aft viewing veranda and spacious bow foredeck will provide perfect platforms for capturing selfies or snapshots of the beautiful Seattle cityscape. The upper deck features a 360-degree viewing experience, complete with an elevated observation and ceremony platform. Dinner, drinks, and networking complete the evening.

THURSDAY, SEPTEMBER 26

Evening Banquet with Speaker
Time: 6:00-9:00 pm; **Location:** Grand Ballroom I

Mr. Mason is a nationally recognized expert in space power and propulsion systems with 30+ years of professional experience at the NASA Glenn Research Center (GRC) in Cleveland Ohio. He is currently serving a Detail Position at NASA Headquarters in the Space Technology Mission Directorate as the Principal Technologist for Power, Energy and Thermal Systems. In that position, Mr. Mason develops the agency strategy for investments in space power and thermal management technologies. He previously served as Chief of the Thermal Energy Conversion Branch in the Power Division at GRC, responsible for the development of Stirling radioisotope generators and advanced fission power systems for science and human exploration missions. Mr. Mason is the recipient of the NASA Exceptional Achievement Medal (2006), the Rotary National Stellar Award (2010), R&D100 Award (2013) and the NASA Outstanding Leadership Medal (2014). He holds a B.S. in Mechanical Engineering from the University of Dayton and a M.S. in Mechanical Engineering from Cleveland State University.
Speaker: Mr. Lee Mason *(NASA Glenn Research Center)*

FRIDAY, SEPTEMBER 27

Bison Workshop
Time: 8:00 am-4:00 pm; **Location:** St. Helens

Bison is a multi-dimensional finite element nuclear fuel performance code based on MOOSE. It's applicable to a variety of fuel forms including light water reactor, TRISO particle, and metallic fuel. It solves the fully coupled equations of thermo mechanics and species diffusion.

Fuel models used in Bison describe temperature and burnup dependent thermal properties, fission product swelling, densification, thermal and irradiation creep, fracture, and fission gas production and release. Plasticity, irradiation growth, and thermal and irradiation creep models are implemented for cladding materials. Models are also available to simulate gap heat transfer, mechanical contact, and the evolution of the gap/plenum pressure with plenum volume, gas temperature, and fission gas addition.

An overview of MOOSE and Bison will be presented, followed by examples of running Bison. The examples begin with solving the heat equation on a simple domain and evolve to a realistic multi-dimensional fuel performance simulation with thermo mechanics, contact, and fuel/cladding material models.

While the details of the workshop are still being planned, some interactive elements may be available to attendees with laptops. The Workshop will be presented by Stephen Novascone and Russell Gardner from the Idaho National Laboratory.

For more information please visit bison.inl.gov contact Russell Gardner at russell.gardner@inl.gov or Stephen Novascone at stephen.novascone@inl.gov.

Social Tour: The Museum of Flight
Time: 9:30 am-2:00 pm **Price:** $40

Buses will be loading at the hotel lobby at 9:15 am. The Museum of Flight is the largest independent, non-profit air and space museum in the world! With over 175 aircraft and spacecraft, tens of thousands of artifacts, millions of rare photographs, dozens of exhibits and experiences and a world-class library, the Museum and its people bring mankind's incredible history of flight to life.

MONDAY, SEPTEMBER 23
GLOBAL 2019 TECHNICAL SESSIONS - 9:45 AM

Off-Gas Capture
Session Organizer: Jack D. Law *(INL)* **Chair:** Nick Soelberg *(INL)*
Location: Grand Crescent **Time:** 9:45-11:50 am

9:45 am: Noble Gas Separation Using Metal Organic Frameworks at Low Temperature, Praveen K. Thallapally, Jian Liu, Michael A. Sinnwell, Radha K. Motkuri *(PNNL)*, invited

10:10 am: Aging Study of AgOZ and AgO-Aerogel in the Presence of Off-Gas Streams, Seungrag Choi, Yue Nan *(Syracuse Univ)*, Alexander Wiechert, Austin P. Ladshaw, Sotira Yiacoumi *(Georgia Tech)*, Costas Tsouris *(Georgia Tech/ORNL)*, Lawrence L. Tavlarides *(Syracuse Univ)*

10:35 am: Capture of Iodine in Off-Gas Streams from Aqueous Used Nuclear Fuel Reprocessing—Deep Bed Test Results, Nick Soelberg, Amy K. Welty, Sam Thomas *(INL)*

11:00 am: Adsorption of Organic Iodides from Vessel Off-Gas (VOG) Stream on Silver-Containing Adsorbents, Siqi Tang, Seungrag Choi *(Syracuse Univ)*, Alexander Wiechert, Austin P. Ladshaw, Sotira Yiacoumi *(Georgia Tech)*, Costas Tsouris *(Georgia Tech/ORNL)*, Lawrence L. Tavlarides *(Syracuse Univ)*

11:25 am: Control Room Accident Filtration System for Testing of Off-Gas Treatment Media for Future Recycling Facilities, Sven O. Bader (*Orano)*

MOx Production and Uranium Separation
Session Organizer: Sven O. Bader *(Orano)* **Chair:** Emory Collins *(ORNL)*
Location: Cascade Ballroom IA **Time:** 9:45-11:25 am

9:45 am: Overview of French R&D on SFR MOX Fuel Fabrication, F. Mazaudier, P. Dubuisson *(CEA)*

10:10 am: A New Photochemical Reactor for the Rapid Reduction of U(VI) in the Development of Mixed Metal Oxide Fuel Production Processes, Michael A. Bromley, Colin Boxall *(Lancaster Univ)*, Robin Taylor, Mark Sarsfield *(NNL)*

10:35 am: Membrane-Supported Metal-Organic Frameworks for Uranium Separation in a Flow-Through Mode, Gang Ye *(Tsinghua Univ)*

11:00 am: Study on the Synthesis of Amidoximized Polyacrylonitrile and Its Adsorption to Uranyl Ion, Heng Jiang, Fuqiu Ma, Peng Liu, Yunyang Gui, Meng Cao, Chen Guo, Xinwei Li *(Harbin Engineering Univ)*

Advanced Reactors—Safety
Cosponsored by RPD. **Session Organizer:** Florent Heidet *(ANL)* **Chair:** Massimiliano Fratoni *(USB)*
Location: Cascade Ballroom IB **Time:** 9:45-11:25 am

9:45 am: Verification of Detailed Core-Bowing Analysis Code ARKAS_Cellule with IAEA Benchmark Problems, Hirokazu Ohta *(CRIEPI)*, Kazuya Ohgama, Hidemasa Yamano *(JAEA)*

10:10 am: Evaluation and Analysis of Assembly Bowing Reactivity Coefficients in AFR-100 with the RAINBOW Code, T. Jing *(INL)*, W. S. Yang, P. Deng *(Univ of Michigan)*, T. K. Kim *(ANL)*

10:35 am: Study on Eutectic Melting Behavior of Control Rod Materials in Core Disruptive Accidents of Sodium-Cooled Fast Reactors: (5) Validation of a Multi-Phase Model for Eutectic Reaction Between Molten Stainless Steel and B4C, Xiaoxing Liu, Koji Morita *(Kyushu Univ)*, Hidemasa Yamano *(JAEA)*

11:00 am: Proven Safe and Effective Process for the Treatment of Bulk Sodium at Shutdown Reactors and Research Facilities Anthony Chang *(Orano Federal Services, LLC)*, Dominique Villani *(Framatome)*

MONDAY, SEPTEMBER 23
GLOBAL 2019 TECHNICAL SESSIONS - 9:45 AM

Waste Management—I
Session Organizer: Jack D. Law *(INL)* **Chair:** Arthur Niemoller *(Orano)*
Location: Cascade Ballroom IC **Time:** 9:45-11:50 am

9:45 am: DEM&MELT In-Can Vitrification Process for D&D and Remediation Waste, Régis Didierlaurent *(Orano)*, Isabelle Hugon, Jean-François Hollebecque *(CEA)*, Thierry Prevost *(Orano),* Hubert-Alexandre Turc *(CEA)*, Guillaume Lecomte *(ECM Technologies)*, Stéphane Catherin *(ANDRA)*, Kohei Shibata *(ANADEC)*

10:10 am: Stabilization Processing of Hazardous and Radioactive Liquid Wastes Derived from Advanced Aqueous Separation Experiments for Safety Handling and Management of Waste, Masaumi Nakahara, Sou Watanabe *(JAEA)*, Hiromichi Ogi *(Inspection Development Co. Ltd.)*, Yoichi Arai, Haruka Aihara, Risa Motoyama, Atsuhiro Shibata, Kazunori Nomura *(JAEA)*, Akihiko Kajinami *(Kobe Univ)*

10:35 am: Electrochemical Behaviors of Nb in the LiCl-KCl Molten Salt, Gwan Yoon Jeong *(UNIST)*, Sungjune Sohn *(KAERI)*, Younghwan Jeon, Jaeyeong Park, *(UNIST)*

11:00 am: Multiphase Alloy Waste Forms Developed for Metallic Fuel Waste, Vineeth Kumar Gattu, William L. Ebert *(ANL)*

11:25 am: Removal of Bond Sodium from an Irradiated Full-Length Experimental Breeder Reactor—II Blanket Element via Melt-Drain-Evaporate Process, S. D. Herrmann, D. L. Wahlquist, J. C. Price, M. N. Patterson *(INL)*

International Collaboration and Research
Session Organizer: Fiona E. Rayment *(NNL)* **Cochairs:** Patricia Paviet *(PNNL)*, Fiona E. Rayment *(NNL)*
Location: Cascade Ballroom II **Time:** 9:45-11:50 am

9:45 am: Ongoing NEA Scientific Activities Related to Advanced Fuel Cycles, S. Cornet (NEA), N. Chauvin *(CEA)*, D. Costa, T. Ivanova *(NEA)*

10:10 am: RELAP/SCDAPSIM Fukushima Related Activities, Raimon Pericas *(Univ Politècnica de Catalunya/Innovative Systems Software)*, C. M. Allison, J. K. Hohorst *(Innovative Systems Software)*

10:35 am: Current Activities of the GIF Sodium Fast Reactor Advanced Fuels Project Management Board, Jason M. Harp *(INL)*, Tong Yin, Wei Feng *(China Inst of Atomic Energy)*, Thierry Beck, Bruno Fontaine *(CEA)*, Kenneth J. McClellan *(LANL)*, Daniel Freis, Dragos Staicu (JRC, Karlsruhe), Katsunori Ishii, Hiroshi Oka *(JAEA)*, Jin Sik Cheon, Jun Hwan Kim *(KAERI)*, Andrey Davydov *(VNIINM)*, Liudmila Zabudko *(Innovative & Technology Center by "PRORYV" Project)*, Satoshi Okajima *(OECD Nuclear Energy Agency)*

11:00 am: Global Potential for Small and Micro Reactor Systems to Provide Electricity Access, A. E. Schweikert, A. Osborne, M. R. Deinert *(CSM)*

11:25 am: The GIF Webinar Initiative: Past, Present and Future, Patricia Paviet *(PNNL)*

GLOBAL 2019 TECHNICAL SESSIONS - 1:30 PM

Minor Actinide and Lanthanide Separations—I
Session Organizer: Jack D. Law *(INL)* **Chair:** Bill DelCul *(ORNL)*
Location: Grand Crescent **Time:** 1:30-4:40 pm

1:30 pm: Selective Separation of Am(III) from PUREX Raffinate with a TODGA-Based Solvent Using Innovative Hydrophilic Complexing Agents, Giuseppe Modolo, Andreas Wilden, Peter Kaufholz *(FzJ)*, Cécile Marie, Vincent Vanel, Manuel Miguiriditchian, Stéphane Bourg *(CEA)*, Alessandro Casnati *(Univ delgi Studi di Parma)*, Andreas Geist *(KIT)*

1:55 pm: Extraction Behavior of Lanthanides from Nitric Acid Medium with N,N'-Dimethyl-N,N'-Dioctyl-3-Oxadiglcolamide, Yang Gao, Zhi Zhang, Caishan Jiao, Yu Zhou, Meng Zhang, Hongguo Hou *(Harbin Eng Univ)*, Guoxin Tian *(Harbin Eng Univ/China Inst of Atomic Energy)*

MONDAY, SEPTEMBER 23
GLOBAL 2019 TECHNICAL SESSIONS - 1:30 PM

Minor Actinide and Lanthanide Separations—I Continued

2:20 pm: Advanced Aqueous Reprocessing for Closing the Nuclear Fuel Cycle: ALSEP Process, Art Gelis *(UNLV)*

2:45 pm: Behavior of Lanthanides and Actinides for Their Mutual Separation Using Extractant and Masking Agent, Yuji Sasaki, Keisuke Morita *(JAEA)*, Masahiko Matsumiya *(Yokohama National Univ)*, Masahiko Nakase *(Tokyo Inst Technology)*

3:10 pm: Development of SELECT Process Using CHON Extractants for Partitioning and Transmutation, Tatsuro Matsumura, Yasutoshi Ban, Hideya Suzuki, Shinobu Hotoku, Nao Tsutsui, Tomohiro Toigawa, Keisuke Morita, Yasuhiro Tsubata *(JAEA)*

3:50 pm: The Effects of Nitric Acid on the Extraction Properties of TOOGA During Fission Product Management, Alexander S. Jackson, COlin Boxa II, Michael Anthony Bromley *(Lancaster Univ)*

COFFEE BREAK: 3:35-3:50 PM

4:15 pm: Extraction Separation of Minor Actinides and Lanthanides by 1,10-Phenanthroline-2,9-Diamide with Phenyl Group in Nitric Acid Systems, Nao Tsutsui *(Tokyo Inst of Technology/JAEA)*, Masahiko Nakase, Sayumi Ito *(Tokyo Inst of Technology)*, Yasutoshi Ban, Tatsuro Matsumura *(JAEA)*, Kenji Takeshita *(Tokyo Inst of Technology)*

Aqueous Technology Advances

Session Organizer: Sven O. Bader *(Orano)* **Cochairs:** Robin Taylor *(NNL)*, Don Wood *(INL)*
Location: Cascade Ballroom IA **Time:** 1:30-4:40 pm

1:30 pm: Sulfonamide Ligands for Extraction of Ln(III) and An(III) from Alkaline Aqueous Media, Evgen V. Govor, Oluwaseun W. Adedoyin, Alexander N. Morozov, April A. Rains, B. Nabi Ajoff, Alexander M. Mebel, Konstantinos Kavallieratos *(Florida International Univ)*

1:55 pm: Interactions Between Tc and Organic Agents in U Pu Separation, Chen Zuo, Taihong Yan, Weifang Zheng, Hui Wang, Fang Liu *(China Inst of Atomic Energy)*

2:20 pm: Flowsheet Development for the Dissolution of Aluminum-Clad Research Reactor Fuels in the Savannah River Site H-Canyon Facility, Tracy S. Rudisill, William E. Daniel, Philip M. Almond *(SRNL)*

2:45 pm: Spent Nuclear Fuel RD&D Experience, Accomplishments, and Capability at ORNL, E. D. Collins, D. E. Benker, F. R. Chattin, L. K. Felker, F. R. Chattin, P. D. Bailey, R. J. Vedder, G. D. Del Cul, B. B. Spencer, R. T. Jubin, *(ORNL)*

3:10 pm: Advances on the Treatment of Research Reactor Used Fuels at La Hague, Paul Murray, Sven O. Bader *(Orano)*

COFFEE BREAK: 3:35-3:50 PM

3:50 pm: Analysis of Water Absorption onto CERLA and THORIA Thin Films by Direct Mass and Contact Angle Measurements, D. Laventine, C. Boxall, M. Chombakkadath *(Univ of Lancaster)*, R. Orr, R. Taylor *(NNL)*

4:15 pm: Exchange of the Rotary Dissolver Wheel at La Hague R1 Facility: An Exceptional Maintenance Operation, S. Gaiffe, C. Schultz, F. Lepresle, Ph. Guibert, D. Leveel, H. Leberbanchon, Ph. Morin, P. Boudaud, C. Fauque, A. Coudray, C. Veyer *(Orano)*

MONDAY, SEPTEMBER 23
GLOBAL 2019 TECHNICAL SESSIONS - 1:30 PM

Advanced Reactors—Components
Cosponsored by RPD. **Session Organizer:** Florent Heidet *(ANL)* **Chair:** Ben Beltzer *(ORNL)*
Location: Cascade Ballroom IB **Time:** 1:30-2:45 pm

1:30 pm: A Novel Approach to Measurement of in-Core Temperatures Based on Ultrasonic Guided Waves for Advanced Reactors, Nesrin O. Cetiner *(UT-Battelle/ORNL)*, Sacit M. Cetiner *(ORNL)*, Michael J. Roberts *(Univ of Tennessee)*, Venugopal K. Varma, Govindarajan Muralidharan, Thomas R. Muth, Rose Montgomery *(ORNL)*

1:55 pm: Using Past Experience to Tackle Today's Challenges in Generation IV Fast Reactor Technologies, J. Lillington, J. Lavarenne, B. Lindley *(Wood)*

2:20 pm: Lessons Learned from Fast Flux Test Facility Experience in Containment Design and Sodium Fire Testing, D. W. Wootan, R. P. Omberg *(PNNL)*, T. M. Burke *(Westinghouse Hanford Co.(Retired))*, C. Grandy *(ANL)*

Fuel Cycle Scenario Analysis—I
Session Organizer: Taek Kyum Kim *(ANL)* **Cochairs:** Nicolas Stauff *(ANL)*, Romain Eschbach *(CEA)*
Location: Cascade Ballroom IC **Time:** 1:30-4:15 pm

1:30 pm: A Modern Transmutation Library Database of Nuclear Fuel Cycle Reactor Stage Performance Information, Mark E. Ambrose, Adrian M. Leandro *(Penn State)*, Jin Whan Bae, Joshua L. Peterson-Droogh *(ORNL)*, Michael Todosow *(BNL)*, Nicholas R. Brown *(Univ of Tennessee, Knoxville)*

1:55 pm: A First Approach to Resilience of Nuclear Fuel Cycle Scenarios, Weifeng Zhou, Guillaume Krivtchik, Patrick Blaise *(CEA)*

2:20 pm: Technology Characteristics of Transitions to Solid-Fueled and Molten-Salt Fast Reactor Fleets, E. Hoffman, B. Feng *(ANL)*, B. Betzler, E. Davidson, A. Worrall *(ORNL)*

2:45 pm: Fast Reactor Design for Using Low-Enriched Uranium Startup and Transition, E. Hoffman, T. Fei *(ANL)*

3:10 pm: Analysis of Transition Scenario from a PWR to a SFR Fleet Simulated with the CLASS Code, Léa Tillard, Jean-Baptiste Clavel *(IRSN)*, Xavier Doligez *(IPNO, CNRS-IN2P3)*, Éric Dumonteil *(IRSN)*, Marc Ernoultm Jiali Liang *(IPNO, CNRS-IN2P3)*, Nicolas Thiollière *(SUBATECH)*

COFFEE BREAK: 3:35-3:50 PM

3:50 pm: Prospective Inventory of Radioactive Materials and Waste Produced by the French Nuclear Fleet According to Various Options, C. Chabert, E. Touron, A. Saturnin, G. Krivtchik, G. Martin, Ph. Miranda, F. Courtin, J. L. Girotto, G. Mathonniere, S. Gabriel, R. Eschbach, A. Allou, R. Boccaccio, F. X. Giffard, A. Bonin, P. Casoli *(CEA)*, F. Laugier *(EdF)*, B. Carlier *(Framatome)*, G. Senentz *(Orano)*

Vision to Enhance R&D and International Cooperation on Nuclear Fuel Cycle Activities–Panel
Session Organizer: Fiona E. Rayment *(NNL)* **Cochairs:** Fiona Rayment *(NNL)*, Patricia Paviet *(PNNL)*
Location: Cascade Ballroom II **Time:** 1:30-5:30 pm

This panel will discuss laboratory capabilities and priorities for nuclear fuel cycles over the short, medium and long term. Panel members will discuss the importance of fuel cycle collaboration in an international context, citing a number of examples where collaboration has led to R&D successes. The panel will provide thoughts on their vision for fuel cycle R&D over the coming decade, the challenges faced and the capability requirements (people and infrastructure) in support of this.
Panelists:
John Wagner *(INL)*
Kathy McCarthy *(CNL)*
Gareth Headdock *(NNL)*
Tsunemitsu Yoshitake *(JAEA)*

Global 2019
Technical Sessions:
Tuesday September 24

TUESDAY, SEPTEMBER 24
GLOBAL 2019 TECHNICAL SESSIONS - 9:15 AM

Sustainability of Nuclear Energy Systems–Panel
Session Organizer and Chair: Taek Kyum Kim *(ANL)*
Location: Grand Crescent **Time:** 9:15-11:45 am

The future energy market will likely be dominated by clean and affordable energy sources, and the market environment would depend on various factors, including the renewable portfolio standard adopted by each state, national and global policies on climate change, potential increase in demand for electricity in the transportation sector, the levelized costs of various energy sources to generate electricity, and proper accounting for the full cost of energy generation. In this session, experts on nuclear energy systems and economics will discuss the sustainable strategies for such systems under the future energy market environment.

The topics are:
- Outlook of Current and Future Electricity Market
- Economics of Nuclear Energy Systems
- Flexible Operation of Nuclear Energy Systems in High Market Penetration of Renewables
- Roles of Advanced and Innovative Nuclear Energy Technologies
- Nuclear Energy Systems Cost Reduction Strategies
- Comparing Energy Generation Options
- U.S. Nuclear Fuel Cycle Scenarios—Timing, Infrastructures, and Value of Nuclear Energy

Panelists:
Sonny Kim *(PNNL)*
Edward Hoffman *(ANL)*
Mark Deinert *(CSM)*
Nicolas Stauff *(ANL)*
Brent Dixon *(INL)*

Molten Salt Technologies
Session Organizer: Sven O. Bader *(Orano)* **Chair:** Jinsou Zhang *(VT)*
Location: Cascade Ballroom IA **Time:** 9:15-10:05 am

9:15 am: Development of Separation Technology of Radionuclide in Waste Salt, Geun Il Park, Hwan-Seo Park, Jung Hoon Choi, Ki-Rak Lee, Seung-Youb Han, Jin-Mok Hur *(KAERI)*

9:40 am: In-Situ Spectroscopy of Transition Metal and Lanthanide Chlorides in LiCl-KCl System for Pyroprocessing Application, Ruchi Gakhar, William Phillips, Steven M. Frank *(INL)*

Advanced Reactors —SMR
Cosponsored by RPD. **Session Organizer:** Florent Heidet *(ANL)* **Chair:** Ben Betzler *(ORNL)*
Location: Cascade Ballroom IB **Time:** 9:15-10:55 am

9:15 am: Evaluation of Economic Performance Metrics for Nuclear Power Plant Concepts Based on Small and Medium-Sized Reactor Modules and a Large Nuclear Reactor, A. A. Andrianov, I. S. Kuptsov, T. A. Osipova, T. A. Frolova, T. V. Utyanskaya (National Research Nuclear Univ MEPhI), O. N. Andrianova (JSC SSC RF)

9:40 am: Considerations in Radioactive Waste Management for SMRs—The Role of the IAEA, Ian Gordon, Stefano Monti *(IAEA)*

10:05 am: Three-Dimensional Analysis of Passive Frequency Control in a Soluble-Boron-Free SMR ATOM, Ahmed Amin E. Abdelhameed, Xuan Ha Nguyen, Yonghee Kim *(KAIST)*

10:30 am: Physics Study for Design Optimization of the Soluble-Boron-Free Small Modular Reactor ATOM, Xuan Ha Nguyen, Seongdong Jang, Yonghee Kim *(KAIST)*

TUESDAY, SEPTEMBER 24
GLOBAL 2019 TECHNICAL SESSIONS - 9:15 AM

MSR Fuels and Fuel Cycle Issues
Session Organizer: Jordan D. Rader *(ORNL)* **Chair:** Robert Flanagan *(Univ of South Carolina)*
Location: Cascade Ballroom IC **Time:** 9:15-11:20 am

9:15 am: Feasibility Study on Oxide/Molten Salt-Fueled CANDU Reactor with Two Regions Bundles, Hiroki Ishida, Naoyuki Takaki *(Tokyo City Univ)*

9:40 am: Proliferation and Terrorism Issues Related to Noble Gas Management at Molten Salt Reactors, Edwin Lyman *(UCS)*

10:05 am: Progress in Experimental Development of MSR Fuel Cycle Technology, Jan Uhlíř *(Research Centre Rez)*, Martin Straka *(UJV Řež)*, Martin Mareček *(Research Centre Rez)*, Lórant Szatmáry *(UJV Řež)*

10:30 am: SALIENT-03: Irradiation of Molten Salt Fuel in Ni-Based Alloy Capsules at the High Flux Reactor, E. D'Agata *(EC JRC)*, P. R. Hania *(NRG)*, O. Benes, R. Konings *(EC JRC)*, K. Kottrup *(NRG)*, P. Soucek *(EC JRC)*, D. A. Boomstra, P. J. Baas, F. F Charpin-Jacobs, H. J. Uitslag-Doolaard *(NRG)*, D. Freis *(EC JRC)*

10:55 am: SALIENT-01: Preparation and Start of Irradiation of Thorium-Bearing Molten Fluoride Salt in Graphite Crucibles, P. R. Hania, D. A. Boomstra *(NRG)*, O. Benes, P. Soucek *(EC JRC)*, A. J. de Koning, I. Bobeldijk, S. de Groot *(NRG)*, R. J. M. Konings *(EC JRC)*, E. Capelli *(Delft Univ of Technol)*, M. Naji *(EC JRC)*, C. Sciolla, P. J. Baas, V. R. Bhimanadham, N. B. Siccama, G. I. A. Lippens *(NRG)*

Progress in Fuel Cycle R&D International Collaborations—I–Panel
Session Organizer: Fiona E. Rayment *(NNL)* **Cochairs:** Stephane Bourg *(CEA)*, Terry Todd *(INL)*
Location: Cascade Ballroom II **Time:** 9:15-11:45 am

This panel focuses on the progress being made in fuel cycle R&D through international engagement. It will look at examples of international success including work through Euratom and a number of bilateral engagements. Importantly it will bring together experienced and less experienced members of the international fuel cycle community to explore areas of current thinking.

Panelists:
Sal Golub *(DOE NE)*
Stephane Bourg *(CEA)*
Tsunemitsu Yoshitake *(JAEA)*
Joel Turner *(Univ of Manchester)*
Allan Germain *(CEA)*

GLOBAL 2019 TECHNICAL SESSIONS - 1:00 PM

U.S. National Laboratory Glenn T. Seaborg Institutes Fuel Cycle Research–Panel
Session Organizer and Chair: Donald Wood *(INL)*
Location: Grand Crescent **Time:** 1:00-5:30 pm

The Glenn T. Seaborg Institutes within the national laboratories will present the current state of heavy element research as it relates to the fuel cycle and other industry sectors. The panel discussion will feature a short presentation by each panel member followed by a directed discussion focused on the state of the industry.

Panelists:
Terry Todd *(INL)*
Franz Friebert *(LANL)*
Rebecca Abergel *(LBNL)*
Mavrik Zavarin *(LLNL)*

TUESDAY, SEPTEMBER 24
GLOBAL 2019 TECHNICAL SESSIONS - 1:00 PM

Advanced Safeguards
Cosponsored by NNPD. **Session Organizer and Chair:** L. Eric Smith *(PNNL)*
Location: Cascade Ballroom IA **Time:** 1:00-3:30 pm

1:00 pm: Automating Spent Fuel Defect Detection with Fused DCVD and GET Data, Evangelina Brayfindley *(NCSU)*, Robert Brigantic *(PNNL)*, Ralph C. Smith, John Mattingly *(NCSU)*, Robert Brigantic *(PNNL)*

1:25 pm: Near Real Time Enrichment Verification with Gas Phase UF_6 Alpha Spectroscopy, Cari Launiere, Anil Mane *(ANL)*, Kristin Knight, Katherine Charbonnet *(Univ of Memphis)*, Joseph Savina, Jeffrey Elam, Candido Pereira *(ANL)*, William Alexander *(Univ of Memphis)*

1:50 pm: Thermal Conductivity Measurement of Non-Stoichiometric UO_2 Pellet for Advanced Nuclear Material Accountancy, Gyeonghun Kim, Jungsu Ahn, Sangjoon Ahn *(UNIST)*

2:15 pm: Process Simulation Tools for Process Control and Safeguards Purpose, B. Dinh, V. Vanel, C. Sorel, A. Duterme, M. Montuir, G. Ferlay *(CEA)*

2:40 pm: IAEA Design Information Verification Authorities for Small Modular Reactors: Potential Challenges and Solutions, D. A. Donnellly, R. T. Otto, C. E. Mathews, B. A. Wilson *(PNNL)*, M. J. Schanfein *(INL)*

3:05 pm: Real-Time Process Monitoring for Plutonium Content of U-TRU Alloys, James A. King, Brian Robert Westphal *(INL)*

Advanced Reactors—Reactor Physics
Cosponsored by RPD. **Session Organizer:** Florent Heidet *(ANL)* **Chair:** Andy Worrall *(ORNL)*
Location: Cascade Ballroom IB **Time:** 1:00-3:30 pm

1:00 pm: A Neutronic Study of Small Long-Cycle Fast Reactor Core with Recycling, Yeong Uk Jo, Ser Gi Hong *(Kyung Hee Univ)*

1:25 pm: Void Effects in Reactor Charged with Plutonium, B. Gastaldi, R. Eschbach *(CEA)*

1:50 pm: A Collision Probability and Depletion Model for Rapid Scoping and Optimization of Nuclear Reactors, Jessica J. Berry, Andrew G. Osborne *(CSM)*

2:15 pm: Assessment of Annular Metallic Fuel in High-Burnup Fast Reactor, N. E. Stauff, Y. Miao, A. Oaks, T. K. Kim *(ANL)*, S. Hayes *(INL)*

2:40 pm: Uranium Utilization and Material Damage in B&B Reactors with Slightly Enriched Fuel, Chris Keckler, Massimiliano Fratoni, Ehud Greenspan *(Univ of California, Berkeley)*

3:05 pm: FAST (Floating Absorber for Safety at Transient) as a Solution for Positive Coolant Temperature Coefficient in Sodium-Cooled Fast Reactors, Chihyung Kim, Yonghee Kim *(KAIST)*

Fuel Cycle Modeling and Simulation—I
Session Organizer: Taek Kyum Kim *(ANL)* **Chair:** Eva Davison *(ORNL)*
Location: Cascade Ballroom IC **Time:** 1:00-3:05 pm

1:00 pm: Recent Improvements to the Advanced Fuel Cycle Cost Basis Report, Francesco Ganda *(ANL)*, Jason K. Hansen *(INL)*, Kent A. Williams *(Consultant)*, Ed Hoffman *(ANL)*, B. Dixon *(INL)*, T. K. Kim, T. Taiwo *(ANL)*

1:25 pm: Solvent Extraction Flowsheet-Level Modeling and Simulation with Radiolysis, Valmor F. de Almeida, Taha Azzaoui *(Univ of Massachusetts Lowell)*, Kevin L. Lyon *(INL)*

1:50 pm: Scenario Analysis Tool Nuclear Fuel Cycle Simulation System (NFCSS): Safety Assessments in the Context of Spent Fuel Management and Disposal, E. Minari *(Tokyo Inst of Technology)*, K. S. Sim *(IAEA)*, R. Yoshioka *(International Thorium Molten-Salt Forum)*, K. Takeshita *(Radioactive Waste Management Funding and Research Center)*

2:15 pm: Demonstration of Demand Driven Deployment Capabilities in Cyclus, Gwendolyn J. Chee *(Univ of Illinois)*, Jin Whan Bae *(ORNL)*, Robert R. Flanagan *(Univ of South Carolina)*, Roberto E. Fairhurst Agosta, Kathryn D. Huff *(Univ of Illinois)*

2:40 pm: Methods for Automated Fuel Cycle Facility Deployment, Robert R. Flanagan *(Univ of South Carolina)*, Gwendolyn J. Chee *(Univ of Illinois)*, Jin Whan Bae *(ORNL)*, Roberto E. Fairhurst, Kathryn D. Huff *(Univ of Illinois)*

TUESDAY, SEPTEMBER 24
GLOBAL 2019 TECHNICAL SESSIONS - 1:00 PM

Building Next Generation Nuclear; Enabling Succession Planning to Create and Maintain a Well Educated Workforce in the NE Sector–Panel
Session Organizer: Fiona E. Rayment *(NNL)* **Chair:** John Kelly *(Individual)*
Location: Cascade Ballroom II **Time:** 1:00-5:30 pm

This panel addresses some of the key challenges for our sector with respect to maintaining and growing a healthy and diverse talent pipeline of higher level skills and subject matter experts to drive future thought leadership in fuel cycle. The panel will explore initiatives that are occurring internationally on this topic both from a national perspective and from a multi-national approach. This panel consists of experts from national and multi-national organizations who are exploring solutions to the nuclear skills challenge.
Panelists:
Patricia Paviet *(PNNL)*
Il Soon Hwang *(UNIST)*
Leon Cizelj *(ENEN)*
Fiona Rayment *(NNL/Nuclear Skills Strategy Group)*
Stefano Monti *(IAEA)*
Adrien Couet *(Univ of Wisconsin, Madison)*
Joelle Reiser *(NEUP)*

GLOBAL 2019 POSTER SESSION - 5:30 PM

Global 2019 Poster Session
Session Organizer and Chair: Jack D. Law *(INL)*
Location: Grand Ballroom I **Time:** 5:30-7:30 pm

1. Estimation of Hydrogen Gas Production at Transient Criticality in Uranyl Nitrate Solution, Ryoichiro Yoshida, Yuichi Yamane, Hitoshi Abe *(JAEA)*
2. A Study on the Use of Multiple Liquid Cadmium Cathodes in Electrorefining Process, Gha-Young Kim, Junhyuk Jang, Chang Hwa Lee, Seungwoo Paek, Seung-Jai Lee *(KAERI)*
3. Effects of Operational and Structural Parameters on Hydrodynamic Characteristics of the 30%TBP/Kerosene-HNO3 Solution System in an Annular Centrifugal Contactor, Honglin Chen, Wuhua Duan *(Tsinghua Univ)*
5. Study on Eutectic Melting Behavior of Control Rod Materials in Core Disruptive Accidents of Sodium-Cooled Fast Reactors: (1) Project Overview, Hidemasa Yamano, Toshihide Takai, Tomohiro Furukawa, Shin Kikuchi, Yuki Emura, Kenji Kamiyama *(JAEA)*, Hiroyuki Fukuyama, Hideo Higashi *(Tohoku Univ.)*, Tsuyoshi Nishi, Hiromichi Ohta *(Ibaraki Univ.)*, Xiaoxing Liu, Koji Morita *(Kyushu Univ.)*, Kinya Nakamura, Hirokazu Ohta, Masahiro Furuya *(CRIEPI)*
6. A Proposed Molten Uranium Thermal Breeder Reactor and Fuel Cycle, Neal L. Mann *(Neal Mann & Associates)*, Mihai (Mike) G. Pop *(AREVA NP, Inc.)*
7. Neutronic Analysis of a Liquid Metal Fast Reactor Experiment in the Large-I Position of the Advanced Test Reactor, B. Lilley, T. Palmer *(Oregon State Univ)*, D. LaBrier *(Idaho State Univ)*, A. Higgins, W. Marcum *(Oregon State Univ)*
8. Remote Fuel Fabrication Mock-Up, Kiho Kim, Sanggyu Park, Hoon Song, Jeongyong Park *(KAERI)*
9. Enhancing MA Transmutation by Irradiation of (MA, Zr)Hx in FBR Blanket Region—Fabrication of (Am, Zr) Alloy, Mutsumi Hirai, Toru Higuchi, Atsushi Ouchi *(Nippon Nuclear Fuel Development Co. Ltd.)*, Kenji Konashi *(Tohoku Univ)*, Hiroaki Muta, Ken Kurosaki *(Osaka Univ)*, Vadim A. Yefimov, Andrey A. Lizin, Sergey V. Tomilin, Alexander G. Osipenko, Sergey S. Poglyad *(Joint Stock Company ''State Scientific Centre - Research Inst of Atomic Reactors")*
10. Improved High Temperature Oxidation Resistance of U_3Si_2 Fuel Pellets Coated by Atomic Layer Deposition, Sumit Bhattacharya, Laura M. Jamison, Yinbin Miao, Abdellatif M. Yacout *(ANL)*

TUESDAY, SEPTEMBER 24
GLOBAL 2019 POSTER SESSION - 5:30 PM

Global 2019 Poster Session Continued

11. Experimental Study on Alkali and Alkaline Earth Metal Oxide Solubility in LiCl at 923 K, Dokyu Kang Seokjoo Yoon *(KAIST)*, Byung Heung Park *(Korea National Univ of Transportation)*, Sungyeol Choi *(KAIST)*

12. Zr Separation from High Level Liquid Waste with a Novel Hydroxyacetoamide Type Extractant, K. Morita, H. Suzuki, T. Matsumura *(JAEA)*, Y. Takahashi, T. Omori, M. Kaneko, K. Asano *(Toshiba ESS)*

13. Separation Process of Long-Lived Fission Products from High-Level Radioactive Wastes, Yuya Takahashi, Takashi Omori, Eiichi Murata, Yu Yamashita, Masaaki Kaneko, Kazuhito Asano *(Toshiba ESS)*, Keisuke Morita, Hideya Suzuki, Tatsuro Matsumura *(JAEA)*

14. Using NMR Spectroscopy to Elucidate Acid-Dissociation Constants of Organic Ligands in Highly Acidic Media, Corey D. Pilgrim, Colt R. Heathman, Travis S. Grimes (INL), Santa Jansone-Popova *(ORNL)*, Peter R. Zalupski *(INL)*

15. Studies on Separation of Platinum Group Metals from High-Level Liquid Waste Using Sulfur-Containing Amide Compounds Fixed Adsorbents, Tatsuya Ito, Naoki Osawa, Haruka Oosugi, Seong-Yun Kim *(Tohoku Univ)*

16. Innovative Density Based Separation Between Actinides and Lanthanides Using Liquid Bi for Eliminating High Level Wastes from Pyroprocessing of Spent Nuclear Fuel, Sungjune Sohn, Jaeyeong Park, Il Soon Hwang *(UNIST)*

17. Adsorption and Separation of Sr(II) and Y(III) by Extraction Chromatography Using DtBuCH18C6-Impregnated Adsorbent, Seong-Yun Kim, Taiga Kawamura, Tatsuya Ito *(Tohoku Univ)*

18. Method for Identifying Waste Types and Data Properties in Radioactive Waste Drums, Hee Seoung Park, Jeoung-Guk Kim, Dae-Seok Hong *(KAERI)*

19. Fenton/Fenton Like Treatment for Spent Ion Exchange Resin, Wooyong Um, Muhammad Aamir Hafeez *(POSTECH)*

20. Status of Research and Development of Fabricating Large-Size High-Level Waste Pellet by Hot Press, Yoichi Endo, Akihiro Suzuki *(Nippon Nuclear Fuel Development)*

21. Lab-Scale Electrorefining Experiments for Decontamination of Intermediate Level Reactor Internals from PWR Decommissioning, Jungho Hur, Sungjune Sohn, Jaeyeong Park (UNIST), Il Soon Hwang *(Seoul Natl Univ)*

22. Modeling of Residual Actinide Recovery Process from High-Level Salt Waste Using Molten Salt-Liquid Metal Extraction Process, Byung Gi Park, Hwajeong Han *(Soonchunhyang Univ)*, Bongsoo Lee *(Chung-Ang Univ)*

23. Development and Validation of a Dynamic Model for Reductive Stripping of Plutonium(IV) in PUREX, Ting Yu, Ye Guoan, Hui He, Hongbin Tang, Zhanyuan Liu *(China Inst of Atomic Energy)*

24. Remote Sensing of Radiological Materials in a Wide Area Using Unmanned Aerial Systems, Monia Kazemeini, Alexander Barzilov, Woosoon Yim *(UNLV)*

25. Co-Crystallization Flowsheet Concept for Group Hexavalent Actinide Separations, Travis Grimes, Kevin Lawrence Lyon *(INL)*, Jonathan D. Burns *(Texas A&M)*, Jack D. Law *(INL)*

26. Design Considerations for a ZIRCEX Pilot Plant, Melissa Warner, Rick L. Demmer, Julia L. Tripp, Richard D. Tillotson, Amy K. Welty *(INL)*

27. A Novel Approach to Measurement of in-Core Temperatures Based on Ultrasonic Guided Waves for Advanced Reactors, Nesrin O. Cetiner *(UT-Battelle/ORNL)*, Sacit M. Cetiner *(ORNL)*, Michael J. Roberts *(Univ of Tennessee)*, Venugopal K. Varma, Govindarajan Muralidharan, Thomas R. Muth, Rose Montgomery *(ORNL)*

WEDNESDAY, SEPTEMBER 25
GLOBAL 2019 TECHNICAL SESSIONS - 8:00 AM

Modeling and Simulation of Advanced Technologies
Session Organizer and Chair: Robert Flanagan *(Univ of South Carolina)*
Location: Grand Crescent **Time:** 8:00-11:35 am

8:00 am: First-Principles Prediction of Universal Relation Between Exchange Current Density and Adsorption Energy of Rare-Earth Elements in a Molten Salt, Byungchan Han, Choah Kwon *(Yonsei Univ)*

8:25 am: A Comparative Assessment of the Waste Arisings from an Advanced PUREX Reprocessing Flowsheet, Ross Harris, David Graham, Robin J. Taylor, Mark Sarsfield *(NNL)*

8:50 am: Electrochemical Process Models for Treatment of Used Nuclear Fuel, Candido Pereira, Laura Maggos, Jackie Copple *(ANL)*

COFFEE BREAK: 9:15-9:30 AM

9:30 am: Impacts of Fast-Spectrum Molten Salt Reactor Characteristics on Fuel Cycle Performance, Benjamin R. Betzler *(ORNL)*, Andrei Rykhlevskii *(Univ of Illinois)*, Andrew Worrall *(ORNL)*, Kathryn D. Huff *(Univ of Illinois)*

9:55 am: Initial Accident-Tolerant Fuel/Cladding Extensions to the VERA-to-Bison Offline Coupling, Aaron J. Reynolds *(Oregon State Univ)*, Shane G. Stimpson *(ORNL)*, Russell Gardner *(INL)*

10:20 am: Effect of Residual Pore on the Thermal-Mechanical Performance of Un Kernel TRISO Particle Fuel, Schichao Liu, Ping Chen , Yi Zhou, Hua Pang, Xong Xi, Changbing Tang, Yanli Zhao, Xi Qiu, Zixuan Guo *(Nuclear Power Inst of China)*

10:45 am: Research on Thermal Diffusion Coefficient Calculation for Subchannels with Spacer Grid Using CFD Methodology, Xi Chen, Sijia Du, Yu Liu, Libo Qian, Lili Liu *(Nuclear Power Inst of China)*

11:10 am: Mitigation of Axial Power Peaking in Alternative Heavy Water Reactors Fuels Using Thoriated End Pellets, H. V. Yan, S. Golesorkhi, B. P. Bromley, C. Dugal *(CNL)*

Waste Form Technologies
Session Organizer: Sven O. Bader *(Orano)* **Chair:** Stephanie Bruffey *(ORNL)*
Location: Cascade Ballroom IA **Time:** 8:00-11:35 am

8:00 am: Synthesis of Simulated Nuclear Waste Immobilization in Apatite Wasteforms Containing Al, Shun Kanagawa *(Tokyo Inst Technol)*, Dong Zhili, Tom Baikie, Tim White *(Nanyang Technological Univ)*, Yukako Aoyama *(Tokyo Inst Technol)*, Masatoshi Iizuka, Takatoshi Hijikata *(CRIEPI)*, Kenji Takeshita (*Tokyo Inst Technol)*

8:25 am: Reduction Reactions of Vanadium as a Neptunium Analogue with Nitrogen Oxide Species, Michael Chimes, Colin Boxall, Scott Edwards (Lancaster Univ), Mark Sarsfield, Robin J. Taylor, Dave Woodhead *(NNL)*

8:50 am: Towards the Decontamination of Plutonium Contaminated Bricks: Creation of a Cerium-Based Simulant Contamination System, James Kennedy *(Lancaster Univ/NNL)*, Colin Boxall *(Lancaster Univ)*, Anthony Banford *(NNL)*, Rick Demmer *(INL)*, Andrew Parker *(Univ of Central Lancashire)*

COFFEE BREAK: 9:15-9:30 AM

9:30 am: Incorporation of Platinum-Group Metals in High-Level Waste Borosilicate Glass: Focus on the Capabilities of the Induction Heated Metallic Melter Operated at La Hague Plant, Régis Didierlaurent, Cèline Roussel *(Orano)* Virginie Labe, Muriel Neyret *(CEA)*, Christophe Renaut, Catherine Veyer *(Orano)*

9:55 am: Development of High Waste Loading Glasses, Yoshiyuki Miura, Hiroto Mitsuhashi, Taku Hashimoto, Tatsuya Horimai, Takahiro Ishio, Norio Kanehira *(JNFL)*

10:20 am: Porous Glass Approach for Reduction of Secondary Molybdate Phase in Vitrification of PUREX Raffinate, Kazuyoshi Uruga, Tsuyoshi Usami, Takeshi Tsukada *(CRIEPI)*

10:45 am: Development of Acid Leaching Method to Retrieve High-Level Wastes from Nuclear Waste Glass, Koichiro Takao, Takahiro Mori, Mayuu Kubo, Yasuhisa Ikeda *(Tokyo Inst Technol)*

11:10 am: Alteration and Leaching Behavior of Simulated Nuclear Waste Glass in Different Acidic Solutions, Mayuu Kubo, Koichiro Takao *(Tokyo Inst Technol)*

Global 2019 Technical Sessions: Wednesday September 25

WEDNESDAY, SEPTEMBER 25
GLOBAL 2019 TECHNICAL SESSIONS - 8:00 AM

Advanced Reactors—Reactor Concepts
Cosponsored by RPD. **Session Organizer:** Florent Heidet *(ANL)* **Chair:** Max Fratoni *(Univ of California, Berkeley)*
Location: Cascade Ballroom IB **Time:** 8:00-9:55 am

8:00 am: Long Core Life Design Options for the Westinghouse LFR, T. K. Kim, N. Stauff *(ANL)*, C. Stansbury. A. Levinsky, Fausto Franceschini *(Westinghouse)*

8:25 am: GEMINI+ Design Options for HTGR Fitting the Requirements for Cogeneration Use in Europe, J. Lavarenne *(Wood)*, V. Amezcua *(Empresarios Agrupados)*, O. Braudrand *(IRSN)*, G. Brinkmann *(BriVaTech)*, W. Brudek *(Energoprojekt)*, M. Davies *(Wood)*, D. Hittner *(LGI)*, J. C. Kuijper *(NUCLIC)*, B. Lindley, J. Lillington *(Wood)*, F. Shahrokhi *(Empresarios Agrupados)*, M. M. Stempniewicz *(NRG)*, D. Vanvor *(BriVaTech)*, G. Wrochna *(NCBJ)*

8:50 am: The Westinghouse Lead Fast Reactor Program, P. Ferroni, C. Stansbury, J. Liao, D. Utley, A. Levinsky, R. Wright, E. Gustavsson, H. Perry, J. Gorgemans *(Westinghouse),* S. J. Lee *(Fauske & Assosc)*, M. Ickes, G. Banyay, F. Franceschini, A. Harkness, J. Wills, J. Chrzanowski, B. Friedman, E. Tatli *(Westinghouse)*, G. Grasso. M. Tarantino *(Italian National Agency for New Technologies)*, M. Frignani *(Ansaldo Nucleare S.P.A.)*

COFFEE BREAK: 9:15-9:30 AM

9:30 am: A Molten Fuel Thermal Breeder—A New Solution for Recycling, Neal L. Mann *(Neal Mann & Associates)*, Mihai (Mike) G. Pop *(AREVA NP, Inc.)*

Fuel Cycle Scenario Analysis—II
Session Organizer: Taek Kyum Kim *(ANL)* **Chair:** Bo Feng *(ANL)*
Location: Cascade Ballroom IC **Time:** 8:00-8:50 am

8:00 am: Interrelationship and the Effects of Introducing Separation Technologies in the Nuclear Fuel Cycle for Enhanced Radioactive Waste Management, Tomohiro Okamura, Eriko Minari, Masahiko Nakase *(Tokyo Inst of Technol)*, Hidekazu Asano *(Tokyo Inst of Technol/Radioactive Waste Management Funding and Research Center)*, Kenji Takeshita *(Tokyo Inst of Technol)*

8:25 am: Characteristics of TRU Fueled SFR Core During the Partial Loading of LEU Assemblies, Hikaru Hiruta, Brent W. Dixon *(INL)*

Progress in Fuel Cycle R&D International Collaborations—II–Panel
Session Organizer: Fiona E. Rayment *(NNL)* **Cochairs:** Stephane Bourg *(CEA)*, Terry Todd *(INL)*
Location: Cascade Ballroom II **Time:** 8:00-11:45 am

This panel focuses on the progress being made in fuel cycle R&D through international engagement. It will look at examples of international success including work through Euratom and a number of bilateral engagements. Importantly it will bring together experienced and less experienced members of the international fuel cycle community to explore areas of current thinking.
Panelists:
Terry Todd *(INL)*
Robin Taylor *(NNL)*
Chao Xu *(Tsinghua Univ)*
Dokyu Kang *(KAIST)*

WEDNESDAY, SEPTEMBER 25
GLOBAL 2019 TECHNICAL SESSIONS - 1:00 PM

Pyrochemical Processing
Session Organizer: Jack D. Law *(INL)* **Chair:** Supathorn (Supy) Phongikaroon *(VCU)*
Location: Grand Crescent **Time:** 1:00-2:40 pm

1:00 pm: Pyroprocessing Technology Development for Flexible Introduction of Fast Reactor Fuel Cycle, Masatoshi Iizuka *(CRIEPI)*, Toshiyuki Nohira *(Kyoto Univ)*, Kohei Tada *(JAEA)*, Tsuyoshi Murakami *(CRIEPI)*, Hirohide Kofuji *(JAEA)*

1:25 pm: High-Efficiency Dehalogenation of LiCl-KCl Based Electrorefiner Salt Using Protonated Ultrastable Y-Type (USHY) Zeolite via Ion-Exchange, M. S. Wasnik, T. Livingston, K. Carlson, M. F. Simpson *(Univ of Utah)*

1:50 pm: Electrochemical Behavior of Liquid Gallium Electrode in Pyroprocessing, Tsuyoshi Murakami, Masatoshi Iizuka *(CRIEPI)*

2:15 pm: Recent Progress on Development of Pyroprocessing Technology for Minor Actinide Transmutation Nitride Fuels, Hirokazu Hayashi, Takumi Sato, Haruka Tateno, Shin Akashi, Hiroki Shibata, Yasuhiro Tsubata *(JAEA)*

Safety HLW
Session Organizer: Sven O. Bader *(Orano)* **Chair:** Arthur Niemoller *(Orano)*
Location: Cascade Ballroom IA **Time:** 1:00-1:50 pm

1:00 pm: Volatilization and Trapping of Ruthenium Under a Loss of Cooling Accident on High Level Liquid Waste *(HLLW)* Storage Tank in Reprocessing Plants, P. Nerisson, M. Barrachin, L. Cantrel, M. Philippe *(IRSN)*

1:25 pm: Conversion of Irradiated Uranium Metal to UO_2 for Safe Interim Storage and Final Disposal, Anders Puranen, Kyle D. Johnson, Alexandre Barreiro *(Studsvik Nuclear AB)*, Peter Bennett *(Inst for Energiteknikk)*

Monitoring and Lifetime Extension
Session Organizer: Sven O. Bader *(Orano)* **Chair:** Arthur Niemoller *(Orano)*
Location: Cascade Ballroom IA **Time:** 2:15-4:10 pm

2:15 pm: Real-Time Solution Analysis in Microfluidic Devices Using Optical Spectroscopy, Samuel A. Bryan, Amanda M. Lines *(PNL)*, Gilbert L. Nelson *(College of Idaho)*, Amanda J. Casella, Susan E. Asmussen, Hannah B. Bryan *(PNNL)*, Job M. Bello *(Spectra Solutions, Inc)*

2:40 pm: Tritium Detection By Electrochemical Assisted Radiometrics (TRIBECA), Ghebrehiwot Berhane, Colin Boxall *(Lancaster Univ)*, Frank Cave *(Hybrid Instrument)*, Malcolm Joyce *(Lancaster Univ/Hybrid Instrument)*, Jackie Pates *(Lancaster Univ)*

3:05 pm: NMR Spectroscopic Studies of Water Dynamics Confined in Cation-Exchanged Montmorillonites, Rongwei Sun, Takehiko Tsukahara *(Tokyo Inst Technol)*

COFFEE BREAK: 3:30-3:45 PM

3:45 pm: Life Extension and Accelerated Testing, **CANCELED** ~~Michael J. Fluss *(NMTC)*~~, Edward I. Mosses *(Longview Consulting, Inc.)*

Global 2019 Technical Sessions: Wednesday September 25

WEDNESDAY, SEPTEMBER 25
GLOBAL 2019 TECHNICAL SESSIONS - 1:00 PM

Advanced Fuels/Targets/Materials—I
Session Organizer: Jack D. Law *(INL)* **Chair:** Mark Sarsfield *(NNL)*
Location: Cascade Ballroom IB **Time:** 1:00-4:35 pm

1:00 pm: Benchmark Study on Fuel Performance Codes for Fast Reactors, N. Chauvin *(CEA)*, L. Capriotti *(INL)*, S. Gianfelici *(KIT)*, J. Harp *(INL)*, J. H. Kim *(KAERI)*, M. Lainet *(CEA)*, C. B. Lee *(KAIST)*, T. Ogato, H. Ohto *(CRIEPI)*, T. Ozawa *(JAEA)*, A. Schubert, P. Von Uffelen *(JRC)*, S. Cornet *(NEA)*

1:25 pm: Overview of Axially Heterogeneous PAVIX 8 Fuel in Irradiation in PHENIX Within the Frame of the French GEN IV Development Program, I. Munoz-Viallard, Ph Bienvenu, K. Hanifi, M. Pelletier, M. Masson *(CEA)*

1:50 pm: New Measurements on $(U,Pu)O_2$ Properties Within European Projects: ESNII+ and ESFR-SMART, N. Chauvin *(CEA)*, D. Staicu, D. Nanara, P. Raison *(JRC)*, Ph. M. Martin *(CEA)*

2:15 pm: Development of Barrier Cladding Technology for the Usage of Metal Fuel, Jun Hwan Kim, Sunghwan Yeo, Sung Ho Eom, Sung Ho Kim, Jeong Yong Park *(KAERI)*, Min Soo Lee, Tai Hong Yim *(Korea Inst of Industrial Technol)*

2:40 pm: Postirradiation Examinations of Annular Fast Reactor MOX, F. Cappia, J. Harp *(INL)*, K. Tanaka, M. Kato *(JAEA)*, K. McClellan *(LANL)*

3:05 pm: Investigation of Antimony as a Fuel Additive to Control FCCI in a Transmutation Fuel, Michael T. Benson, Yi Xie, James A. King, Daniel Murray, Lingfeng He *(INL)*, Indrajit Charit, Samrat Choudhury *(Univ of Idaho)*, Jinsuo Zhang *(Virginia Tech)*

COFFEE BREAK: 3:30-3:45 PM

3:45 pm: Technological Development of the Particle Size Adjustment of Dry Recovered Powder, Tomoomi Segawa, Kazuya Yamamoto, Takayoshi Makino, Hidetoshi Iso, Koichi Kawaguchi, Katsunori, Ishii, Hisato Sato *(JAEA)*, Tomonori Fukasawa, Kunihiro Fukui *(Hiroshima Univ)*

4:10 pm: Development of Advanced Fabrication Process for Metallic Fuel, Jeong-Yong Park, Kiho Kim, Hoon Song, Seok-Jin Oh, Sang-Gyu Park, Seoung-Woo Kuk, Kyung-Chai Jeong, Ki-Hwan Kim *(KAERI)*

Trends in Nuclear Energy Fuel Cycles
Session Organizer: Taek Kyum Kim *(ANL)* **Cochairs:** Ross Hays *(INL)*, Eriko Minari *(Tokyo Inst of Technol)*
Location: Cascade Ballroom IC **Time:** 1:00-3:05 pm

1:00 pm: Prospective Nuclear Fuel Cycle Characteristics of Advanced Nuclear Energy Systems, T. K. Kim, T. A. Taiwo *(ANL)*, B. W. Dixon *(INL)*, M. Todosow *(BNL)*, A. Worrall *(ORNL)*

1:25 pm: **CANCELLED:** ~~The Complexation of Ln(III)/An(III) with Cyanex301 Investigated with Spectroscopy, Suliang Yang, Qiang Liu, Yan Zhang, Tuo Fang, Dingming Li, Guoxin Tian *(China Inst of Atomic Energy)*~~

1:50 pm: Westinghouse Approach to Flexible Power Operation in PWRs, Jeffery A. Brown, Robert E. Becse *(Westinghouse)*

2:15 pm: IAEA On-Going Activities on Power Reactors Fuel Engineering and Spent Fuel Management, Amparo González-Espartero, Mikhail Veshchunov, Ki Seob Sim, Laura McManniman, Christoph Gastl, Clément Hill *(IAEA)*

2:40 pm: Using a Technology and Systems Readiness Assessment to Roadmap a Nuclear Energy R&D Program, B. W. Dixon *(INL)*, W. G. Halsey *(LLNL – retired)*, T. K. Kim *(ANL)*, G. Matthern, N. R. Soelberg *(INL)*, M. Todosow *(BNL)*

THURSDAY, SEPTEMBER 26
GLOBAL 2019 TECHNICAL SESSIONS - 8:00 AM

Minor Actinide and Lanthanide Separations—II
Session Organizer: Jack D. Law *(INL)* **Chair:** Kristain Myhre *(ORNL)*
Location: Grand Crescent **Time:** 8:00-11:10 am

8:00 am: GENIORS, Assessing the MOX Fuel Reprocessing in GEN IV Systems, Stéphane Bourg *(CEA)*, Andreas Geist *(KIT)*, Jean-Marc Adnet *(CEA)*, Chris Rhodes *(NNL)*, Bruce Hanson *(Univ of Leeds)*

8:25 am: Characterization of HONTA/SiO2-P Adsorbent for MA(III)/Ln(III) Separation Flow-Sheet, Masayuki Takeuchi, Sou Watanabe, Yuichi Sano, Hirohide Kofuji, Hideya Suzuki, Tatsuro Matsumura *(JAEA)*

8:50 am: Back Extraction Method for Minor Actinide Solvent Extraction Using Solubility-Enhanced Nitrogen-Donor Ligand, Daisuke Watanabe *(Hitachi-GE Nuclear Energy/Hitachi)*, Yuko Kani, Akira Sasahira (Hitachi), Kuniyoshi Hoshino *(Hitachi-GE Nuclear Energy)*

9:15 am: Electrophoretic Separations of Lanthanum and Gadolinium for Used Nuclear Fuel Reprocessing, Sydney Hodampf, Mark R. Deinert *(CSM)*

COFFEE BREAK: 9:40-9:55 AM

9:55 am: Studies on Lanthanide (III) Hydration Structure in Poly(N-Isopropyl Acrylamide) Polymer Networks Grafted onto Porous Silica for Partitioning of Radionuclides, Yokajaksusri Nutthon, Takehiko Tsukahara *(Tokyo Inst Technol)*

10:20 am: Solvent Washing Schemes for the ALSEP Process Solvent, Dean R. Peterman *(INL)*

10:45 am: Absolute Complexation Kinetics for Lanthanide Ions in the Aqueous and Organic Phases, Stephen Mezy, Kristian Larsson *(California State Univ at Long Beach)*

Transportation
Session Organizer: Sven O. Bader *(Orano)* **Chair:** Matthew R. Feldman *(ORNL)*
Location: Cascade Ballroom IA **Time:** 8:00-8:50 am

8:00 am: Transport of Irradiated Research Reactor Fuels in the BEA Research Reactor Package, Phillip W. Noss, Richard J. Smith, *(Orano)*

8:25 am: Use of Multi-Attribute Utility Analyses to Assess Transportation Routes from ISFSIs, Sven Bader, Isabel Srivoraphan, Michael Murray *(Orano)*

Disposition and Security of SNF
Session Organizer: Sven O. Bader *(Orano)* **Chair:** Andrew Newman *(NTI)*
Location: Cascade Ballroom IA **Time:** 8:50-10:20 am

8:50 am: Deep Isolation: Innovative Technology for the Disposal of Spent Nuclear Fuel and Other High-Level Waste, Rodney (Rod) A. Baltzer *(Deep Isolation)*

9:15 am: Disposition Pathway for Used Nuclear Fuel, Chuck Soderquist, Bruce McNamara, Gregg J. Lumetta, Dallas Reilly *(PNNL)*

COFFEE BREAK: 9:40-9:55 AM

9:55 am: Security and Proliferation Risks Associated with Management of Spent Fuel Nuclear Fuel, Alex Bednarek, Andrew Newman *(Nuclear Threat Initiative)*

THURSDAY, SEPTEMBER 26
GLOBAL 2019 TECHNICAL SESSIONS - 8:00 AM

Advanced Reactors—Fuels and Materials
Cosponsored by RPD. **Session Organizer:** Florent Heidet *(ANL)* **Chair:** Andy Worrall *(ORNL)*
Location: Cascade Ballroom IB **Time:** 8:00-10:20 am

8:00 am: Study on Eutectic Melting Behavior of Control Rod Materials in Core Disruptive Accidents of Sodium-Cooled Fast Reactors: (2) Effect of B_4C Addition on Thermophysical Properties of Austenitic Stainless Steel in a Solid State, Toshihide Takai, Tomohiro Furukawa, Hidemasa Yamano *(JAEA)*

8:25 am: Study on Eutectic Melting Behavior of Control Rod Materials in Core Disruptive Accidents of Sodium-Cooled Fast Reactors: (3) Effect of B_4C Addition on Thermophysical Properties of Austenitic Stainless Steel in a Liquid State, Hiroyuki Fukuyama, Hideo Higashi *(Tohoku Univ)*, Hidemasa Yamano *(JAEA)*

8:50 am: Study on Eutectic Melting Behavior of Control Rod Materials in Core Disruptive Accidents of Sodium-Cooled Fast Reactors: (4) Effect of B_4C Addition on Viscosity of Austenitic Stainless Steel in a Liquid State, Hiromichi Ohta, Hiroki Kokubo, Tsuyoshi Nishi *(Ibaraki Univ)*, Hidemasa Yamano *(JAEA)*

9:15 am: Development of a Fuel Safety Research Program for Metallic Fast Reactor Fuels, C. Jensen, D. Wachs, F. Di Lemma, M. Benson *(INL)*, B. Heath *(DOE)*

COFFEE BREAK: 9:40-9:55 AM

9:55 am: A2-D Correlation to Evaluate Fuel-Cladding Gap Thermal Conductance in Mixed Oxide Fuel Elements for Sodium-Cooled Fast Reactors, J. Lavarenne *(Wood)*, E. Bubelis *(KIT)*, U. Davies *(Univ of Cambridge)*, S, Gianfelici *(KIT)*, S. Gicquel *(EdF)*, J. Krepel *(PSI)*, M. Lainet *(CEA)*, B. Lindley *(Wood)*, K. Mikityuk *(PSI)*, C. Murphy *(Wood)*, B. Perrin *(Framatome)*, W. Pfrang *(KIT)*, A. Ponomarev *(PSI)*, A. Schubert *(JRC)*, E. Shwageraus *(Univ of Cambridge)*, P. Van Uffelen *(JRC)*

Fuel Cycle Modeling and Simulation—II
Session Organizer: Taek Kyum Kim *(ANL)* **Chair:** Ed Hoffman *(ANL)*
Location: Cascade Ballroom IC **Time:** 8:00-9:40 am

8:00 am: Functionality Isolation Test for Fuel Cycle Code ORION—MOX Fabrication and Depletion, Jin Whan Bae, Eva Davidson *(ORNL)*, Robert Gregg *(UK National Lab Springfields Works)*, Andrew Worrall *(ORNL)*

8:25 am: Study on the Coordination of Amidoxime Small Molecule Ligands with Uranyl Ions Under Seawater Conditions, Tingting Liu *(Harbin Eng Univ/China Inst of Atomic Energy)*, Suliang Yang, Qian Liu *(China Inst of Atomic Energy)*, Fuqiu Ma, Yun Xue *(Harbin Eng Univ)*, Guoxin Tian *(Harbin Eng Univ/China Inst of Atomic Energy)*

8:50 am: Energy Market Simulation Tools to Assess Competitiveness of Nuclear Power Plants, N. Stauff, G. Maronati *(ANL)*, P. Talbot *(INL)*, A. Cuadra *(BNL)*, R. Ponciroli, T. K. Kim *(ANL)*, B. Dixon *(INL)*, T. A. Taiwo *(ANL)*

9:15 am: Examining Plutonium Multirecycling Options for the French Reactor Fleet in Terms of Radioactive Waste Inventories, A. Saturnin, J.-F. Milot, C. Chabert *(CEA)*, F. Laugier *(EdF)*, G. Senentz *(Orano)*, B. Carlier *(Framatome)*

MSR Modeling and Simulation
Session Organizer: Jordan D. Rader *(ORNL)* **Chair:** Cole Gentry *(ORNL)*
Location: Cascade Ballroom II **Time:** 8:00-10:45 am

8:00 am: Multicomponent Mass Transfer of Actinides in Nuclear-Relevant Molten Salts, Haomin Yuan, Nathaniel Hoyt *(ANL)*

8:25 am: Development of Molten Salt Reactor Modeling and Simulation Capabilities in VERA, Aaron Graham, Benjamin Collins, Robert Salko *(ORNL)*, Zack Taylor *(Univ of Tennessee)*, Cole Gentry *(ORNL)*

8:50 am: Molten Salt Reactor Transient Analysis Capability of PROTEUS-NODAL, M. K. Jaradat, W. S. Yang *(Univ of Michigan)*, Y. S. Jung, C. H. Lee *(ANL)*

9:15 am: Safety Analysis of the Molten Salt Fast Reactor Fuel Composition Using Moltres, Sun Myung Park, Andrei Rykhlevskii. Kathryn D. Huff *(Univ of Illinois)*

THURSDAY, SEPTEMBER 26
GLOBAL 2019 TECHNICAL SESSIONS - 8:00 AM

MSR Modeling and Simulation Continued

COFFEE BREAK: 9:40-9:55 AM

9:55 am: Safeguards and Process Modeling for Molten Salt Reactors, Nathan Shoman, Benjamin B. Cipiti *(SNL)*, Benjamin Betzler *(ORNL)*

10:20 am: Molten Salt Reactor Fuel Depletion Tools in SCALE, Benjamin R. Betzler, Kursat B. Bekar *(ORNL)*, William A. Wieselquist, Shane W. Hart, Shane G. Stimpson *(ORNL)*

GLOBAL 2019 TECHNICAL SESSIONS - 1:00 PM

Advanced Aqueous Separations
Session Organizer: Jack D. Law *(INL)* **Cochairs:** Manuel Miguirditchian *(CEA),* Gregg Lumetta *(PNNL)*
Location: Grand Crescent **Time:** 1:00-5:00 pm

1:00 pm: Process Chemistry for Production of New Plutonium-238, Robert M. Wham, David DePaoli *(ORNL)*

1:25 pm: ZIRCEX Pilot Plant Commissioning Lessons Learned, Amy K. Welty, Rick L. Demmer, Richard D. Tillotson, Julia Tripp, Melissa M. Warner *(INL)*

1:50 pm: Technetium Routing in an Advanced Purex Process, Mark John Sarsfield, Mike Carrott, Chris Maher, Dan Whittaker, Catherine Campbell, Chris Mason, Bliss McLuckie, Josh Holt *(NNL)*

2:15 pm: Optimization of New Extractant Molecules for U(VI)/Pu(IV) Separation, Gaëlle Milanole, Cécile Marie, Manuel Miguirditchian, Christian Sorel *(CEA)*

2:40 pm: Redox Reactions of Fe(III) and AHA in Nitric Acid Solutions in the Context of an Advanced PUREX Process, Suzanne Jones, Colin Boxall *(Lancaster Univ)*, Robin Taylor *(NNL)*

3:05 pm: Progress in Real-Ttime Monitoring for Controlling of the Composition of the Uranium-Plutonium Nitrate Product in a Tri-Butyl Phosphate Based Flowsheet, Gregg J. Lumetta, Jarrod R. Allred, Susan E. Asmussen, Samuel A. Bryan, Gabriel B. Hall, Forrest D. Heller, Amanda M. Lines, Sergey I. Sinkov *(PNNL)*

COFFEE BREAK: 3:30-3:45 PM

3:45 pm: Development of New Processes for MOX Fuel Treatment and Manufacturing, Manuel Miguirditchian, Stephane Grandjean, Nathalie Herlet, Olivier Dugne, Andrea Salvatores, Philippe Dubuisson, Emmanuel Touron *(CEA)*

4:10 pm: Rapid and Efficient Extraction of Inert Platinum Group Metals from HNO_3(aq) at Elevated Temperature, Zhiwei Zheng, Tsuyoshi Arai *(Shibaura Inst of Technol)*, Koichiro Takao *(Tokyo Inst of Technol)*

4:35 pm: Study on U/Th Separation by Monoamide-Immobilized Hydrogel Adsorbents, Masahiko Nakase *(Tokyo Inst Technol)*, Tomoo Yamamura *(Kyoto Univ)*, Kenji Shirasaki, Mitsuie Nagai *(Tohoku Univ)*, Daiju Matsumura, Tohru Kobayashi *(JAEA)*, Kenji Takeshita *(Tokyo Inst of Technol)*

Dry Storage
Session Organizer: Sven O. Bader *(Orano)* **Chair:** Andrew Sowder *(EPRI)*
Location: Cascade Ballroom IA **Time:** 1:00-5:25 pm

1:00 pm: Spent Fuel Interim Storage with the NUHOMS® HSM Matrix, Prakash Narayanan, William Bracey, Ahmad Salih, *(TN Americas LLC)*

1:25 pm: Evaluation of Aluminum-Clad Spent Nuclear Fuel During Drying and Dry Storage, Rebecca Smith, Daniel Murray, Alexander Winston, Cynthia Adkins, Philip Winston *(INL)*

1:50 pm: Used Fuel Drying by Vacuum and Forced Gas Circulation for Dry Cask Storage, Jonathan E. Perry, Tanvir Farouk, Jamil Khan *(Univ of South Carolina)*, James S. Tulenko *(Univ of Florida)*, Arthur Niemoller *(Orano)*, Travis W. Knight *(Univ of South Carolina)*

THURSDAY, SEPTEMBER 26
GLOBAL 2019 TECHNICAL SESSIONS - 1:00 PM

Dry Storage Continued

2:15 pm: Successful Integration: Bringing Together the High Burnup Spent Fuel Demonstration Project Team, J. A. McEntire, D. McGee (Orano)

2:40 pm: Guided Wave Technology, Arthur R. Niemoller *(Orano)*

3:05 pm: A Mechanistic Description of Aerosol Transport and Deposition in Stress Corrosion Cracks, Stylianos Chatzidakis, John Scaglione *(ORNL)*

COFFEE BREAK: 3:30-3:45 PM

3:45 pm: System-Wide Impacts of Resolution Options for a Nonconforming Dry Storage System, Stylianos Chatzidakis *(ORNL)*, Efe G. Kurt, Justin L. Coleman *(INL)*, John Scaglione *(ORNL)*, Josh Jarrell *(INL)*

4:10 pm: Investigation of Cutting Activities to Open Dry UNF Storage/Shielded Canisters, Sven O. Bader *(Orano)*

4:35 pm: The Behavior of Analogues for RIS-Affected AGR Cladding Under Conditions Relevant to Wet Interim Storage, Elizabeth Howett *(Studsvik Ltd.)*, Colin Boxall *(Lancaster Univ)*, David Hambley *(NNL)*

5:00 pm: Localized Corrosion Behavior of FeCrAl Nuclear Fuel Cladding in Pool Storage, Raul B. Rebak, R. J. Blair *(GE Research)*, Dan R. Lutz *(GE Power)*

Advanced Fuels/Targets/Materials—II

Session Organizer: Jack D. Law *(INL)* **Chair:** Kristian Myhre *(ORNL)*
Location: Cascade Ballroom IB **Time:** 1:00-3:30 pm

1:00 pm: Temperature-Dependent Crystal Structure of U_3SI_2 by High-Temperature Neutron Diffraction, Sven C. Vogel *(LANL)*, Tashiema L. Wilson *(LANL/Univ of South Carolina)*, Elizabeth Sooby Wood *(LANL/Univ of Texas, San Antonio)*, Joshua T. White *(LANL)*, Theodore M. Besmann *(Univ of South Carolina)*

1:25 pm: Fabrication and Phase Composition of Alloyed Uranium Silicide Fuels, Elizabeth Sooby Wood, Geronimo Robles, Cole Moczygemba *(Univ of Texas at San Antonio)*, Lu Cai, Peng Xu, Edward Lahoda *(Westinghouse)*

1:50 pm: Nondestructive Examination of Uranium Oxide Kernels Using Energy-Resolved Neutron Imaging, Kristian G. Myhre, Yuxuan Zhang, Hassina Z. Bilheux, Jared A. Johnson, Jean-Christophe Bilheux, Andrew J. Miskowiec, Rodney D. Hunt *(ORNL)*

2:15 pm: Development of FIPD: The EBR-II Fuels Irradiation and Physics Database, Aaron Oaks, Kun Mo, Walid Mohamed, Abdellatif Yacout *(ANL)*

2:40 pm: Analytical Local Stress Model for UMo/Al Dispersion Fuel, Yeon Soo Kim *(ANL)*, G. Y. Jeong *(UNIST)*, K. Mo *(ANL)*

3:05 pm: Proliferation-Protected and Ultra-High Burn-Up Reactor Fuel Produced in Thorium Blanket of a Fusion Neutron Source, G. G. Kulikov, A. N. Shmelev, E. G. Kulikov, V. A. Apse *(National Research Nuclear Univ MEPhI)*

THURSDAY, SEPTEMBER 26
GLOBAL 2019 TECHNICAL SESSIONS - 1:00 PM

MSR Chemistry
Session Organizer: Jordan D. Rader *(ORNL)* **Chair:** Ben Collins *(ORNL)*
Location: Cascade Ballroom IC **Time:** 1:00-4:10 pm

1:00 pm: Measuring Thermophysical Properties of Molten Salts, Melissa A. Rose, Evan Wu, Mark A. Williamson *(ANL)*

1:25 pm: Effect of Dissolved Mg on the Electrochemistry of Molten $MgCl_2$-NaCl-KCl, Olivia Dale, Suhee Choi, Michael F. Simpson *(Univ of Utah)*

1:50 pm: Effects of Ionizing Radiation on Molten Chloride Salts, Ruchi Gakhar, Gregory P. Horne *(INL)*, Jay A. LaVerne *(Univ of Notre Dame)*, Simon Martin Pimblott *(INL)*, James F. Wishart *(BNL)*

2:15 pm: Thermodynamic Estimation of Vaporization of Cesium and Iodine Dissolved in LiF-NaF-KF Molten Salt, Y. Sekiguchi *(Univ of Tokyo)*, T. Kato, K. Uozumi *(CRIEPI)*, K. Kawamura *(Tokyo Inst Technol)*, T. Terai *(Univ of Tokyo)*

2:40 pm: On-Line Monitoring Combined with Spectroelectrochemistry for the Characterization of Uranium and Fission Products Within Molten Salt Environments, Amanda M. Lines, Shirmir D. Branch, Heather M. Felmy, Jennifer M. Wilson, Gregg J. Lumetta, Samuel A. Bryan *(PNNL)*

3:05 pm: Innovative Method for Separation Elements from Molten Fluoride Salt, Jinsuo Zhang, Yafei Wang *(Virginia Tech)*

COFFEE BREAK: 3:30-3:45 PM

3:45 pm: Stability Study of Platinum and Silver as Quasi-Reference Electrodes for Molten Salt Systems, Dimitris Killinger, Supathorn Phongikaroon *(Virginia Commonwealth Univ)*

Waste Management—II
Session Organizer: Jack D. Law *(INL)* **Chair:** Jared Johnson *(ORNL)*
Location: Cascade Ballroom II **Time:** 1:00-3:05 pm

1:00 pm: Development of Fuel Debris Treatment Technology by the Fluorination Method, Keita Endo, Kuniyoshi Hoshino, Akira Sasahira, Tetsuo Fukasawa *(Hitachi-GE Nuclear Energy, Ltd)*, Takahiro Chikazawa *(Mitsubishi Materials)*, Akira Kirishima, Nobuaki Sato *(Tohoku Univ)*

1:25 pm: Microfluidic-Based Separation and In-Situ Detection of Selenium(IV) Ion in Radioactive Wastes, Aileen Brandt, Takehiko Tsukahara *(Tokyo Inst Technol)*

1:50 pm: An Approach to the Assessment of the Marginal Value of Neutron Multiplication Factor for the Radioactive Waste Tank, O. N. Andrianova, V. A. Dulin, V. V. Dulin *(JSC State Scientific Centre of the Russian Federation)*, A. A. Andrianov, I. S. Kuptsov, T. A. Frolova *(National Research Nuclear Univ MEPhI)*

2:15 pm: Compatibility of Pellet Form Storage of High-Level Waste with a Flexible Waste Management System, Akihiro Suzuki, Yoichi Endo *(Nippon Nulcear Fuel Development)*, Tetsuo Fukasawa *(Hitachi-GE Nuclear Energy)*, Yusa Muroya *(Osaka Univ)*, Tatsuro Matsumura *(JAEA)*

2:40 pm: Characterization of Ruthenium Tetroxide Capture from Dry Gas Streams by Silica Gel and Metal Surfaces, Barry B. Spencer, Stephanie H. Bruffey *(ORNL)*

MONDAY, SEPTEMBER 23
TOP FUEL 2019 TECHNICAL SESSIONS - 9:45 AM

Advanced Fuel Designs—I
Session Organizer: Zeses Karoutas *(Westinghouse)* **Cochairs:** Zeses Karoutas *(Westinghouse)*, Patty McCumbee *(GNF)*
Location: Grand Ballroom III **Time:** 9:45-11:50 am

9:45 am: PROtect FUEL: The Leading E-ATF Solution Delivered by Framatome, V. Rebeyrolle, N. Vioujard, A. C. Scholer *(Framatome Fuel)*, R. Kliewer, J. Reed *(Framatome Inc.)*

10:10 am: Westinghouse Chromium-Coated Zirconium Alloy Cladding Development and Testing, John L. Lyons, Jonna Partezana, W. Art Byers, Guoqiang Wang, Arash Parsi, Jorie Walters, Javier Romero, Andrew J. Mueller, Hemant Shah, Robert Oelrich Jr. *(Westinghouse)*

10:35 am: Coated Fuel Rod for Accident Tolerance and Debris Fret Resistance, Y.-P. Lin, S. DeSilva, D. R. Lutz, M. Connor, S. Michael *(GNF)*, L. Yin, E. J. Dolley, R. B. Rebak *(GE Global Research)*

11:00 am: Advanced Fuel Technologies of the Future, N. Vioujard *(Framatome SAS)*, R. Kliewer *(Framatome Inc.)*, C. Delafoy *(Framatome SAS)*, J. O'Brian *(Framatome Inc.)*

11:25 am: GAIA PROtect EATF Lead Fuel Assembly Implementation at Vogtle, Jennifer Baker, Matthew Leonard, Ray Flanery *(Southern Nuclear)*, Scott D'Orio, Robert Clarke, Jeff Reed *(Framatome Inc.)*, Jeremy Bischoff *(Framatome SAS)*

Development, Verification and Validation of Fuel Modeling Codes—I
Session Organizer: Jérôme Gerard Bigot *(Framatome)* **Cochairs:** Jérôme Gerard Bigot *(Framatome)*, Nathan Capps *(EPRI)*
Location: Vashon I/II **Time:** 9:45-11:50 am

9:45 am: Development and Validation of Multi-Dimensional Entire Rod Analysis Module for Simulation of Fuel Behavior During LOCA, Sung-Uk Lee, Hyochan Kim, Dong-Hyun Kim *(KAERI)*, Jinsu Kim, Jeong Whan Yoon *(KAIST)*

10:10 am: The Benefit of International Benchmarks for Extension and Validation of the TRANSURANUS Fuel Performance Code, A. Schubert, Z. Soti, P. Van Uffelen *(EC-JRC)*, M. Ieremenko *(State Scientific and Technical Center for Nuclear and Radiation Safety)*, R. Calabrese *(ENEA)*, S. Boneva, N. Mihaylov, M. Mitev *(Inst for Nuclear Research and Nuclear Energy)*

10:35 am: Cladding Plasticity Modeling with the Multidimensional Fuel Performance Code OFFBEAT, Alessandro Scolaro *(EPFL)*, Ivor Clifford *(PSI)*, Carlo Fiorina, Andreas Pautz *(EPFL)*

11:00 am: Qualification of Framatome Fuel Performance Code—GALILEO, Yusen Qi, Chris Allison, Philippe Bellanger, Will Maxson *(Framatome)*, Christophe Garnier *(Framatome SAS)*

11:25 am: Recent Developments in ARCADIA, Framatome's Suite of Advanced Core Physics Methods for LWRs, J. Senecal, A. Bennett *(Framatome Inc.)*, M. Riedmann *(Framatome GmbH)*, N. Martin *(Framatome Inc.)*, J. Bigot *(Framatome SAS)*

Fuel Characteristics and Performance for Transportation and Interim/Long-Term Storage—I
Session Organizer: Dan Lutz *(GNF)* **Cochairs:** Dan Lutz *(GNF)*, Manuel Quecedo *(ENUSA)*
Location: St. Helens **Time:** 9:45-11:50 am

9:45 am: Sibling Rod Thermomechanical Modeling with FAST and Comparison to Post-Irradiation Examination Data, Ken Geelhood, Christine Goodson *(PNNL)*

10:10 am: Characteristics and Performance of ZIRLO Cladding Used Fuel, Guirong Pan *(Westinghouse)*, Rose Montgomery *(ORNL)*, David B. Mitchell *(Westinghouse)*, Brady D. Hanson *(PNNL)*

10:35 am: Post-Irradiation Measurements on Fuel Rod Plenum Springs for Transport and Reuse of Partly Burnt Fuel, David Schrire *(Vattenfall Nuclear Fuel)*, Klaus Nissen, Udo Fischer, Dominik Streit *(Framatome GmbH)*, Janne Pakarinen *(Studsvik AB)*

11:00 am: Boundary Conditions to Water Removal from Defective Spent Fuel, Marc Verwerft, Janne Pakarinen, Guy Cornelis *(SCK-CEN)*, Wolfgang Faber *(PreussenElektra)*, Hagen Höfer *(Höfer & Bechtel GmbH)*, Christoph Rirschl *(GNS)*

11:25 am: Ring Compression Testing of Prehydrided PWR Cladding with Hydride Blisters, M. A. Martin Rengel, J. Ruiz-Hervias *(UPM)*, F. J. Gomez *(Advanced Material Simulation)*, J. M. Rey, C. Alejano *(CSN)*, F. J. Fernandez Lopez, A. Munoz *(ENRESA)*, C. Munoz-Reja, M. Quecedo *(ENUSA)*

MONDAY, SEPTEMBER 23
TOP FUEL 2019 TECHNICAL SESSIONS - 1:30 PM

Cladding and Structural Alloys Development—I
Session Organizer: Daniel Wachs *(INL)* **Cochairs:** Daniel Wachs *(INL)*, Robert Oelrich *(PNNL)*
Location: Grand Ballroom III **Time:** 1:30-3:10 pm

1:30 pm: PROtect: Accelerated Implementation of Framatome's Evolutionary eATF Solution, J. Bischoff, C. Delafoy, N. Chaari, K. Buchanan *(Framatome Fuel)*, E. Schweitzer *(Framatome GmbH)*, K. Nimishakavi, J. Stevens, J. Reed *(Framatome Inc.)*, H. Palancher *(CEA)*, G. Girardin *(Kernkraftwerk Gösgen-Däniken AG)*

1:55 pm: Two-Sided Protection for Zirconium-Based Nuclear Fuel Cladding, F. Addou, A. Michau, H. Maskrot *(SEARS, CEA, Université Paris-Saclay)*, Y. Gazal, F. Maury, T. Duguet *(CIRIMAT, CNRS/INPT/UPS)*, E. Monsifrot *(Dephis)*, F. Schuster *(CEA)*

2:20 pm: Status of ATF Cladding Development at KAERI, Hyun-Gil Kim, Il-Hyun Kim, Yang-Il Jung, Dong-Jun Park, Jung-Hwan Park, Young-Ho Lee, Byung-Kwon Choi *(KAERI)*

2:45 pm: Advanced Codes and Methodologies Supporting Implementation of Framatome's Accident Tolerant Fuel in the U.S.A., F. Curca-Tivig *(Framatome GmbH)*, S. Cole *(Framatome Inc.)*, N. Vioujard *(Framatome SAS)*

Fuel Modeling and Analysis—I
Session Organizer: Erik Mader *(EPRI)* **Cochairs:** Erik Mader *(EPRI)*, Uffe Bergman *(Westinghouse)*
Location: Vashon I/II **Time:** 1:30-3:10 pm

1:30 pm: Bison Application to the Analysis of LWR Fuel Responses Under Accident Conditions, Wenfeng Liu, Anh Mai, John Alvis, Joseph Y. R. Rashid *(Structural Integrity Associates, Inc.)*, Charles Folsom, Richard L. Williamson *(INL)*

1:55 pm: Modeling Fuel Assembly Distortion in Light Water Reactors Using Bison, Swetha Veeraraghavan, Albert Casagranda, Benjamin Spencer *(INL)*

2:20 pm: Investigation of Coated Cladding Ballooning Behavior Using Bison, K. A. Gamble *(INL)*

2:45 pm: Modeling of Westinghouse Advanced Fuels EnCore and ADOPT with the CASL Tools, F. Franceschini *(Italy Westinghouse Mangiarotti)*, V. Kucukboyaci, D. Strucker, E. J. Lahoda, Z. Karoutas *(Westinghouse)*

R&D Activities
Session Organizer: Nico Vollmer *(Framatome)* **Cochairs:** Nico Vollmer *(Framatome)*, Rosemary Montgomery *(ORNL)*
Location: St. Helens **Time:** 1:30-3:10 pm

1:30 pm: Overview of R&D Program for Evaluating Spent Nuclear Fuel Integrity Under Normal Conditions of Road and Sea Transport in Korea, Hyeong Koo Kim, Jae Jun Lee, Joong Jin Kim, Seong Ki Lee *(KEPCO NF)*

1:55 pm: Hydride Characterization in Zircaloy-2 Liner Cladding After C-Shaped Ring Compression Tests, Liliana I. Duarte *(PSI)*, Francesco Fagnoni *(Aalborg Univ)*, Robert Zubler, Weijia Gong, Pavel Trtik, Johannes Bertsch *(PSI)*

2:20 pm: First Phase of the Spent Fuel Autoclave Leaching Experiments (SF-ALE) at SCK-CEN, Thierry Mennecart, Gregory Leinders, Christelle Cachoir, Guy Cornelis, Göran Verpoucke *(SCK-CEN)*, Giuseppe Modolo, Dirk Bosbach *(FzJ)*, Karel Lemmens, Marc Verwerft *(SCK-CEN)*

2:45 pm: The Nuclear Fuel Storage Demonstration Project in Taiwan, Wan-June Chiu, Yaw-Hwa Shiu, Che-Chung Tseng *(INER)*

MONDAY, SEPTEMBER 23
TOP FUEL 2019 TECHNICAL SESSIONS - 3:50 PM

Advanced Fuel Designs—II
Session Organizer: Patty McCumbee *(GNF)* **Cochairs:** Patty McCumbee *(GNF)*, Jeremy Bischoff *(Framatome)*
Location: Grand Ballroom III **Time:** 3:50-5:30 pm

3:50 pm: PROtect SiC: Framatome's Revolutionary ATF Solution for Improved Performance and Safety in LWRs, K. Nimishakavi *(Framatome Inc.)*, B. Sanders *(CORYS)*, L. Duquesne *(Framatome Fuel)*, C. Lorrette *(CEA)*

4:15 pm: Overview of Westinghouse Lead EnCore Accident Tolerant Fuel Program, Robert Oelrich, Zeses Karoutas, Peng Xu, Javier Romero, Hemant Shah, Jorie Walters, Ed Lahoda, Michael Sivack, John Lyons, Luke Czerniak, Frank Boylan, Raghu Āvali, Andrew Bowman *(Westinghouse)*, Magnus Limbäck, Antoine Claisse, Jonathan Wright *(Westinghouse Electric Sweden AB)*

4:40 pm: Recent Progress in Development of Accident Tolerant FeCrAl-ODS Fuel Claddings for BWRs in Japan, K. Sakamoto, Y. Miura *(NFD)*, S. Ukai *(Hokkaido Univ)*, A. Kimura *(Kyoto Univ)*, A. Yamaji *(Waseda Univ)*, K. Kusagaya *(GNF-J)*, S. Yamashita *(JAEA)*

5:05 pm: Overview of Accident-Tolerant Fuel R&D Program in Japan, S. Yamashita, I. Ioka, Y. Nemoto, T. Kawanishi, M. Kurata, Y. Kaji, T. Fukahori *(JAEA)*, T. Nozawa *(National Institutes for Quantum and Radiological Science and Technology)*, D. Sato *(Mitsubishi Nuclear Fuel Co., Ltd.)*, N. Murakami *(Mitsubishi Heavy Industries, Ltd.)*, H. Sato *(Toshiba Energy Systems & Solutions Corp)*, T. Kondo *(GE-Hitachi)*, K. Sakamoto *(NFD)*, K. Kusagaya *(GNF-J)*, S. Ukai *(Hokkaido Univ)*, A. Kimura *(Kyoto Univ)*, A. Yamaji *(Waseda Univ)*

Fuel Modeling and Analysis—II
Session Organizer: Lori Braase *(INL)* **Cochairs:** Lori Braase *(INL)*, Jason Ingraham *(GNF)*
Location: Vashon I/II **Time:** 3:50-5:30 pm

3:50 pm: Optimized Gap Conductance Model for UO_2-Zircaloy Interfaces and Identified Sources of the Uncertainties in the Model, Aysenur Toptan (NCSU), David J. Kropaczek *(NCSU, ORNL)*, Maria N. Avramova *(ORNL)*

4:15 pm: Variance-Based Sensitivity Analysis Approach Applied to Hydrogen Migration and Redistribution Model in Bison, Zineb Aly *(Penn State)*, Albert Casagranda, Giovanni Pastore *(INL)*, Nicholas R. Brown *(Univ of Tennessee)*

4:40 pm: Validating the Fill Gas Thermal Conductivity Models for Gap Conductance Calculations in Nuclear Fuel Performance Codes, Aysenur Toptan *(NCSU)*, David J. Kropaczek *(NCSU, ORNL)*, Maria N. Avramova *(ORNL)*

5:05 pm: Source Range Detector Response Modeling Using VERA, Cole Gentry, Andrew Godfrey, Eva Davidson, Germina Ilas, Benjamin Collins, Shane Hart, Kang-Seog Kim, Tara Pandya, Katherine Royston, Gregory Davidson, Seth Johnson, Thomas Evans *(ORNL)*, Gary Wolfram *(PNNL)*, Scott Palmtag *(NCSU)*

Aging Issues
Session Organizer: Rosemary Montgomery *(ORNL)* **Cochairs:** Rosemary Montgomery *(ORNL)*, Dan Lutz *(GNF)*
Location: St. Helens **Time:** 3:50-5:05 pm

3:50 pm: Influence of Cracking Direction on Fracture Mechanics During DHC of Zircaloy-2 Cladding, A. W. Colldeweih, W. Gong, R. Zubler, J. Bertsch, P. Trtik *(PSI)*

4:15 pm: Evaluation of BWR Spent Fuel Potential for Reconfiguration and Damage During Storage and Transportation Accidents, William F. Lyon, Joe R. Rashid, Anh Mai, Myles T. Parr *(Structural Integrity Associates, Inc.)*

4:40 pm: Leaching Behavior of Nuclides from BWR Spent Fuel and TMI-2 Debris, Takeshi Sonoda, Kenta Inagaki, Takanari Ogata *(CRIEPI)*, Daniel Serrano-Purroy, Vincenzo V. Rondinella *(EC-JRC)*

TUESDAY, SEPTEMBER 24
TOP FUEL 2019 TECHNICAL SESSIONS - 9:15 AM

Cladding and Structural Alloys Development—II
Session Organizer: Kiran Nimishakavi *(Framatome)* **Cochairs:** Kiran Nimishakavi *(Framatome)*, Guangjun Li *(GE-Hitachi)*
Location: Grand Ballroom III **Time:** 9:15-11:20 am

9:15 am: OECD/NEA Nuclear Science Fuel Activities Spanning Scales and Technologies, I. Hill, J.-F. Martin, D. Costa, A. Vànyi, S. Cornet, T. Ivanova *(OECD/NEA)*

9:40 am: Investigation of Corrosion and High Temperature Oxidation of Promising ATF Cladding Materials in the Framework of the II Trovatore Project, Mirco M. Grosse *(KIT)*, Koba Van Loo *(KU Leuven)*, Erkka L. Frankberg *(Italian Inst of Technology)*, Chongchong Tang *(KIT)*, Konstantza Lambrinou *(SCK-CEN)*, F. Di Fonzo *(Italian Inst of Technology)*, Martin Steinbrück *(KIT)*

10:05 am: Development Status of High Thermal Conductive UO_2 Pellet as ATF at KAERI, Dong-Joo Kim, Dong Seok Kim, Sang-Chae Jeon, Keon Sik Kim, Jong Hun Kim, Ji-Hae Yoon, Jae Ho Yang *(KAERI)*

10:30 am: Round Robin Exercise of the Candidate ATF Cladding Materials Within the ACTOF Project, Martin Ševeček, Jakub Krejčí, Adéla Chalupová, Jitka Kabátová, František Manock, Jan Kočí, Ladislav Cvrček *(CTU in Prague)*, Chongchong Tang, Martin Steinbrück, Mirco Grosse *(KIT)*, Sami Penttilä, Juha-Matti Autio, Jari Lydman, Aki Toivonen *(VTT Technical Research Centre of Finland)*, Bożena Sartowska, Wojciech Starosta, Lech Waliś *(Inst of Nuclear Chemistry and Technology)*, Zoltan Hózer, Tamás Novotny, Erzsébet Perezné-Feró, Anna Pintér Csordás, M. Horváth, Péter Szabó *(Hungarian Academy of Sciences, KFKI Atomic Energy Research Inst)*, Claudia Giovedi *(Univ of São Paulo)*, Peng Xu *(Westinghouse)*

10:55 am: Critical Heat Flux and Crud WALT Loop Measurements for Westinghouse Accident Tolerant Fuel, Zeses Karoutas, Guoqiang Wang, William A. Byers *(Westinghouse)*

Development, Verification and Validation of Fuel Modeling—II
Session Organizer: Erik Mader *(EPRI)* **Cochairs:** Erik Mader *(EPRI)*, Ioan Arimescu *(Framatome)*
Location: Vashon I/II **Time:** 9:15-11:20 am

9:15 am: Bison as a PCI Screening Tool—PCI Failure Model Development, Joseph Y. R. Rashid, Wenfeng Liu *(Structural Integrity Associates, Inc.)*, Richard L. Williamson *(INL)*

9:40 am: Locked Rotor Studies to Quantify Benefits of Accident Tolerant Fuel Technologies, Yixing Sung, Serhat Lider, Michael P. Johnson, Zeses E. Karoutas *(Westinghouse)*

10:05 am: Improvements in CTFFuel for Core Follow Applications in VERA, J. Hu, R. Salko, S. G. Stimpson, A. T. Godfrey, A. Wysocki, B. S. Collins *(ORNL)*

10:30 am: Effect of Crossflow Modeling on Vapor Void Fraction and Criticality in a BWR Fuel Assembly Using MPACT/CTF, Jacob P. Gorton *(Univ of Tennessee, ORNL)*, Benjamin S. Collins *(ORNL)*, Nicholas R. Brown *(Univ of Tennessee)*

10:55 am: Inference of Crud Model Parameters from Plant Data, Benjamin Collins, William Gurecky *(ORNL)*, Lindsay Gilkey *(SNL)*, Alicia Elliott, David Kropaczek *(ORNL)*

Fuel Characteristics and Performance for Transportation and Interim/Long-Term Storage Session—II
Session Organizer: Manuel Quecedo *(ENUSA)* **Cochairs:** Manuel Quecedo *(ENUSA)*, Keith Waldrop *(EPRI)*
Location: St. Helens **Time:** 9:15-10:55 am

9:15 am: Anisotropic Influence of Hydrides on Zircaloy Fatigue, Weijia Gong, Mikael Mille, Robert Zubler, Johannes Bertsch *(PSI)*

9:40 am: Post-Irradiation Examination of KKB Special Fuel Rods, Joakim K.-H. Karlsson, Anders Puranen, Pia Tejland, Janne Pakarinen, Kyle Johnson, Charlotta Askeljung, Anna-Maria Alvarez *(Studsvik Nuclear AB)*, Arno Benen, Andreas Hüttmann, Sten Lundberg *(Vattenfall Europe Nuclear Energy)*

10:05 am: Hydride Reorientation and Redistribution Under Non-Uniform Stress, Weijia Gong, Pavel Trtik, Robert Zubler, Johannes Bertsch *(PSI)*

10:30 am: Destructive Examinations of High Burnup Pressurized Water Reactor Fuel Rods, R. A. Montgomery, R. N. Morris, R. H. Ilgner, J. M. Giaquinto, B. B. Bevard, J. M. Scaglione *(ORNL)*, Tom Brookmire *(Dominion Energy)*

TUESDAY, SEPTEMBER 24
TOP FUEL 2019 TECHNICAL SESSIONS - 1:00 PM

Advanced Fuel Designs—III
Session Organizer: William Gassmann *(Exelon)* **Cochairs:** William Gassmann *(Exelon)*, Norman Garner *(Framatome)*
Location: Grand Ballroom III **Time:** 1:00-3:05 pm

1:00 pm: FeCrAl ATF Safety Benefits for Boiling Water Reactors, Francis Bolger, Guangjun Li, Daniel Pappone *(GE-Hitachi)*

1:25 pm: Initial Valuation of Accident Tolerant Fuel for Industry Adoption: ATF Valuation 1.0, Stephen M. Hess, Jeff Gabor *(Jensen Hughes)*, Aladar Csontos, Nathan Capps

1:50 pm: The U.S. Accident Tolerant Fuels Program—A National Initiative Coming of Age, F. J. Goldner, W. McCaughey *(DOE)*, S. L. Hayes, D. M. Wachs *(INL)*, K. A. Terrani, A. T. Nelson *(ORNL)*, K. J. McClellan, C. R. Stanek *(LANL)*

2:15 pm: Valuation of Accident Tolerant Fuel for Industry Adoption: ATF Valuation 2.0, Stephen M. Hess, Jeff Gabor *(Jensen Hughes)*, Aladar Csontos, Nathan Capps *(EPRI)*

2:40 pm: Accident Tolerant Fuel Benefits Analysis for AOOs and DBAs, Nathan Capps *(EPRI)*, Jeff Reed, Brett Boman, Chris Lewis, Nicolas Viojard *(Framatome Inc.)*, Aladar Csontos *(EPRI)*

Design and Analysis Methods—I
Session Organizer: Nadine Hollasky *(BeIV)* **Cochairs:** Nadine Hollasky *(BeIV)*, Jérôme Gerard Bigot *(Framatome)*
Location: Vashon I/II **Time:** 1:00-2:40 pm

1:00 pm: Full-Core Normal and Preliminary Transient Analysis for SiC-Based Rod Designs, Yanan He *(MIT, Xi'an Jiaotong Univ)*, Yangbin Deng *(Shenzhen Univ)*, Koroush Shirvan *(MIT)*

1:25 pm: Economic Benefits of Higher Enriched Assays for 24-Month Cycle Length, Coral Kazaroff, Andrew Johnson, Dan Kotlyar *(Georgia Tech)*, Joshua L. Parker *(Framatome Inc.)*

1:50 pm: Advancements in the Framatome Crud and Corrosion Risk Assessment Process for Pressurized Water Reactors, B. G. Lockamon, S. M. Palzewicz, J. H. Jones, D. S. Tobin *(Framatome Inc.)*

2:15 pm: Radiation Transport Methods to Support Subsequent License Renewal (SLR), Justin Byard, J. R. Worsham III *(Framatome Inc.)*

Transient Fuel Behavior and Criteria—I
Session Organizer: Jinzhao Zhang *(Tractebel Eng)* **Cochairs:** Jinzhao Zhang *(Tractebel Eng)*, Dan LaBrier *(Idaho State Univ)*
Location: St. Helens **Time:** 1:00-3:05 pm

1:00 pm: Demonstration of Bison/TRACE Coupling (CRAB) Through Validation Case LOFT L2-5, Russell Gardner, Cody Permann *(INL)*, Matthew Bernard *(NRC)*, Richard Williamson *(INL)*

1:25 pm: Development of Evaluation Methodology of Core-Wide Fuel Rod Burst in LOCA Safety Analysis, Joosuk Lee, Young-Seok Bang *(KINS)*

1:50 pm: Monte Carlo Analysis of Cladding Burst During LOCA Using Bison, Cole Blakely, David Kamerman, Charles Folsom, Kyle Gamble *(INL)*

2:15 pm: Safety Assessment of UN/Zr Fuel with SiC Cladding Under Large Break Loss-of-Coolant Accident, Libo Qian, Hongxing Yu, Yufa Sun, Jian Deng, Dan Wu, Shuhua Ding, Wei Chen, Zhongchun Li, Xi Chen, Lili Liu *(Nuclear Power Inst of China)*

2:40 pm: Investigation of Zr-Based Alloy Cladding Burst Mechanisms Under Station Blackout Using Bison, Jianguo Yu, Cole Blakely, Hongbin Zhang *(INL)*

TUESDAY, SEPTEMBER 24
TOP FUEL 2019 TECHNICAL SESSIONS - 3:45 PM

Cladding and Structural Alloys Development—III
Session Organizer: Aylin Kucuk *(EPRI)* **Cochairs:** Aylin Kucuk *(EPRI)*, Aaron Phillippe *(Southern Nuclear)*
Location: Grand Ballroom III **Time:** 3:45-5:25 pm

3:45 pm: Immersion Testing of FeCrAl Tubes Under Simulated Light Water Nuclear Reactor Normal Operation Conditions, Raul B. Rebak, Timothy B. Jurewicz, Michael Larsen *(GE Research)*, Kan Sakamoto *(NFD)*

4:10 pm: Analysis of FeCrAl-ODS Cladded Fuel Performance During BWR Power Ramp with FEMAXI-7, Yoshihiro Fujiwara, Akifumi Yamaji *(Waseda Univ)*, Shigeharu Ukai *(Hokkaido Univ)*, Kan Sakamoto *(NFD)*, Shinichiro Yamashita *(JAEA)*

4:35 pm: Effect of Yttrium Addition on the Corrosion Behavior of FeCrAl Alloys in Simulated Primary Water Condition, Taeyong Kim, Seung Chang Yoo, Inyoung Song, Junhyuk Ham, Yunju Lee *(UNIST)*, Sungyu Kim, Chi Bum Bahn *(Pusan National Univ)*, Ji Hyun Kim *(UNIST)*

5:00 pm: Length Dependence of FeCrAl Accident-Tolerant Fuel Cladding Under Simulated Loss-of-Coolant Accident Testing, B. Garrison, M. Howell, M. N. Cinbiz, K. Linton, M. N. Gussev *(ORNL)*

Development, Verification and Validation of Fuel Modeling—III
Session Organizer: Kenneth Geelhood *(PNNL)* **Cochairs:** Kenneth Geelhood *(PNNL)*, Fausto Franceschini *(Westinghouse)*
Location: Vashon I/II **Time:** 3:45-5:00 pm

3:45 pm: Separate-Effects Validation Experiments for Models of Fracture in Ceramic Nuclear Fuel, Benjamin W. Spencer, Nicholas E. Woolstenhulme, Leigh A. Emerson, Ju-Yuan Yeh, D. Devin Imholte, Connie M. Hill, Daniel B. Chapman, Colby B. Jensen *(INL)*, Mary Lou Dunzik-Gougar *(Idaho State Univ)*, Travis W. Knight, Theodore M. Besmann, Sobhan Patnaik *(Univ of South Carolina)*, Sean M. McDeavitt, Luis Ortega, Delia Perez-Nunez *(Texas A&M)*, Heng Ban *(Univ of Pittsburgh)*

4:10 pm: Implementation of Chromia-Doped Fuel in RODEX4 and Downstream Codes and Methods for U.S. BWR Applications, V. I. Arimescu, T. Davis, V. Korolev, M. Anderson *(Framatome Inc.)*, C. Delafoy *(Framatome SAS)*

4:35 pm: Transient MOX Fuel Swelling in TESPA-ROD Code Applied on CABRI RIA Tests, Felix Boldt *(GRS GmbH, Technical Univ of Munich)*, Heinz-Günther Sonnenburg *(GRS GmbH)*

Transient Fuel Behavior and Criteria—II
Session Organizer: Lori A. Braase *(INL)* **Cochairs:** Lori A. Braase *(INL)*, Olivier Marchand *(IRSN)*
Location: St. Helens **Time:** 3:45-5:25 pm

3:45 pm: Transient Boiling During RIA: Out-of-Pile Testing and In-Pile Design for TREAT, Kevin Terrill, Richard Christensen *(Univ of Idaho)*, Colby B. Jensen, Charles Folsom *(INL)*

4:10 pm: Behavior of LWR Fuels with Additives Under Reactivity-Initiated Accident Conditions, Takeshi Mihara, Yutaka Udagawa, Masaki Amaya, Yoshinori Taniguchi, Kazuo Kakiuchi *(JAEA)*

4:35 pm: Behavior of High-Burnup LWR-MOX Fuel Under a Reactivity-Initiated Accident Condition, Yoshinori Taniguchi, Yutaka Udagawa, Takeshi Mihara, Masaki Amaya, Kazuo Kakiuchi *(JAEA)*

5:00 pm: Testing Accident Tolerant Fuels in Reactivity Initiated Accident Conditions, D. W. Kamerman, D. D. Imholte, N. E. Woolstenhulme, C. B. Jensen, D. M. Wachs *(INL)*

TUESDAY, SEPTEMBER 24
TOP FUEL 2019 POSTER SESSION - 5:30 PM

Top Fuel 2019 Poster Session
Session Organizers: Stephen Mazurkiewicz *(Framatome)*, Randall Dunavant *(Southern Nuclear)*
Location: Grand Ballroom I **Time:** 5:30-7:30 pm

28. Study of Irradiated and Non-Irradiated MOX Fuel Reprocessing, Murielle Bertrand, A. Salvatores, S. Grandjean *(CEA)*, C. Lavalette, N. Golles *(Orano)*, E. Touron *(CEA)*

29. Integrated Study of Experiment and First-Principles Computation for the Characterization of ZrO8 Complex in a Zr-Doped Fluorite UO_2, Jeongmook Lee *(KAERI)*, Choah Kwon *(Yonsei Univ)*, Jandee Kim *(KAERI)*, Young-Sang Youn *(Yeungnam Univ)*, Jong-Yun Kim (KAERI), Byungchan Han *(Yonsei Univ)*, Sang Ho Lim *(KAERI)*

31. Estimation Source Term with Time and Reference Spent Fuel in Korea, Ara Go, Daesik Yook *(KINS)*, GunHee Jung, YeSeul Cho, Ser Gi Hong *(Kyung Hee Univ)*

32. A Study on Thermal Behavior for the OASIS (Optimized and Safe Interim Storage System)-32D Spent Nuclear Fuel Cask, Kunwoo Yi, Kyongin Ju, Seongchan Park *(KEPCO Eng and Construction Co., Inc.)*

33. Effects of Molten Fuel Relocation on In-Vessel Retention, L. L. Liu, H. X. Yu, J. Deng, L. Chen, M. Zhang, X. J. Wang, H. H. Peng (*Nuclear Power Inst of China)*

34. Thermal-Mechanical Performance of SiC Composite Cladding Under Transient and LOCA Conditions, Chunyu Yin, Shichao Liu, Yongjun Jiao, Ping Chen, Yi Zhou *(Nuclear Power Inst of China)*

35. Neutronic Performance of Burnable Poisons in FCM Fuel Loaded PWR, Mancang Li, Yong Liu *(Nuclear Power Inst of China)*, Shichang Liu *(North China Electric Power Univ)*, Yingrui Yu, Lei Lou *(Nuclear Power Inst of China)*, Kan Wang *(Tsinghua Univ)*

36. Development of Multi-Dimensional Entire Rod Analysis Module (MERCURY) for Simulation of Fuel Behavior During LOCA, Hyochan Kim, Sung-Uk Lee *(KAERI)*, Jinsu Kim, Jeong Whan Yoon *(KAIST)*

37. Enabling CTF AND CTF-R for Thermal Analysis of Metallic Fuels and Alloys in Sodium Metal Fast Breeder Reactors, Chaitee Milind Godbole, Maria N. Avramova *(NCSU)*

38. Modelling and 2D/3D Assessments of Cracked Fuel Pellets, Armando Carlos Marino, Gustavo Demarco, Lucas Furlano *(CEA)*

39. Development of Coupled Multi-Physics Code System to Solve New Issues and Challenges, Yongsik Yang *(KAERI)*, Deokjung Lee *(UNIST)*, Hocheol Shin *(Korea Hydro & Nuclear Power Co.)*

40. Stress Analysis of Nuclear Fuel Assembly Using DYTRAC During Seismic and LOCA Events, Ki-Sung Choi *(KNFC)*, Heon-Jeong Ha, Jin-Seok Lee, Jong-Sung Yoo *(KEPCO NF)*

41. Comparisons of Intra-Pin Power Distribution Using Coupled FAST/SCALE and FAST/TUBRNP for New Fuel Concepts, Ian E. Porter *(NRC)*

42. New FAST 3D Capabilities for Advanced Fuel Designs and Plans for Future Development, Ian E. Porter *(NRC)*

43. Thermal-Mechanical Evaluation of Coated Fuel Rod with BISON/PRIME, Mine Ozdemir Yilmaz, Paul E. Cantonwine, Francis T. Bolger, Russ Fawcett *(GNF-Americas)*, Ryan T. Sweet, Brian D. Wirth *(Univ of Tennessee Knoxville)*, Andrew T. Nelson *(ORNL)*

44. Thermal Hydraulic CFD Simulations and Experimental Investigation of Deformed Fuel Assemblies, Anthony Chang *(Orano)*, Tom Reeves, R. Brian Jackson *(TerraPower)*

45. Using TRACE and FRAPTRAN Codes to Simulate and Analyze the Severe Accident and Ultimate Response Guideline of Maanshan Nuclear Power Plant, Bo-Ru Shen, Tsung-I Shen, Shao-Wen Chen, Jong-Rong Wang, Chunkuan Shih, Jung-Hua Yang *(National Tsing Hua Univ)*

46. Preliminary Design of I-Loops in ATR for Irradiation Testing of LWR Fuels, N. S. Oldham, N. E. Woolstenhulme, K. R. Horman, J. L. Peterson-Droogh, T. L. Maddock, D. M. Wachs *(INL)*

Top Fuel 2019 Poster Session Continued

47. Severe Accident Analysis of MELCOR2.2/SNAP for Maanshan Nuclear Power Plant ELAP Event, Wei-Yuan Cheng, Shang-Chih Lin *(National Tsing Hua Univ)*, Jong-Rong Wang *(Nuclear and New Energy Education and Research Foundation)*, Shao-Wen Chen *(National Tsing Hua Univ)*, Chunkuan Shih *(Nuclear and New Energy Education and Research Foundation)*

48. Oxidation of Zirconium Cladding in Air, Nitrogen, and Nitrogen-Rich Steam Atmospheres, Erzsébet Perez-Feró, Anna Pintér-Csordás, Tamás Novotny, Zoltán Hózer, Levente Illés, György Zoltán Radnóczi *(Hungarian Academy of Sciences)*

49. Comparison of Fuel Meat Materials for Boosted Fast Flux Concepts at the Advanced Test Reactor, Daniel P. LaBrier, Benjamin Lilley, Anton Michael Higgins, Todd S. Palmer, Wade R. Marcum *(Oregon State Univ)*

50. Modeling of Oxygen Potential and Specialization of the I-Te-Cs-Ba-Mo System in Irradiated Fuel During Severe Accidents, A. Germain, J. Sercombe, C. Riglet-Martial, Y. Pontillon, L. Noirot, C. Introini *(CEA)*, Ph. Maugis *(IM2NP)*

51. Irradiation Testing Solutions for ATF and Broader LWR Fuels and Materials (in a Post-Halden Era), Colby B. Jensen, Nicolas Eric Woolstenhulme, Daniel Michael Wachs, Steven L. Hayes, Nate S. Oldham, Kate Richardson, Thomas Maddock, Patrick Calderoni *(INL)*

52. Aspect of Breakaway Oxidation of a Zirconium Alloy Cladding Tube During Oxidation at 800ºC, Cheol Min Lee *(KAERI)*, Gwan Yoon Jeong *(UNIST)*

53. High Temperature Oxidation Behavior of Fe20Cr2Si Alloy in Steam Environment, Joonho Moon, Sungyu Kim *(Pusan National Univ)*, Ji Hyun Kim *(UNIST)*, Michael P. Short *(MIT)*, Chi Bum Bahn *(Pusan National Univ)*

54. Effects of Yttrium on High Temperature Steam Oxidation Behavior of FeCrAl-Y Alloy, Sungyu Kim, Joonho Moon, Chi Bum Bahn *(Pusan National Univ)*

55. Cesium Retention Ability in Silica-Based Cesium Compounds, Sang-Chae Jeon, Dong-Joo Kim, Dong Seok Kim, Keon Sik Kim, Jong Hun Kim, Ji-Hae Yoon, Jae Ho Yang *(KAERI)*

56. High-Temperature Oxidation Behavior of Defected Coating Layer for Accident-Tolerant Fuel Cladding, Y.-H. Lee, J.-H. Park, I.-H. Kim, D.-J. Park, Y.-I. Jung, B.-K. Choi, H.-G. Kim *(KAERI)*

57. Update on the Postirradiation Examination of the ATF-1 Series Irradiation Experiments, Jason M. Harp, Fabiola Cappia *(INL)*

58. Progress and Future Plan for Development of Accident Tolerant Fe-Based Alloy Cladding at KEPCO NF, Hun Jang, Sung Yong Lee, Dae Gyun Ko, Yoon Ho Kim, Seung Jae Lee *(KEPCO NF)*, Hyunmyung Kim, Chaewon Kim, Changheui Jang *(KAIST)*

59. In-Situ Irradiation Induced Creep Measurements on UO_2 and $(U,Pu)O_2$ During Neutron Irradiation in the High Flux Reactor, Sander Van Til *(NRG)*

60. Development of Zirconium Complexes for Laser Engineered Net Shaping, Colt R. Heathman, Rocklan McDowell, Edna Cardenas *(INL)*

61. Assessment of Wear Coefficients of Accident Tolerance Fuel Cladding with Coated Materials, Roger Y. Lu *(Westinghouse)*

62. Accident Tolerant Fuel: Safety and Economic Benefit Studies, Aladar Csontos, Nathan Capps *(EPRI)*

63. Fabrication and Characterization of SiCf/SiC Composites Cladding Tube, Zongbei He Ming Li, Ruiqian Zhang, Daogui Fu, Shaoyu Qiu *(Nuclear Power Inst of China)*

64. Fabrication and Steam Oxidation Testing of Alloyed Uranium Silicide Fuels, Elizabeth S. Sooby, Cole Moczygemba, Geronimo Robles, Sean Nesloney *(Univ of Texas at San Antonio)*, Christopher Grote *(LANL)*, Lu Cai, Peng Xu, Edward Lahoda *(Westinghouse)*

TUESDAY, SEPTEMBER 24
TOP FUEL 2019 POSTER SESSION - 5:30 PM

Top Fuel 2019 Poster Session Continued

65. Transverse Rupture Strength of Cerium Dioxide as a Surrogate Nuclear Fuel, Adrianna Elzabeth Lupercio

66. Preliminary Evaluation of FeCrAl-UN Fuel Rod Performance, Shixin Gao *(Science and Technology on Reactor System Design Technology Laboratory)*, Zhengang Duan *(Nuclear Power Inst of China)*, Yi Zhou, Ping Chen, Liang He, Shichao Liu, Kun Zhang, Xi Qiu *(Science and Technology on Reactor System Design Technology Laboratory)*, Ruiqian Zhang *(Nuclear Power Inst of China)*

67. Modeling of the U_3Si_2/SiC Fuel System Behavior for a RIA Scenario, C. Cozzo, R. Ngayam-Happy, J.-C. Chen, M. Pecchia *(PSI)*, G. Girardin *(Kernkraftwerk Gösgen-Däniken AG)*

68. Cause Analysis of Stress Corrosion Cracking Incident due to Polyvinyl Chloride Cable on Glove Box, Yoshikazu Yamada, Kimikazu Shibanuma *(JAEA)*

69. Overview and Prediction of Lead CF Fuel Assembly's Poolside Examination Results, Yongjun Jiao *(Nuclear Power Inst of China)*

70. Operational Feedback—Enriched Reprocessed Uranium Operation at Sizewell B, Peter G. Newby *(Framatome)*, Ingo Koban, Nico Vollmer *(Framatome GMBH)*, Roger Float *(EdF Energy)*

71. Rim Structure Effects on Fuel Rod Performance with Burnup Extension Using FRAPCON, Jianguo Yu, Hongbin Zhang *(INL)*

72. Safety Benefit of Corrosion-Resistant CrAl Coated Zr Cladding under SBO Conditions of OPR-1000, T. H. Chun, C. H. Shin, J. H. Yang *(KAERI)*

73. Machine Learning-Based Multiphysics Reactor Simulator, Cole A. Gentry, Seung-Huan Lim, Sarah S. Power, Sacit M. Cetiner, Benjamin S. Colins, Rama Krishnan *(ORNL)*

74. Fission Gas Diffusion in UO_2 Calculation Using Free Energy Cluster Dynamics, Christopher Matthews, Romain Perriot, Michael Cooper, David Anderson *(LANL)*

75. Evolution of SSTC NRS Computer Models for Carrying Out Independent Verifying Evaluation of the Mixed Cores at the Ukrainian NPPs, M. Ieremenko, I. Ovdiienko, O. Dybach, I. Shevchenko *(State Scientific and Technical Center for Nuclear and Radiation Safety)*, A. Shepitchak *(State Nuclear Regulatory Inspectorate of Ukraine)*

76. Pin2Perform: A Framework for Consistent Fuel Performance Calculations, Daniel O'Grady, Dean Reid Price, Tomasz Kozlowski (Univ of Illinois), Julie-Fiona Martin, Ian Hill *(OECD/NEA)*

WEDNESDAY, SEPTEMBER 25
TOP FUEL 2019 TECHNICAL SESSIONS - 8:00 AM

Innovation in Nuclear–Panel
Session Organizer: Randall Dunavant *(Southern Nuclear)* **Chair:** Erik Mader *(EPRI)*
Location: Grand Ballroom III **Time:** 8:00-9:15 am

Since 2011, the nuclear industry has been pursuing development of reactor fuels that are more robust and have improved performance during both normal and postulated accident conditions, i.e. Advanced Technology Fuel (ATF). These technologies create opportunities to modernize the industry, support nuclear industry economic goals, and improve performance and safety. Along these lines, Top Fuel has had a considerable focus on ATF development and research over the last few years. Join this panel where key leaders from the U.S. nuclear industry provide their perspectives on innovation within the nuclear industry. The panelists will touch on topics such as the role their respective entities play, key learnings from recent initiatives, drivers for innovation, and the challenges that come along with it. The panel will be led by a moderator and each panelist will be given a few minutes to present their perspectives followed by a question and answer session with the audience.
Panelists:
John Williams *(Southern Nuclear Co.)*
Steve Hayes *(INL)*
Josh Whitman *(NRC)*

TOP FUEL 2019 TECHNICAL SESSIONS - 9:30 AM

Fuel Rod, Fuel Cladding and Component Materials Behaviors—I
Session Organizer: Jeremy Bischoff *(Framatome)* **Cochairs:** Jeremy Bischoff *(Framatome)*, Kiran Nimishakavi *(Framatome)*
Location: Grand Ballroom III **Time:** 9:30-11:10 am

9:30 am: Microstructure Characterization of Atomized Dispersion Targets for Mo-99 Production, Tae Won Cho, Ki Nam Kim, Yong Jin Jeong, Kyuhong Lee, Sunghwan Kim, Jong Man Park *(KAERI)*

9:55 am: High Temperature Steam Oxidation of Cr-Coated SiC_f/SiC Composite for LWR Cladding Applications, Jo Jo Lee, Takaaki Koyanagi, Bruce A. Pint, Yutai Katoh *(ORNL)*

10:20 am: Oxidation of Silicon Carbide in Steam Studied by Laser Heating, H. V. Pham, Y. Nagae, M. Kurata *(JAEA)*, K. Furumoto *(Mitsubishi Nuclear Fuel Co., Ltd.)*, H. Sato *(Toshiba Energy Systems & Solutions Corp)*, R. Ishibashi *(GE-Hitachi)*, S. Yamashita *(JAEA)*

10:45 am: Assessment of Pre-Irradiation SiC CMC Joint Performance in Representative Cladding Geometries, S. Gonderman, G. Jacobson *(General Atomics)*, T. Koyanagi, C. Petrie *(ORNL)*, C. Deck *(General Atomics)*

Fuel Behavior Modeling During Operation and Under Back-End Conditions
Session Organizer: Erich Wimmer *(Materials Design, Inc.)* **Cochairs:** Erich Wimmer *(Materials Design, Inc.)*, John Jackson *(INL)*
Location: Vashon I/II **Time:** 9:30-11:10 am

9:30 am: Cycle Specific Evaluation of the Margin to Ballooning and Burst of High Burnup Fuel Rods During a Large Break Loss-of-Coolant Accident, M. Hemlin *(Vattenfall Nuclear Fuel)*, H. Nylén *(Ringhals AB)*

9:55 am: Computational Studies of Amorphous UO_2 for Grain Boundary Behavior, Ember L. Sikorski *(Boise State Univ, Center for Advanced Energy Studies)*, Eric B. Nelson *(Boise State Univ)*, Simon C. Middleburgh *(Bangor Univ)*, Lan Li *(Boise State Univ)*

10:20 am: Fuel Performance Analysis of Uranium Silicide Fuel for LWRs During Cladding Failure, R. T. Sweet *(Univ of Tennessee Knoxville)*, A. T. Nelson *(ORNL)*, B. D. Wirth *(Univ of Tennessee Knoxville, ORNL)*

10:45 am: Modeling of Base Irradiation Histories of LOCA Tests Using CMS5 and ENIGMA, Gerardo Grandi *(Studsvik Scandpower)*, Joakim Karlsson *(Studsvik Nuclear AB)*, Mattias Hemlin *(Vattenfall Nuclear Fuel)*

Top Fuel 2019
Technical Sessions:
Wednesday September 25

WEDNESDAY, SEPTEMBER 25
TOP FUEL 2019 TECHNICAL SESSIONS - 9:30 AM

Transient Fuel Behavior and Criteria—III
Session Organizer: Dan LaBrier *(Idaho State Univ)* **Cochairs:** Dan LaBrier *(Idaho State Univ)*, Oliver Marchand *(IRSN)*
Location: St. Helens **Time:** 9:30-10:45 am

9:30 am: Fuel Fragmentation During LOCA Simulated Transients: Investigation of Irradiated MOX vs. UO_2 Fuel, B. Baurens, C. Esnoul, N. Waeckel, R. Largenton, F. Rossillon, E. Pouillier, J. J. Vermoyal *(EdF)*

9:55 am: Deformation Behavior of Zircaloy-4 Cladding in a Spent Fuel Pool Accident, Kinya Nakamura, Kenta Inagaki, Takeshi Sonoda, Satoshi Nishimura *(CRIEPI)*

10:20 am: Determination of Zirconium Oxide Chemistry Through Complimentary Characterization Techniques, Corey M. Efaw, Michael Reynolds (Boise State Univ), Jordan L. Vandegrift, Kassiopeia Smith, Yaqiao Wu, Brian J. Jaques *(Boise State Univ, Center for Advanced Energy Studies)*, Hongqiang Hu *(INL)*, Claire Xiong, Michael F. Hurley *(Boise State Univ)*

TOP FUEL 2019 TECHNICAL SESSIONS - 1:00 PM

Fuel Rod, Fuel Cladding and Component Materials Behaviors—II
Session Organizer: Sarah DeSilva *(GNF)* **Cochairs:** Sarah DeSilva *(GNF)*, Aylin Kucuk *(EPRI)*
Location: Grand Ballroom III **Time:** 1:00-3:05 pm

1:00 pm: Thermal Annealing of Irradiated Prehydrided Zircaloy-4 Materials, Scott C. Middlemas *(INL)*, Daniel Jädernäs *(Studsvik)*, Erik Mader *(EPRI)*

1:25 pm: Joining Technology with Corrosion-Resistant Coating for Silicon-Carbide Fuel Cladding, R. Ishibashi, M. Kida, M. Shibata, T. Kondo *(GE-Hitachi)*, S. Yamashita, T. Fukahori *(JAEA)*

1:50 pm: Development of Additive Manufacturing at Westinghouse, William Cleary, Artem Aleshin, David Huegel, Jason Moore, Thomas Pomorski *(Westinghouse)*

2:15 pm: Applicability of 3D Printing to Manufacture Spacer Grid in Nuclear Fuel, Chaeyoung Nam, Jooyoung Ryu, Joongjin Kim, Namgyu Park, Seungjae Lee *(KEPCO NF)*

2:40 pm: Oxidation and Quench Behavior of Cold Spraying Cr-Coated Zircaloy Fuel Cladding Under Severe Accident Scenarios, Chongchong Tang, Mirco Grosse, Martin Steinbrueck *(KIT)*, Koroush Shirvan *(MIT)*

Design and Analysis Methods—II
Session Organizer: Uffe Bergman *(Westinghouse)* **Cochairs:** Uffe Bergman *(Westinghouse)*, Nadine Hollasky *(BeIV)*
Location: Vashon I/II **Time:**1:00-3:05 pm

1:00 pm: Determination of Hidden Extrapolations via Gaussian Mixture Models, Ross Pivovar *(BWXT)*

1:25 pm: Prediction of Boiling Crisis in a Full-Size Rod Bundle with Spacer Grids, Quan Li, Yuanming Li *(Nuclear Power Inst of China)*, M. Avramova *(NCSU)*, Yongzhong Huang, Zhenhai Liu, Chao Ma, Feipeng Qi, Bo Zhao *(Nuclear Power Inst of China)*

1:50 pm: A Robust Mechanistic Approach to Prediction of Departure from Nucleate Boiling, Xingang Zhao, Koroush Shirvan *(MIT)*, Robert K. Salko *(ORNL)*

2:15 pm: Validation of a Pin-Based Screening Methodology for the Investigation of Pellet-Clad Interaction During Load-Follow Operation, Daniel O'Grady, Tomasz Kozlowski *(Univ of Illinois)*

2:40 pm: Analysis of MM Space for LWR AI Fuel Design Optimization with CMM, Albert Gu *(AREVA ret)*, Guobin Jia *(Shanghai Inst of Applied Physics)*

WEDNESDAY, SEPTEMBER 25
TOP FUEL 2019 TECHNICAL SESSIONS - 1:00 PM

Transient Fuel Behavior and Criteria—IV
Session Organizer: V. I. Arimescu *(Framatome Inc.)* **Cochairs:** V. I. Arimescu *(Framatome Inc.)*, Olivier Marchand *(IRSN)*
Location: St. Helens **Time:** 1:00-3:05 pm

1:00 pm: Chromium-Coated Cladding Effects in the Context of 10 CFR 50.46c, Michael A. Shockling, Jun Liao, Jeffrey R. Kobelak *(Westinghouse)*

1:25 pm: Modeling and Simulation Strategy for TREAT Experiments, C. P. Folsom, C. B. Jensen, N. E. Woolstenhulme, D. W. Kamerman, D. M. Wachs *(INL)*

1:50 pm: Development of Out of Pile Test for SiC Cladding to Simulate DBA Conditions in PWRs, K. Furumoto, D. Sato, S. Watanabe *(Mitsubishi Nuclear Fuel Co., Ltd.)*, T. Yumura, M. Okamoto *(Mitsubishi Heavy Industries, Ltd.)*, S. Yamashita, T. Fukahori *(JAEA)*

2:15 pm: Recent Advances in Water-Environment Irradiation Testing for Transient and Safety Research at INL, N. E. Woolstenhulme, C. B. Jensen, D. W. Kamerman, T. L. Maddock, N. S. Oldham, D. M. Wachs, S. L. Hayes *(INL)*

2:40 pm: Oxidation Behavior of Zr-Alloy Cladding Candidates for the TREAT Reactor, Jordan L. Vandegrift *(Boise State Univ, Center for Advanced Energy Studies)*, Corey M. Efaw *(Boise State Univ)*, Patrick M. Price *(Boise State Univ, Center for Advanced Energy Studies, SNL)*, Clemente J. Parga *(Center for Advanced Energy Studies, INL)*, Darryl P. Butt *(Boise State Univ, Center for Advanced Energy Studies, Univ of Utah)*, Ben Coryell *(INL)*, Michael F. Hurley *(Boise State Univ)*, Brian J. Jaques *(Boise State Univ, Center for Advanced Energy Studies)*

TOP FUEL 2019 TECHNICAL SESSIONS - 3:50 PM

Fuel Rod, Fuel Cladding and Component Materials Behaviors—III
Session Organizer: Jacki Stevens *(Framatome)* **Cochairs:** Jacki Stevens *(Framatome)*, Daniel Wachs *(INL)*
Location: Grand Ballroom III **Time:** 3:45-4:35 pm

3:45 pm: Fabrication, Characterization, and Testing of Cr-Coated Zr Alloy Nuclear Fuel Rod Cladding for Enhanced Accident Tolerance, A. K. Evans, P. J. Kelly *(MMU)*, D. T. Goddard *(NNL)*, A. Cole-Baker *(Wood plc)*, G. Obasi, M. Preuss *(Manchester Univ)*, E. P. Vernon *(NNL)*

4:10 pm: Experimental Investigation of Cold-Spray Cr-Coated Cladding During Normal and Accident Conditions, Koroush Shirvan, Arunkumar Seshadri, Akshay Dave, Bren Philips (MIT), Martin Ševeček *(CTU in Prague, Alvel a.s.)*, Jakub Krejčí, Adéla Chalupová *(CTU in Prague, UPJ Praha a.s.)*, Miltiadis Kennas, Ekaterina Ryabikovskaya, Aaron French, Hyosim Kim, Lin Shao *(Texas A&M)*

Fuel Operating Experience and Performance—I
Session Organizer: Hank Hoelscher *(Xcel Energy)* **Cochairs:** Hank Hoelscher *(Xcel Energy)*, David Schrire *(Vattenfall Nuclear Fuel)*
Location: Vashon I/II **Time:** 3:45-5:00 pm

3:45 pm: BWR Water Chemistry Trends and Impacts on Fuel Performance, Aylin Kucuk, Michelle Mura *(EPRI)*, Rob Schneider, Dan Lutz *(GNF-Americas)*, Britta Helmersson, Lena Oliver *(Westinghouse Electric Sweden AB)*, Brian Lockamon *(Framatome Inc.)*

4:10 pm: Enhanced Efficiency and Systematic Risk Assessment at Edwin I. Hatch Nuclear Plant—GNF3 Fuel Introduction, R. Dunavant, J. Chavers, A. Phillippe, T. Collart, D. Arvan, R. Patrick, D. Carvallo, R. Fennel *(Southern Nuclear)*, P. McCumbee, F. Bolger, J. Ingraham *(GE-Hitachi)*

4:35 pm: Mitigating the Effects of Baffle-Related Wear in Babcock and Wilcox Nuclear Power Reactors, G. F. Borum, S. M. Mazurkiewicz *(Framatome Inc.)*, D. L. Smith *(Entergy Corp)*

WEDNESDAY, SEPTEMBER 25
TOP FUEL 2019 TECHNICAL SESSIONS - 3:50 PM

Transient Fuel Behavior and Criteria—V
Session Organizer: Kenneth J. Geelhood *(PNNL)* **Cochairs:** Jinzhao Zhang *(Tractebel Eng)*, Kenneth J. Geelhood *(PNNL)*
Location: St. Helens **Time:** 3:45-5:00 pm

3:45 pm: Experimental Behavior of Chromium-Based PVD-Coated Cladding Materials During LOCA Transient, Jakub Krejčí *(UJP PRAHA a.s.)*, Adéla Chalupová, Ladislav Cvrček, Martin Ševeček *(CTU in Prague)*, Vojtěch Rozkošný *(UJP PRAHA a.s.)*, Patricie Halodová, Petra Gávelová *(Research Centre Rez)*

4:10 pm: Behavior of High-Burnup Advanced LWR Fuel Cladding Tubes Under LOCA Conditions, Takafumi Narukawa, Masaki Amaya *(JAEA)*

4:35 pm: Results of the Bundle Test QUENCH-19 with FeCrAl Claddings, J. Stuckert, M. Grosse, M. Steinbrueck *(KIT)*, K. Terrani *(ORNL)*

THURSDAY, SEPTEMBER 26
TOP FUEL 2019 TECHNICAL SESSIONS - 8:00 AM

Design and Analysis Methods—III
Session Organizer: Nathan Capps *(EPRI)* **Cochairs:** Nathan Capps *(EPRI)*, John Jackson *(INL)*
Location: Vashon I/II **Time:** 8:00-9:15 am

8:00 am: Hydrides in Irradiated Liner Cladding—Local and In-Depth Concentration Determination by Neutron Radiography, Liliana I. Duarte *(PSI)*, Francesco Fagnoni *(Aalborg Univ)*, Robert Zubler, Weijia Gong, Pavel Trtik, Johannes Bertsch *(PSI)*

8:25 am: OpenFOAM Thermal Analysis of Nuclear Thermal Propulsion Fuel and Moderating Elements, J. C. Wang, D. Kotlyar *(Georgia Tech)*

8:50 am: The SIF Model of Zr-4 Cladding Tube with Axial Cracks, L. Chen, L. L. Liu, X. M. Song, H. Pang, X. M. Xie *(Nuclear Power Inst of China)*, X. G. Zeng *(Sichuan Univ)*

Fuel Operating Experience and Performance—II
Session Organizer: Philip I. Wengloski *(Exelon)* **Cochairs:** Philip I. Wengloski *(Exelon)*, David L. Smith *(Entergy Corp)*
Location: St. Helens **Time:** 8:00-9:40 am

8:00 am: Addressing the Negative Industry Trend of Debris-Related Failures in Commercial Nuclear Fuel, S. M. Mazurkiewicz *(Framatome Inc.)*, C. Bretting *(Framatome GmbH)*, C. Petit *(Framatome SAS)*

8:25 am: GNF Fuel Reliability and Channel Performance: 2019 Update, R. Schneider, D. Lutz, P. McCumbee, P. Cantonwine *(GNF-Americas)*

8:50 am: Advanced Debris Protection for PWR Fuel, Michael E. Conner, Yuriy Aleshin, Robert A. Brewster, Caroline K. Duncan (*Westinghouse)*

9:15 am: Development and Testing of BWR Fuel Debris Filter, Uffe Bergmann, Fredrik Waldemarsson *(Westinghouse Electric Sweden AB)*

TOP FUEL 2019 TECHNICAL SESSIONS - 9:55 AM

Cladding and Structural Alloys Development—IV
Session Organizer: Robert Oelrich *(PNNL)* **Cochairs:** Robert Oelrich *(PNNL)*, Susan Hoxie-Key *(Southern Nuclear)*
Location: Grand Ballroom III **Time:** 9:55-11:35 am

9:55 am: Framatome Shielding Fuel Assemblies Ensure Plant Lifetime Extension, Lars Ackermann, Christian Möllmer, Jörg Peucker, Dominik Streit *(Framatome GmbH)*, Jenny Roudén, Henrik Nylén *(Ringhals AB)*, Malin Löwe, David Schrire *(Vattenfall Nuclear Fuel)*

10:20 am: Irradiation of Advanced Neutron Absorbing Material to Support Accident Tolerant Fuel Applications, J. N. Stevens, M. Aumand *(Framatome Inc.)*, B. Winterholer, G. Raveu *(Framatome)*, A. Le Coq, N. Cetiner, K. Linton *(ORNL)*

10:45 am: Burnup Performance Analysis for Candidate Materials of the LWR Accident Tolerant Control Rod, Yong Liu, Mancang Li, Yingrui Yu, Peng Xiao, Xingbo Wang, Bin Zhang, Dongyong Wang *(Nuclear Power Inst of China)*

11:10 am: Thermal and Neutronic Analysis for Irradiation of Advanced Neutron- Absorbing Material in the High Flux Isotope Reactor, N. O. Cetiner, J. R. Burns, A. G. Le Coq, K. D. Linton, C. M. Petrie *(ORNL)*, J. N. Stevens *(Framatome Inc.)*, B. Winterholer, G. Raveu *(Framatome)*

Top Fuel 2019
Technical Sessions: Thursday September 26

THURSDAY, SEPTEMBER 26
TOP FUEL 2019 TECHNICAL SESSIONS - 9:55 AM

Design and Analysis Methods—IV
Session Organizer: Erich Wimmer *(Materials Design, Inc.)* **Cochairs:** Erich Wimmer *(Materials Design, Inc.)*, Guangjun Li *(GE-Hitachi)*
Location: Vashon I/II **Time:** 9:55 am-11:35 pm

9:55 am: Reactivity Initiated Accident Multi-Physics Simulation and Output Data Compression, Alexey Cherezov, Hanjoo Kim, Jinsu Park, Deokjung Lee *(UNIST)*

10:20 am: Hatch TRACG ECCS LOCA Application, R. Dunavant, J. Chavers (Southern Nuclear), M. Holmes, G. J. Li, J. Fricano, R. Harrington *(GE-Hitachi)*

10:45 am: Fuel Performance Uncertainty due to Manufacturing Tolerances, Jinan Yang, Benjamin Collins, Shane Stimpson *(ORNL)*

11:10 am: Benchmark of Fuel Performance Codes for FeCrAl Cladding Behavior Analysis, G. Pastore, K. A. Gamble *(INL)*, M. Cherubini *(Nuclear and Industrial Engineering)*, C. Giovedi *(Univ of São Paulo)*, A. Marino *(National Atomic Energy Commission)*, A. Yamaji *(Waseda Univ)*, Y. Kaji *(JAEA)*, P. Van Uffelen *(EC-JRC)*, M. S. Veshchunov *(IAEA)*

Fuel Performance Reliability, Operations, and Maintenance Experience
Session Organizer: David L. Smith *(Entergy Corp)* **Cochairs:** David L. Smith *(Entergy Corp)*, Volker Schoss *(Framatome)*
Location: St. Helens **Time:** 9:55-11:10 am

9:55 am: Irradiation Growth Behavior of Improved Zr-Based Alloys for Fuel Cladding, Masaki Amaya, Kazuo Kakiuchi, Takeshi Mihara *(JAEA)*

10:20 am: Nuclear Power Plant Flexible Operation, J. Plancher, A. Grossetete *(Framatome)*, S. Nguyen *(EdF)*

10:45 am: Safer and Faster Outages with Modern Prediction Tools, Veit Marx, Markus Singer *(Framatome GmbH)*, Kai Fülber *(PreussenElektra GmbH)*

TOP FUEL 2019 TECHNICAL SESSIONS - 1:00 PM

Cladding and Structural Alloys Development—V
Session Organizer: Susan Hoxie-Key *(Southern Nuclear)* **Cochairs:** Susan Hoxie-Key *(Southern Nuclear)*, William P. Gassmann *(Exelon)*
Location: Grand Ballroom III **Time:** 1:00-3:05 pm

1:00 pm: Effect of Alloying Elements on Formation and Stability of Dislocation Loops in Zirconium, M. Christensen, W. Wolf, C. Freeman, E. Wimmer *(Materials Design, Inc.)*, R. B. Adamson *(Zircology Plus)*, M. Griffiths *(Advanced Nuclear Technology)*, E. V. Mader *(EPRI)*

1:25 pm: Nano-Grained UO_2 Grain Growth Kinetics at 600-800°C: An In-Situ Synchrotron X-Ray Study, K. Mo, Y. Miao *(ANL)*, T. Yao, J. Lian *(RPI)*, J.-S. Park, J. Almer, S. Bhattacharya, A. M. Yacout *(ANL)*

1:50 pm: Characterization of $(U,La)O_2$ Fuel from the Standpoint of Power Reactor Applications, E. N. Onder, A. Bergeron, L. Fu, J. Mouris, D. Roubtsov, M. Saoudi *(CNL)*

2:15 pm: Improving the Fuel Qualification Process Through the Use of Microscale Samples for Describing Bulk Material Properties, Daniel LaBrier *(Idaho State Univ)*, Jason Schulthess *(INL)*, Wade Marcum *(Oregon State Univ)*, Mitchell K. Meyer *(INL, Oregon State Univ)*

2:40 pm: Sintering and FEA Simulation of Oxide Fuel Pellet Containing Lumped Gd_2O_3, Qusai M. Mistarihi, Faris Sweidan, Jang Soo Oh, Yonghee Kim, Ho Jin Ryu *(KAIST)*

THURSDAY, SEPTEMBER 26
TOP FUEL 2019 TECHNICAL SESSIONS - 1:00 PM

Fuel Operating Experience and Performance—III
Session Organizer: Volker Schoss *(Framatome)* **Cochairs:** Volker Schoss *(Framatome)*, Philip Wengloski *(Exelon)*
Location: St. Helens **Time:** 1:00-3:05 pm

1:00 pm: Grid Width Growth Behaviors in Korean PWR Nuclear Fuels, Y. K. Jang, J. W. Kim, J. S. Yoo *(KEPCO NF)*

1:25 pm: Introduction of the Temelin Irradiated Cladding Project—TIRCLAD 1, Martin Ševeček *(CTU in Prague, Alvel a.s.)*, Josef Bělář, Stanislav Linhart, Radomír Řeháček *(Alvel a.s.)*, Martina Malá, Ondřej Srba *(Research Center Rez)*

1:50 pm: GAIA Fuel Implementation in the U.S., Scott D'Orio, Robert Clarke *(Framatome Inc.)*, Scott Thomas *(Duke Energy)*

2:15 pm: Westinghouse CE16NGF Fuel Assembly Performance, M. Dye, M. O'Cain *(Westinghouse)*

2:40 pm: ATRIUM 11 Global Implementation, Norman Garner, Steven Cole *(Framatome Inc.)*, Nico Vollmer, Robert Koch *(Framatome GmbH)*

TOP FUEL 2019 TECHNICAL SESSIONS - 3:50 PM

Cladding and Structural Alloys Development—VI
Session Organizer: Sarah DeSilva *(GNF)* **Cochairs:** Sarah DeSilva *(Southern Nuclear)*, Jacki Stevens *(Framatome)*
Location: Grand Ballroom III **Time:** 3:45-5:25 pm

3:45 pm: Effect of TiN and ZrN Coating to CRUD Deposition Behavior of Pressurized Water Reactor Fuel Cladding, Junhyuk Ham, Yunju Lee, Seung Chang Yoo, Ji Hyun Kim *(UNIST)*

4:10 pm: Towards Industrial Scale Manufacture of UN Fuel for Water-Cooled Reactors, Janne Wallenius *(LeadCold Reactors)*, Mikael Jolkkonen, Yulia Mishchenko *(KTH)*, Daniel Laurin *(Promation Nuclear)*

4:35 pm: Improved Hydrothermal Corrosion Resistance of UN Fuel Forms via Addition of Metallic Constituents, Jennifer K. Watkins *(Boise State Univ, Center for Advanced Energy Studies)*, Ember Sikorski, Lan Li *(Boise State Univ)*, Brian J. Jaques *(Boise State Univ, Center for Advanced Energy Studies)*

5:00 pm: Development of Self-Healing Coating on Fuel Cladding for Water-Cooling Nuclear Reactors, Z. G. Duan, G. S. Xin, Y. Zhou, Y. M. Li (Nuclear Power Inst of China), H. Abe, H. L. Yang, S. Kano, J. McGrady *(Univ of Tokyo)*

Multi-Physics Coupling
Session Organizer: Jason Ingraham *(GNF)* **Cochairs:** Jason Ingraham *(GNF)*, Christophe Schneidesch *(Tractebel Eng)*
Location: Vashon I/II **Time:** 3:45-5:00 pm

3:45 pm: Validation and Verification of the FINIX Fuel Behavior Module, Jussi Peltonen, Henri Loukusa, Ville Tulkki *(VTT Technical Research Centre of Finland)*

4:10 pm: Coupling Methodology for the Multidimensional Fuel Performance Code OFFBEAT and the Monte Carlo Neutron Transport Code Serpent, Alessandro Scolaro *(EPFL)*, Yves Robert *(Inst National des Sciences Appliquées Lyon, EPFL)*, Carlo Fiorina *(EPFL)*, Ivor Clifford (PSI), Andreas Pautz *(EPFL)*

4:35 pm: Framatome Advanced Codes and Methods Application to Control Rod Ejection, Single Rod Withdrawal, and Steam Line Break at Power, Ruxandra Bobolea, William Walters, Keith Maupin, Richard Deveney, Tim Lindquist, Robert Barner *(Framatome Inc.)*

THURSDAY, SEPTEMBER 26
TOP FUEL 2019 TECHNICAL SESSIONS - 3:50 PM

Fuel Operating Experience and Performance—IV

Session Organizer: David Schrire *(Vattenfall Nuclear Fuel)* **Cochairs:** David Schrire *(Vattenfall Nuclear Fuel)*, Norman Garner *(Framatome)*
Location: St. Helens **Time:** 3:45-5:25 pm

3:45 pm: Towards Understanding Thermal Cycling Effects on Hydride Precipitation and Dissolution in Zirconium Alloys and Subsequent Effect on Cladding Performance, A. Cole-Baker, P. Binks, J. R. Lovett, H. Hulme, M. Gass *(Wood plc)*

4:10 pm: A Study on Corrosion Behavior of Zirconium Alloy at High Temperature Water Condition Under UV Irradiation, Taeho Kim, Zefeng Yu, Yalong He, Mohamed Elbakhshwan, Li He, Adrien Couet *(Univ of Wisconsin Madison)*

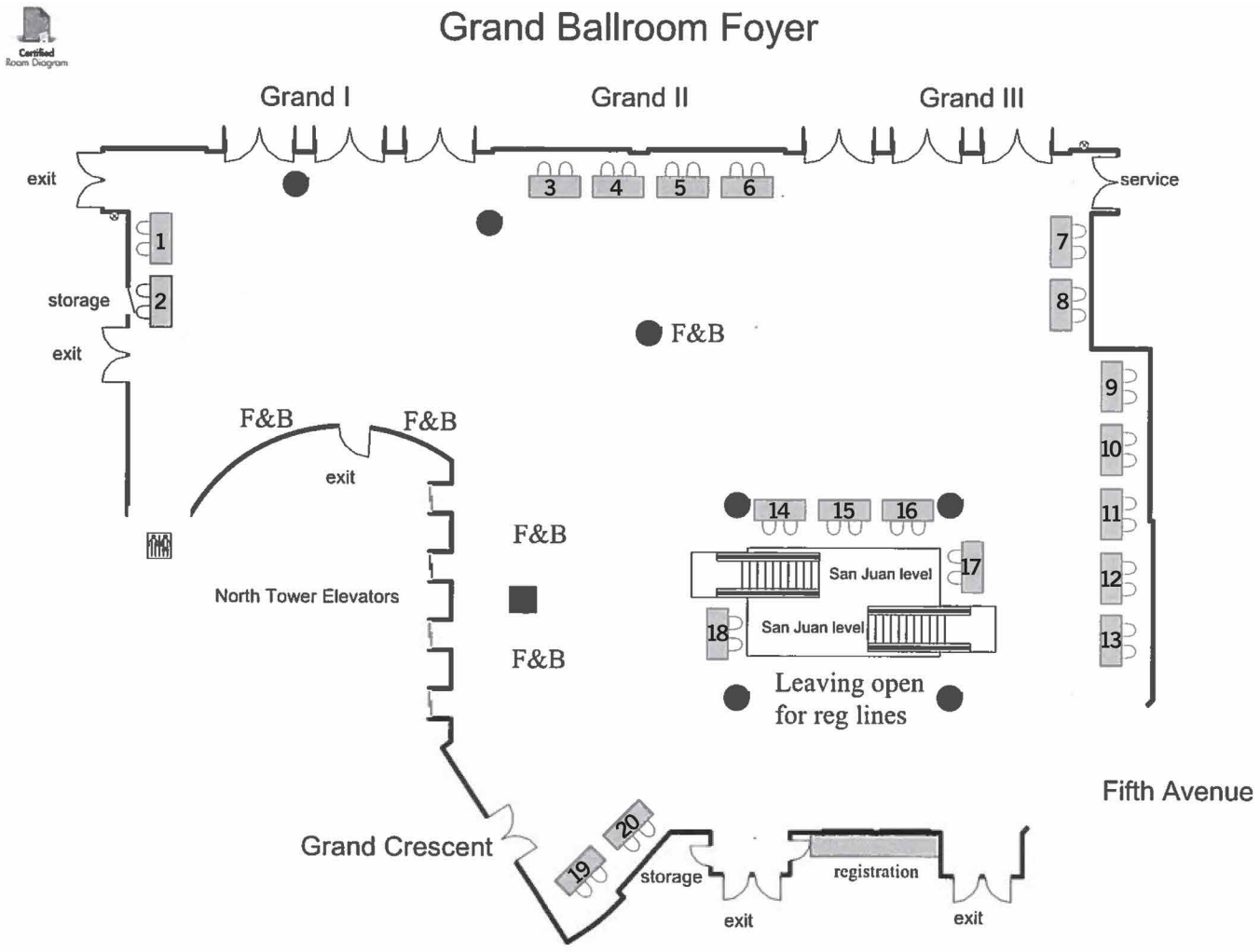
4:35 pm: BWR Water Chemistry Transients and Crud-Induced Corrosion Fuel Failure Risk Assessment, Aylin Kucuk *(EPRI)*, Roy Nelson *(Energy Northwest)*, Alfredo Avila *(Comision Federal de Electricidad)*, Kornelia Szwarc *(Entergy Nuclear Northeast)*, Kenny Epperson *(Epperson Engineering)*, Gerald A. Potts, Joe Giannelli *(Structural Integrity Associates)*, Garry Gose *(Zachry Nuclear)*

5:00 pm: Oxide Surface Peeling (OSP) of Advanced Zirconium Cladding Irradiated in PWRs, G. Pan, D. Mitchell, A. Atwood, J. Iyer *(Westinghouse)*, M. Limbäck, L. Fridemo *(Westinghouse Electric Sweden AB)*, L. Cai *(Westinghouse)*, C. Muñoz-Reja, A. Muñoz *(ENUSA)*

Exhibitors List

Exhibit Hall Floor Plan

HOURS:
Monday, September 23, 7:00 am – 4:00 pm
Tuesday, September 24, 7:00 am – 7:30 pm



Exhibitor & Expo Info

Argonne National Laboratory

Lemont, IL (17)

Argonne National Laboratory continues to advance the science and technology foundations of safe, secure, and sustainable nuclear energy systems. Stop by the Argonne booth to learn more and register to win a piece of history – a block of CP-1 graphite! www.ne.anl.gov.

Exelon Generation Company, LLC

Warrenville, IL (9)

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Exelon Generation operates the largest U.S. fleet of carbon-free nuclear plants with more than 19,600 megawatts of capacity from 22 reactors at 13 facilities in Illinois, Maryland, New York and Pennsylvania.

FRAMATOME, Inc.

Lynchburg, VA (3 and 4)

Framatome is a major international player in the nuclear energy market recognized for its innovative solutions and value-added technologies for designing, building, maintaining, and advancing the global nuclear fleet. The company designs, manufactures and installs components, fuel and instrumentation and control systems for nuclear power plants and offers a full range of reactor services. With 14,000 employees worldwide, every day Framatome's expertise helps its customers improve the safety and performance of their nuclear plants and achieve their economic and societal goals.

Gateway for Accelerated Innovation in Nuclear

Idaho Falls, ID (16)

GAIN's mission is to provide the nuclear energy industry with access to the technical, regulatory, and financial support necessary to move new or advanced nuclear technologies toward commercialization in an accelerated and cost-effective fashion. Through private-public partnerships, GAIN connects nuclear innovators to DOE national laboratory capabilities and RD&D programs.

Exhibitor & Expo Info

Idaho National Laboratory
Idaho Falls, ID (15)

Idaho National Laboratory (INL) is the nation's nuclear energy laboratory and home of the National Reactor Innovation Center. INL's researchers work with unparalleled irradiation and post-irradiation examination, fuel fabrication, materials testing and demonstration facilities to develop better fuels and materials for the current fleet and for advanced nuclear reactor designs.

Netzsch Instruments NA LLC
Burlington, MA (8)

NETZSCH Instruments is the leading supplier of thermal analysis and thermophysical property instrumentation within the nuclear industry. We offer reliable, robust, and easy to use instruments with modular designs made specifically for incorporation into gloveboxes and hot cells. Contact NETZSCH Instruments today to meet all of your material characterization needs!

Nuclear Science User Facilities (NSUF)
Idaho Falls, ID (18)

The Nuclear Science User Facilities (NSUF) offers unparalleled research opportunities for nuclear energy researchers via 21 partner institutions. Users are provided access (at no cost to the researcher) to world-class nuclear research facilities, technical expertise from experienced scientists and engineers, and assistance with experiment design, assembly, safety analysis and examination. Access is awarded through a competitive peer-reviewed process, and NSUF research supports Department of Energy-Office of Nuclear Energy missions.

Oak Ridge National Laboratory
Oak Ridge, TN (1)

Oak Ridge National Laboratory (ORNL) is a multi-program science and technology laboratory managed for the U.S. Department of Energy by UT-Battelle, LLC. Scientists and engineers at ORNL conduct basic and applied research and development to create scientific knowledge and technological solutions that strengthen the nation's leadership in key areas of science; increase the availability of clean, abundant energy; restore and protect the environment; and contribute to national security. www.ornl.gov

Orano
Washington, DC (5 and 6)

Orano USA is a leading technology and services provider for used nuclear fuel management, decommissioning shutdown nuclear energy facilities, federal site cleanup and closure, and the sale of uranium, conversion, and enrichment services to the U.S. commercial and federal markets. Orano Med is developing targeted alpha therapy to fight cancer.

Pacific Northwest National Laboratory
Richland, WA (14)

Pacific Northwest National Laboratory draws on signature capabilities in chemistry, Earth sciences, and data analytics to advance scientific discovery and create solutions to the nation's toughest challenges in energy resiliency and national security. Founded in 1965, PNNL is operated by Battelle for the U.S. Department of Energy. www.pnnl.gov

Westinghouse Electric Company
Cranberry Twp, PA (7)

Westinghouse Electric Company is the world's pioneering nuclear energy company and a leading supplier of nuclear plant products and technologies to utilities throughout the world. Westinghouse supplied the world's first commercial pressurized water reactor in 1957. Today, Westinghouse technology is the basis for approximately one-half of the world's operating nuclear plants.

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Accelerated decommissioning of shutdown reactors, waste packaging, and site remediation

Orano Med

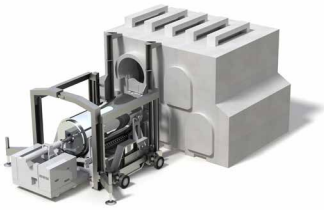
Developing nuclear medicine and innovative therapies to fight cancer

MCE

Long-term contracts for uranium concentrates, conversion and enrichment services

High Burnup Used Fuel Thermal Data Project

Thermal modeling and analyses of long-term used nuclear fuel dry storage



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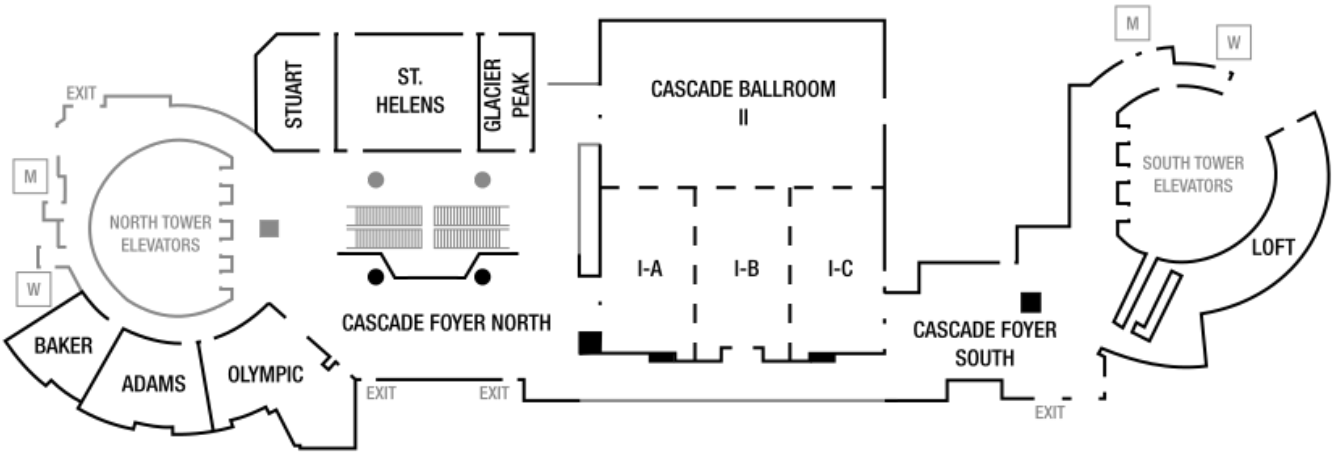
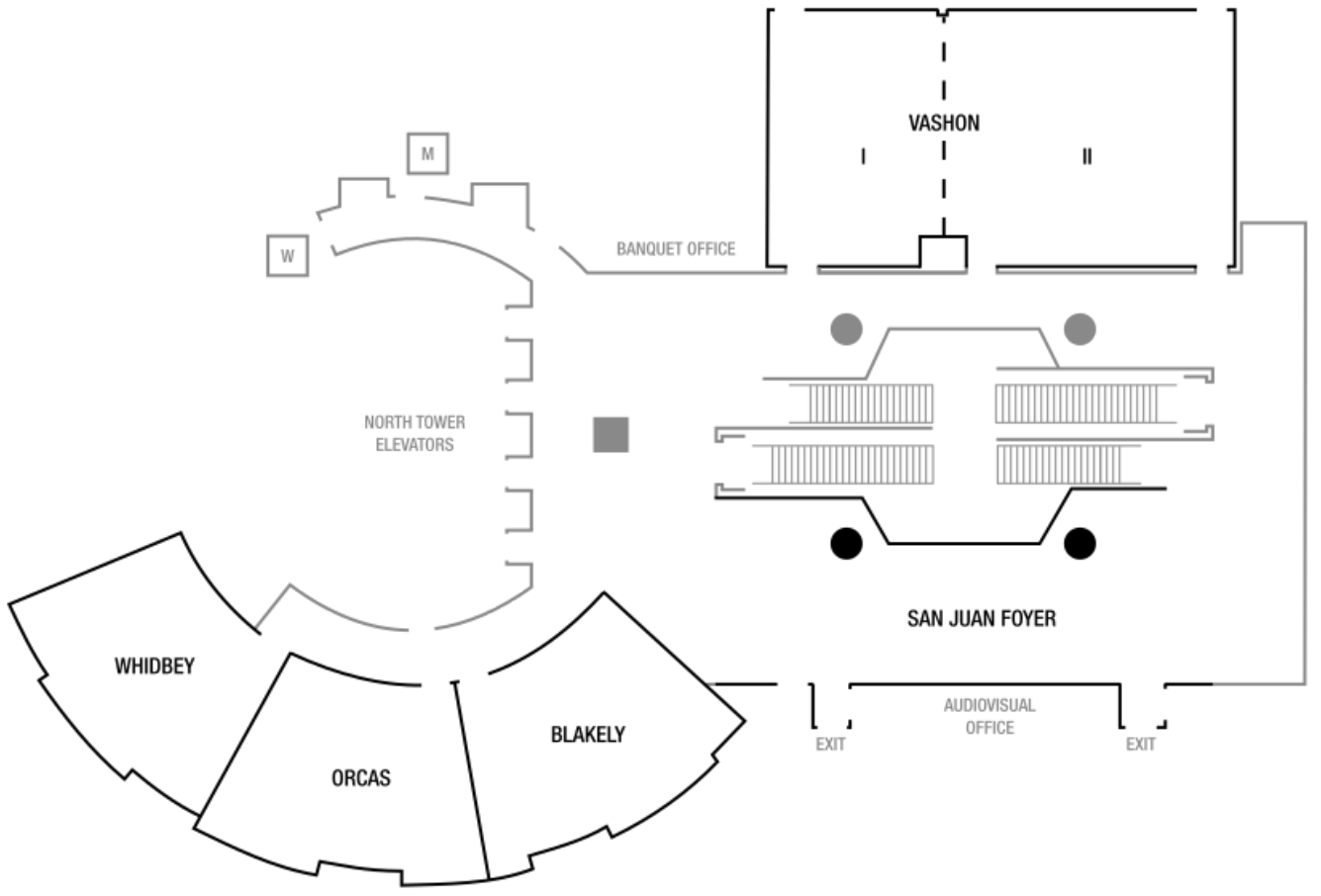
Hotel Floorplans

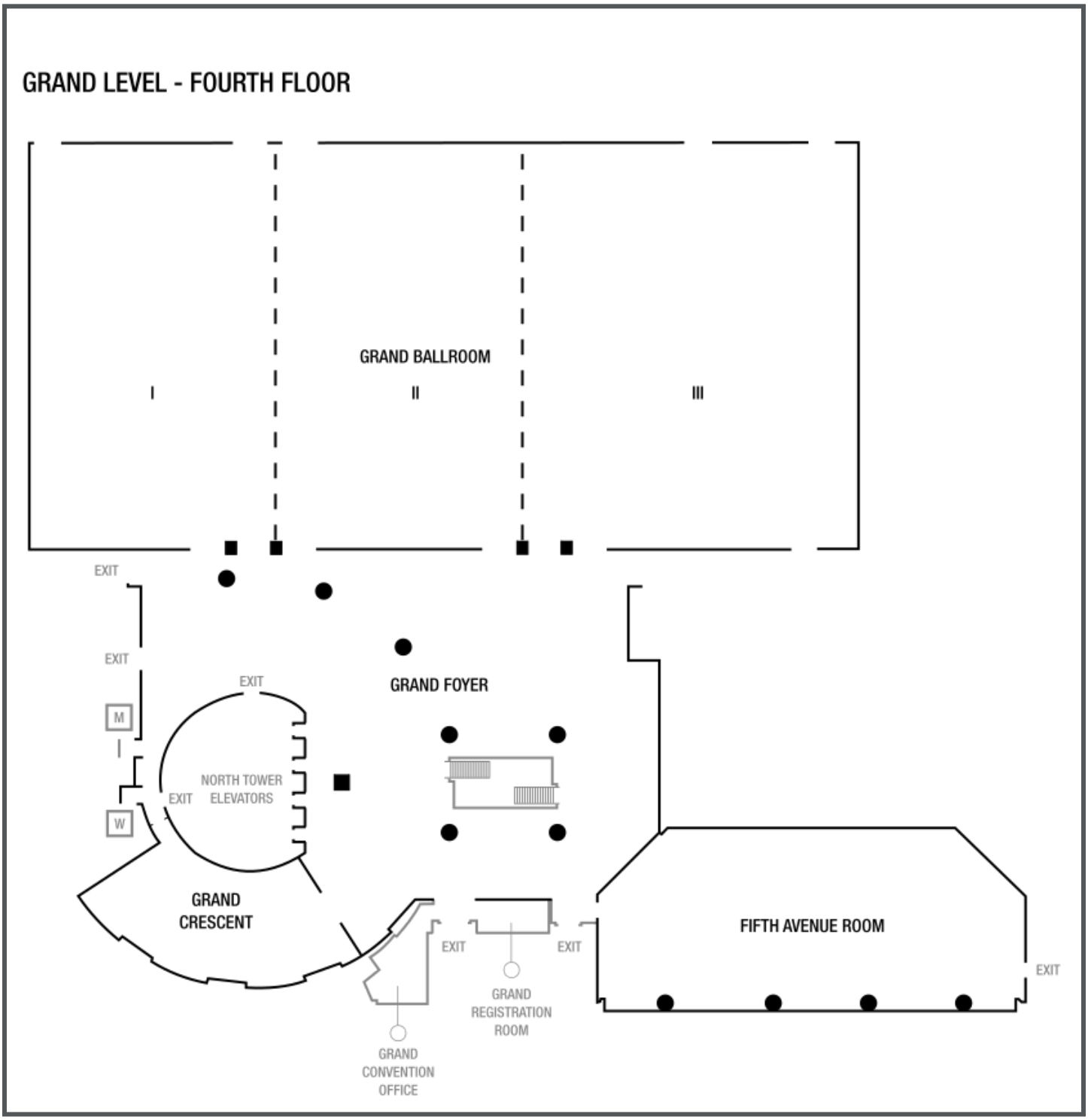
MEZZANINE LEVEL - SECOND FLOOR



SAN JUAN LEVEL - THIRD FLOOR



Hotel Floorplans



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ANS Meetings

MATERIALS IN NUCLEAR ENERGY SYSTEMS (MINES)

OCT 6-10, 2019 | Baltimore, MD | Hilton Baltimore

2019 ANS WINTER MEETING AND NUCLEAR TECHNOLOGY EXPO

NOV 17-21, 2019 | Washington, DC | Marriott Wardman Park

EMBEDDED TOPICAL MEETING YOUNG PROFESSIONALS CONGRESS (YPC)

NOV 16, 2019 | Washington, DC | Marriott Wardman Park

14TH INTERNATIONAL TOPICAL MEETING ON NUCLEAR APPLICATIONS OF ACCELERATORS (ACCAPP '20)

APR 5-9, 2020 | Vienna, Austria

TECHNOLOGY OF FUSION ENERGY (TOFE) 2020

APR 19-24, 2020 | Charleston, SC

2020 ANS ANNUAL MEETING

JUN 7-11, 2020 | Phoenix, AZ | Arizona Grand Resort & Spa

ICRS 14/RPSD 2020

SEP 13-18, 2020 | Seattle, WA

2020 ANS WINTER MEETING AND NUCLEAR TECHNOLOGY EXPO

NOV 15-19, 2020 | Chicago, IL | Chicago Marriott Downtown