ANS Meetings

TMS
The Minerals, Metals & Materials Society

MiNES
MATERIALS IN NUCLEAR ENERGY SYSTEMS

Official Program

Hilton Baltimore Inner Harbor
Baltimore, Maryland, USA
October 6-10, 2019

ANS MiNES 2019

Materials In Nuclear Energy Systems

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GENERAL MEETING INFORMATION

PLENARY, SPECIAL SESSIONS & EVENTS

MiNES 2019 TECHNICAL SESSIONS

TECHNOLOGY EXPO

ADDITIONAL

Meeting Officials

A Biennial International Forum

2019 Materials In Nuclear Energy Systems

HONORARY CHAIR
Gary Was
University of Michigan

GENERAL CHAIR
Janelle Wharry
Purdue University

TECHNICAL PROGRAM CHAIR
Todd Allen
University of Wisconsin

ASSISTANT TECHNICAL PROGRAM CHAIR
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Los Alamos National Laboratory

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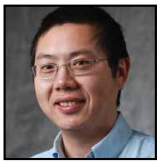
Idaho National Laboratory



Jie Lian
Rensselaer Polytechnic Institute

Stu Maloy
Los Alamos National Laboratory

Simon Pimblott
Idaho National Laboratory

Lance Snead
Massachusetts Institute of Technology

Michael Tonks
University of Florida

Julie Tucker
Oregon State University

Gary Was
University of Michigan

Brian Wirth
University of Tennessee

Yong Yang
University of Florida

Steve Zinkle
University of Tennessee and Oak Ridge National Laboratory

Daily Schedule

Sunday, October 6

4:00-7:00 pm	Registration	Holiday West Foyer
6:00-8:00 pm	Exhibit Hall	Holiday West Foyer
6:00-8:00 pm	Opening Reception	Holiday 6

Monday, October 7

7:30 am-4:30 pm	Registration	Holiday West Foyer
8:30-10:00 am	Plenary—I	Holiday 6
10:00-10:20 am	Refreshment Break	Holiday West Foyer
10:00 am-4:30 pm	Exhibit Hall	Holiday West Foyer
10:20 am-12:30 pm	Technical Sessions	
	• Irradiation Damage and Microstructure: Structural Alloys	Holiday 1
	• Irradiated Microstructures: Structural and Cladding Alloys—I	Holiday 2
	• Advanced Fuels and Actinides: Advanced Fuel Forms—I	Holiday 3
12:30-2:00 pm	Lunch on own	
2:00-4:10 pm	Technical Sessions	
	• Irradiation Damage and Microstructure: Fuels	Holiday 1
	• Irradiated Microstructures: Structural and Cladding Alloys—II	Holiday 2
	• Advanced Fuels and Actinides: Advanced Fuel Forms—II	Holiday 3
4:10-4:30 pm	Refreshment Break	Holiday West Foyer
4:30-6:00 pm	Technical Sessions	
	• Irradiation Damage and Microstructure: Cladding	Holiday 1
	• Irradiated Microstructures: Structural and Cladding Alloys—III	Holiday 2
	• Advanced Fuels and Actinides: Advanced Fuel Forms—III	Holiday 3
6:00-8:00 pm	Poster Session	Holiday Ballroom 4-5

Daily Schedule

Tuesday, October 8

8:30 am-4:30 pm	Registration	Holiday West Foyer
9:00-10:00 am	Plenary—II	Holiday 6
10:00-10:20 am	Refreshment Break	Holiday West Foyer
10:00 am-4:30 pm	Exhibit Hall	Holiday West Foyer
10:20 am-12:30 pm	Technical Sessions	
	• Integrated Phenomena: Neutron-Ion Irradiated Microstructures—I	Holiday 1
	• Irradiated Microstructures: Mechanics and Welding	Holiday 2
	• Irradiated Microstructures: Ceramics and Advanced Materials	Holiday 3
12:30-2:00 pm	Lunch on own	
2:00-4:10 pm	Technical Sessions	
	• Integrated Phenomena: Neutron-Ion Irradiated Microstructures—II	Holiday 1
	• Advanced Alloys and Materials: Structural Alloys—I	Holiday 2
	• Advanced Fuels and Actinides: Accident Tolerant Fuels—I	Holiday 3
4:10-4:30 pm	Refreshment Break	Holiday West Foyer
4:30-6:00 pm	Technical Sessions	
	• Irradiation Damage and Microstructure: Composites and Nanomaterials	Holiday 1
	• Advanced Alloys and Materials: Structural Alloys—II	Holiday 2
	• Advanced Fuels and Actinides: Accident Tolerant Fuels—II	Holiday 3
6:00-8:00 pm	Poster Session	Holiday Ballroom 4-5

Wednesday, October 9

7:30 am-1:30 pm	Registration	Holiday West Foyer
8:00-10:00 am	Technical Sessions	
	• Integrated Phenomena: Corrosion or Aging with Irradiation	Holiday 1
	• Advanced Alloys and Materials: Fuels and Cladding—I	Holiday 2
	• Advanced Fuels and Actinides: Fuel Performance and Characterization	Holiday 3
10:00-10:20 am	Refreshment Break	Holiday West Foyer
10:00 am-1:30 pm	Exhibit Hall	Holiday West Foyer
10:30 am-12:30 pm	Technical Sessions	
	• Early Career Development in Nuclear Materials–Panel	Holiday 1
	• Advanced Alloys and Materials: Fuels & Cladding—II	Holiday 2
	• Advanced Fuels and Actinides: Metallic Fuels	Holiday 3
12:30-1:30 pm	Lunch on own	
1:30-3:40 pm	Technical Sessions	
	• Nuclear Fuel Cycle	Holiday 1
	• Advanced Alloys and Materials: Fuels and Cladding—III	Holiday 2
	• Radiation Effects Simulation and Evaluation Techniques: Alloys—I	Holiday 3
6:00-9:00 pm	USS Constellation Reception	

Daily Schedule

Thursday, October 10

7:30 am-1:30 pm	Registration	Holiday West Foyer
8:00-10:10 am	Technical Sessions	
	• Mechanical Properties—I	Holiday 1
	• Advanced Alloys and Materials: Advanced Manufacturing	Holiday 2
	• Radiation Effects Simulation and Evaluation Techniques: Alloys—II	Holiday 3
10:10-10:30 am	Refreshment Break	
10:30 am-12:00 pm	Technical Sessions	
	• Mechanical Properties—II	Holiday 1
	• Advanced Alloys and Materials: Materials for Advanced Reactors—I	Holiday 2
	• Radiation Effects Simulation and Evaluation Techniques: Fuels—I	Holiday 3
12:00-1:30 pm	Lunch on own	
1:30-3:40 pm	Technical Sessions	
	• Mechanical Properties—III	Holiday 1
	• Advanced Alloys and Materials: Materials for Advanced Reactors—II	Holiday 2
	• Radiation Effects Simulation and Evaluation Techniques: Fuels—II	Holiday 3

General Information

MEETING INFORMATION

MiNES is a new conference created to serve the fission reactor materials community that grew out of, and supplants, biannual symposia held at the TMS meeting (Microstructure Processes in Irradiated Materials – MPIM) and the ANS meeting (Nuclear Fuel and Structural Materials – NFSM). MiNES will be held biannually (every other year) in the autumn season with the first meeting to be held October 6-10, 2019 in Baltimore, MD, USA. ANS and TMS alternate sponsorship of the conference and assist an organizing committee headed by three conference chairs in planning the content and venue for each meeting. While held in the U.S., the organizers of MiNES strongly encourage international participation.

REGISTRATION

Location: **Holiday West Foyer**

Sunday, October 6	4:00 pm-7:00 pm
Monday, October 7	7:30 am-4:30 pm
Tuesday, October 8	8:30 am-4:30 pm
Wednesday, October 9	7:30 am-1:30 pm
Thursday, October 10	7:30 am-1:30 pm

NOTE TO ATTENDEES

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.

TECHNOLOGY EXPO & EXPO HOURS

Join us and visit with our exhibitors in the Technology Expo! Learn about new technology, products and services that are being offered. For more information or to view the floorplan and exhibitors see page 26.

Sunday, October 6	6:00-8:00 pm
Monday, October 7	10:00 am-4:30 pm
Tuesday, October 8	10:00 am-4:30 pm
Wednesday, October 9	10:00 am-1:30 pm

ATTENDEE MEAL FUNCTIONS

Breaks will be provided to all registered meeting attendees, Monday-Thursday in the Holiday West Foyer.

Opening Reception: Name badges must be worn for entry. Light hors d'oeuvres and beverage tickets are included with a full meeting registration. Additional tickets are available for purchase at the registration desk. The reception is in Holiday 6.

Wednesday Evening Reception in the USS Constellation: Name badges must be worn for entry. Heavy hors d'oeuvres and beverage tickets are included with a full meeting registration. Additional tickets are available for purchase at the registration desk. Buses will be available to attendees. Buses will depart to the USS Constellation from the hotel lobby at 5:30 pm and 6:00 pm. The returning buses back to the hotel will be at 8:00 pm and 9:00 pm.

FREE WIFI AT MiNES

Network: MiNES

Password: MiNES2019

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 on-site contact for reports at The 2019 Materials In Nuclear Energy Systems is MiNES General Chair Janelle Wharry. Janell can be reached at the hotel. Please leave a message at the ANS Registration Desk with your contact information and Janell will contact you as quickly as possible.

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, OCTOBER 6

Opening Reception
Location: Holiday 6 **Time:** 6:00-8:00 pm

Name badges must be worn for entry. Heavy hors d'oeuvres and beverage tickets are included with a full meeting registration. Additional tickets are available for purchase at the registration desk.

MONDAY, OCTOBER 7

Plenary—I: The Importance of Conducting Experiments in Reactor-Like Environments for Material Performance and Development…….without the Reactor
Location: Holiday 6 **Time:** 8:30-10:00 am

Speaker: Gary Was *(University of Michigan)*

TUESDAY, OCTOBER 8

Plenary—II: Subsequent License Renewals (SLRs): R&D and Stakeholder Collaboration
Location: Holiday 6 **Time:** 9:00-10:00 am

Speaker: Tina Taylor *(Electric Power Research Institute)*

WEDNESDAY, OCTOBER 9

USS Constellation Reception
Location: Baltimore City's iconic Inner Harbor **Time:** 6:00-9:00pm

Buses will depart to the USS Constellation from the hotel lobby at 5:30 pm and 6:00 pm. The returning buses back to the hotel will be at 8:00 pm and 9:00 pm. Heavy hors d'oeuvres and beverage tickets are included with a full meeting registration. Additional tickets are available for purchase at the registration desk.

The last Civil War vessel afloat, the USS Constellation is now permanently docked in Baltimore City's iconic Inner Harbor. The USS Constellation provides spectacular views of Baltimore's historic waterfront and offers a most distinctive venue for corporate hospitality and private parties. Included in each private rental is two guided tours along the four decks of the ship by crew members dressed in period attire, as well as one cannon firing. Independence Day and New Year's Eve rentals are available! All aboard the USS Constellation!

Its Rich History…
The 1854 US Sloop-of-war Constellation, the second of three ships to carry the name, is the last all-sail warship constructed for the US Navy. The vessel has a long and storied history, serving the US Navy in a variety of roles for a full century. The most notable of which was between 1859-1861 when the ship served as a flagship of the US African Squadron, charged with intercepting vessels participating in the illegal slave trade. Constellation successfully freed over 700 Africans during this time. The ship's tenure with the US African Squadron provides a direct connection to an overlooked chapter in US naval history, as well as to one of the United States' few proactive measure to end slavery in the years prior to the Civil War. USS Constellation was brought to Baltimore in 1955 and is currently managed and operated by Historic Ships in Baltimore as an education and tourism venue where the public and area students can explore life at sea from the mid-19th century and connect with the nation's maritime history. Proceeds from the rental of the USS Constellation directly benefit the education and public programming aboard the fleet of Historic Ships in Baltimore.

MONDAY, OCTOBER 7
TECHNICAL SESSIONS - 10:20 AM

Irradiation Damage and Microstructure: Structural Alloys
Cochairs: Jeremy Busby *(ORNL)*, Jason Trelewicz *(Stony Brook Univ)*
Location: Holiday 1 **Time:** 10:20 am-12:10 pm

10:20 am: Electronic Energy Deposition and Radiation Effects in Oxides, Carbides and Metallic Alloys, Yanwen Zhang, Ritesh Sachan, Neila Sellami, Mohammad Ullah, Aleksi Leino, Ke Jin, Eva Zarkadoula *(ORNL)*, Haizhou Xue *(Univ of Tennessee, Knoxville)*, William J. Weber *(Univ of Tennessee, Knoxville/ORNL)*, invited

10:50 am: Understanding of the Chemical Effects on the Morphology of Neutron Irradiation-Induced Solute Clusters in Reactor Pressure Vessel Steels, Joven J. H. Lim *(UK Atomic Energy Authority)*, M.Grace Burke *(Univ of Manchester)*

11:10 am: Mechanisms of Stability and Defect Trapping in Doped Iron Grain Boundaries, J. R. Trelewicz, Y. Zhang *(Stony Brook Univ)*, B. P. Uberuaga *(LANL)*

11:30 am: Effect of Cr and C on Dislocation Loops in Heavy Ion Irradiated Ultra-High Purity FeCr Alloys, Yao Li, Yajie Zhao *(Univ of Tennessee, Knoxville)*, Arunodaya Bhattacharya *(ORNL)*, Jean Henry *(CEA)*, Steven John Zinkle *(Univ of Tennessee Knoxville/ORNL)*

11:50 am: Investigation of Neutron-Irradiated Microstructure of Fe-Cr System: A GPU Accelerated Phase-Field Method, Jeonghwan Lee, Kunok Chang *(Kyung Hee Univ)*

Irradiated Microstructures: Structural and Cladding Alloys—I
Cochairs: M. Grace Burke *(Univ of Manchester)*, Wei-Ying Chen *(ANL)*
Location: Holiday 2 **Time:** 10:20 am-12:30 pm

10:20 am: Influence of Irradiation Conditions on Precipitation Behavior in Fe-Cr and Ni Alloys, E. Reese, L.-J. Yu *(Univ of Michigan)*, N. Almirall *(Univ of California, Santa Barbara)*, K. Hattar *(SNL)*, T. Yamamoto, G. R. Odette *(Univ of California, Santa Barbara)*, J. Tucker *(Oregon State Univ)*, M. G. Burke *(Univ of Manchester)*, E. A. Marquis *(Univ of Michigan)*, invited

10:50 am: In-Situ Ion Irradiation of Ni-Based Austenitic Model Alloys, K. MA *(CEA)*, B. Decamps *(CSNSM)*, F. Prima *(Institut de Recherche de Chimie)*, M. Loyer-Prost *(CEA)*

11:10 am: Dislocation Loop Evolution in an Ion Irradiated FeCrAl Alloy with Various Irradiation Parameters, P. Xiu, L. Jiang, C. Lu, L. Wang *(Univ of Michigan)*

11:30 am: In-Situ Observation of Irradiation Effects on High Entropy Alloys, 316H Stainless Steels and Nickel at 500-700°C, Wei-Ying Chen, Marquis Kirk *(ANL)*, Naoyuki Hashimoto *(Hokkaido Univ)*, Jien-Wei Yeh *(Natl Tsing Hua Univ)*

11:50 am: Heat Treatment Effects on Precipitation in Irradiated HT9 Steel, T. M. K. Green, Todd Allen *(Univ of Michigan)*, Li He *(Univ of Wisconsin, Madison)*

12:10 pm: Positron Annihilation Spectroscopy to Better Understand Void Formation in Neutron Irradiated Fe-Cr Alloys, C. J. Romnes *(Univ of Illinois)*, M. Liu *(NCSU)*, J. F. Stubbins *(Univ of Illinois)*

Advanced Fuels and Actinides: Advanced Fuel Forms—I
Cochairs: Jie Lian *(RPI)*, Sarah Finkeldei *(Univ of California, Irvine)*
Location: Holiday 3 **Time:** 10:20 am-12:30 pm

10:20 am: Ageing Studies of Actinides Containing Fuels, Thierry Wiss, Oliver Dieste, Emanuele, De Bona, Alessandro Benedetti, Dragos Staicu, Ondrej Benes, Jean-Yves Colle *(EC-JRC)*, Philippe Martin *(CEA)*, Giancuido Baldinozzi *(Centrale Supélec)*, Vincenzo Rondinella, Rudy Konings *(EC-JRC)*, invited

10:50 am: TEM Study of Irradiated Fast Reactor MOX Fuels, Oliver Dieste, Thierry Wiss, Dragos Staicu *(EC-JRC)*, Nathalie Chauvin *(CEA)*, Jean-Yves Colle, Ondrej Benes, Mara Marchetti, Rudy Konings *(EC-JRC)*

11:10 am: Cluster Dynamics Simulation of Xe Diffusion in UO_2 and Doped UO_2 for Out-of-Pile and In-Pile Conditions, D. A. Andersson, C. Matthews, R. Perriot, M. W. D. Cooper (LANL), G. Pastore *(INL)*, B. P. Uberuaga, C. R. Stanek *(LANL)*

11:30 am: Preparation of Ultrafine Nanofibrous Uranium Oxides by Electrospinning, V. Kundrat, J. Pinkas *(Masaryk Univ)*

11:50 am: Fabrication of UO_2-Mo Composite Fuel Candidates with Enhanced Thermal Conductivity from Sol-Gel Feedstock, S. Finkeldei *(ORNL/Univ of California, Irvine)*, R. D. Hunt, J. Kiggans, K. A. Terrani, A. T. Nelson *(ORNL)*

12:10 pm: Three-Dimensional Microstructural Characterization of the Peripheral Region in FBR MOX Fuel, Casey McKinney, Riley Parrish, Assel Aitkaliyeva *(Univ of Florida)*

Technical Sessions: Monday October 7

MONDAY, OCTOBER 7
TECHNICAL SESSIONS - 2:00 PM

Irradiation Damage and Microstructure: Fuels
Cochairs: Brian Wirth *(Univ of Tennessee, Knoxville)*, Peng Wang *(Univ of Michigan)*
Location: Holiday 1 **Time:** 2:00-3:50 pm

2:00 pm: Atomistic Model of Fission Gas Bubble Re-Solution Rate in UO_2, W. Setyawan *(PNNL)*, M. W. D. Cooper *(LANL)*, K. J. Roche *(PNNL)*, B. P. Uberuaga, D. A. Andersson *(LANL)*, B. D. Wirth *(Univ of Tennessee, Knoxville)*, R. J. Kurtz *(PNNL)*, invited

2:30 pm: The Influence of Mo Content on the Microstructural Evolution of Irradiated U-Mo Fuels, Charlyne Alexandria-Marie Smith *(Univ of Florida)*, Dennis D. Keiser, Brandon D. Miller *(INL)*, Assel Aitkaliyeva *(Univ of Florida)*

2:50 pm: Irradiation Driven Diffusion in UMo Fuels, Benjamin W. Beeler *(INL)*, Zhi-Gang Mei *(ANL)*, Michael William Donald Cooper *(LANL)*

3:10 pm: In-Situ Atomic Force Microscopy of Halide Salts Under X-Ray Irradiation, S. J. Riechers, N. B. Petrik, C. J. Pearce, J. S. Loring, K. M. Rosso, G. A. Kimmel *(PNNL)*

3:30 pm: Measurement of Low-Dose Irradiation Effects in PTFE Using Differential Scanning Calorimetry, Rachel C. Connick, Charles A. Hirst, Kangpyo So, Michael P. Short, R. Scott Kemp *(MIT)*

Irradiated Microstructures: Structural and Cladding Alloys—II
Cochairs: Yong Yang *(Univ of Florida)*, Arunodaya Bhattacharya *(ORNL)*
Location: Holiday 2 **Time:** 2:00-4:10 pm

2:00 pm: Neutron Irradiated Microstructure of FeCr Alloys Investigated by TEM, M. Hernández-Mayoral, E. Oñorbe *(CIEMAT)*, B. Gómez-Ferrer *(Normandie Univ)*, C. Heintze *(HZDR)*, L. Malerba *(CIEMAT)*, P-M. Gueye, C. Pareige *(Normandie Univ)*, invited

2:30 pm: Dose Rate and Temperature Effect on Irradiation-Enhanced Alpha Prime Precipitation in Ultra-High Purity FeCr Alloys, Yajie Zhao *(Univ of Tennessee, Knoxville)*, Arunodaya Bhattacharya, Philip D. Edmondson *(ORNL)*, Caleb Massey *(Univ of Tennessee, Knoxville)*, Jean Henry *(CEA)*, Steven J. Zinkle *(Univ of Tennessee, Knoxville/ORNL)*

2:50 pm: Effect of Heavy Ion Irradiation on α' Precipitate Stability in Fe-15Cr, K. Thomas, Z. Jiao, G. S. Was *(Univ of Michigan)*

3:10 pm: High Dose Neutron Irradiation-Induced Microstructure Evolution in PM2000 and MA957 ODS Steels, Arunodaya Bhattacharya *(ORNL)*, Samara M. Levine *(Univ of Michigan)*, David T. Hoelzer, Josina W. Geringer, Kevin G. Field, Yutai Katoh *(ORNL)*

3:30 pm: Effect of Neutron Irradiation on the Microstructure of the ODS 14YWT Ferritic Alloy, David T. Hoelzer *(ORNL)*, Maria A Auger *(Universidad Carlos III de Madrid)*, Michael P. Moody *(Univ of Oxford)*, Philip D. Edmondson, Kevin G. Field *(ORNL)*

3:50 pm: Microstructural Evolution of High-Dose Neutron Irradiated E97 at the Nano-Scale, C. Pareige, B. Gòmez-Ferrer *(Normandie Univ)*, C. Dethloff, E. Gaganidze *(KIT)*, P. Pareige *(Normandie Univ)*, L. Malerba *(SCK-CEN)*

Advanced Fuels and Actinides: Advanced Fuel Forms—II
Cochairs: Michael Tonks *(Univ of Florida)*, Tyler Gerczak *(ORNL)*
Location: Holiday 3 **Time:** 2:00-3:40 pm

2:00 pm: Uranium Diboride, Accident Tolerant Fuel Concepts, J. Turner, T. J. Abram *(Univ of Manchester)*

2:20 pm: Development of Microstructurally-Engineered Uranium Mononitride, Aditya P. Shivprasad, Joshua T. White, Christopher J. Grote, Tarik A. Saleh *(LANL)*

2:40 pm: Thermal Property Measurement of Micrometer-Sized Samples, Heng Ban *(Univ of Pittsburgh)*

3:00 pm: Modeling Reactor Fuel Performance for Nuclear Thermal Propulsion, Michael Tonks *(Univ of Florida)*, Marina Sessim *(Penn State)*, Marvin Barnes *(NASA)*

3:20 pm: High Temperature Nanoindentation of Advanced Accident Tolerant Fuels, D. Frazer *(Univ of California, Berkeley)*, J. T. White, T. A. Saleh *(LANL)*

MONDAY, OCTOBER 7
TECHNICAL SESSIONS - 4:30 PM

Irradiation Damage and Microstructure: Cladding
Cochairs: Brian Wirth *(Univ of Tennessee, Knoxville)*, Peng Wang *(Univ of Michigan)*
Location: Holiday 1 **Time:** 4:30-6:10 pm

4:30 pm: Dislocation Loop Structure in Individual Grains of Proton Irradiated Polycrystalline Zr Aggregates, M. Topping *(Univ of Manchester/Queen's Univ)*, Gy Zilahi *(Eötvös Univ Budapest)*, S. Irukuvarghula *(Univ of Manchester)*, G. Ribárik *(Eötvös Univ Budapest)*, A. Garner, A. Smith, R. Thomas *(Univ of Manchester)*, P. Kenesel *(ANL)*, P. Frankel, M. Preuss *(Univ of Manchester)*, Tamas Ungar *(Univ of Manchester/Eötvös Univ Budapest)*

4:50 pm: Microstructure Characterization of Proton Irradiated Zircaloy-4, Peng Wang *(Univ of Michigan)*, Josh Bowman, Arthur Motta *(Penn State)*, Gary S. Was *(Univ of Michigan)*

5:10 pm: Characterization of a Neutron-Irradiated Zr-Nb-O Alloy Using Analytical Scanning Transmission Electron Microscopy, Xiang Liu *(INL)*, M. Nedim Cinbiz *(ORNL)*, Lingfeng He *(INL)*, Daniel Jadernas *(Studsvik Nuclear AB)*

5:30 pm: Investigating the Effects of Existing Damage on the Primary Damage Formation in Zirconium, Jesse J. Carter, Richard W. Smith *(NNL)*

5:50 pm: Hardness Evolution of Zr2.5Nb and Zirconium Hydride Due to Proton-Irradiation, Igor Cherubin, Mark Daymond *(Queen's Univ)*

Irradiated Microstructures: Structural and Cladding Alloys—III
Cochairs: Yong Yang *(Univ of Florida)*, Caleb Massey *(ORNL)*
Location: Holiday 2 **Time:** 4:30-6:00 pm

4:30 pm: Machine Learning for Rapid Defect Quantification in Static and Dynamic Electron Microscopy Experiments, K. G. Field *(ORNL)*, Mingren Shen, Guanzhao Li, Dongxia Wu, Yudai Yaguchi *(Univ of Wisconsin, Madison)*, Jack Haley *(Univ of Oxford)*, Dane Morgan *(Univ of Wisconsin, Madison)*, invited

5:00 pm: Effect of Irradiation Temperature and Alloy Composition on Microstructural Evolution of Wrought FeCrAl Alloys After Low-Dose Neutron Irradiation, Caleb P. Massey *(ORNL)*, Dalong Zhang *(PNNL)*, Samuel A. Briggs *(Oregon State Univ)*, Philip D. Edmondson, Maxim N. Gussev, Kevin G. Field *(ORNL)*

5:20 pm: Study of B2 and Laves Phase Evolution in a Novel Ferritic Steel Under Ion Irradiation, Li He *(Univ of Wisconsin, Madison)*, L. Tan, Y. Yang *(ORNL)*, K. Sridharan *(Univ of Wisconsin, Madison)*

5:40 pm: Heavy Ion Irradiation of FCC and BCC High Entropy Alloys for Advanced Nuclear Reactor Applications, Calvin A. Parkin, Michael Moorehead, Mohamed Elbakhshwan, Kumar Sridharan *(Univ of Wisconsin, Madison)*, Wei-Ying Chen *(ANL)*, Chuan Zhang *(Computherm LLC)*, Lin Shao, Adam Gabriel *(Texas A&M)*, Lingfeng He, Mukesh Bachhav *(INL)*, Jing Hu *(ANL)*, Adrien Couet *(Univ of Wisconsin, Madison)*

Advanced Fuels and Actinides: Advanced Fuel Forms—III
Cochairs: Michael Tonks *(Univ of Florida)*, Tyler Gerczak *(ORNL)*
Location: Holiday 3 **Time:** 4:30-6:00 pm

4:30 pm: Beyond TRISO: Applications and Opportunities for Particle Fuels in New Reactor Systems, A. T. Nelson *(ORNL)*, invited

5:00 pm: Annular Fuel Pebble Test Program for the FHR, R. N. Latta *(Kairos Power)*

5:20 pm: Non-Destructive Geometric Characterization of TRISO Particles by X-Ray Tomography, Grant W. Helmreich, Tyler Gerczak, Dylan Richardson *(ORNL)*

5:40 pm: Influence of Irradiation Temperature on Fission Product and Actinide Distribution in AGR-2 TRISO Fuel, T. J. Gerczak, B. D. Eckhart, J. D. Hunn, F. C. Montgomery, R. L. Seibert, D. J. Skitt *(ORNL)*

MONDAY, OCTOBER 7
POSTER SESSION - 6:00 PM

Irradiation Damage and Microstructures, Radiation Effects Simulation and Evaluation, Integrated Phenomena, and Mechanical Properties

Location: Holiday Ballroom 4-5 **Time:** 6:00-8:00 pm

1. Swelling, Creep and Embrittlement of D9 Stainless Steel Cladding and Duct in Four FFTF Driver Fuel Assemblies after High Neutron Exposure, F. A. Garner *(Radiation Effects Consulting)*, B. J. Makenas *(Hanford Mission Support Alliance, retired)*, S. A. Maloy *(LANL)*
2. Radiation Damage Studies for Fe-Based Alloys Under 30 MeV Proton Irradiation, P. Uslu, M. Vedat Akdeniz, Amdulla Mekhrabov, M. Bilge Demirköz *(Middle East Technical Univ)*
3. Helium Bubble Super-Lattice Formation, Grain Boundary Agglomeration, and Surface Blistering of Tungsten Under Combined Helium Implantation and Self-Ion Irradiation, Tianyao Wang, Frank A. Garner, Lin Shao *(Texas A&M)*
4. Radiation Response of Pure Chromium for Evaluation of an Accident-Tolerant Fuel Concept Using Chromium Outer Coating on Zircalloy Cladding, Ekaterina Ryabikovskaya, Hyosim Kim, Tianyao Wang, Aaron French, Adam Gabriel, Frank A. Garner, Lin Shao *(Texas A&M)*
5. Microstructure Evolution in Dual Ion-Irradiated HT9 at 445 °C and 460 °C to 16.6 dpa, L. He *(Univ of Wisconsin, Madison)*, T. M. K. Green *(Univ of Michigan)*, T. Allen *(Univ of Michigan/Univ of Wisconsin, Madison)*
6. Peak Swelling Temperature in Ion Irradiated High-Purity Fe and Fe-Cr Alloys, Yan-Ru Lin *(Univ of Tennessee, Knoxville)*, Arunodaya Bhattacharya *(ORNL)*, Jean Henry *(CEA)*, Steven J. Zinkle *(Univ of Tennessee Knoxville/ORNL)*
7. Microstructural Stability of a ^{9}Cr Ferritic-Martensitic Steel Irradiated to 7.44 dpa at ~490°C, Weicheng Zhong *(ORNL)*, Tianyi Chen *(Oregon State Univ)*, Lizhen Tan *(ORNL)*
8. Microstructural Evolution after Helium-Pre-Implantation and Self-Ion Irradiation on a Dual-Phase 12Cr Oxide Dispersion Strengthened Alloy, Hyosim Kim, Tianyao Wang, Jonathan G. Gigax, Frank A. Garner, Lin Shao *(Texas A&M)*
9. Radiation Tolerance of Additively Manufactured HT-9 Ferritic/Martensitic Steel, K. G. Field *(ORNL)*, S. Taller *(Univ of Michigan)*, N. Sridharan *(ORNL)*
10. Effects of the Microstructure and Thickness of Porous Carbon Buffer Layer on the Thermo-Mechanical Behavior of an FCM Fuel Pellet, Hongyang Wei, Xiaobin Jian, Shurong Ding *(Fudan Univ)*
11. A Model for Mesoscale Tensile Strength of Irradiated U-10Mo Fuels Considering Irradiation Creep Damage, Xiaobin Jian, Xiangzhe Kong, Shurong Ding *(Fudan Univ)*
12. Measurement of Nanoscale Material Properties of Irradiated Lithium Aluminate, S. L. Riechers, B. R. Johnson, W. Jiang *(PNNL)*
13. Investigation of Proton Radiation Damage Effects on the Tensile Strength of 3D Printed Acrylonitrile Butadiene Styrene, Arielle Miller, Grant Warner, Dharmaraj Raghavan *(Howard Univ)*
14. Interfacial Radiation Damage Resistance in Oxide Thin Film Heterojunctions: An Atomic Perspective, M. Sassi, T. Kaspar, V. Shutthanandan, K. M. Rosso, S. R. Spurgeon *(PNNL)*
15. Microstructural and Fracture Surface Analysis of TIG-Welded Zircaloy-4, J. R. Echols, K. Bawane, L. M. Garrison *(ORNL)*
16. Bi-Axial Deformation of Zr-2.5 Nb Pressure Tube Material, H. Mazhar, C. Azih, M. A. Gharghouri, C. Bramburger *(CNL)*
17. Flux and Fluence Dependence of Irradiation Creep in Austenitic Stainless Steels, Malcolm Griffiths *(Queens Univ)*, Frank A. Garner *(Radiation Effects Consulting)*
18. A Mesoscopic Investigation of the Mechanical Response of Iron with Irradiated Microstructure, Y. Pachaury, S. Mazumder, C. Nuela Enebechi, G. Warren *(Purdue Univ)*, G. Po *(Univ of Miami)*, J. P. Wharry, A. El-Azab *(Purdue Univ)*

MONDAY, OCTOBER 7
POSTER SESSION - 6:00 PM

Irradiation Damage and Microstructures, Radiation Effects Simulation and Evaluation, Integrated Phenomena, and Mechanical Properties Continued

Location: Holiday Ballroom 4-5 **Time:** 6:00-8:00 pm

19. Deformation Behavior of SiC-SiC Channel Box in Boiling Water Reactor Environment, G. Singh, J. Gorton, D. Schappel, N. R. Brown, B. D. Wirth *(Univ of Tennessee, Knoxville)*

20. Development and Evaluation of High Temperature Lead-Bismuth Corrosion Facilities for Fast Reactor Material Development, R. N. Wahlen, T. L. Grimm, M. Mamtimin, F. Y. Odeh, W. A. Peters *(Niowave, Inc.)*, S. A. Maloy, K. A. Woloshun, E. Olivas, Natalia Rubio *(LANL)*

21. Mesoscale Modeling of High Burn-up Structure (HBS) Formation and Evolution in UO_2, M. Gomma Abdoelatef, F. Badry, Karim Ahmed *(Texas A&M)*, Andrea Jokisaari, Daniel Schwen, Youngfeng Zhang *(INL)*

22. Accelerated Atomistic Simulation of Radiation Events in Metal, Elton Y. Chen *(Georgia Tech)*, Remi P. Dingreville *(SNL)*, Chaitanya S. Deo *(Georgia Tech)*

23. Investigation of Threshold Stress Level of Radially Reprecipitated Hydrides: A Phase-Field Approach, Wooseob Shin, Kunok Chang *(Kyung Hee Univ)*

24. Local Chemical Environment Effects on the Energetics of Stacking Faults and Vacancy Platelets in α-Zirconium, J. F. March-Rico, G. Huang, B. D. Wirth *(Univ of Tennessee, Knoxville)*

Technical Sessions: Tuesday October 8

TUESDAY, OCTOBER 8
TECHNICAL SESSIONS - 10:20 AM

Integrated Phenomena: Neutron-Ion Irradiated Microstructures—I
Cochairs: Lance Snead *(MIT)*, Miao Song *(Univ of Michigan)*
Location: Holiday 1 **Time:** 10:20 am-12:30 pm

10:20 am: Neutron-Irradiated Microstructure of Light Water Reactor Materials, W. L. Karlsen *(VTT)*, invited

10:50 am: Re-Irradiation of Flux Thimble Tubes Using Heavy Ions, M. Song *(Univ of Michigan)*, K. G. Field, J. T. Busby *(ORNL)*, C. Topbasi *(EPRI)*, G. S. Was *(Univ of Michigan)*

11:10 am: Effect of High Dose Ion-Irradiation on Laser Weld Repairs of Previously Neutron Irradiated AISI 304 Stainless Steel, K. Mao *(Purdue Univ)*, A. French, L. Shao *(Texas A&M)*, Emmanuel Perez *(INL)*, P. D. Freyer *(Westinghouse)*, F. A. Garner *(Texas A&M)*, Yaqiao Wu *(Boise State Univ)*, J. P. Wharry *(Purdue Univ)*

11:30 am: A New Void Swelling Phenomenon Revealed During Self-Ion Irradiation of Neutron-Preconditioned 304 Stainless Steel, Aaron J. French, Hyosim Kim, Laura Hawkins, Tianyao Wang, ChingHeng Shiau, Frank A. Garner, Lin Shao *(Texas A&M)*

11:50 am: Re-Irradiation of Neutron Irradiated 304L Stainless Steel to High Damage Levels, Samara M. Levine, Zhijie Jiao, Gary S. Was *(Univ of Michigan)*, Chad M. Parish *(ORNL)*

12:10 pm: Recent Applications of Transient Grating Spectroscopy for Inferring Radiation-Induced Evolution of Nuclear Materials, S. E. Ferry, K. B. Woller, C. A. Dennett, M. P. Short *(MIT)*

Irradiated Microstructures: Mechanics and Welding
Cochairs: Clarissa Yablinsky *(LANL)*, Elizabeth Getto *(U.S. Naval Academy)*
Location: Holiday 2 **Time:** 10:20 am-12:30 pm

10:20 am: Hardening and Strain Localisation in Irradiated Materials, Malcolm Griffiths *(Queens Univ)*, Roman Voskoboynikov *(Kurchatov Inst)*, invited

10:50 am: Influence of Impurities in Microstructural Evolution of FeCr Alloys Under Ion Irradiation—Link with Hardening, C. Pareige, B. Gòmez-Ferrer *(Normandie Univ)*, C. Heintze *(HZDR)*, E. Oñorbe, M. Hernández-Mayoral *(CIEMAT)*, P-M Gueye *(Normandie Univ)*, L. Malerba *(CIEMAT)*

11:10 am: Deformation-Based Recovery of Irradiation-Induced Ostwald Ripening in Nanocrystalline CuTa Alloy, Priyam V. Patki *(Purdue Univ)*, Yaqiao Wu *(Boise State Univ/Center for Advanced Energy Studies)*, Janelle P. Wharry *(Purdue Univ)*

11:30 am: Effect of Temperature and Friction Stir Welding on Microstructure Evolution on Self-Ion Irradiated MA956 up to 200 dpa, J. McMahan, E. Getto, N. Nathan, B. Tobie *(U.S. Naval Academy)*, S. Briggs *(Oregon State Univ)*, K. Hattar *(SNL)*, B. Baker *(U.S. Naval Academy)*

11:50 am: Neutron Attenuation Effect on Cu-Rich Precipitate Formation and Evolution in a Pressure Vessel Weldment from the Zion NPP, Philip D. Edmondson, Thomas M. Rosseel, Mikhail A. Sokolov *(ORNL)*

12:10 pm: Effect of Friction Stir Welding on Microstructure Evolution on -Ion Irradiated MA956 up to 25 dpa, E. Getto, B. Tobie, N. Nathan *(U.S. Naval Academy)*, S. Briggs *(Oregon State Univ)*, K. Hattar *(SNL)*, B. Baker *(U.S. Naval Academy)*

Irradiated Microstructures: Ceramics and Advanced Materials
Cochairs: Todd Allen *(Univ of Michigan)*, Kangpyo So *(MIT)*
Location: Holiday 3 **Time:** 10:20 am-12:10 pm

10:20 am: Understanding the Driving Forces for Microstructural Evolution in Ceramics Subject to Ion Irradiation, Nathan Madden *(Univ of Illinois)*, Khalid Hattar *(SNL)*, Jessica A. Krogstad *(Univ of Illinois)*, invited

10:50 am: Effects of High Temperature Neutron Irradiation on the Structure of Graphite, Anne A. Campbell, Ercan Cakmak, Cristian I. Contescu, Nidia C. Gallego, Timothy D. Burchell *(ORNL)*

11:10 am: Nanotube/Nanowire as Effective Defect Sinks in Metals: Atomistic Simulations and In Situ Ion Radiation Transmission Electron Microscopy, Kangpyo So, Penghui Cao, Yang Yang *(MIT)*, Jong Gil Park *(Sungkyunkwan Univ)*, Mingda Li, Yan Long *(MIT)*, Yan Long *(Shanghai Inst of Applied Physics)*, Jing Hu, Mark Kirk, Meimei Li *(ANL)*, Young Hee Lee *(Sungkyunkwan Univ)*, Michael P. Short, Ju Li *(MIT)*

11:30 am: Cross-Sectional X-Ray Nanodiffraction Characterization of Radiation Damage, Stresses, and Microstructure in W Coatings, K. Hlushko *(Montanuniversität Leoben)*, A. Mackova *(Czech Academy of Sciences)*, J. Todt, J. Zalesak *(Austrian Academy of Sciences)*, R. Daniel *(Montanuniversität Loeben)*, J. Keckes *(Montanuniversität Loeben/Austrian Academy of Sciences)*

11:50 am: Dependence of Microstructure Evolution in an Ion Irradiated Molybdenum Alloy on Irradiation Temperature and Ion Dose, P. Xiu, L. Jiang, C. Lu, L. Wang *(Univ of Michigan)*

TUESDAY, OCTOBER 8
TECHNICAL SESSIONS - 2:00 PM

Integrated Phenomena: Neutron-Ion Irradiated Microstructures—II
Cochairs: George Young *(Kairos Power)*, Elizabeth Getto *(U.S. Naval Academy)*
Location: Holiday 1 **Time:** 2:00-4:10 pm

2:00 pm: Radiation-Induced Microstructural Changes Under Neutron and Ion Irradiations, Meimei Li, Mark Kirk, Weiying Chen *(ANL)*, invited

2:30 pm: The Role of High Damage Rates on Cavity Nucleation with Co-Injected Helium in Dual Ion Irradiated T91 Steel, Stephen Taller, Zhijie Jiao, Gary Was *(Univ of Michigan)*

2:50 pm: Effect of Helium on Swelling and Bubble and Cavity Evolution in Dual Ion Irradiated HT9 Steel, David Woodley, Zhijie Jiao, Kai Sun, Gary S. Was *(Univ of Michigan)*

3:10 pm: Dual Ion Irradiation of Commercial and Advanced Structural Materials: High Dose Resistance for Extended LWR Operation, C. R. Lear, M..Song, M. Wang, G. S. Was *(Univ of Michigan)*, L. Tan *(ORNL)*, R. Pathania *(EPRI)*, J. L. Nelson *(JLN Consulting)*

3:30 pm: The Effect of Helium Co-Injection on the Cavity Evolution in Ion irradiated $^{21}Cr^{32}Ni$ Model Alloy, Muhammet Ayanoglu, Arthur T. Motta *(Penn State)*

3:50 pm: Reassessment of Void Swelling Rates in Austenitic Pressure Vessel Internals and Structural Components of Other Lower Operating Temperature Devices, F. A. Garner *(Radiation Effects Consulting)*, S. A. Maloy *(LANL)*

Advanced Alloys and Materials: Structural Alloys—I
Cochairs: Simon Pimblott *(INL)*, Keyou Mao *(Purdue Univ)*
Location: Holiday 2 **Time:** 2:00-3:50 pm

2:00 pm: Advanced Manufacturing Technologies for Nuclear Applications, Fanny Balbaud-Célérier, P. Aubry, A. Chniouel, O. Hercher, F. Lomello, H. Maskrot, A. Michau, M. Ougler, M. Schlegel, W. Pacquentin, F. Schuster *(CEA)*, invited

2:30 pm: Fabrication of Massive Crack-Free Delta-Phase Zirconium Hydride for High-Performance Moderator Application, Xunxiang Hu, Kurt Terrani *(ORNL)*

2:50 pm: Mechanical Behavior of Alloy 709 for Advanced Fast Reactor Applications, Dominic Piedmont *(Univ of Illinois)*, Donghee Park *(Univ of Illinois/KAIST)*, Victoria Riso *(Univ of Illinois/Exelon Generation)*, Xiang Liu *(Univ of Illinois/INL)*, James F. Stubbins *(Univ of Illinois)*

3:10 pm: Radiation Response of Bulk Metallic Glasses and Nanostructured Metallic Glasses: Fundamentals and Applications, Lin Shao, Hyosim Kim, Tianyao Wang *(Texas A&M)*

3:30 pm: Potential Solid-State Welding Processes of Advanced Ferritic-Martensitic Steels in the Nuclear Industry, Mei He *(TerraPower)*

Advanced Fuels and Actinides: Accident Tolerant Fuels—I
Cochairs: Maria Okuniewski *(Purdue Univ)*, Elizabeth Sooby Wood *(Univ of Texas at San Antonio)*
Location: Holiday 3 **Time:** 2:00-4:10 pm

2:00 pm: Westinghouse Electric Company Accident Tolerant Fuels Development, Kallie Metzger *(Westinghouse)*, invited

2:30 pm: Atomic Scale Simulations of Self-Diffusion and Xe Diffusion in U_3Si_2 for Reactor Conditions, Michael Cooper *(LANL)*, Ben Beeler, Kyle Gamble, Giovanni Pastore *(INL)*, Christopher Matthews, Xiang-Yang Liu *(LANL)*, Simon Middleburgh *(Bangor Univ)*, Antoine Claisse *(Westinghouse)*, Chris Stanek, David Andersson *(LANL)*

2:50 pm: A Phase-Field Approach to Predict the Formation Conditions of the High Burn-Up Structure in U_3Si_2, A. Cheniour, M. R. Tonks *(Univ of Florida)*, J. Lian *(RPI)*, Y. Zhang *(Univ of Wisconsin, Madison)*

3:10 pm: High Density Uranium Silicide Fuels—Fabrication and Oxidation Resistance, Bowen Gong *(RPI)*, Lu Cai *(Westinghouse)*, Tiankai Yao *(RPI)*, Edward J. Lahoda, Frank Boylan, Peng Xu *(Westinghouse)*, Jason Harp *(INL)*, Jie Lian *(RPI)*

3:30 pm: Thermophysical Properties of Crystalline and Amorphous Uranium Silicides from First-Principles, Zhi-Gang Mei, Yinbin Miao, Abdellatif M. Yacout (ANL)

3:50 pm: Steam Oxidation Dynamics of Alloyed U_3Si_2+X (X=Al, Cr, Nb, Y, and Zr), Elizabeth Sooby Wood, Cole Moczygemba, Geronimo Robles, Sean Nesloney *(Univ of Texas at San Antonio)*, Christopher Grote *(LANL)*, Lu Cai, Edward Lahoda *(Westinghouse)*

Technical Sessions: Tuesday October 8

TUESDAY, OCTOBER 8
TECHNICAL SESSIONS - 4:30 PM

Irradiation Damage and Microstructure: Composites and Nanomaterials
Cochairs: Jeremy Busby *(ORNL)*, Jessica Krogstad *(Univ of Illinois)*
Location: Holiday 1 **Time:** 4:30-5:40 pm

4:30 pm: Radiation Tolerance in Amorphous SiOC and Amorphous SiOC/Crystalline Fe Nanocomposite, Q. Su, M. Nastasi *(Univ of Nebraska-Lincoln)*, invited

5:00 pm: Determination of Dose Effects on Defect Accumulation Under Irradiation in Niobium Nanowires and Nanofoams via Atomistic Simulations, Daniel Vizoso *(Georgia Tech/SNL)*, Remi Dingreville *(SNL),* Chaitanya Deo *(Georgia Tech)*

5:20 pm: Effects of Ion Dose and Irradiation Temperature on Chromium Coatings for Zirconium Alloy Fuel Claddings, Li Jiang, Pengyuan Xiu, Lumin Wang *(Univ of Michigan)*

Advanced Alloys and Materials: Structural Alloys—II
Cochairs: Simon Pimblott *(INL)*, Keyou Mao *(Purdue Univ)*
Location: Holiday 2 **Time:** 4:30-6:10 pm

4:30 pm: Novel Amorphous SiOC Dispersion-Strengthened Austenitic Steels, Xueliang Yan, Fei Wang (*Univ of Nebraska-Lincoln)*, Khalid Hattar *(SNL)*, Michael Nastasi, Bai Cui *(Univ of Nebraska Lincoln)*

4:50 pm: Capacitive Discharge Resistance Welding for ODS Steel Cladding: Weld Properties and Radiation Resistance, C. R. Lear, B. P. Eftink, S. A. Maloy *(LANL)*, T. J. Lienert *(T. J. Lienert Consulting, LLC.)*

5:10 pm: Radiation Response of Nanostructured Austenitic Stainless Steels, Zhongxia Shang, C. Fan, Jin Li *(Purdue Univ)*, T. D. Shen *(Yanshan Univ)*, Y. M. Wang *(LLNL)*, M. A. Kirk, M. Li *(ANL)*, Xinghang Zhang *(Purdue Univ)*

5:30 pm: Novel Fabrication Route for Oxide Dispersion Strengthened (ODS) Steel Cladding Tubes Using Cold Spray Technology, H. Yeom, M. Lenling *(Univ of Wisconsin, Madison)*, J. Graham, P. Hosemann *(Univ of California, Berkeley)*, D. Hoelzer *(ORNL)*, S. Maloy *(LANL)*, P. Grant *(Oxford Univ)*, K. Sridharan *(Univ of Wisconsin, Madison)*

5:50 pm: Elucidating Three-Dimensional Microstructural Evolution in Neutron Irradiated HT-UPS Steel, M. A. Okuniewski, S. T. Nori, J. Thomas, G. Park, A. Figueroa *(Purdue Univ)*, H. Sharma, J.-S. Park, P. Kenesei, J. Almer *(ANL)*

Advanced Fuels and Actinides: Accident Tolerant Fuels—II
Cochairs: Maria Okuniewski *(Purdue Univ)*, Elizabeth Sooby Wood *(Univ of Texas at San Antonio)*
Location: Holiday 3 **Time:** 4:30-6:00 pm

4:30 pm: Modeling Fission Gas Behavior in Traditional and Advanced Fuels Applied to Engineering Simulations, G. Pastore, K. A. Gamble, Y. Zhang *(INL)*, D. A. Andersson, M. W. D. Cooper *(LANL)*, L. Luzzi *(Politecnico di Milano)*, invited

5:00 pm: Determination of Phase Equilibria in Uranium Silicide Fuel, Tashiema L. Ulrich, Theodore M. Besmann *(Univ of South Carolina)*, Joshua T. White, Sven C. Vogel *(LANL)*

5:20 pm: Challenges and Opportunities of High Density Nuclear Fuel Use in Light Water Reactors, J. T. White, A. P. Shivprasad, C. Grote, Nan Li, Artaches Migdissov, K. Hollis, N. Abdul-Jabbar, T. Saleh *(LANL)*

5:40 pm: Microstructure Design Insights for UO_2 Composite Fuels from a Microstructure Dependent Thermal Resistor Model and Fission Gas Study, Floyd W. Hilty, Michael R. Tonks *(Univ of Florida)*

TUESDAY, OCTOBER 8
POSTER SESSION - 6:00 PM

Advanced Alloys, Fuels, and Materials, and Nuclear Fuel Cycle
Location: Holiday Ballroom 4-5 **Time:** 6:00-8:00 pm

1. Micro-Nano Hetero Structures a Game Changer in Nuclear Fuel Cycle, Liviu Popa-Simil *(LAVM LLC)*
2. First X-Ray Diffraction Characterizations of a Spent Nuclear Fuel Sample with Zy-4 Cladding at MARS Beamline of the SOLEIL Synchrotron, Sandrine Schlutig, Vincent Klosek *(CEA)*, Denis Menut *(Synchrotron SOLEIL)*, Raphaëlle Guillou, Jean Luc Bechade, Jean Noirot *(CEA)*
3. Novel Synthesis Method for Three-Dimensional sp-2 Carbon Structure for Nuclear Waste Management, A. Resnick *(Kennesaw State Univ)*, B. Haile *(Georgia Tech)*, J. Park *(Kennesaw State Univ)*
4. AFM Measurement of Adhesion Forces Under PWR Conditions Identifies Crud Resistant Coatings, M. Carlson, M. Short *(MIT)*
5. LIBS Investigation of Nickel-Chromium Alloys Exposed to Molten Salt, William Ponder *(Univ of Tennessee, Knoxville/ORNL)*, Kristian Myhre *(ORNL)*, Steven Zinkle *(Univ of Tennessee Knoxville/ORNL)*, Stephen Raiman *(ORNL)*
6. Ab Initio Molecular Dynamics Study of U-Mo Alloys: Structural, Mechanical, Vibrational and Defect Properties, Zhi-Gang Mei, Abdellatif M. Yacout *(ANL)*
7. Room Temperature Mechanical Properties and Microstructure Evolution of TIG/FCAW Welded AISI 347 and AISI 347 Clad A533B-1 Low Alloy Steel, Kaustubh Bawane *(Virginia Tech/ORNL)*, Lauren M. Garrison *(ORNL)*
8. Fabrication of High-Entropy Alloys by Spark Plasma Sintering for Nuclear Applications, Xiang Zhang, Xueliang Yan, Fei Wang, Michael Nastasi, Bai Cui *(Univ of Nebraska-Lincoln)*
9. Experimentally Validated Mesoscale Modeling of Thermal Conductivity of a UO_2-BeO Composite Nuclear Fuel, F. Badry, Ryan Brito, M. Gomaa Abdoelatef, Sean McDeavitt, Karim Ahmed *(Texas A&M)*
10. Heterogeneity by Design in Engineered Micro-Nano Hetero Structures, Liviu Popa-Simil *(LAVM LLC)*
11. Atom Probe Tomography of Single Crystal ThO_2 and the Associated Challenges of Analyzing Oxide Materials with this Technique, Amrita Sen *(Purdue Univ)*, Mukesh Bachhav *(INL)*, Janelle P. Wharry *(Purdue Univ)*
12. Recent Examinations of Microstructural Evolution of Metallic Fuels for Sodium-Cooled Fast Reactors After a Reactor Transient, F. G. Di Lemma, K. E. Wright, L. Capriotti, C. B. Jensen, D. M. Wachs *(INL)*
13. Investigation of Restructuring Behavior in Commercial LWR Fuel, T. J. Gerczak, M. Gussev *(ORNL)*, C. McKinney *(ORNL/Univ of Florida)*, Z. Burns, K. Linton, K. A. Terrani *(ORNL)*
14. Shielded Fuel Organic Moderated and Cooled Reactor, Daniel R. Talbot *(U.S. Air Force Academy)*
15. Post-Irradiation Examination of Thoria and Thoria-Based Fuel Experiments DME-176 and DME-221 at Canadian Nuclear Laboratories, A. Barry *(CNL)*
16. Evaluation of the Accuracy of Computed Uranium Thermodynamic Properties with Dispersion-Corrected Density Functional Theory, Matthew S. Christian, Theodore Besmann *(Univ of South Carolina)*, Erin R. Johnson *(Dalhousie Univ)*
17. Resolution Capabilities for Measurement of Fuel Swelling Using X-Ray Tomography, Michael Dylan Richardson, Grant William Helmreich, Alicia Marie Raftery, Andrew T. Nelson *(ORNL)*
18. Quantitative Microchemical Analysis Using Electron Probe Microanalysis: A Study Featuring the Analysis of Irradiated FUTURIX-FTA U-Pu-Zr with Added Minor Actinides, K. E. Wright, J. M. Harp, L. Capriotti *(INL)*
19. Fabrication of UN-Mo CERMET Nuclear Fuel Using Advanced Manufacturing Techniques, A. M. Raftery, A. T. Schumacher, M. P. Trammell, J. W. McMurray, A. T. Nelson, K. A. Terrani *(ORNL)*
20. Advanced Characterization of Annular Fast Reactor MOX, F. Cappia, K. Wright, L. He, D. Murray, B. Miller, J. Harp *(INL)*
21. Molten Salt Thermochemical Database (MSTDB) to Support Reactor Design and Simulation, Johnathon Ard, Jacob Yingling, Kaitlin Johnson, Denise Lopes, Theodore Besmann *(Univ of South Carolina)*, Jake McMurray *(ORNL)*, Markus Piro *(Univ of Ontario Inst of Tech)*
22. Assessment of Constituent Molten Salt Fuel Systems and Demonstration of Relevant Molten Salt Thermochemical Calculations, Jacob Yingling, Johnathon Ard, Kaitlin Johnson, Denise Lopes, Theodore Besmann *(Univ of South Carolina)*, Jake McMurray, Stephen Utlak *(ORNL)*
23. Comparison of Urania and Thoria Fuels Under Light Water Reactor Conditions and Investigation of Fracture/Relocation Behavior Using the BISON Fuel Performance Code, R. T. Sweet *(Univ of Tennessee, Knoxville)*, B. D. Wirth *(Univ of Tennessee, Knoxville/ORNL)*
24. Development of a Lead-Bismuth Cooled Subcritical Fast/Thermal Testbed for Material Radiation Damage Studies, M. Mamtimin, T. L. Grimm, R. N. Wahlen, F. Y. Odeh, W. A. Peters *(Niowave, Inc.)*, S. A. Maloy, K. A. Woloshun *(LANL)*, W. Yang, P. Deng *(Univ of Michigan)*

Technical Sessions: Wednesday October 9

WEDNESDAY, OCTOBER 9
TECHNICAL SESSIONS - 8:00 AM

Integrated Phenomena: Corrosion or Aging with Irradiation
Cochairs: George Young *(Kairos Power)*, Stephen Raiman *(ORNL)*
Location: Holiday 1 **Time:** 8:00-10:00 am

8:00 am: Neutron Irradiation of Structural Materials in Molten Chloride Salt, Stephen S. Raiman, N. Dianne Bull Ezell, Kurt Smith, Richard T. Mayes, Joel McDuffee *(ORNL)*

8:20 am: Simultaneous Proton Irradiation Can Decelerate Corrosion of Ni-20Cr in Molten Fluoride Salt, Weiyue Zhou, Michael Philip Short *(MIT)*

8:40 am: Comparison of Post-Irradiation Annealing Effects in Proton-Irradiated and Neutron-Irradiated 304 Stainless Steels, Zhijie Jiao, Justin Hesterberg, Gary Was *(Univ of Michigan)*

9:00 am: Fundamental Understanding of Coupled Irradiation and Corrosion Effects on ZrNb Fuel Cladding, Adrien Couet, Zefeng Yu *(Univ of Wisconsin, Madison)*, Lingfeng He, Mukesh Bachhav *(INL)*

9:20 am: Effect of Thermal Aging on Static and Impact Fracture Properties of Cast Duplex Stainless Steels, T. S. Byun, D. A. Collins, T. G. Lach *(PNNL)*

9:40 am: Interdependent and Nonuniform Microstructural Evolution Pathways of Thermal Aging Degradation of Cast Austenitic Stainless Steels, Timothy G. Lach, William E. Frazier, Arun Devaraj, David A. Collins, Emily Barkley, Thak Sang Byun *(PNNL)*

Advanced Alloys and Materials: Fuels and Cladding—I
Cochairs: Mitra Taheri *(John Hopkins)*, Kallie Metzger *(Westinghouse)*
Location: Holiday 2 **Time:** 8:00-10:10 am

8:00 am: Degradation Resistance of FeCrAl Alloys in the Entire Nuclear Fuel Cycle, Raul B. Rebak *(GE Global Research)*, invited

8:30 am: Interface Reactions, Irradiation Response, and Mechanical Properties of FeCrAl-Coated Zircaloy-4, Miltiadis Kennas, Hyosim Kim *(Texas A&M)*, Jonathan G. Gigax *(Texas A&M/LANL)*, Benjamin R. Maier, Hwasung Yeom, Greg O. Johnson, Kumar Sridharan *(Univ of Wisconsin, Madison)*, Lin Shao *(Texas A&M)*

8:50 am: Creep Rupture Tests of FeCrAl Alloy for Accident Tolerant Fuel Cladding, P. Joshi *(NCSU)*, M. N. Cinbiz, Boopathy Kombaiah *(ORNL)*, K. L. Murty *(NCSU)*

9:10 am: Simulation of the Homogenized Stress-Strain Relation for FeCrAl Alloys by Improved Crystal Plasticity Finite Element Method, Jingyu Zhang, Shurong Ding *(Fudan Univ)*

9:30 am: Development of Advanced Low N 12Cr Ferritic/Martensitic Steel for Reactor Applications, C. J. Rietema, A. J. Clarke *(CSM)*, T. A. Saleh (LANL), O. Anderoglu *(Univ of New Mexico)*, B. Eftink *(LANL)*, M. M. Hassan *(Univ of New Mexico)*, K. D. Clarke *(CSM)*

9:50 am: Development and Evaluation of Cold Spray Chromium Coatings for Accident-Tolerant Zirconium-Alloy Cladding, K. Sridharan, H. Yeom, B. Maier, G. Johnson, T. Dabney *(Univ of Wisconsin, Madison)*, J. Walters, J. Romero, H. Shah, P. Xu *(Westinghouse)*

Advanced Fuels and Actinides: Fuel Performance and Characterization
Cochairs: Jian Gan *(Idaho National Lab)*, Assel Aitkaliyeva *(University of Florida)*
Location: Holiday 3 **Time:** 8:00-10:10 am

8:00 am: Application of the Bison Fuel Performance Code to EBR-II Data, C. Matthews *(LANL)*, S. Novascone, A. Casagranda *(INL)*, C. Unal *(LANL)*, invited

8:30 am: Initial Efforts to Benchmark Bison for VTR Driver Fuel Analysis, J. J. Powers, J. Hu *(ORNL)*, K. M. Cunningham *(ORNL/Oak Ridge Inst for Science and Education)*, I. Greenquist *(ORNL)*, S. L. Morrison *(ORNL/Oak Ridge Inst for Science and Education)*, S. R. Novascone , A. Casagranda, D. C. Crawford *(INL)*

8:50 am: Mesoscale Modeling and Experiments for Predicting the Thermal Conductivity of UZr Fuels, F. Badry, M. Gomaa Abdoelatef, Moiz Butt, Sean McDeavitt *(Texas A&M)*, Mitch Meyer *(INL)*, Karim Ahmed *(Texas A&M)*

9:10 am: Recent Results of Microstructural Characterization of Neutron-Irradiated U-Mo Fuels Using Advanced techniques, Dennis D. Keiser, Jr., Brandon Miller, Jian Gan, Fidelma Giulia Di Lemma, Mukesh Bachhav, Adam Robinson, James Madden *(INL)*

9:30 am: Advanced Characterization Capabilities at INL, Jian Gan *(INL)*

9:50 am: Hydrogen Corrosion of α-Uranium Observed by Transmission Electron Microscopy, Matthew T. Janish, Matthew M. Schneider, Edward F. Holby, Andrew W. Richards, Roland K. Schulze, Terry G. Holesinger *(LANL)*

WEDNESDAY, OCTOBER 9
TECHNICAL SESSIONS - 10:30 AM

Early Career Development in Nuclear Materials–Panel
Moderator: Janelle Wharry *(Purdue Univ)*
Location: Holiday 1 **Time:** 10:30 am-12:00 pm

Panelists:
John Vetrano *(DOE)*
Drew Thomas *(DOE)*
Clarissa Yablinksy *(LANL)*
Marat Khafzov *(Ohio State Univ)*

Advanced Alloys and Materials: Fuels & Cladding—II
Cochairs: Mitra Taheri *(John Hopkins)*, Zhijie Jiao *(Univ of Michigan)*
Location: Holiday 2 **Time:** 10:30 am-12:00 pm

10:30 am: Development of Ultra High Temperature Ceramics for Extreme Environments and Their Potential for Nuclear Applications, Jeremy Watts *(Missouri Univ Sci Tech)*, invited

11:00 am: Microstructural Characterization of TRISO Particles in off-Normal Conditions, Katherine Montoya, Brian A. Brigham *(Univ of Texas at San Antonio)*, Tyler J. Gerczak *(ORNL)*, Elizabeth Sooby Wood *(Univ of Texas at San Antonio)*

11:20 am: Results of a Machine Learning Model to Predict the Behavior of TRISO Particles Under High-Temperature Gas-Cooled Reactor Accident Conditions, M. D. Gaspar, K. I. Montoya, B. A. Brigham, A. S. Fernandez, E. S. Wood *(Univ of Texas at San Antonio)*

11:40 am: Analysis of Matrix Burnoff in Off-Normal HTGR Conditions and the Impact on TRISO Particle Oxidation, Brian A. Brigham, Katherine I. Montoya *(Univ of Texas at San Antonio)*, Tyler J. Gerczak *(ORNL)*, Marielle D. Gaspar, Zachary Acosta, Elizabeth Sooby Wood *(Univ of Texas at San Antonio)*

Advanced Fuels and Actinides: Metallic Fuels
Cochairs: Jian Gan *(INL)*, Assel Aitkaliyeva *(Univ of Florida)*
Location: Holiday 3 **Time:** 10:30 am-12:00 pm

10:30 am: Microstructural Characterization of Metallic Fuel Alloys, Assel Aitkaliyeva, Jacob Hirschhorn, Michael Tonks *(Univ of Florida)*, Cynthia Adkins *(INL)*, invited

11:00 am: Development and Sensitivity Analysis of a Quantitative Phase-Field Model for Non-Equilibrium U-Zr, Jacob Hirschhorn, Michael Tonks, Assel Aitkaliyeva *(Univ of Florida)*, Cynthia Adkins *(INL)*

11:20 am: Fuel Additives to Mitigate FCCI in Metallic Fuels, Michael T. Benson, Yi Xie, James A. King, Jason M. Harp, Lingfeng He *(INL)*, Indrajit Charit, Samrat Choudhury *(Univ of Idaho)*, Jinsuo Zhang *(Virginia Tech)*

11:40 am: Fuel Cladding Chemical Interaction with Irradiated U-Zr-Ce Fuel with Fe Based Cladding Materials at High Temperatures, J.-S. Kim, J.-H. Kim, B.-O. Oon Lee, J.-S. Cheon *(KAERI)*

Technical Sessions: Wednesday October 9

WEDNESDAY, OCTOBER 9
TECHNICAL SESSIONS - 1:30 PM

Nuclear Fuel Cycle
Cochairs: Jie Lian *(RPI)*, Sarah Finkeldei *(Univ of California, Irvine)*
Location: Holiday 1 **Time:** 1:30-3:30 pm

1:30 pm: The Size, Shape and Distribution of Intragranular Fission Product Bubbles in Spent Nuclear Fuel, M. J. D. Rushton *(Bangor Univ)*, C. O. Galvin *(Univ of New South Wales)*, M. W. D. Cooper *(LANL)*, P. A. Burr *(Univ of New South Wales)*, S. C. Middleburgh *(Bangor Univ)*, R. W. Grimes *(Imperial College)*, W. E. Lee *(Bangor Univ/Imperial College)*, invited

2:00 pm: Identification of Chlorine-Containing Gases Generated by Hydrated PuO_2/Salt Mixtures, Daniel Rios, Andrew J. Gaunt, Joshua E. Narlesky, John M. Berg, D. Kirk Veirs, Laura A. Worl *(LANL)*, invited

2:30 pm: Ceramic Waste Form Design and Degradation: Mechanistic Understandings, Jie Lian *(RPI)*

2:50 pm: A Study for Zeolite Mixing Ratio and Strength Property of Cement Solidified Product Mixed with Zeolite, Atsushi Imabuchi, Kazuhito Niwase *(Hachinohe College)*, Takeshi Yamamoto *(CRIEPI)*

3:10 pm: Evaluation of Microscopic Structure of Cement Solidification Mixed with Zeolite, Taisei Sakai, Kazuhito Niwase *(Hachinohe College)*, Michio Kikuchi *(CRIEPI)*

Advanced Alloys and Materials: Fuels and Cladding—III
Cochairs: Steve Zinkle *(Univ of Tennessee, Knoxville/ORNL)*, Haiming Wen *(Missouri Univ of Science & Technol)*
Location: Holiday 2 **Time:** 1:30-3:10 pm

1:30 pm: Cladding Development for Current and Advanced Reactor Applications: A Comparison of Thin-Walled Tubes for Three Variants of Oxide Dispersion Strengthened Alloys, Caleb P. Massey, David T. Hoelzer, Sebastien Dryepondt, Philip D. Edmondson *(ORNL)*, Stuart A. Maloy *(LANL)*, Maxim N. Gussev *(ORNL)*, Anoop Kini, Baptiste Gault *(Max-Planck-Institut für Eisenforschung GmbH)*, Kurt A. Terrani *(ORNL)*, Steven J. Zinkle *(ORNL/Univ of Tennessee, Knoxville)*

1:50 pm: High Temperature Oxidation Behavior of CrAl Alloy Layer Coated Zr Fuel Cladding Using Arc Ion Plating, Dong Jun Park, Yang Il Jung, Jung Hwan Park, Byoung Kwon Choi, Young Ho Lee, Hyun Gil Kim *(KAERI)*

2:10 pm: Study of the Effect of the Zirconium Grain Structure on Hydride Precipitation Using Phase Field Modeling, P.-C. A. Simon, A. T. Motta *(Penn State)*, M. R. Tonks *(Univ of Florida)*

2:30 pm: Radiation Effects on the Aqueous Compatibility of Coated and Uncoated SiC for Accident-Tolerant Fuel Cladding in Light Water Reactors, Peter Doyle *(Univ of Tennessee, Knoxville/ORNL)*, Takaaki Koyanagi *(ORNL)*, Caen K. Ang *(Univ of Tennessee, Knoxville)*, Yutai Katoh *(ORNL)*, Steven Zinkle *(ORNL/Univ of Tennessee, Knoxville)*, David Carpenter *(MIT)*, Stephen Raiman *(ORNL)*

2:50 pm: Coating Development for SiC/SiC Fuel Cladding to Prevent Fission Gas Release, Peter Mouche, Takaaki Koyanagi, Yutai Katoh *(ORNL)*

Radiation Effects Simulation and Evaluation Techniques: Alloys—I
Cochairs: Lance Snead *(MIT)*, Kevin Field *(Univ of Michigan)*
Location: Holiday 3 **Time:** 1:30-3:40 pm

1:30 pm: Multi-Scale Modeling of Irradiated Grain Boundaries: Radiation-Induced Segregation and Corrosion, Izabela Szlufarska *(Univ of Wisconsin, Madison)*, Xing Wang *(ORNL)*, Hongliang Zhang, Cheng Liu, Jianqi Xi, *(Univ of Wisconsin, Madison)*, invited

2:00 pm: Ab Initio Modeling of Radiation Effects in NiFeMnCr High Entropy Alloy, Congyi Li *(Univ of Tennessee, Knoxville)*, Khorgolkhuu Odbadrakh *(ORNL)*, Sai Mu *(Univ of California, Santa Barbara)*, Phil Sterne *(LLNL)*, Brian Wirth *(Univ of Tennessee, Knoxville)*

2:20 pm: Modeling Activation and Radionuclide Decay in Proton Irradiated Zirconium Alloys, Jesse J. Carter, Richard W. Smith *(NNL)*

2:40 pm: Helium and Damage Rate Dependence of Swelling in Simulated Ferritic Alloys Using a Hybrid Cluster Dynamics Model, Gerrit VanCoevering *(Univ of Michigan)*, Brian D. Wirth *(Univ of Tennessee, Knoxville)*, Gary S. Was *(Univ of Michigan)*

3:00 pm: Developing a Method to Quantify Radiation Damage Using Stored Energy: Simulations and Experiments, C. A. Hirst *(MIT)*, P. Cao *(Univ of California, Irvine)*, R. S. Kemp, M. P. Short *(MIT)*

3:20 pm: Ab Initio Thermodynamic and Kinetic Model of Hydrogen Segregation in Zirconium Grain Boundaries, W. Setyawan, C. H. Henager, Jr., D. J. Senor *(PNNL)*

THURSDAY, OCTOBER 10
TECHNICAL SESSIONS - 8:00 AM

Mechanical Properties—I
Cochairs: T. S. Byun *(ORNL)*, Ben Eftink *(LANL)*
Location: Holiday 1 **Time:** 8:00-10:10 am

8:00 am: Fracture and Fatigue Behaviors of Pressure Vessel Steels and Austenitic Steels in Light Water Reactor Environments, Philippe Spätig, Hans-Peter Seifert, Zaiqing Que, Wen Chen *(PSI)*, invited

8:30 am: Characterization of RPV Materials Harvested from the Decommissioned Zion Unit 1 Nuclear Power Plant, M. A. Sokolov, T. M. Rosseel, P. D. Edmondson, X. Chen *(ORNL)*, R. K. Nanstad *(R&S Consultants, LLC)*

8:50 am: Irradiation Assisted Stress Corrosion Cracking in SA508-304 Weldment Under BWR/NWC Simulated Environment, Zhen Li *(Univ of Illinois)*, Weicheng Zhong *(ORNL)*, Gary S. Was *(Univ of Michigan)*, Brent J. Heuser *(Univ of Illinois)*

9:10 am: Experimental Study on Irradiation Embrittlement of 2 1/4 Cr-1 Mo Steel for Reactor Pressure Vessels, L. Sun, P. Joly, F. Roch *(Framatome)*, C. Ritter, B. Tanguy, P. Wident, B. Marini *(CEA)*, P. Todeschini, L. Pineau *(EdF)*

9:30 am: Mechanical Properties of Thermally Aged and Ion Irradiated FeCr Alloys, Shradha Agarwal, Pengcheng Zhu, Yajie Zhao *(Univ of Tennessee, Knoxville)*, Jean Henry *(CEA)*, Steven J. Zinkle *(Univ of Tennessee, Knoxville/ORNL)*

9:50 am: Comparison of Shear Punch and Tensile Testing of Neutron Irradiated FeCrAl, B. P. Eftink, T. J. Romero, M. E. Quintana, T. A. Saleh, S. A. Maloy *(LANL)*

Advanced Alloys and Materials: Advanced Manufacturing
Cochairs: Janelle Wharry *(Purdue Univ)*, Kurt Terrani *(ORNL)*
Location: Holiday 2 **Time:** 8:00-9:50 am

8:00 am: Qualification of Additive Manufactured Components—Integration of Modeling, Measurement and Manufacturing Processes, Sudarsanam Sureshy Babu *(Univ of Tennessee. Knoxville/ORNL)*, invited

8:30 am: Transforming Nuclear Core Manufacturing: Application of Advanced Manufacturing and Process Monitoring, Kurt Terrani, Ryan Dehoff, Kevin Field, Vincent Paquit, Andrew Nelson, William Peter *(ORNL)*

8:50 am: A Road Map to Process Ferritic Martensitic Steels Using Additive Manufacturing, Niyanth Sridharan, Maxim Gussev, Xiang Chen, Kevin G. Field *(ORNL)*

9:10 am: Recent Progress in Testing and Qualification of PM-HIP Nuclear Structural Alloys, Janelle P. Wharry, George Warren *(Purdue Univ)*, Donna P. Guillen *(INL)*, Lucille A. Giannuzzi *(L. A. Giannuzzi & Associates)*, Elizabeth Getto *(U.S. Naval Academy)*, Darren C. Pagan *(Cornell High Energy Synchrotron Source)*, Yaqiao Wu *(Boise State Univ/Center for Advanced Energy Studies)*, Paula D. Freyer *(Westinghouse)*, David W. Gandy *(EPRI)*

9:30 am: Wear Behavior of Additive Manufactured Stainless Steels 304L for Nuclear Applications, Junhyun Kwon, Jung-Min Kim, Hyung-Ha Jin *(KAERI)*

Radiation Effects Simulation and Evaluation Techniques: Alloys—II
Cochairs: Kevin Field *(Univ of Michigan)*, Karim Ahmed *(Texas A&M)*
Location: Holiday 3 **Time:** 8:00-10:00 am

8:00 am: Surface Near Helium Damage in Materials Studied with a High Throughput Implantation Method, Peter Hosemann, M. Balooch, A. Scott, S. Stevenson, Y. Yang, F. Allen *(Univ of California, Berkeley/LBNL)*

8:20 am: Atomistic Modeling of the Effect of He on Vacancy Clustering Energetics in Ni, E. K. Stirrup, B. D. Wirth *(Univ of Tennessee, Knoxville)*

8:40 am: Density Functional Theory Studies of Effects of Oxygen on Grain Boundary Fracture in Nickel, Ziqi Xiao, Xian-Ming Bai *(Virginia Tech)*

9:00 am: Rapid, Non-Destructive Detection of Microstructural Degradation in Light Water Reactor Structural Materials Using Transient Grating Spectroscopy, Saleem A. Aldajani, Benjamin R. Dacus, Cody A. Dennett *(MIT)*, M. Grace Burke *(Univ of Manchester)*, James J. Wall *(EPRI)*, Michael P. Short *(MIT)*

9:20 am: Elemental Nuclear Data Application Libraries for Materials Sciences, Jean-Christophe C. Sublet *(IAEA)*, Mark R. Gilbert *(United Kingdom Atomic Energy Authority)*

9:40 am: Material Informatics Approach for Composition Reconstruction in Irradiated Fe-Cr-Al Alloys, Y. Pachaury, C. Nuela Enebechi, G. Warren, Janelle P. Wharry, Anter El-Azab *(Purdue Univ)*

Technical Sessions: Thursday October 10

THURSDAY, OCTOBER 10
TECHNICAL SESSIONS - 10:30 AM

Mechanical Properties—II
Cochairs: T. S. Byun *(ORNL)*, Zhen Li *(Univ of Illinois)*
Location: Holiday 1 **Time:** 10:30 am-12:00 pm

10:30 am: Bridging the Length Scales on Mechanical Properties of Irradiated Materials, Peter Hosemann, H. Vo *(Univ of California, Berkeley)*, A. Dong *(LBNL)*, S. A. Maloy, L. Capolungo *(LANL)*, A. Sitkaliyeva *(Univ of Florida)* invited

11:00 am: Micro-Tensile Testing for Grain Boundary Fracture in Neutron-Irradiated Stainless Steels, T. Miura, K. Fujii, K. Fukuya *(Inst of Nuclear Safety System, Inc.)*, Y. Kitsunai *(Nippon Nuclear Fuel Development Co., Ltd)*

11:20 am: Mechanical Properties and Dislocation Dynamics in Irradiated FeCrAl Using In Situ TEM Tensile Tests, George Warren, Patrick Warren, Y. Pachaury, C. Nuela Enebechi *(Purdue Univ)*, Jatuporn Burns, Megha Dubey, Yaqiao Wu *(Boise State Univ/Center for Advanced Energy Studies)*, Kevin G. Field *(ORNL)*, Anter El-Azab, Janelle P. Wharry *(Purdue Univ)*

11:40 am: In-Situ X-Ray Diffraction and 4D X-Ray Microscopy Study of Tensile Deformation of Neutron-Irradiated Fe-9Cr Alloy, Xuan Zhang, Meimei Li, Jun-Sang Park, Peter Kenesei, Jonathan Almer *(ANL)*, James F. Stubbins *(Univ of Illinois)*

Advanced Alloys and Materials: Materials for Advanced Reactors—I
Cochairs: Anne Campbell *(ORNL)*, Gabriel Meric de Bellefon *(Kairos Power)*
Location: Holiday 2 **Time:** 10:30 am-12:00 pm

10:30 am: Development of Cladded and Alloy Systems for Short and Long Term Deployment of Molten Salt Reactors, Adrien Couet, Evan Buxton, William Doniger, Cody Falconer, Kumar Sridharan *(Univ of Wisconsin, Madison)*, invited

11:00 am: Comparison of Advanced and Conventional Austenitic Structural Alloys for Use in Molten Salts, George A. Young, Micah J. Hackett, Michael Hanson, Steven Huang, Pierre-Alexandre Juan, Henry Kim, Henry Korellis, Alan Kruizenga, Robert McReynolds, Augustus Merwin *(Kairos Power)*, T.-L. Sham *(ANL)*

11:20 am: Coating Down Selection for Fluoride-Cooled High-Temperature Reactor, Steven Huang, Micah Hackett, George Young, Henry Kim *(Kairos Power LLC)*

11:40 am: Measurements and Modeling of Tritium Retention Mechanisms in Nuclear Graphite Irradiated in Molten Fluoride Salt, K. Dolan, G. Zheng, D. Carpenter *(MIT)*, S. Huang *(Kairos Power, LLC)*, L. W. Hu *(MIT)*

Radiation Effects Simulation and Evaluation Techniques: Fuels—I
Cochairs: Kevin Field *(Univ of Michigan)*, Karim Ahmed *(Texas A&M)*
Location: Holiday 3 **Time:** 10:30 am-12:00 pm

10:30 am: Overview of Multiscale Fuels and Materials Modeling Within the U.S. DOE-NE NEAMS Program, C. R. Stanek *(LANL)*, invited

11:00 am: Modeling and Simulations of Irradiation-Induced Void Superlattices, Yipeng Gao, Yongfeng Zhang, Jian Gan *(INL)*

11:20 am: Cluster Dynamics and Phase Field Model of Gas Bubble Evolution and Volumetric Swelling in Polycrystalline UMo Fuels, Shenyang Hu *(PNNL)*, Benjamin W. Beeler *(INL)*, Douglas E. Burkes *(PNNL)*

11:40 am: Mesoscale Modeling of High Burn-Up Structure (HBS) Formation and Evolution in U-Mo Alloy, M. Gomma Abdoelatef, F. Badry, Karim Ahmed *(Texas A&M)*, Andrea Jokisaari, Daniel Schwen, Yongfeng Zhang *(INL)*

THURSDAY, OCTOBER 10
TECHNICAL SESSIONS - 1:30 PM

Mechanical Properties—III
Cochairs: Stuart Maloy *(LANL)*, Shradha Agarwal *(Univ of Tennessee, Knoxville)*
Location: Holiday 1 **Time:** 1:30-3:40 pm

1:30 pm: Radiation Effects on Mechanical Behavior of Zirconium Alloys: From Dislocations to Polycrystals, F. Onimus, L. Dupuy, Matthew Bono *(CEA)*, F. Mompiou *(CNRS)*, P. Pilvin *(Univ. Bretagne Sud)*, invited

2:00 pm: A Molecular Dynamics Study of Irradiation Creep Deformation Mechanisms in α-Zirconium, Nargisse Khiara, Fabien Onimus, Laurent Dupuy, Jean-Paul Crocombette *(CEA)*, Thomas Pardoen, Jean-Pierre Raskin *(Université Catholique de Louvain)*, Yves Brechet *(INPG)*

2:20 pm: Quantifying Radiation Embrittlement in Structural Materials, Steven J. Zinkle *(Univ of Tennessee, Knoxville/ORNL)*

2:40 pm: Quantification of Local Stress Fields in Crack Initiation in Irradiated Austenitic Stainless Steels, D. C. Johnson *(Univ of Michigan)*, M. R. He, I. M. Robertson *(Univ of Wisconsin, Madison)*, D. Farkas *(Virginia Tech)*, G. S. Was *(Univ of Michigan)*

3:00 pm: Method for Extracting True Strain and Stress from TEM in Situ Compression Testing, H. Qu, K. H. Yano, P. Patki, J. P. Wharry *(Purdue Univ)*

3:20 pm: A New Method for TEM in Situ Tensile Testing of Ion Irradiated Alloys, Patrick Warren, George Warren, C. Nuela Enebechi *(Purdue Univ)*, Jatuporn Burns, Megha Dubey *(Boise State Univ/Center for Advanced Energy Studies)*, Janelle P. Wharry *(Purdue Univ)*

Advanced Alloys and Materials: Materials for Advanced Reactors—II
Cochairs: Anne Campbell *(ORNL)*, Adrien Couet *(Univ of Wisconsin)*
Location: Holiday 2 **Time:** 1:30-3:10 pm

1:30 pm: Fabrication and Phase Analysis of U_3Si_2 Alloyed with Cr, Nb, and Zr, G. Robles, C. Moczygemba *(Univ of Texas at San Antonio)*, J. T. White *(LANL)*, L. Cai, E. Lahoda *(Westinghouse)*, E. Sooby-Wood *(Univ of Texas at San Antonio)*

1:50 pm: Development and Testing of Ultrafine-Grained and Nanocrystalline Steels for Enhanced Irradiation Tolerance, Haiming Wen, Andrew K. Hoffman *(Missouri Univ Sci Tech)*, Rinat K. Islamgaliev *(Ufa State Aviation Technical Univ)*

2:10 pm: Corrosion of Refractory Metals and Advanced Steels in 700°C Stagnant and 250 °C Flowing Lead-Bismuth Eutectic, S. A. Maloy, N. Rubio, K. A. Woloshun, E. Olivas *(LANL)*, R. N. Wahlen, T. L. Grimm, M. Mamtimin,, F. Y. Odeh *(Niowave, Inc.)*

2:30 pm: An Advanced Metallic Composite for Use in Lead Fast Reactors, S. W. McAlpine, S. E. Ferry, M. P. Short *(MIT)*

2:50 pm: Qualifying Irradiated Structural Austenitic Stainless Steels for Kairos Power's Fluoride-Salt-Cooled, High-Temperature Reactor, G. Meric de Bellefon, H. Kim, P.-A. Juan, G. Young, M. Hackett *(Kairos Power LLC)*

Radiation Effects Simulation and Evaluation Techniques: Fuels—II
Cochairs: Gary Was *(Univ of Michigan)*, Todd Allen *(Univ of Michigan)*
Location: Holiday 3 **Time:** 1:30-3:40 pm

1:30 pm: Atomistic Modeling of Mixed Oxide Fuel Properties and Radiation Effects, Michel Freyss, Marjorie Bertolus, Emeric Bourasseau, Gérald Jomard, Martin Stéphane Talla Noutack, Ibrahim Cheik Njifon, Didier Bathellier *(CEA)*

1:50 pm: Investigating Defects in Actinides Oxides by Coupling Eectronic Structure Calculations and Positron Annihilation Lifetime Spectroscopy, Mamy Rivo Dianzinga, M. Bertolus, Gérald Jomard *(CEA)*, M.-F. Barthe, *(CNRS, CEMHTI)*, invited

2:20 pm: A Multi-Scale Microstructure Simulation Framework for Fission Gas Bubble Growth: Phase-Field and Cluster Dynamics Modeling, Dong-Uk Kim *(Univ of Florida)*, Sophie Blondel, Brian Wirth *(Univ of Tennessee, Knoxville)*, Michael Tonks *(Univ of Florida)*

2:40 pm: 3D Comprehensive Effective Heat Conductivity Model of UO_2, Bohyun Yoon, Heebaek Chang, Kunok Chang *(Khung Hee Univ)*

3:00 pm: Modeling Thermal-Mechanical Behavior of SiC-SiC Cladding in BWR Fuel Assemblies Using BISON, D. Schappel, G. Sing *(Univ of Tennessee, Knoxville)*, Y. Katoh *(ORNL)*, B. D. Wirth *(Univ of Tennessee, Knoxville/ORNL)*

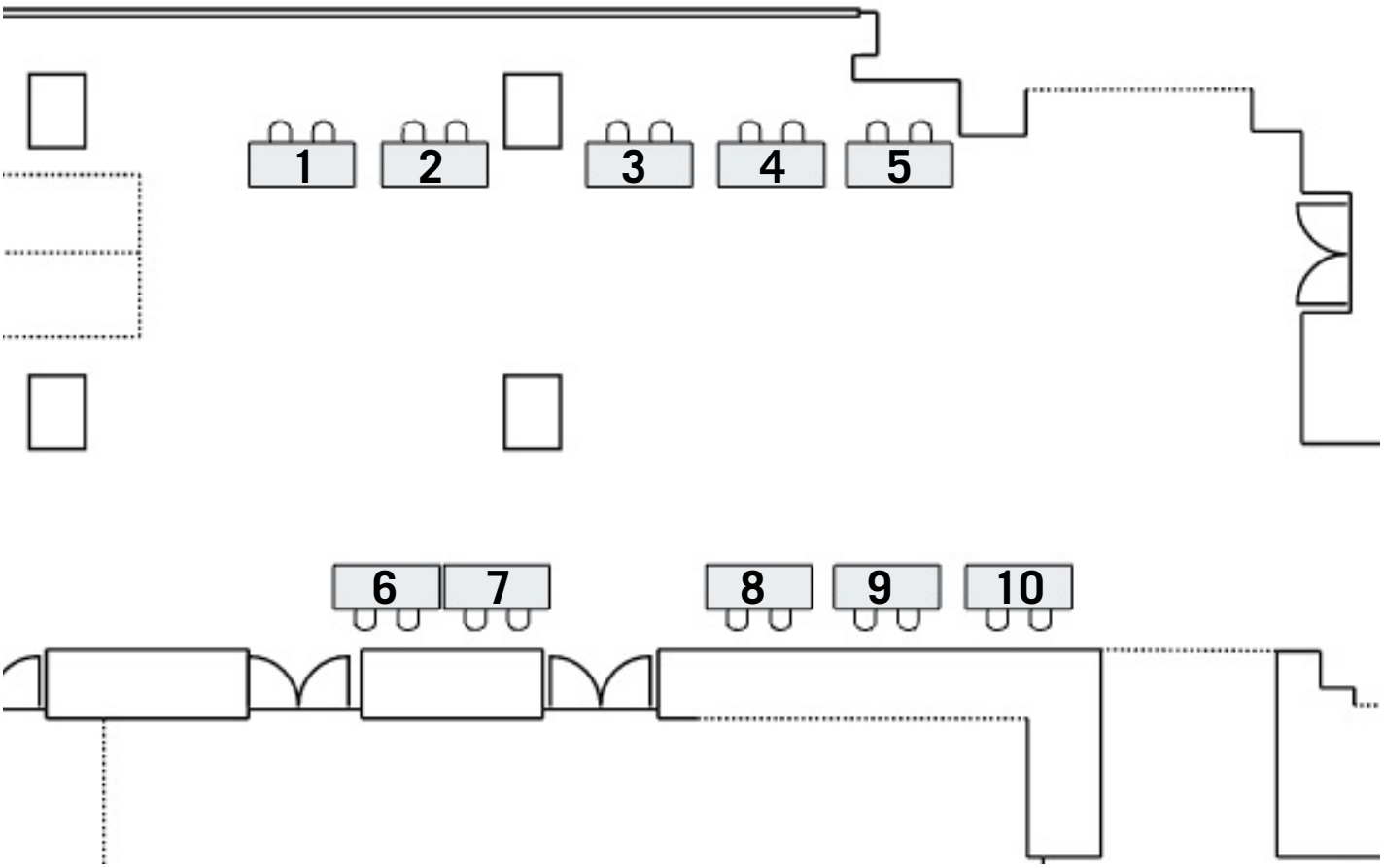
3:20 pm: Simulating the Solid Chemical Composition of PWR Fuel CRUD, Jason Rizk, Brian Wirth *(Univ of Tennessee, Knoxville)*

Exhibitors List

Exhibit Hall Floor Plan

October 6-10, 2019 | Baltimore, Maryland | Hilton Baltimore Inner Harbor

Location: Holiday West Foyer



Exhibitor & Expo Info

Canadian Nuclear Laboratories

Ontario Canada (Table 7)

Canadian Nuclear Laboratories (CNL) is Canada's premier nuclear science and technology laboratory, dedicated to developing peaceful and innovative applications from nuclear technology through its expertise in physics, metallurgy, chemistry, biology, and engineering. We address global issues across the nuclear lifecycle and develop novel medical isotopes and devices.

Framatome Inc.

Lynchburg, VA (Table 1)

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.

Idaho National Laboratory

Idaho Falls, ID (Table 8)

Idaho National Laboratory (INL) is part of the U.S. Department of Energy's complex of national laboratories. The laboratory performs work in each of the strategic goal areas of DOE: energy, national security, science and environment. INL is the nation's leading center for nuclear energy research and development. INL is managed by Battelle Energy Alliance for the Department of Energy's Office of Nuclear Energy.

Michigan Ion Beam Laboratory

Ann Arbor, MI (Table 3)

The Michigan Ion Beam Laboratory (MIBL) at the University of Michigan provides the capability to conduct a wide range of ion irradiation experiments including single, dual or triple beam irradiation in a range of environments, as well as single or dual ion irradiation in-situ in a 300 kV Tecnai G2 F30 transmission electron microscope.

The Minerals, Metals & Materials Society (TMS)

Pittsburgh, PA (Table 10)

TMS is a member-driven, professional society that connects minerals, metals, and materials scientists and engineers on six continents. TMS has established leadership in organizing international conferences, publishing books and journals, and convening the professional community on issues of common concern. TMS will be sponsoring MiNES 2021 in Pittsburgh. To learn more, visit www.tms.org.

Netzsch Instruments NA LLC

Burlington, MA (Table 4)

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!

Oak Ridge National Laboratory

Oak Ridge, TN (Table 6)

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

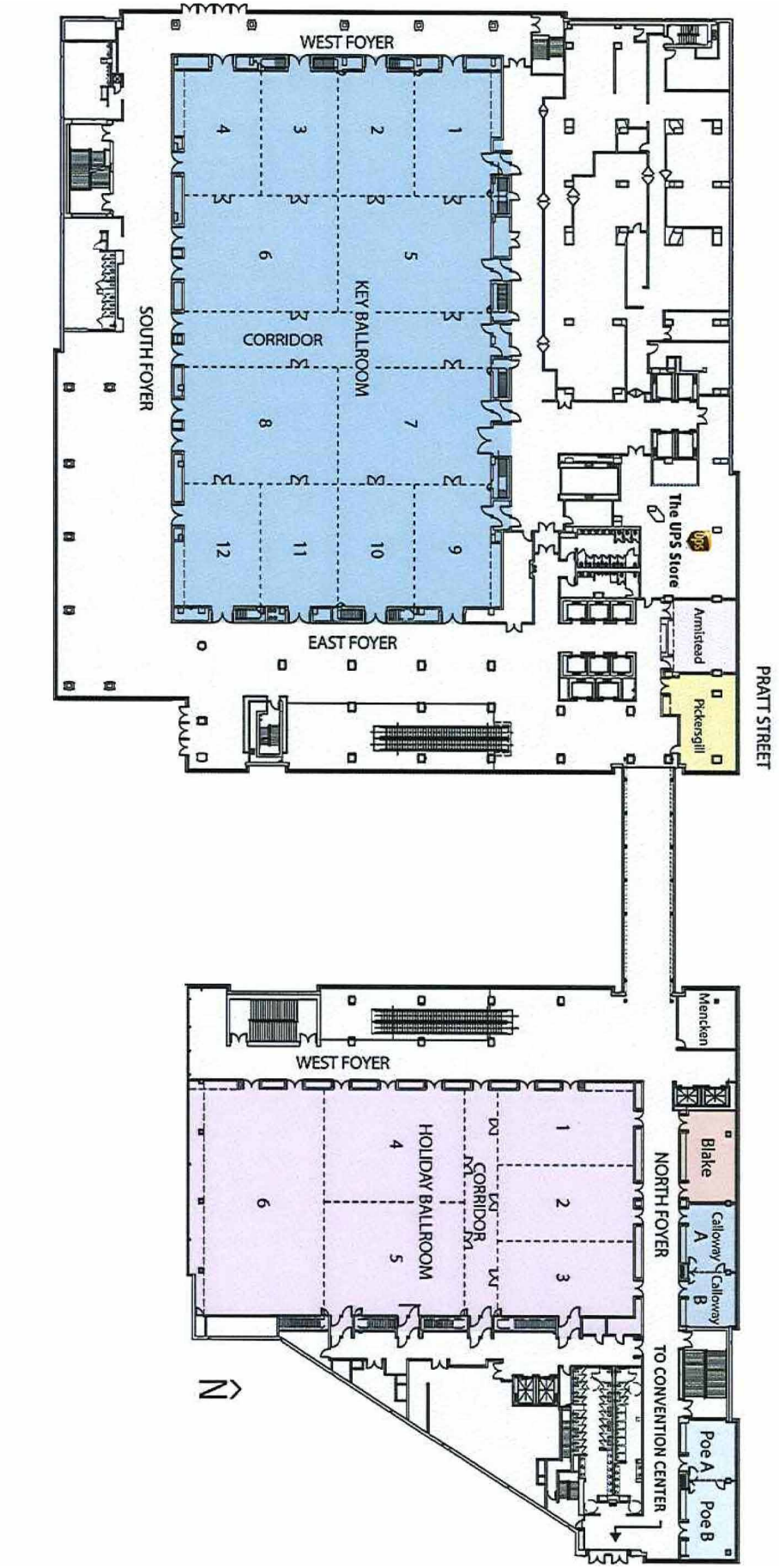
United Kingdom Atomic Energy Authority

United Kingdom (Table 2)

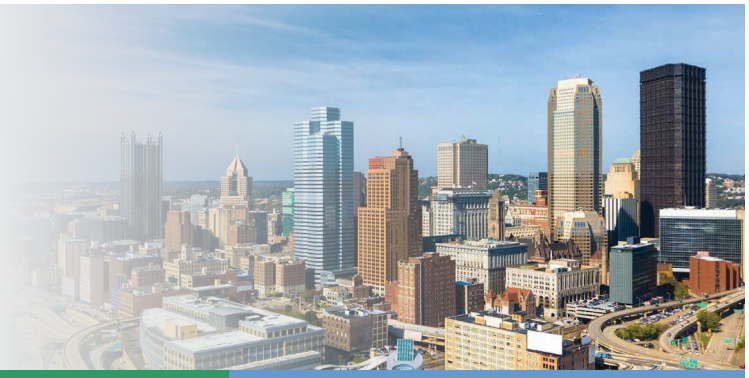
The UKAEA's Materials Research Facility (MRF) has been established to analyse material properties in support of both fission and fusion research. The MRF can offer hot cells for processing and analysis of neutron-irradiated material. It is part of the NNUF initiative and Sir Henry Royce Institute for Advanced Materials.

Hotel Floorplan

Hilton Baltimore
Inner Harbor
Second Floor



MiNES
MATERIALS IN NUCLEAR ENERGY SYSTEMS



Join the fission reactor materials community in Pittsburgh for the second installment of MiNES.

MiNES 2021: SAVE THE DATE!

SEPTEMBER 19-23, 2021
Omni William Penn Hotel
Pittsburgh, Pennsylvania, USA

Topics to be explored will include:

- Irradiation Damage
- Irradiated Microstructures
- Mechanical Properties of Irradiated Materials
- Radiation Effects Simulation & Evaluation Techniques
- Integrated Phenomena in Reactor Materials
- Advanced Alloys and Materials for Nuclear Systems
- Advanced Fuels & Actinide Materials
- Nuclear Fuel Cycles

The MiNES conference series grew out of two biannual symposia: Microstructure Processes in Irradiated Materials (MPIM) held at the TMS Annual Meeting & Exhibition and Nuclear Fuel and Structural Materials (NFSM) held at the ANS Annual Meeting

CONFERENCE SPONSORS AND ORGANIZERS

MiNES 2021 is sponsored by the TMS Structural Materials Division and the TMS Nuclear Materials Committee, and is being organized by the following individuals:

Todd Allen
General Chair
University of Wisconsin-Madison

Clarissa Yablinsky
Programming Chair
Los Alamos National Laboratory

Janelle Wharry
2019 General Chair
Purdue University

TMS
The Minerals, Metals & Materials Society

ANS
AMERICAN NUCLEAR SOCIETY

"MiNES will establish a home for the nuclear and irradiated materials community."
— **Janelle Wharry**, Purdue University, MiNES 2019 General Chair

www.tms.org/MiNES2021

ANS Meetings

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 19-23, 2020 | CHARLESTON, SC

2020 ANS ANNUAL MEETING
JUN 7-11, 2020 | PHOENIX, AZ | ARIZONA GRAND RESORT & SPA

UTILITY WORKING CONFERENCE AND VENDOR TECHNOLOGY EXPO
AUG 9-12, 2020 | MARCO ISLAND, FL
JW MARRIOTT MARCO ISLAND

ICRS 14/RPSD 2020
SEP 13-18, 2020 | SEATTLE, WA
SEATTLE MARRIOTT WATERFRONT

2020 ANS WINTER MEETING AND NUCLEAR TECHNOLOGY EXPO
NOV 15-19, 2020 | CHICAGO, IL
CHICAGO MARRIOTT DOWNTOWN