ANS Winter Meeting & Expo

2018
Official Program

Joining Forces to Advance Nuclear

November 11-15, 2018
Orlando, FL
Hilton Orlando Bonnet Creek

ANS Winter Meeting & Expo

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Joining Forces to Advance Nuclear

2018 Winter Meeting

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Daily Schedule

Sunday, November 11

7:00 am-7:00 pm	Registration	Bonnet Creek Foyer
6:00-8:00 pm	ANS President's Opening Reception in Technology Expo	Bonnet Creek Salon VII-IX
6:00-8:00 pm	ANS Nuclear Technology Expo	Bonnet Creek Salon VII-IX

Monday, November 12

7:00 am-5:00 pm	Registration	Bonnet Creek Foyer
7:00 am-4:00 pm	ANS Nuclear Technology Expo	Bonnet Creek Salon VII-IX
7:30-8:00 am	Continental Breakfast in Technology Expo	Bonnet Creek Salon VII-IX
8:00-11:00 am	Opening Plenary	Floridian Ballroom A –F
11:00 am-1:00 pm	Luncheon in Technology Expo	Bonnet Creek Salon VII-IX
1:00-3:35 pm	ANS Technical Sessions	
	• Current Issues in Computational Methods–Roundtable	Floridian G
	• Nuclear Fuels	Floridian H
	• Advanced Gen-IV Reactors—I	Floridian J
	• Isotopes and Radiation: General—I	Floridian K
	• NCS Implementation Programs–Panel	Floridian L
	• ENDF/B-VIII.0: Evaluation and Validation–Panel	Floridian L
	• International Research Towards Key Improvements within the Closed Fuel Cycle–Panel	Bonnet Creek III
	• Radiation Protection and Shielding: General—I	Bonnet Creek IV
	• Current Issues in LWR Core Design and Reactor Engineering Support–Panel	Bonnet Creek V
	• Current Topics in Probabilistic Risk Analysis	Bonnet Creek VI
1:00-5:35 pm	ANTPC Technical Sessions	See page 42
1:30-6:00 pm	ATH Opening Plenary	Citrus, Collier
1:30-6:30 pm	TOFE Technical Sessions	See page 57
3:35-3:50 pm	Coffee Break	Bonnet Creek Salon VII-IX
3:50-6:30 pm	ANS Technical Sessions	
	• Student Design Competition	Floridian G
	• Accident Tolerant Fuels	Floridian H
	• Reactor Physics: General—I	Floridian I
	• Strategy Development for Junior Faculty–Panel	Floridian J
	• Operations and Power: General	Floridian K
	• Recent Nuclear Criticality Safety Program Technical Accomplishments	Floridian L
	• Fuel Cycle Analysis	Bonnet Creek III
	• Radiation Protection and Shielding in Aeronautics and Space Applications–Panel	Bonnet Creek IV
	• Applications of the NEAMS Workbench–Panel	Bonnet Creek V
	• Eighty Years with Nuclear Fission–Panel	Bonnet Creek VI

#ANSMeeting

Daily Schedule

Tuesday, November 13

7:00 am-5:00 pm	Registration	Bonnet Creek Foyer
7:00 am-1:30 pm	ANS Nuclear Technology Expo	Bonnet Creek Salon VII-IX
7:30-8:00 am	Continental Breakfast in Technology Expo	Bonnet Creek Salon VII-IX
8:00-10:00 am	President's Special Session	Floridian Ballroom A-F
8:00-10:00 am	ATH Technical Sessions	See page 48
8:00-9:55 am	TOFE Plenary—I	Bonnet Creek Ballroom I
10:00-10:15 am	Coffee Break	Bonnet Creek Salon VII-IX
10:15 am-12:25 pm	ANS Technical Sessions	
	• Deterministic Transport Methods	Floridian G
	• Fuels and Materials for Molten Salt Reactors	Floridian H
	• Perspectives on the ANS Congressional Fellowship–Panel	Floridian I
	• Professional Licensure in the Nuclear Industry Matters: It's NOT the Job You Do It's How You Do the Job!	Floridian J
	• General Topics in Instrumentation and Control	Floridian K
	• Data, Analysis and Operations in Nuclear Criticality Safety—I	Floridian L
	• Used Fuel and High-Level Waste Management—The Long and Winding Road–Panel	Bonnet Creek III
	• Radiation Protection and Shielding: General—II	Bonnet Creek IV
	• Reactor Analysis Methods—I	Bonnet Creek V
	• Nuclear Cogeneration for Sustainable Development–Panel	Collier, Columbia
	• Robotic Inspection and Survey in Radiation Environments	Citrus
10:15 am-12:00 pm	ANTPC Technical Sessions	See page 42
10:30 am-11:30 am	ATH Technical Sessions	See page 48
10:30 am-12:35 am	TOFE Technical Sessions	See page 57
11:30 am-1:30 pm	Student Poster Session in Technology Expo	Bonnet Creek Salon VII-IX
11:55 am-1:30 pm	Luncheon in Technology Expo	Bonnet Creek Salon VII-IX
1:30-3:40 pm	ANS Technical Sessions	
	• Monte Carlo Methods—I	Floridian G
	• Challenges and Opportunities with Accelerated Qualification of LWR ATF Cladding and Fuel Materials–Panel	Floridian H
	• Achieving a Work/Life Balance–Panel	Floridian I
	• Focus on Communications—I–Panel	Floridian J
	• Isotopes and Radiation: General—II	Floridian K
	• Data, Analysis and Operations in Nuclear Criticality Safety—II	Floridian L
	• Molten Salts in Nuclear Fuel Cycle Processes	Bonnet Creek III
	• Nuclear Installations Safety: General—I	Bonnet Creek IV
	• Reactor Physics in Test and Research Reactors—I	Bonnet Creek V
	• Micro Nuclear Reactor Concepts for Special Purpose Applications–Panel	Bonnet Creek VI
	• Aerospace Nuclear Science and Technology: General	Collier, Columbia
	• Design of Robotic and Remote Systems for Use in Radioactive Environments	Citrus
1:30-6:05 pm	ANTPC Technical Sessions	See page 42
1:30-6:30 pm	ATH Technical Sessions	See page 48
1:30-6:30 pm	TOFE Technical Sessions	See page 57
3:35-3:55 pm	Coffee Break	Bonnet Creek Foyer
3:55-6:05 pm	ANS Technical Sessions	
	• Monte Carlo Methods—II	Floridian G
	• Advanced Manufacturing and Post Irradiation Examination	Floridian H
	• Getting Involved in a Professional Society–Panel	Floridian I
	• Focus on Communications—II–Panel	Floridian J
	• Isotopes and Radiation: General—III	Floridian K
	• Critical and Subcritical Experiments—I	Floridian L
	• Transportation and Storage of Used Nuclear Fuel	Bonnet Creek III
	• Ethics in Nuclear Engineering and Design–Panel	Bonnet Creek IV
	• Reactor Physics in Test and Research Reactors—II	Bonnet Creek V
	• Reactor Physics: General—II	Bonnet Creek VI
	• Decommissioning and Environmental Sciences: General	Collier, Columbia
	• Accelerator Applications: General	Citrus

Daily Schedule

Wednesday, November 14

7:00 am-5:00 pm	Registration	Bonnet Creek Foyer
7:30-8:00 am	Continental Breakfast	Bonnet Creek Foyer
8:00-10:00 am	General Chair's Special Session	Floridian Ballroom A-F
8:30 am-12:25 pm	ATH Technical Sessions	See page 48
8:00-9:45 am	TOFE Plenary—II	Bonnet Creek Ballroom I
10:00-10:15 am	Coffee Break	Bonnet Creek Foyer
10:15 am-12:00 pm	ANS Technical Sessions	
	• Uncertainty Quantification and Sensitivity Analysis	Floridian G
	• Transient Fuel Performance	Floridian H
	• Underway on Nuclear Power: A Retrospective—Panel	Floridian I
	• Research by U.S. DOE NEUP Sponsored Students—I	Floridian J
	• General Topics in Human Factors and Human Machine Interface	Floridian K
	• Hand Calculation Methodology and Use–Panel	Floridian L
	• Grand Challenge of Closing the Fuel Cycle: Federal, Commercial, or Hybrid Ownership of Recycling Facility–Panel	Bonnet Creek III
	• Outreach for Nuclear Science and Engineering—Tools and Strategies in the Precollege Space–Panel	Bonnet Creek IV
	• Reactor Analysis Methods—II	Bonnet Creek V
	• Reactor Physics: General—III	Bonnet Creek VI
10:15 am-12:00 pm	ANTPC Technical Sessions	See page 42
10:30 am-12:55 pm	TOFE Technical Sessions	See page 57
12:00-1:30 pm	Lunch on Own	
1:30-3:40 pm	ANS Technical Sessions	
	• Computational Methods: General	Floridian G
	• Nuclear Fuels and Materials in Fast Reactors—I	Floridian H
	• Research by U.S. DOE NEUP Sponsored Students—II	Floridian J
	• Preview of the 2019 NPIC/HMIT Topical Meeting–Panel	Floridian K
	• Critical and Subcritical Experiments—II	Floridian L
	• Progress in DOE's Nuclear Technology Research and Development Programs–Panel	Bonnet Creek III
	• Computational Tools for Radiation Protection and Shielding	Bonnet Creek IV
	• Reactor Physics in Test and Research Reactors—III	Bonnet Creek V
	• Reactor Physics: General—IV	Bonnet Creek VI
1:30-3:40 pm	ANTPC Technical Sessions	See page 42
1:30-6:30 pm	ATH Technical Sessions	See page 48
1:30-5:55 pm	TOFE Technical Sessions	See page 57
3:40-3:55 pm	Coffee Break	Bonnet Creek Foyer
3:55-6:30 pm	ANS Technical Sessions	
	• Analytic Methods and Verification	Floridian G
	• Nuclear Fuels and Materials in Fast Reactors—II	Floridian H
	• [Grand Challenge] Expedite Licensing and Deployment of Advanced Reactor Designs–Panel	Floridian I
	• Cutting Edge Techniques in Education, Training and Distance Education	Floridian J
	• Advanced Gen IV Reactors—II	Floridian K
	• New Code Developments for Nuclear Criticality Safety Applications	Floridian L
	• Fuel Cycle and Waste Management: General—I	Bonnet Creek III
	• Innovations in Nuclear Technology R&D Awards	Bonnet Creek IV
	• Reactor Analysis Methods—III	Bonnet Creek V
	• Reactor Physics: General—V	Bonnet Creek VI
4:30-6:30 pm	Focus on Communications: Does the U.S. Nuclear Industry Have a Future	Bonnet Creek XII

Daily Schedule

Thursday, November 15

7:00 am-2:00 pm	Registration	Bonnet Creek Foyer
7:30-8:00 am	Continental Breakfast	Bonnet Creek Foyer
8:00-10:10 am	ANS Technical Sessions	
	• Reduced Order Modeling	Floridian G
	• Advanced Measurement Techniques, Fuels, and Reactors—I	Floridian H
	• Nuclear Installations Safety: General—II	Floridian I
	• Research by U.S. DOE NEUP Sponsored Students—III	Bonnet Creek VII
	• Data, Analysis and Operations in Nuclear Criticality Safety—III	Bonnet Creek VIII
	• Fuel Cycle and Waste Management: General—II	Bonnet Creek XI
	• Results for the Nuclear Futures Discussion on Community Engagement–Panel	Nassau
	• Reactor Analysis Methods—IV	Manatee
8:30-12:35 pm	ATH Technical Sessions	See page 48
8:30-10:05 am	TOFE Plenary—III	Bonnet Creek Ballroom I
10:05-10:20 am	Coffee Break	Bonnet Creek Foyer
10:25 am-12:35 pm	ANS Technical Sessions	
	• Advanced Measurement Techniques, Fuels, and Reactors—II	Floridian H
	• Research by U.S. DOE NEUP Sponsored Students—IV	Bonnet Creek VII
	• ANS-8 Standards Forum	Bonnet Creek VIII
	• Application and Challenges in CFD-Neutronics Coupling	Orange
10:30 am-12:35 pm	TOFE Technical Sessions	See page 57
12:30-1:30 pm	Lunch on Own	
2:00-4:20 pm	ATH Technical Sessions	See page 48
1:30-6:00 pm	TOFE Technical Sessions	See page 57

Free ANS Meetings App

Scan this code or type in Attendee Hub to your app store, download the app, then type in ANS Winter Meeting and login to the ANS Meetings App to experience all of the app features!

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

If you still have the email invitation sent to you by ANS Meetings:

1. Open the invitation in your inbox. Tap Verify Account.
2. Tap **Open App.** to complete the verification via the new mobile app.

To retrieve your verification code:

1. From the event homescreen, tap the three white lines icon on the top left.
2. Tap Log in for more features.
3. Enter your name and tap Next.
4. Tap Resend Code to have a verification code sent to your email address.

Or go to event.crowdcompass.com/answinter2018 for the online event guide.

General Information

MEETING INFORMATION

The 2018 ANS Winter Meeting promises to be one of the year's most exciting and informative educational and networking events for attendees from every facet of nuclear science and technology. The theme for this meeting is "Joining Forces to Advance Nuclear".

In addition, the Technology Expo will give attendees a glimpse into the applications of new technology through three days of exhibits and special events. The Expo will also give attendees many opportunities to network with each other and establish new professional relationships while having food and fun in a friendly and informal setting.

REGISTRATION HOURS

Location: **Bonnet Creek Foyer**

Sunday, November 11	7:00 am-7:00 pm
Monday, November 12	7:00 am-5:00 pm
Tuesday, November 13	7:00 am-5:00 pm
Wednesday, November 14	7:00 am-5:00 pm
Thursday, November 15	7:00 am-2:00 pm

ANS BUSINESS OFFICE

Location: **Dixie**
Sunday-Wednesday 8:00 am-5:00 pm
Thursday 8:00 am-2:00 pm

ANS STUDENT OFFICE

Location: **Duval**
Sunday-Wednesday 8:00 am-5:00 pm
Thursday 8:00 am-4:00 pm

ANS MEDIA CENTER

Location: **De Soto**
Monday and Tuesday 7:45 am-4:30 pm
Wednesday 7:45 am-12:00 pm

TECHNOLOGY EXPO HOURS & LOCATION

Location: **Bonnet Creek Salon VII-IX**

Join us and visit with our exhibitors in the Expo! Learn about new technology, products and services that are being offered. Continental Breakfast, breaks, lunches and reception will be hosted in the Expo. For more information or to view the floorplan and exhibitors see pages 72-75.

Sunday, November 11	6:00-8:00 pm
Monday, November 12	7:00 am-4:00 pm
Tuesday, November 13	7:00 am-1:30 pm

NOTICE TO SPEAKERS & ATTENDEES

Name badges must be worn during all technical sessions, in the expo and events. Certain events require a ticket, and may entail an additional cost.

After printing your badge, all speakers and session chairs must check in at the Speaker Desk located near the ANS Registration Desk.

EMBEDDED TOPICAL MEETINGS

The second **Advances in Nuclear Nonproliferation Technology and Policy Conference (ANTPC) 2018** is rescheduled to take place during the ANS Winter Meeting due to widespread flooding following Hurricane Florence. This Meeting is co-sponsored by the American Nuclear Society's Nuclear Nonproliferation Policy and Fuel Cycle Waste Management Divisions. The goal is to stimulate conversation among nuclear science researchers, facilities operators, and policy makers and provide a venue for discussions on relevant policy and technical needs in nonproliferation. For additional information, visit pages 42-47.

The **Advances in Thermal Hydraulics (ATH 2018)** Embedded Topical Meeting will be held during the ANS Winter Meeting. This embedded topical meeting is the fourth in a growing series organized by the Thermal Hydraulics Division consisting of peer-reviewed, full-length technical papers covering recent advances in thermal hydraulics. For additional information, visit pages 48-56.

The **Technology of Fusion Energy (TOFE 2018)** Embedded Topical Meeting will be held during the ANS Winter Meeting. TOFE 2018 features abstracts and papers detailing outstanding research in the field of fusion science and technology For additional information, visit pages 57-66.

General Information

ATTENDEE MEAL FUNCTIONS

ANS President's Opening Reception
This reception is a ticketed event on Sunday evening from 6:00-8:00 pm. Reception and (2) Drink tickets are included with a full meeting registration. Additional reception tickets are available for purchase at the following cost: $130 (Adult) / $50 (Child, 16 and under)

Continental Breakfast in Technology Expo
Continental Breakfast will be provided to all registered meeting attendees from 7:30-8:00 am Monday-Thursday.

Lunch & Breaks in the Technology Expo
Lunch will be provided to all registered meeting attendees Monday and Tuesday.

Daily coffee breaks will also be provided Monday-Thursday.

OTHER THINGS TO ATTEND

First-Time Attendee Orientation
Sunday: 1:00-1:30 pm – Floridian K

The ANS Membership Committee will offer an orientation session for first-time ANS meeting attendees. Learn what goes on at national meetings, how the national organization works, and how to get involved at the national and local levels. Whether you are a member or not, student or professional, if this is your first ANS national meeting, the Membership Committee invites you to attend this session.

Student Program Q&A Meeting
Sunday: 4:00-5:00 pm – Floridian H

All students participating in the Student Program are encouraged to attend this brief informative meeting. Learn the basic operation of the Program and get your questions answered.

Mentor Meeting
Sunday: 5:00-6:00 pm – Bonnet Creek Ballroom III

All attendees, from seasoned professionals to students, are encouraged to attend this informal one-hour open discussion. Prior mentor/mentoring experience is not required. Simply come share your insights, ask questions, and network in this mentoring experience beneficial to all.

Meet the Plutonium Handbook Editors
Sunday: 6:00-8:00 pm; Monday: 7:00 am-4:00 pm; Tuesday: 7:00 am-1:30 pm

Stop by the ANS exhibit (Booths 209 & 211) to meet the editors of the upcoming Plutonium Handbook and review a sample copy of its six volumes.

Book Signing
Wednesday: 12:00-1:30 pm – Bonnet Creek Foyer

Authors Ann Marie Daniel Winters and Paul E. Cantonwine will be available to sign copies of their books. Winters wrote Underway on Nuclear Power: The Man Behind the Words, Eugene P. "Dennis" Wilkinson, Vice Admiral, USN, and Cantonwine compiled The Never-Ending Challenge of Engineering: Admiral H.G. Rickover in His Own Words. The authors will be available right after the panel session, "Underway on Nuclear Power: A Retrospective" on Wednesday. The books will be available on-site for purchase.

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 contacts for reports at the 2018 Winter Meeting are ANS President John Kelly or Executive Director Robert Fine. Dr. Kelly can be reached at jekellyans@gmail.com. Mr. Fine can be reached at rfine@ans.org, or you can leave a message at the ANS Registration Desk for one of them to contact you directly.

The complete Respectful Behavior Policy can be found at www.ans.org/about/rbp. If you have questions about the policy, please contact ANS Executive Director Bob Fine at 708-579-8200 or rfine@ans.org.

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, NOVEMBER 11

ANS President's Opening Reception in Technology Expo
Location: Bonnet Creek Salon VII-IX **Time:** 6:00-8:00 pm

All attendees are invited to enjoy an evening of networking. This event is included in your full meeting registration. Additional tickets are available for purchase at the following cost: $130 (Adult) / $50 (Child, 16 and under).

MONDAY, NOVEMBER 12

Opening Plenary: Joining Forces to Advance Nuclear
Chair: Daniel L. Churchman *(Southern Nuclear Corporation)* **Location:** Floridian Ballroom A-F **Time:** 8:00-11:00 am

Speakers: Per Peterson *(Chief Nuclear Officer, Kairos Power)*
Dave Hill *(Chief Technical Officer, Terrestrial Energy (former Deputy Director INL & Associate Director of both ANL and ORNL))*
Tom Bergman *(Vice President Reg Affairs, NuScale)*
Sama Bilbao y Leon *(Head of Nuclear Technology Development and Economics – Nuclear Energy Agency)*

ATH Opening Plenary
Cochairs: John C. Luxat *(McMaster Univ),* Xu Cheng *(KIT)* **Location:** Citrus, Collier **Time:** 1:30-6:00 pm

1:30 pm: Welcome message, W. D. Pointer *(ORNL, THD Chair)*

1:40 pm: Introduction to ATH'18, John Luxat *(McMaster Univ)*

2:00 pm: From IRP to Company: The History of Kairos Power, Ed Blandford *(Kairos Power)*

3:00-5:30 pm: Innovation in Thermal Hydraulics: The Key to the Future of Nuclear Energy–Panel

Thermal-hydraulics remains a key discipline in nuclear engineering, driving design choice and safety analysis. In this panel we discuss how sustained research and innovation is key to sustain the disruption occurring in the nuclear industry today. We will discuss issues, challenges and opportunities, especially in the area of enhanced collaboration between industry, laboratories and academia.

Panelists: John Kelly *(ANS President)*
Kathryn McCarthy (*CNL)*
Jean Paul Chabard *(EdF)*
Youssef Ballout *(Elysium Industries)*

5:30 pm: Closing and Award Ceremony

TOFE Student Paper Competition
Location: Bonnet Creek Ballroom II **Time:** 6:30-8:00 pm

The Student Paper Competition session is meant to showcase the finalists of the student paper competition. Students who chose to participate in the competition submitted papers to TOFE in October. These papers were given scores in various categories by a panel of judges. The papers with the best scores were invited to speak in this session. We encourage you to attend this session to show support for our young fusion researchers.

Operations & Power Division (OPD) Dinner
Location: Harvest Bistro **Time:** 7:00-9:00 pm

Join the Operations and Power Division at Harvest Bistro located inside the hotel to celebrate a successful year as a division. This event is not included in your registration fee.

TUESDAY, NOVEMBER 13

ANS President's Special Session: Moving Forward on Nuclear
Chair: John Kelly *(ANS President)* **Moderator:** Nicholas William Thompson *(IRSN, Institute of Radiation Protection)*
Location: Floridian Ballroom A-F **Time:** 8:00-10:00 am

Panelists: **Future of Nuclear Energy in a Carbon-Constrained World** Michael Corradini *(Univ of Wisconsin, Past President ANS, Chair of the Advisory Committee on Reactor Safeguards)*
Energizing the Millennials Eric Meyer *(Founder of Generation Atomic)*
Engagement with Millennials Bradley Williams *(USDOE)*
Nuclear Power in the UAE Mohamed al Hammadi *(CEO ENEC)*

Plenary, Special Sessions & Events

TUESDAY, NOVEMBER 13 CONTINUED

ATH 2018 Keynote—I
Chair: Sama Bilbao y Leon *(NEA)* **Location:** Collier, Columbia **Time:** 8:30-10:00 am

Advanced Liquid-Metal Thermal Hydraulics Research for MYRRHA, K. Van Tichelen, G. Kennedy, F. Mirelli, A. Marino, A. Toti, D. Rozzia, E. Cascioli, S. Keijers *(SCK-CEN)*, Ph. Planquart *(Von Karman Inst)*, invited

TOFE Plenary—I
Chair: John Gilligan *(NCSU)* **Location:** Bonnet Creek Ballroom I **Time:** 8:00-9:55 am

8:10 am: Overview of Fusion Engineering Research in Japan Focusing on Activities in NIFS and Universities, T. Muroga *(National Inst. Fusion Sci)*, S. Fukada *(Kyushu Univ.)*, T. Hayashi *(National Inst. For Quantum and Radiol. Sci. and Technol.)*

8:45 am: Progress by the US Virtual Laboratory for Technology, P. D. Ferguson *(ORNL)*

9:20 am: Technical Challenges and First Operation of the Wendelstein 7-X Superconducting Stellarator, Thomas Klinger *(IPP MPG)*

Student Poster Session in Technology Expo
Location: Bonnet Creek Salon VII-IX **Time:** 11:30 am-1:30 pm

Stop by the Exhibit Hall and join us for lunch, posters and networking! Student Technical posters will be on display Tuesday, during the lunch hour in the Technology Expo. 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 23 & 24.

WEDNESDAY, NOVEMBER 14

General Chair's Special Session: Accident Tolerant Fuel – A Case Study of Accelerated Innovation Through Collaboration
Moderator: Johnathan Chavers *(Manager, BWR Fuel Engineering, Southern Company)* **Location:** Floridian Ballroom A-F **Time:** 8:00-10:00 am

Speakers: Kurt Terrani *(Nuclear Fuels Materials Group Leader, Oak Ridge National Laboratory)*
Al Csontos *(Technical Executive, EPRI)*
Amir Vexler *(CEO, Global Nuclear Fuels)*
Kemal Pasamehmetoglu *(Associate Laboratory Director for Nuclear Science & Technology at Idaho National Lab)*

TOFE Plenary–II
Chair: Chuck Kessel *(PPPL)* **Location:** Bonnet Creek Ballroom I **Time:** 8:00-9:45 am

8:00 am: The Approach to Address Key Design Integration Issues in the EU DEMO, C. Bachmann, F. Cismondi, G. Federici, C. Gliss, G. Keech, F. Maviglia *(EUROfusion)*

8:35 am: The Progress and Technical Challenges of CFETR, Y. T. Song, J. G. Li, Y. X. Wan, B. N. Wan *(Inst. Plasma Phys., & Univ. Sci. Technol. China)*, et. al., and CFETR Team

9:10 am: Results of the NAS Panel on the Strategic Plan for US Burning Plasma Research, Stanley Kaye *(PPPL)*

ATH 2018 Keynote–II
Chair: Elia Merzari *(ANL)* **Location:** Orange **Time:** 8:30-10:00 am

Interface Resolved Simulation of Reactor Flows, Igor A. Bolotnov *(NCSU)*, invited

ATH 2018 Technical Achievement Award Lecture
Chair: Xiaodong Sun *(Univ of Michigan)* **Location:** Nassau **Time:** 8:30-10:00 am

A Career in Applied Research at DOE Nuclear Facilities, Si Young Lee *(SRNL)*

Focus on Communications: Does the U.S. Nuclear Industry Have a Future?
Location: Bonnet Creek XII **Time:** 4:30-6:30 pm

We think the answer to that question is a qualified "yes." Why is it qualified? Because nuclear energy, engineering and science need good government policies, strong advocacy from its supporters and excellence from its operators and suppliers. In this session, INL's Kemal Pasamehmetoglu will unveil Eco:Logic, a campaign that offers a new approach to talking about nuclear energy. ANS Washington Rep Craig Piercy will analyze the government policy we have and what we need and Mimi Holland Limbach will tie it all together. Framatome and Lightbridge are sponsoring this event and are providing beer, wine, soft drinks and snacks.

Plenary, Special Sessions & Events

THURSDAY, NOVEMBER 15

TOFE Plenary—III
Chair: Arnie Lumsdaine *(ORNL)* **Location:** Bonnet Creek Ballroom I **Time:** 8:30-10:05 am

8:30 am: Fusion Energy Division (FED) Awards, FED Awards Chair

8:50 am: Nuclear Integration Activities in ITER, S Jakhar, M Loughlin, E Polunovskiy, A Tchistiakov *(ITER)*, R Pampin, M. Fabbri *(Fusion for Energy)*, P. Srinivasan, M Dentan *(ITER)*, Laura Mont *(Fusion for Energy)*, V. Barabash, P. Aravinda, M. Battaglia, Y. Le Tonqueze *(ITER)*

9:25 am: Advances in Fusion Technology in Support of U.S. ITER's Mission, David A. Rasmussen *(ORNL)*

ATH 2018 Keynote—III
Chair: Sofiane Benhamadouche (EdF R&D) **Location:** Orange **Time:** 8:30-10:00 am

Direct Numerical Simulation and Wall-Resolved Large Eddy Simulation in Nuclear Thermal Hydraulics, Iztok Tiselj, Cedric Flageul, Jure Oder *(Jožef Stefan Inst),* invited

Technical Tour: St. Lucie Nuclear Power Plant
Time: 7:30 am-4:30 pm

Registration for the tour is closed. Board the bus at 7:15 am in the hotel lobby.

Technical Tour: Mitsubishi Hitachi Power Systems - Orlando Service & Manufacturing Center
Time: 8:15 am-12:00 pm

Registration for the tour is closed. Board the bus at 8:00 am in the hotel lobby.

Technical Sessions by Division

SPECIAL SESSIONS

*Opening Plenary: Joining Forces to Advance Nuclear, Mon. am (8:00-11:00 am)

*ANS President's Special Session, Tues. am (8:00-10:00 am)

*General Chair's Special Session, Wed. am (8:00-10:00 am)

ACCELERATOR APPLICATIONS (AAD)

Accelerator Applications: General, Tues. pm

AEROSPACE NUCLEAR SCIENCE AND TECHNOLOGY (ANSTD)

(Radiation Protection and Shielding in Aeronautics and Space Applications–Panel), Mon. pm

Aerospace Nuclear Science and Technology: General, Tues. pm

BIOLOGY AND MEDICINE (BMD)

(Isotopes and Radiation: General—I), Mon. pm

(Isotopes and Radiation: General—II), Tues. pm

(Isotopes and Radiation: General—III), Tues. pm

DECOMMISSIONING AND ENVIRONMENTAL SCIENCES (DESD)

Decommissioning and Environmental Sciences: General,Tues. pm

EDUCATION, TRAINING, AND WORKFORCE DEVELOPMENT (ETWDD)

Student Design Competition, Mon. pm

Strategy Development for Junior Faculty–Panel, Mon. pm

Professional Licensure in the Nuclear Industry Matters: It's Not the Job You Do, It's How You Do the Job!, Tues. am

Perspectives on the ANS Congressional Fellowship–Panel, Tues. am

Focus on Communications—I–Panel, Tues. pm

Focus on Communications—II–Panel, Tues. pm

Research by U.S. DOE NEUP Sponsored Students—I, Wed. am

Research by U.S. DOE NEUP Sponsored Students—II, Wed. pm

Research by U.S. DOE NEUP Sponsored Students—III, Thurs. am

Research by U.S. DOE NEUP Sponsored Students—IV. Thurs. am

Outreach for Nuclear Science and Engineering—Tools and Strategies In the Precollege Space–Panel, Wed. am

Cutting Edge Techniques in Education, Training and Distance Education, Wed. pm

Innovations in Nuclear Technology R&D Awards, Wed. pm

FUEL CYCLE AND WASTE MANAGEMENT (FCWMD)

International Research Towards Key Improvements Within the Closed Fuel Cycle–Panel, Mon. pm

Fuel Cycle Analysis, Mon. pm

Used Fuel and High-Level Waste Management—The Long and Winding Road–Panel, Tues. am

Molten Salts in Nuclear Fuel Cycle Processes, Tues. pm

Transportation and Storage of Used Nuclear Fuel, Tues. pm

FUEL CYCLE AND WASTE MANAGEMENT (FCWMD)

Grand Challenge of Closing the Fuel Cycle: Federal, Commercial or Hybrid Ownership of Recycling Facility–Panel, Wed. am

Progress in DOE's Nuclear Technology Research and Development Programs–Panel, Wed. pm

Fuel Cycle and Waste Management: General—I, Wed. pm

Fuel Cycle and Waste Management: General—II, Thurs. am

HUMAN FACTORS, INSTRUMENTATION, AND CONTROLS (HFICD)

General Topics in Instrumentation and Control, Tues. am

General Topics in Human Factors and Human Machine Interface, Wed. am

Preview of the 2019 NPIC/HMIT Topical Meeting–Panel, Wed. pm

ISOTOPES AND RADIATION (IRD)

Isotopes and Radiation: General—I, Mon. pm

Isotopes and Radiation: General—II, Tues. pm

Isotopes and Radiation: General—III, Tues. pm

MATERIALS SCIENCE AND TECHNOLOGY (MSTD)

Nuclear Fuels, Mon. pm

Accident Tolerant Fuels, Mon. pm

Fuels and Materials for Molten Salt Reactors, Tues. am

Challenges and Opportunities with Accelerated Qualification of LWR ATF Cladding and Fuel Materials–Panel, Tues. pm

Advanced Manufacturing and Post Irradiation Examination, Tues. pm

Transient Fuel Performance, Wed. am

Nuclear Fuels and Materials in Fast Reactors—I, Wed. pm

Nuclear Fuels and Materials in Fast Reactors—II, Wed. pm

Advanced Measurement Techniques, Fuels, and Reactors—I, Thurs. am

Advanced Measurement Techniques, Fuels, and Reactors—II, Thurs. am

MATHEMATICS AND COMPUTATION (MCD)

Current Issues in Computational Methods–Roundtable, Mon. pm

(ENDF/B-VIII.0: Evaluation and Validation–Panel), Mon. pm

(Applications of the NEAMS Workbench–Panel), Mon. pm

Deterministic Transport Methods, Tues. am

Monte Carlo Methods—I, Tues. pm

Monte Carlo Methods—II, Tues. pm

Uncertainty Quantification and Sensitivity Analysis, Wed. am

Computational Methods: General, Wed. pm

Analytic Methods and Verification, Wed. pm

(New Code Developments for Nuclear Criticality Safety Applications), Wed. pm

Reduced Order Modeling, Thurs. am

Technical Sessions by Division

NUCLEAR CRITICALITY SAFETY (NCSD)

NCS Implementation Programs–Panel, Mon. pm

ENDF/B-VIII.0: Evaluation and Validation–Panel, Mon. pm

Recent Nuclear Criticality Safety Program Technical Accomplishments, Mon. pm

Data, Analysis, and Operations in Nuclear Criticality Safety—I, Tues. am

Data, Analysis, and Operations in Nuclear Criticality Safety—II, Tues. pm

Data, Analysis, and Operations in Nuclear Criticality Safety—III, Thurs. am

Critical and Subcritical Experiments—I, Tues. pm

Critical and Subcritical Experiments—II, Wed. pm

Hand Calculation Methodology and Use–Panel, Wed. am

New Code Developments for Nuclear Criticality Safety Applications, Wed. pm

ANS-8 Standards Forum, Thurs. am

NUCLEAR INSTALLATIONS SAFETY (NISD)

Current Topics in Probabilistic Risk Analysis, Mon. pm

Nuclear Installations Safety: General—I, Tues. pm

Nuclear Installations Safety: General—II, Thurs. am

[Grand Challenges] Expedite Licensing and Deployment of Advanced Reactor Designs–Panel, Wed. pm

NUCLEAR NONPROLIFERATION POLICY (NNPD)

Eighty Years with Nuclear Fission–Panel, Mon. pm

(Critical and Subcritical Experiments—I), Tues. pm

(Critical and Subcritical Experiments—II), Wed. pm

OPERATIONS AND POWER (OPD)

Advanced Gen-IV Reactors—I, Mon. pm

Advanced Gen IV Reactors—II, Wed. pm

Operations and Power: General, Mon. pm

Nuclear Cogeneration for Sustainable Development–Panel, Tues. am

(Current Issues in LWR Core Design and Reactor Engineering Support–Panel), Mon. pm

(Micro Nuclear Reactor Concepts for Special Purpose Applications–Panel), Tues. pm

Underway on Nuclear Power: A Retrospective Panel

Results from the Nuclear Futures Discussion on Community Engagement–Panel, Thurs. am

RADIATION PROTECTION AND SHIELDING (RPSD)

Radiation Protection and Shielding: General—I, Mon. pm

Radiation Protection and Shielding: General—II, Tues. am

Radiation Protection and Shielding in Aeronautics and Space Applications–Panel, Mon. pm

Ethics in Nuclear Engineering and Design–Panel, Tues. pm

Computational Tools for Radiation Protection and Shielding, Wed. pm

REACTOR PHYSICS (RPD)

(ENDF/B-VIII.0: Evaluation and Validation–Panel), Mon. pm

Current Issues in LWR Core Design and Reactor Engineering Support–Panel, Mon. pm

Reactor Physics: General—I, Mon. pm

Reactor Physics: General—II, Tues. pm

Reactor Physics: General—III, Wed. am

Reactor Physics: General—IV, Wed. pm

Reactor Physics: General—V, Wed. pm

(Radiation Protection and Shielding in Aeronautics and Space Applications–Panel), Mon. pm

Applications of the NEAMS Workbench–Panel, Mon. pm

Reactor Analysis Methods—I, Tues. am

Reactor Analysis Methods—II, Wed. am

Reactor Analysis Methods—III, Wed. pm

Reactor Analysis Methods—IV, Thurs. am

Reactor Physics in Test and Research Reactors—I, Tues. pm

Reactor Physics in Test and Research Reactors—II, Tues. pm

Reactor Physics in Test and Research Reactors—III, Wed. pm

(Micro Nuclear Reactor Concepts for Special Purpose Applications–Panel), Tues. pm

(New Code Developments for Nuclear Criticality Safety Applications), Wed. pm

Application and Challenges in CFD-Neutronics Coupling, Thurs. am

ROBOTICS AND REMOTE SYSTEMS (RRSD)

Robotic Inspection and Survey in Radiation Environments, Tues. am

Design of Robotic and Remote Systems for Use in Radioactive Environments, Tues. pm

THERMAL HYDRAULICS (THD)

(Applications of the NEAMS Workbench–Panel), Mon. pm

YOUNG MEMBERS GROUP (YMG)

(Current Issues in LWR Core Design and Reactor Engineering Support–Panel), Mon. pm

(Strategy Development for Junior Faculty–Panel), Mon. pm

(Applications of the NEAMS Workbench–Panel), Mon. pm

(Eighty Years with Nuclear Fission–Panel), Mon. pm

Perspectives on the ANS Congressional Fellowship–Panel, Tues. am

Achieving a Work/Life Balance–Panel, Tues. pm

Micro Nuclear Reactor Concepts for Special Purpose Applications–Panel, Tues. pm

Getting Involved in a Professional Society–Panel, Tues. pm

(Hand Calculation Methodology and Use–Panel), Wed. am

(Outreach for Nuclear Science and Engineering—Tools and Strategies in the Precollege Space–Panel), Wed. am

(Progress in DOE's Nuclear Technology Research and Development Programs–Panel), Wed. pm

MONDAY, NOVEMBER 12
TECHNICAL SESSIONS - 1:00 PM

Current Issues in Computational Methods–Roundtable
Sponsored by MCD
Session Organizer and Chair: David P. Griesheimer *(Naval Nuclear Lab)*
Location: Floridian G **Time:** 1:00-3:35 pm

"Diffusion Theory in the 21st Century"

Historically, diffusion theory has been one of the most important and widely-used techniques for performing radiation transport calculations. For over 60 years, the development of diffusion-based methods, and associated techniques to overcome the inherent limitations of the diffusion approximation, was an active area of research in the field of nuclear engineering. More recently, research trends have shifted towards the development of computational methods based on transport theory rather than diffusion theory. Such methods avoid the limitations of the diffusion approximation but often require longer run-times and more computing resources than diffusion-based tools. The roundtable will include panelists from a variety of academic, commercial, and government institutions, who will share their perspectives on the current and future role of diffusion theory in computational radiation transport methods.

Panelists: Yonghee Kim *(KAIST)*, Joshua Hykes *(Studsvik)*, Vefa Kucukboyaci *(Westinghouse)* Mathew Cleveland *(LANL)*, Thomas Downar *(Univ of Michigan)*

Nuclear Fuels
Sponsored by MSTD
Session Organizer: Kenneth J. Geelhood *(PNNL)* **Chair:** Troy Munro *(Brigham Young Univ)*
Location: Floridian H **Time:** 1:00-3:10 pm

1:05 pm: Fission Product Transport in TRISO Fuel: A Computational Study, Nanjun Chen, Qing Peng, Zhijie Jiao *(Univ. Michigan)*, Isabella J. van Rooyen, William F. Skerjanc *(INL)*, Fei Gao *(Univ. Michigan)*

1:30 pm: Ceramic Fuel for Advanced High Temperature Gas Reactors, Jonas Opperman, Christian Deck *(General Atomics)*, Christian Petrie *(ORNL)*

1:55 pm: Direct Vacancy Tracking in Uranium Dioxide Using Molecular Dynamics, C. A. Manring, A. I. Hawari *(NCSU)*

2:20 pm: A Web-Based Application for Standardization of Radiation Damage Calculations, J. R. Burns, K. A. Terrani *(ORNL)*

2:45 pm: Mini-Plate Irradiation Testing in ATR to Support U-Mo Fuel Qualification for High Performance Research Reactor Conversion, Margaret Marshall, Irina Glagolenko, Dong O. Choe, Joseph W. Nielsen *(INL)*

Advanced Gen-IV Reactors—I
Sponsored by OPD
Session Organizer and Chair: Piyush Sabharwall *(INL)*
Location: Floridian J **Time:** 1:00-3:10 pm

1:05 pm: Westinghouse eVinci™ Reactor for Off-Grid Markets, Alex Levinsky, Jurie J. van Wyk, Yasir Arafat, Matthew C. Smith *(Westinghouse)*

1:30 pm: Sodium-Steel Heat Storage for Variable Energy Output from Nuclear and Solar Power Systems, Charles Forsberg *(MIT)*

1:55 pm: Versatile Test Reactor for Advanced Reactor Testing, S. Balderrama, P. Sabharwall, D. Wachs *(INL)*

2:20 pm: Design and R&D Progress of China Lead-Based Reactor, Yican Wu, FDS Team *(Inst of Nuclear Energy Safety Technology)*

2:45 pm: NuScale Plant Resiliency to an Electromagnetic Pulse, Camille Palmer *(Oregon State)*, George Baker *(James Madison Univ.)*, James Gilbert *(Metatech Corp.)*

Technical Sessions: Monday November 12

MONDAY, NOVEMBER 12
TECHNICAL SESSIONS - 1:00 PM

Isotopes and Radiation: General—I
Sponsored by IRD; **Cosponsored by** BMD
Session Organizer: Kenan Unlu *(Penn State)* **Chair:** Lei Raymond Cao *(Ohio State)*
Location: Floridian K **Time:** 1:00-3:35 pm

1:05 pm: A γ-Rays Source Detector by Image Processing Technology, Kai Yokoyama, Hideki Tenzou, Ayumi Nagoshi, Yusuke Kunimi *(Kagawa College)*

1:30 pm: The UNM Fission Spectrometer and Correlated N, Z, E Fragment Data from ^{235}U Fission, Adam Hecht, Phoenix Baldez, Rick Blakeley *(Univ. New Mexico)*

1:55 pm: ^{127}Xe and ^{37}Ar Production in the University of Texas at Austin TRIGA Reactor, E. J. Artnak, R. Lester, S. Biegalski, D. Haas *(U.T., Austin)*

2:20 pm: Separation of Radiosilver from Radiocesium by Autodeposition on Copper, Georg Steinhauser, Dorian Zok *(Leibniz Univ., Hannover)*

2:45 pm: The Study of Physical Characteristics in Producing Mo-99, Yuying Hu, Qi Luo, Dong Yao, Yingrui Yu, Liqing Qiu, Hongkuan Liao *(Nuclear Power Inst China)*

3:10 pm: CPVC-PVT Multi-Panel Coincidence Measurements for Special Nuclear Material Detection, B. M. Van Der Ende, D. Horn, V. P. Janzen, O. Kamaev, L. Li, E. T. Rand *(CNL)*

NCS Implementation Programs–Panel
Sponsored by NCSD
Session Organizer: Christopher F. Haught *(CNS)* **Chair:** Tyler C. Lovelace *(CNS)*
Location: Floridian L **Time:** 12:45-2:10 pm

This session addresses programs for implementation and maintenance of nuclear criticality safety (NCS) controls, including the use of criticality safety officer (CSO) staff positions. Responsibility for nuclear criticality safety ultimately lies with the personnel that conduct fissile material activities. A healthy NCS program includes integration of multiple organizations to assure a clear understanding of the process evaluation and proper implementation of NCS controls. ANSI/ANS-8.19 outlines criteria for implementation and maintenance of NCS controls. Some sites use formal CSO programs within the operating organization with a primary staff duty of implementing NCS requirements and resolving NCS compliance issues. Other sites have assigned implementation responsibilities as collateral duties. This session is to share information from several sites on their programs for implementation and maintenance of NCS controls.

Panelists: Deb Hill *(NNL),* David Erickson *(SRS),* Larry Wetzel *(BWXT),* Todd Taylor *(INL)* James Kuropatwinski *(LANL),* Preston Carroll (*Y-12),* George McGehee *(Westinghouse)*

ENDF/B-VIII.0: Evaluation and Validation–Panel
Sponsored by NCSD; **Cosponsored by** RPD, MCD
Session Organizer and Chair: Michael L. Zerkle *(NNL)*
Location: Floridian L **Time:** 2:10-3:45 pm

This panel will discuss the new nuclear data evaluations included in ENDF/B-VIII.0 and the work completed to date on validation of the latest major release of the U.S. national ENDF/B nuclear data library. Emphasis will be on fast and resonance evaluations, covariance data, thermal scattering law evaluations, and validation.

Panelists: David Brown *(BNL),* Mike Herman *(BNL),* Roberto Capote Noy *(IAEA),* Ayman Hawari *(NCSU)*

International Research Towards Key Improvements Within the Closed Fuel Cycle–Panel
Sponsored by FCWMD
Session Organizer and Chair: Tim P. Tinsley *(National Nuclear Lab)*
Location: Bonnet Creek III **Time:** 1:00-3:35 pm

Future operation of a closed fuel cycle will require plants and facilities that are less expensive to build, less expensive to operate, and more flexible in operations than existing facilities. Internationally a range of research is taking place to address these challenges. The panel will discuss the aims of these research programs and identify key improvements needed to deliver the fuel cycle of the future.

Panelists: Steve Napier *(NIRO),* Robin Taylor *(NNL),* Jack Law *(INL),* Andy Worrall *(ORNL)*

MONDAY, NOVEMBER 12
TECHNICAL SESSIONS - 1:00 PM

Radiation Protection and Shielding: General—I
Sponsored by RPSD
Session Organizer and Chair: Irina I. Popova *(ORNL)*
Location: Bonnet Creek IV **Time:** 1:00-3:10 pm

1:05 pm: Neutron Field Benchmark for a Passive Neutron Spectrometer with a Cf-252 Source, Luisa Hansen, Soon Sam Kim, David Heinrichs *(LLNL)*, Leo Clark, Chris Wilson *(Atomic Weapons Establishment)*

1:30 pm: Emergency Response Transuranic Activity Assay Method for Mixed Alpha/Beta Air Samples, S. Joseph Cope, Robert B. Hayes *(NCSU)*

1:55 pm: Effects of Altitude Varying Air Density on Neutron Transport in Air, L. M. Rolison, M. L. Fensin, K. C. Kelley, S. S. McCready *(LANL)*

2:20 pm: Continuous Tritium Monitoring System for Tritium in Water Using PEM Electrolysis Cell, Jun Woo Bae, Ki Joon Kang, Hee Reyoung Kim *(UNIST)*

2:45 pm: Gamma Streaming Through an Inbleed Penetration, S. Jha *(Bechtel)*

Current Issues in LWR Core Design and Reactor Engineering Support–Panel
Sponsored by RPD; **Cosponsored by** YMG, OPD
Session Organizer and Chair: Moussa Mahgerefteh *(Exelon Generation Co., LLC)*
Location: Bonnet Creek V **Time:** 1:00-3:35 pm

This will be a panel session with members invited from utilities, fuel vendors, and universities. The focus of the presentations will be to share current core design capabilities, developments, and methods for addressing issues impacting core designs and associated reactor engineering support activities. Particular issues may include recent operating experiences, post-Fukushima and accident-tolerant fuel (ATF), load follow and alternative to load follow, fuel and poison management economics and cycle length, and new developments in and impact of primary chemistry.

Panelists: Alireza Haghighat *(Virginia Tech),* Bill Gassmann *(Exelon Generation),* Amanda Lee Lang *(Duke Energy)* Arthur Motta *(Penn State),* Kevin Segard *(Framatome),* James Tusar *(Exelon Generation)*

Current Topics in Probabilistic Risk Analysis
Sponsored by NISD
Session Organizer: Girija S. Shukla *(NRC)* **Chair:** Nicholas Brown *(PSU)*
Location: Bonnet Creek VI **Time:** 1:00-3:35 pm

1:05 pm: Estimation of Inter-Unit Correlation Factor for Multi-Unit Site Using BBN, Yun Yeong Heo, Jong Woo Park, Seung Jun Lee *(UNIST)*

1:30 pm: A Bayesian Network-Based Framework for Probabilistic Risk Assessment, William Zywiec, Shahram Sarkani, Thomas Mazzuchi *(George Washington Univ.)*

1:55 pm: Reduced Order Model and PRA: A Multi-Unit Perspective, D. Mandelli, D. Maljovec, A. Alfonsi *(INL)*

2:20 pm: Identification and Quantification of Initiating Events for Multi-Unit PSA, Seungwoo Lee, Ar Ryum Kim, Namchul Cho, Sokchul Kim, Hyowon Kim, Dohyoung Kim, Ku Young Chung *(KINS)*

2:45 pm: Preliminary Risk Analysis of FeCrAl Cladding Design Impact on a Generic PWR Station Blackout PRA Model, Zhegang Ma, Carlo Parisi, Hongbin Zhang, Diego Mandelli *(INL)*

3:10 pm: Hazard and Consequence Analysis for Digital Systems – A New Approach to Risk Analysis in the Digital Era for Nuclear Power Plants, Andrew J. Clark, Adam D. Williams, Alice Muna *(SNL)*, Matt Gibson *(EPRI)*

Technical Sessions: Monday November 12

MONDAY, NOVEMBER 12
TECHNICAL SESSIONS - 3:50 PM

Student Design Competition
Sponsored by ETWDD
Session Organizer and Chair: Travis W. Knight *(Univ of South Carolina)*
Location: Floridian G **Time:** 3:50-5:55 pm

The following undergraduate and graduate entries have been selected by a panel of judges from industry as finalists in the 2018 Student Design Competition. Oral presentations will be made by students in front of a second panel of judges who will determine the undergraduate winner.

Undergraduate Category

3:55 pm: Hydrogen Production Electrolysis Reactor, A. Biela, C. Copeland, A. Damico, A. Darr, R. Kile, C. Ohneck *(Purdue)*

4:25 pm: Concept Reactor for Extraterrestrial Surface Power: PULSR, Dan Floyd, Gavin Ridley, Patrick Tidwell, Walter Tebbs *(U.T., Knoxville)*

Graduate Category

4:55 pm: Multiplicity Counting of Distributed Sources for Safeguards Application, Lauren A. Finney, Stefano Marin, Christopher A. Meert, Tingshuan C. Wu, Jianxin Zhou *(Univ. Michigan)*

5:25 pm: Design and Analysis of a Subcritical Assembly for On-Campus Nuclear Training and Education, Cliff Ghiglieri, Hannah Grover, Joey Latta, Jeffrey King *(Colorado School of Mines)*

Accident Tolerant Fuels
Sponsored by MSTD
Session Organizer: Kenneth J. Geelhood *(PNNL)* **Chair:** Stéphane Bremier *(EC-JRC-ITE)*
Location: Floridian H **Time:** 3:50-6:05 pm

3:55 pm: Reactivity and Activation Measurements of Novel Neutron-Absorbing Materials for Accident-Tolerant Control Rods, Hirokazu Ohta, Yasushi Nauchi, Kinya Nakamura *(Central Res. Inst. Electric Power Industry)*, Tadafumi Sano *(Kyoto Univ.)*

4:20 pm: Thermal Diffusivity Measurements with Fluorescent Scanning Microscope, Samuel Hayden, Troy Munro *(Brigham Young Univ.)*

4:45 pm: Particle Coarsening During Oxide Dispersion Strengthened FeCrAl Thin-Walled Tube Fabrication, Caleb P. Massey *(U.T., Knoxville)*, Sebastien N. Dryepondt, Philip D. Edmondson, Kurt A. Terrani *(ORNL)*, Steven J. Zinkle *(U.T., Knoxville & ORNL)*

5:10 pm: Sensitivity and Uncertainty Analysis for Fuel Performance Evaluation of Cr_2O_3-Doped UO_2 Fuel Under LB-LOCA, Yifeng Che, Xu Wu *(MIT)*, Giovanni Pastore, Jason Hales *(INL)*, Koroush Shirvan *(MIT)*

5:35 pm: System Code Evaluation of Accident Tolerant Claddings During BWR Station Blackout Accident, Xu Wu, Koroush Shirvan *(MIT)*

Reactor Physics: General—I
Sponsored by RPD
Session Organizer: Pavel V. Tsvetkov *(Texas A&M)* **Cochairs:** Taek K. Kim *(ANL)*, William J. Walters *(PSU)*
Location: Floridian I **Time:** 3:50-6:00 pm

3:55 pm: Study on Increasing of Transmutation Rate of LLFP Using Moderators in a Fast Reactor, Toshio Wakabayashi *(Tohoku Univ.)*, Makoto Takahashi *(Tokyo Inst. Technol.)*

4:20 pm: Simulation of PWR Load Follow Operation Using VERA-CS, Daniel O'Grady, Travis Mui, Tomasz Kozlowski *(Univ. Illinois)*

4:45 pm: MNR Benchmark Analysis Using McCARD Monte Carlo Code with ENDF/B-VIII.0, Ho Jin Park, Byung Chul Lee *(KAERI)*, Chang Je Park *(Sejong Univ.)*, Jin Young Cho *(KAERI)*

5:10 pm: Generation of Rod Cusping Correction Factor in Real Time Simulator, Heejeong Jeong, Jae-seung Song *(KAERI)*

5:35 pm: Assessment of SCALE Capabilities for High Temperature Reactor Modeling and Simulation, Friederike Bostelmann, Mark L. Williams, Cihangir Celik, Ronald J. Ellis, Germina Ilas, Bradley T. Rearden *(ORNL)*

Strategy Development for Junior Faculty–Panel
Sponsored by ETWDD; **Cosponsored by** YMG
Session Organizer and Chair: Andrew E. Thomas *(INL)*
Location: Floridian J **Time:** 3:50-6:00 pm

This panel discussion will address topics important to junior and tenure-track faculty members including course development strategies, student mentoring and development, proposal writing, and tenure package preparation among other topics. The panel will be composed of one senior faculty member, to moderate discussion and provide input, and three junior faculty members or recently tenured professors that will spur discussion on topics of importance to faculty members during their early academic careers. The panel will be focused on facilitating robust discussions with attendees to create a space for junior faculty members to come together as a community.

Panelists: Todd Allen *(Univ of Wisconsin, Madison),* Assel Aitkaliyeva *(Univ of Florida),* Katy Huff *(Univ of Illinois, Urbana-Champaign),* Jeremy Roberts *(Kansas State Univ)*

MONDAY, NOVEMBER 12
TECHNICAL SESSIONS - 3:50 PM

Operations and Power: General
Sponsored by OPD
Session Organizer: Piyush Sabharwall *(INL)* **Chair:** James V. (Vince) Gilbert *(EXCEL Services Corp.)*
Location: Floridian K **Time:** 3:50-6:00 pm

3:55 pm: APR+ LBLOCA Best Estimate Uncertainty Analysis Using KINS Realistic Evaluation Methodology, Youn Shil Kim, Min Jeong Hwang, S. K. Sim *(Environment & Energy Technol.)*, Deog-Yeon Oh, Young Seok Bang *(Korea Inst. Nuclear Safety)*

4:20 pm: Improvement of MARS-KS Subchannel Analysis Model Using CTF, R. Marigomen, Y. K. Kwack, N. H. Hoang, S. H. Bae, M. J. Hwang, S. K. Sim *(Environment & Energy Technol.)*

4:45 pm: PIV/PTV Measurements of Lateral Velocity Components in a 5×5 PWR Bundle with Mixing Vanes, Courtney Powell, Carlos E. Estrada-Perez, Thien Nguyen, Yassin A. Hassan *(Texas A&M)*

5:10 pm: A RANS Simulation of Cold Leg Buoyant Mixing, John P. Mulloy, Yassin A. Hassan, Daniel Orea, Rodolfo Vaghetto *(Texas A&M)*

5:35 pm: Design for Safeguards of Nuclear Facilities—Online HEPA Filter Replacement System, Joshua J. Bolt, Matthew J. Carlson, David L. Kehoe, Bahram Nassersharif *(Univ. Rhode Island)*, Christy Ruggiero, Carolynn P. Scherer *(LANL)*

Recent Nuclear Criticality Safety Program Technical Accomplishments
Sponsored by NCSD
Session Organizer: Lori Scott *(NCSP)* **Cochairs:** Angela Chambers *(NNSA)*, Douglas G. Bowen *(ORNL)*
Location: Floridian L **Time:** 3:50-6:50 pm

3:55 pm: Kilopower Reactor Using Stirling TechnologY (KRUSTY) Update: Cold Critical Experiments, Rene Sanchez, Travis Grove, David Hayes, Joetta Goda, George McKenzie, Jesson Hutchinson, Theresa Cutler, John Bounds, Jessie Walker *(LANL)*

4:20 pm: Thermal Epithermal eXperiments (TEX) with Plutonium Zero Power Physics Reactor (ZPPR) Plates First Critical Preliminary Results, C. M. Percher, S. S. Kim, D. P. Heinrichs *(LLNL)*, R. G. Sanchez, T. J. Grove, Jesson Hutchison, Theresa Cutler, George McKenzie *(LANL)*

4:45 pm: Qualification of Y-12 Legacy Criticality Accident Alarm System Detectors, Chris Haught, Chris Woodrow, Troy McMillen *(Consolidated Nuclear Security)*

5:10 pm: Impact of the Dynamic Structure Factor on Doppler Broadening for ^{238}U in UO_2, N. C. Sorrell, A. I. Hawari *(NCSU)*

5:35 pm: A Testing Trifecta: Data, Codes, and Evaluations, W. J. Marshall, A. M. Holcomb *(ORNL)*

6:00 pm: CURIE Preliminary Design, T. Cutler, R. Bahran, J. Hutchinson, M. Rathbun, D. Fritz *(LANL)*

6:25 pm: Computational Optimization of TEX Critical Experiment Design, Jesse Norris, William Zywiec, Anthony Nelson, Catherine Percher, David Heinrichs *(LLNL)*

Fuel Cycle Analysis
Sponsored by FCWMD
Session Organizer: Kathryn D. Huff *(Univ of Illinois)* **Chair:** Katie Mummah *(Univ of Wisconsin, Madison)*
Location: Bonnet Creek III **Time:** 3:50-6:25 pm

3:55 pm: Comparison of Actinide Production in a Light Water Reactor and a Long Life Fast Reactor, Tessa M. Rider, Andrew G. Osborne, Mark R. Deinert *(Colorado School of Mines)*

4:20 pm: Fuel Cycle Performance of Russian Floating Small Modular Reactor Concepts with Enrichments from 5-20%, Richard Hernandez, Nicholas R. Brown *(Penn State)*, Michael Todosow *(BNL)*

4:45 pm: Design for Safeguards of System for Transfer of Spent Nuclear Fuel Assembly from Containment to Storage Building, Elio A. Manzi, Ryan P. Sullivan. Mathew G. Monfils, Jordan M. Kantor, Bahram Nassersharif *(Univ. Rhode Island)*, Eric B. Rauch, Carolynn P. Scherer (*LANL)*

5:10 pm: TRU Multi-Recycling Analysis in SMR Core with MOX Rods and FCM Rods, Dae Hee Hwang, Ye Seul Cho, Ser Gi Hong *(Kyung Hee Univ.)*

5:35 pm: Validation of Spent Nuclear Fuel Output by Cyclus, A Fuel Cycle Simulator Code, Gwendolyn J. Chee, Gyutae Park, Kathryn D. Huff *(Univ. Illinois*)

6:00 pm: Spent Fuel Investigation System at ITU Triga Mark II Reactor, T. Akyurek *(Marmara Univ.)*, I. A. Reyhancan, M. S. Kiziltas *(Istanbul Tech)*

MONDAY, NOVEMBER 12
TECHNICAL SESSIONS - 3:50 PM

Radiation Protection and Shielding in Aeronautics and Space Applications–Panel
Sponsored by RPSD; **Cosponsored by** RPD, ANSTD
Session Organizer: Robert C. Singleterry, Jr. *(NASA, Langley)* **Chair:** John D. Bess *(INL)*
Location: Bonnet Creek IV **Time:** 3:50-6:00 pm

The purpose of this technical session is to give a tutorial on the physics and engineering issues related to radiation protection in shielding in aeronautical (e.g. high-altitude) and space application (including low earth orbit, and interplanetary). This covers background radiation in the space environment, but also radiation that may result from the use of the nuclear power in space reactors and propulsion systems. Discussions of the computational physics tools and methods used for analyzing and designing systems for the protection of equipment and biological organisms (i.e. humans) will be covered. This tutorial should be of particular interest to members of the following divisions: RPSD, ANSTD, RPD, RRSD, IRD, MCD, and BMD.

Panelists: Mike Houts *(NASA MSFC),* Robert Singleterry *(NASA LRC)*, Paolo Venneri (or a co-worker) (*USNC),* Lawrence Heilbronn *(UTK)*

Applications of the NEAMS Workbench–Panel
Sponsored by RPD; **Cosponsored by** MCD, YMG, THD
Session Organizer: Nicolas E. Stauff *(ANL)* **Chair:** Rob Lefebvre *(ORNL)*
Location: Bonnet Creek V **Time:** 3:50-6:00 pm

The Nuclear Energy Advanced Modeling and Simulation (NEAMS) Workbench is intended to facilitate the transition from conventional tools to high-fidelity tools by providing a common user interface for model creation, review, execution, output review, and visualization for integrated codes providing multiple physics capabilities. The Workbench enables a common user input that includes engineering scale specifications that are expanded into application-specific input requirements through the use of customizable templates. In this panel, the NEAMS program will present different capabilities of the Workbench in an interactive way.

Panelists: R. Lefebvre *(ORNL),* T. Valentine *(ORNL),* M. O. Delchini *(ORNL),* N. Stauff *(ANL)*

Eighty Years with Nuclear Fission–Panel
Sponsored by NNPD; **Cosponsored by** YMG
Session Organizer: James W. Behrens *(U.S. Navy)* **Chair:** Kelsey Amundson *(DNFSB/UC-Berkeley)*
Location: Bonnet Creek VI **Time:** 3:50-6:00 pm

Nuclear Fission was discovered in 1938. Eighty Years have now passed since this important discovery which changed the world in which we live. A review of the past 80 years will be given and will include highlights since the 1954 creation of the American Nuclear Society following Dwight D. Eisenhower's famous "Atoms for Peace" speech to the United Nations in 1953. This reflection back over the past years will be followed by a look at possibilities for upcoming twenty years as we get closer, and closer, to nuclear fission's first hundred years.

Panelists: Mark Peters *(INL),* Alan Icenhour *(ORNL),* Eric Loewen *(GEH),* Gene Carpenter *(DOE),* Jeffrey Chapman *(ORNL),* Jim Behrens *(Retired, Navy),* John Kotek *(NEI)*

TUESDAY, NOVEMBER 13
TECHNICAL SESSIONS - 10:15 AM

Deterministic Transport Methods
Sponsored by MCD
Session Organizer: Steven P. Hamilton *(ORNL)* **Chair:** William J. Walters *(Penn State)*
Location: Floridian G **Time:** 10:15-11:35 am

10:20 am: Quadratic Serendipity DFEM Functions on Concave Polygonal Cells, Michael W. Hackemack *(Naval Nuclear Lab)*

10:45 am: The Coarse-Scattering Multigroup Method for Radiation Transport, Pablo A. Vaquer *(Texas A&M)*, Ryan G. McClarren *(Notre Dame)*, Teresa S. Bailey, Cheuk Y. Lau *(LLNL)*

11:10 am: S_N and LBM to Solve Coupled Transport and Energy Equations for Temperature-Dependent Cross Sections, Min-Tsung Kao, Rizwan-Uddin *(Univ. Illinois)*

Fuels and Materials for Molten Salt Reactors
Sponsored by MSTD
Session Organizer: Kenneth J. Geelhood *(PNNL)* **Chair:** Troy Munro *(Brigham Young Univ)*
Location: Floridian H **Time:** 10:15 am-11:35 pm

10:20 am: Initial Irradiation Testing of Chloride Salts for Molten Salt Reactors, N. Dianne Bull Ezell, Joel McDuffee, Kurt Smith, Stephen Raiman *(ORNL)*

10:45 am: Comparative Characterization of IG110 Nuclear Graphite and A3 Matrix Graphite, Huali Wu, Allen Chen, Raluca O. Scarlat *(U.W., Madison)*

11:10 am: Numerical Model of FLiBe Corrosion of Bimetallic Alloy, David Weitzel, Youho Lee, Amir Ali *(Univ. New Mexico)*, Michael Short *(MIT)*, Govindarajan Muralidharan *(ORNL)*

Perspectives on the ANS Congressional Fellowship–Panel
Sponsored by YMG; **Cosponsored by** ETWDD
Session Organizer and Chair: Harsh S. Desai *(NEI)*
Location: Floridian I **Time:** 10:15 am-12:00 pm

The objectives of this session are to discuss the need for public policy engagement on nuclear issues and to highlight career development opportunities in policy, particularly through the ANS Congressional Fellowship experience. The panel members will discuss their experience working with policy makers and the benefits of fellowship experience for their current and future endeavors.

Panelists: Chip Martin *(Rep. Marcy Kaptur)* - 2018 & Current Congressional Fellow
Benjamin Reinke *(U.S. Senate)* - 2016 Congressional Fellow
Chad J. Boyer *(Westinghouse)* - 2012 Congressional Fellow
Craig H. Piercy *(ANS Washington Representative)*

Professional Licensure in the Nuclear Industry Matters: It's Not the Job You Do, It's How You Do the Job!
Sponsored by ETWDD
Session Organizer and Chair: Joshua L. Vajda *(AECOM)*
Location: Floridian J **Time:** 10:15 am-12:00 pm

10:20 am: The Benefit of Professional Licensure in an Engineering Career, Robert Bruce Hayes *(NCSU)*

10:40 am: Importance of Professional Engineering Licensure for Nuclear Engineers, Kenneth S. Allen *(U.S. Military Academy)*

10:50 am: Professional Licensure for Engineering Professors, Thomas Bearden *(TBPE)*, Joshua L. Vajda *(AECOM)*

11:00 am: Why Take the Nuclear PE Exam?, Alexandra Siwy *(U.S. NRC)*

11:10 am: Panel Discussion

General Topics in Instrumentation and Control
Sponsored by HFICD
Session Organizer: Jamie Baalis Coble *(Univ of Tennessee Knoxville)* **Chair:** Richard T. Wood *(Univ of Tennessee, Knoxville)*
Location: Floridian K **Time:** 10:15 am-12:00 pm

10:20 am: Deviation Analysis of Flowrate Measured by Differential Pressure, Eunsuk Oh, Byung Rae Kim, Seog Hwan Jeong *(KEPCO)*

10:45 am: Modeling of Fission Fragment Detection in 4H-SiC Schottky Diodes, Neil Taylor, Joshua Jarrell, Raymond Cao *(Ohio State)*

11:10 am: Designing Frequency Response Tests for System Identification in CIET, Dane de Wet, Christopher Poresky, Per F. Peterson *(U.C., Berkeley)*

11:35 am: TRIGA Pulse Tracking Utilizing a Multi-Node Micro-Pocket Fission Detector, Daniel Nichols, Michael Reichenberger, Sarah Stevenson, Caden Hilger, Tanner Swope, Katharine Kellogg, Joseph Hewitt, Jeremy Roberts, Douglas McGregor *(Kansas State)*

Technical Sessions: Tuesday November 13

TUESDAY, NOVEMBER 13
TECHNICAL SESSIONS - 10:15 AM

Data, Analysis, and Operations in Nuclear Criticality Safety—I
Sponsored by NCSD
Session Organizer: Theresa E. Cutler *(LANL)* **Chair:** Natasha N. Glazener *(LANL)*
Location: Floridian L **Time:** 10:15 am-12:00 pm

10:20 am: Release and Distribution of ENDF/B-VIII.0-Based ACE Files, Jeremy Lloyd Conlin, Wim Haeck, Denise Neudecker, Kent Parsons, Morgan C. White *(LANL)*

10:45 am: ENDF/B-VIII.0: The 8th Major Release of the ENDF/B Library, D. A. Brown *(BNL)*

11:10 am: An Overview of the Status of Lead Evaluations in ENDF/B-VIII.0 and JEFF 3.3, Vladimir Sobes *(ORNL)*, Luiz Leal *(IRSN)*

11:35 am: Verification of MCNP6.2 for Nuclear Criticality Safety Applications, Forrest B. Brown, Michael E. Rising, Jennifer L. Alwin *(LANL)*

Used Fuel and High-Level Waste Management—The Long and Winding Road–Panel
Sponsored by FCWMD
Session Organizer: Steven P. Nesbit *(Duke Energy Corp)* **Cochairs:** Steven P. Nesbit *(Duke Energy Corp)*, Christina Leggett *(NRC)*
Location: Bonnet Creek III **Time:** 10:15 am-12:00 pm

Progress on high-level radioactive waste (HLW) management in the United States ground to a halt in 2010 when the Yucca Mountain project was cancelled, and to date the HLW management program remains at a standstill. The issue of HLW disposition remains an anchor on the nuclear industry and a financial drain on the government. Since the administration has released some funding for Yucca Mountain, and since DOE is engaged in planning the defueling of spent fuel in storage at reactor sites, it is appropriate to continue to discuss the disposition of HLW. This panel will discuss the current and evolving status of geologic disposition and interim storage of used nuclear fuel and transportation of this material.

Panelists: Adam Levin *(Exelon, retired),* Lake Barrett *(DOE, retired),* Eric Knox *(AECom),* Rod McCullum *(NEI)*

Radiation Protection and Shielding: General—II
Sponsored by RPSD
Session Organizer and Chair: Irina I. Popova *(ORNL)*
Location: Bonnet Creek IV **Time:** 10:15 am-12:00 pm

10:20 am: Data Fusion for a Vision-Aided Radiological Detection System—Sodium Iodide Detectors Versus Liquid Scintillator Detectors, Heaba Noureddine, Kelsey Stadnikia, Kristofer Henderson, Sanjeev Koopal, Andreas Enqvist *(Univ. Florida)*

10:45 am: SINBAD Shielding Benchmark with MCNP6 and MC2-3/TWODANT, T. Fei, T. K. Kim, F. Heidet *(ANL)*, J. Y. Lim *(KAERI)*

11:10 am: Evaluation of Spent Fuel Cask Dose Rate Distribution During Long Term Storage, Yuan Gao, Christopher R. Greulich, James Tulenko, Andreas Enqvist, James Baciak *(Univ. Florida)*

11:35 am: Developing a Photon Clutter Scaling Algorithm for Implementation in the NINESIM Tool, K. R. Gerez *(Oregon State)*, G. E. McMath, J. R. Tutt, G. W. McKinney *(LANL)*

Reactor Analysis Methods—I
Sponsored by RPD
Session Organizer: Pavel V. Tsvetkov *(Texas A&M)* **Cochairs:** Akio Yamamoto *(Nagoya Univ)*, Nicolas Stauff *(ANL)*
Location: Bonnet Creek V **Time:** 10:15 am-12:50 pm

10:20 am: Analysis of Reaction Rate Measurements in ZPPR-15D Loading 203, Gerardo Aliberti, Richard M. Lell, Michael A. Smith, Nicolas E. Stauff, Changho Lee, Taek K. Kim *(ANL)*

10:45 am: Transport Consistent Diffusion Coefficient for CMFD Acceleration, Akio Yamamoto, Tomohiro Endo, Akinori Giho *(Nagoya Univ.)*

11:10 am: Development of the High-Performance Pin-by-Pin Calculation Code with Planar Parallelization, Joo Il Yoon, Chae Ho Lim *(KEPCO)*, Hyun Sik Hong, Hyun Ho Cho *(Seoul National Univ.)*

11:35 am: Research on the Strategy of VERA Problem 8 Calculation, Zhen Luo, Shichang Liu, Ganglin Yu, Kan Wang *(Tsinghua Univ.)*

12:00 pm: MCNP Californium Production Simulations Within the High Flux Isotope Reactor, C. Ryan Priest *(ORNL & U.T., Knoxville)*, Susan Hogle, Julie Ezold *(ORNL)*, G. Ivan Maldonado *(U.T., Knoxville)*

12:25 pm: Comparison Between Spatially Dependent Embedded Self-Shielding and Subgroup Methods, Kang-Seog Kim *(ORNL)*

TUESDAY, NOVEMBER 13
TECHNICAL SESSIONS - 10:15 AM

Nuclear Cogeneration for Sustainable Development–Panel
Sponsored by OPD
Session Organizer: Ibrahim Khamis *(IAEA)* **Chair:** Sama Bilbao Y Leon *(NEA)*
Location: Collier, Columbia **Time:** 10:15 am-12:00 pm

There is a global increased concern on climate change. Yet, the issue of climate change can well be mitigated based on large scale deployment of nuclear cogeneration into the heat, transportation and industrial markets. Such a deployment of advanced nuclear technology coupled to a wide spectrum of non-electric applications (e.g. hydrogen production, seawater desalination, petro-chemical refineries, and other industrial applications) would have a consequential impact not only to reduce CO_2 emissions and to decrease the reliance on depleting hydrocarbon resources, but also to preserve conventional energy resources. The panel will discuss the reality of nuclear cogeneration, the future role of advanced nuclear technology in a more sustainable future, the status of demonstration projects on nuclear cogeneration; the success stories of nuclear cogeneration for low temperature applications and the potential to extend to medium and high temperature applications. The panel will also try to shed lights on how nuclear cogeneration could support some of the 17 important UN sustainable development goals (with some emphasis on the IAEA activities).

Panelists: Ibrahim Khamis *(IAEA),* Sama Bilbao Y Leon *(NEA)*

Robotic Inspection and Survey in Radiation Environments
Sponsored by RRSD
Session Organizer: Mitch W. Pryor *(Univ of Texas, Austin)* **Chair:** Jean R. Plummer *(SRNL)*
Location: Citrus **Time:** 10:15 am-12:00 pm

10:20 am: Informative Path Planning for Mapping Radiation, Sebastián A. Zanlongo, Yew Teck Tan *(Florida Int'l Univ.),* Timothy Aucott *(SRNL)*

10:45 am: Automated Gamma Radiation Surveying with a Lanthanum Bromide Detector, Selma Wanna, Blake Anderson, Derek Haas, Mitch Pryor, Sheldon Landsberger *(U.T., Austin)*

11:10 am: Development of a Modular Sensor Tree for Inspection of Hazardous Environments, Conor McMahon, Christopher Suarez *(U.T., Austin)*, Jean Plummer (SRNL), Mitch Pryor *(U.T., Austin)*

11:35 am: Advancing the Survivability of Unmanned Systems in High Radiation Environments, Daniel P. Speaker, Nathan B. Hall *(Southwest Research Inst.)*

POSTER SESSION – 11:30 AM

Student Poster Session in Technology Expo
Location: Bonnet Creek Salon VII-IX **Time:** 11:30 am-1:30 pm

Decommissioning and Environmental Sciences
1. Cesium and Strontium Concentration Profiling of the James River Watershed Using Laser Induced Breakdown Spectroscopy (LIBS), Ivan A. Cano *(Virginia Commonwealth Univ)*, Charlie Willard, Hunter B. Andrews, Supathorn Phongikaroon

Fuel Cycle and Waste Management
2. Investigation of Electrode Withdrawal and Laser-Induced Breakdown Spectroscopy Methods for Concentration Estimation of SmCl3 in LiCl-KCl, Hunter Andrews *(Virginia Commonwealth Univ)*, Supathorn Phongikaroon
3. Characterization and Drying of Oxyhydroxides for Dry Storage of Aluminum-Clad Spent Fuel, Matthew G. Shalloo *(Univ of South Carolina - Columbia)*, Roderick Fuentes, Anna d'Entremont, Robert Sindelar, Travis W. Knight
4. Impact of Composition Approximation on Simulated Nuclear Fuel Cycle Metrics, Jin Whan Bae *(Univ of Illinois - Urbana Champaign)*, Kathryn Huff, Joshua L. Peterson-Droogh

Human Factors, Instrumentation, and Controls
5. Parallel Real Time Simulators, Cain Manzira *(Univ of New Mexico)*
6. Data-driven Cyber-attack Detection Platform for NPP Digital I&C Systems, Fan Zhang *(Univ of Tennessee)*, Jamie Coble, Wesley Hines

Isotopes and Radiation
7. Parameter Optimization for Agricultural X-Ray Backscatter Radiography, Hannah Gardiner *(Univ of Florida)*, Shuang Cui, James E. Baciak

Materials Science and Technology
8. Investigation of Uranium Morphology from Electrochemical Separation in Molten Salt, Dimitris Killinger *(Virginia Commonwealth Univ)*, Meredith Eaheart, Supathorn Phongikaroon
9. High Temperature Creep Properties of Nuclear-grade Generation III SiC Fibers, Deep Patel *(Univ of New Mexico)*, Koyanagi Takaaki

Mathematics and Computation
10. Parallel RB-SOR Method for Solving Neutron Diffusion Equation, Ayodeji Adeniran *(Texas A&M Univ-Kingsville)*
11. MOOSE Meshing Capability Implementation, Jieun Lee *(Texas A&M Univ)*, Sebastian Schenurt

TUESDAY, NOVEMBER 13
POSTER SESSION - 11:30 AM

Student Poster Session in Technology Expo Continued
Location: Bonnet Creek Salon VII-IX **Time:** 11:30 am-1:30 pm

Nuclear Criticality Safety

12. Analysis and Control of Reactivity Adjuster Rod of a Miniature Neutron Source Reactor, Elizabeth Bahiise *(Texas A&M Univ - Kingsville)*, Bright Mawuko Sogbadji, Kwasi Gyeabour and Xue Yang

Nuclear Nonproliferation

13. Source Imaging and Assay Using Ubiquitous Building Materials, Ryan P. O'Mara *(NCSU)*, Dr. Sebastian Schenurt

14. Simulation of the Nuclear Fuel Cycle and its Application to International Safeguards, Katie Mummah *(Univ of Wisconsin-Madison)*, Rian Bahran, Karen Miller *(LANL)*

Operations and Power

15. Designing Supercritical CO_2 Turbomachinery for a LFTR, Kurt Harris *(Utah State Univ)*, Chad Shenk

Radiation Protection and Shielding

16. Characterization of Conservatism in Transuranic Activity Estimation, Samuel J. Cope *(NCSU)*

Reactor Physics

17. A Multiphysics Solver for the Analysis of Compressibility Effects on Super-Prompt-Critical Dynamics of the Molten Salt Fast Reactor, Eric Cervi *(Politecnico di Milano)*, Stefano Lorenzi, Antonio Cammi, Lelio Luzzi

18. Initial Assessment of the Time Response to Transient Events Within Fast Spectrum Molten Salt Reactor Systems, Alexander Mausolff *(Univ of Florida)*, Sedat Goluoglu

19. Baseline Experimentation with Micro-Pocket Fission Detectors for Validation of Transient Nuclear Reactor Simulations, Daniel Nichols *(Kansas State Univ)*, Taylor Ochs, Ye Cheng, Wenkai Fu, Michael Reichenberger, Joseph Hewitt, Caden Hilger, Robyn Hutchins, Katharine Kellogg, Jared Medina, Tanner Swope, Jeremy Roberts, Douglas McGregor

20. Benchmark and Optimization of the SmAHTR Design, Kristina Reed *(Georgia Inst of Technology)*

Robotics and Remote Systems

21. Dexterous Robotic Manipulator for Semi-Autonomous Glove Box Tasks, Christopher Nataros *(Florida International Univ)*, Maria Ovalle

22. Performance Evaluation of Augmented Teleoperation of Contact Manipulation Tasks, Anibal Morales *(Florida International Univ)*, Dr. Young Soo Park

23. Development of a Bioinspired Multi-Link Inspection Tool for Environments with Small Size Constraints, Michael DiBono *(Florida International Univ)*, Dwayne McDaniel, Ben Boesl, Yew Teck Tan, Adrian Verdin, Ariana Bueno, Rami Ghazzara

24. Development of a Peristaltic Crawler for the Inspection of the High Level Waste Tanks at Hanford, Christopher Excellent *(Florida International Univ)*

25. Informative Path Planning for Robotic Inspection of Radioactive Environments, Sebastian Zanlongo *(Florida International Univ)*, Yew Teck Tan; Timothy Aucott

26. Automated Thrust Control Based on PID Method for Thrust or Suction Based Inspection Tool, Mackenson Telusma *(Florida International Univ)*, Yew Tek Tan, Dwayne McDaniel, Leonel Lagos

Thermal Hydraulics

27. Experimental and Numerical Investigations in a Very High Temperature Reactor (VHTR), Apoorva Rudra *(City College of New York)*, Dinesh Kalaga, Masahiro Kawaji

28. Quenching and Fragmentation of High Temperature Molten Materials in Water, Yen-Ku Lin *(National Tsing Hua Univ)*

29. Design and Instrumentation of Flow Loop for Testing Natural Convection Phenomena, James Richards *(Univ of Idaho)*

30. Simulation of High Pressure Void Fraction Measurement for Multiphase Flow Using ANSYS Fluent, Babatunde P. Afolabi *(Texas A&M Univ, Kingsville)*, Itohan C. Agbonkina, Dr. Xue Yang, Dr. Jun Wang

31. CFD Analysis of C-tube Heat Exchanger in Passive Residual Heat Removal System (PRHR), Soumitra M. Vadnerkar *(Texas A&M Univ-Kingsville)*, Prof. Xue Yang

Co-op or Internship Experience and Results

32. Simulating UF6 Cylinders for Standoff Emission Analysis, Noah J. McFerran *(Univ of Florida)*, Bonnie Canion, Mateusz Monterial, Jonathan Dreyer, Owen Drury, Karl Nelson, Simon Labov

33. VEXS, An Open Platform for the Study of Continuous-Energy Neutron Transport Cross-Section Lookup Algorithms on Accelerators, Forrest Shriver *(Univ of Florida)*, Seyong Lee, Jeffrey Vetter

34. Evaluation of Trends of Critical Heat Flux (CHF) Correlations Between Different Correlations, Gemma Strong *(Univ of New Mexico)*

TUESDAY, NOVEMBER 13
TECHNICAL SESSIONS - 1:30 PM

Monte Carlo Methods—I
Sponsored by MCD
Session Organizer: Steven P. Hamilton *(ORNL)* **Chair:** Timothy P. Burke *(LANL)*
Location: Floridian G **Time:** 1:30-3:40 pm

1:35 pm: Region-Specific Monte Carlo Analysis of Stochastic Systems, Travis J. Trahan *(LANL)*

2:00 pm: Bias in Monte Carlo Alpha-Eigenvalue Calculations, Colin Josey, Forrest B. Brown *(LANL)*

2:25 pm: Generation of Weight Window Isosurface Geometries for Monte-Carlo Variance Reduction, Kalin R. Kiesling, Paul P. H. Wilson *(U.W., Madison)*

2:50 pm: A Method for Adaptive Stratified Sampling with Angular Source Biasing, William J. Walters *(Penn State)*

3:15 pm: Generating Variance Reduction Parameters for Shutdown Dose Rate Analysis of Moving Systems, Chelsea A. D'Angelo, Paul P. H. Wilson *(U.W., Madison)*

Challenges and Opportunities with Accelerated Qualification of LWR ATF Cladding and Fuel Materials–Panel
Sponsored by MSTD
Session Organizer: Gokul Vasudevamurthy *(General Atomics)* **Chair:** Kenneth J. Geelhood *(PNNL)*
Location: Floridian H **Time:** 1:30-3:40 pm

In order to avoid Fukushima-like events, the U.S. DOE has invested heavily in research and development of accident-tolerant fuel and cladding materials to replace the problem-prone Zircaloy-uranium dioxide system. Currently, three prime candidates for the cladding system are under active consideration: silicon carbide composites, Iron-chromium-aluminum (FeCrAl) steels, and surface-modified Zircaloy. In the fuel arena, uranium silicide is being pursued as a replacement for uranium dioxide on account of its attractive thermal properties. Although the R&D in this field (including the installation of lead test assemblies) is proceeding as expected, there is an immediate need to start a dialogue among the major stakeholders: materials developers, regulators, and utilities, to chalk out the next steps involved in the qualification of these systems and to ensure a smooth transition from laboratory scale to commercial-scale deployment.

Panelists: Steven Hayes *(INL),* Sumit Ray *(Westinghouse),* Andrew Proffitt *(NRC),* Jack Gazza *(General Atomics),* Kurt Terrani *(ORNL),* Bill Gassmann *(Exelon),* Peter Newby *(Framatome)*

Achieving a Work/Life Balance–Panel
Sponsored by YMG
Session Organizers: Kelsey Amundson *(DNFSB/UC-Berkeley)*, Harsh S. Desai *(NEI)*
Chair: Kelsey Amundson *(DNFSB-UC-Berkeley)*
Location: Floridian I **Time:** 1:30-3:40 pm

High performers can struggle finding a balance between their work, family, extracurricular, and health activities. In this session we will discuss how people struggle balancing all that and how professionals can work towards achieving a healthy, balanced lifestyle.

Panelists: Lenka Kollar *(NuScale),* Rian Bahran *(LANL),* Harsh Desai *(NEI),* Lisa Marshall *(NCSU)*

Focus on Communications—I–Panel
Sponsored by ETWDD
Session Organizer and Chair: Mimi H. Limbach *(Potomac Communication Group, Inc.)*
Location: Floridian J **Time:** 1:30-3:40 pm

Diversity in organizations of all types has demonstrably improved organizational performance because it brings a variety of perspectives to decisions and operations. In this session, we will give a presentation of what a diversity initiative in the United Kingdom has accomplished in terms of improving the performance of organizations there and how it is being communicated. Panel members will discuss their experiences in academic, research, nonprofit and corporate organizations in the nuclear energy industry.

Panelists: Fiona Rayment *(NNL),* Margaret Harding *(4Factor Consulting),* Ivan Maldonado *(Univ of Tennessee)* Michelle Scott *(DOE),* Lane Carasik *(Ultra Safe Nuclear Corp)*

Isotopes and Radiation: General—II
Sponsored by IRD; **Cosponsored by** BMD
Session Organizer: Kenan Unlu *(Penn State)* **Chair:** Jung Rim *(LANL)*
Location: Floridian K **Time:** 1:30-3:40 pm

1:35 pm: Design and Testing of the Wireless Independent Noble Gas Sampler, R. Wiser, J. Jennings, K. Shah, M. Byers, D. Haas *(Univ. Texas, Austin)*

2:00 pm: Flux Variations Caused by Source Location Shifting in a Neutron Generator, Walid A. Metwally *(Univ. Sharjah)*

2:25 pm: Measurement of Gamma Ray Dose Rates from Bricks for Hazard Assessment, Ryan P. O'Mara, Robert B. Hayes *(NCSU)*

2:50 pm: Semi-Automated CR-39 Imaging System, Erik Ziehm *(Univ. Illinois)*, Zhiheng Xu *(Nanjing Univ.)*, Matthew Bergschneider *(Industrial Heat LLC)*, Damian Markiewicz, George H. Miley *(Univ. Illinois)*

3:15 pm: An Open-Access Nuclear Knowledge and Innovation Toolkit to Make Use of Nuclear World and Increase Collaboration, Brenden J. Heidrich *(INL)*, Jordan M. Argyle *(Univ. Idaho)*

Technical Sessions: Tuesday November 13

TUESDAY, NOVEMBER 13
TECHNICAL SESSIONS - 1:30 PM

Data, Analysis, and Operations in Nuclear Criticality Safety—II
Sponsored by NCSD
Session Organizer: Theresa E. Cutler *(LANL)* **Chair:** William J. Marshall *(ORNL)*
Location: Floridian L **Time:** 1:30-3:40 pm

1:35 pm: Inventory-Based Computational Analysis of Hanford Tank Waste, Alyssa R. Kersting, David C. Losey *(Washington River Protection Solutions)*

2:00 pm: Validation of Scale 6.2 Using Tsunami for Swedish Spent Nuclear Fuel, Fredrik Johansson *(Swedish Nuclear Fuel and Waste Management)*

2:25 pm: Update on the Use of Neutron Absorbers for Storage Applications at Y-12, Joshua Schwartz *(Consolidated Nuclear Security)*

2:50 pm: Application of the Limiting Surface Density Method to Arrays of 9975 Shipping Packages with Plutonium Oxide, James Baker *(SRNL)*

3:15 pm: Concurrent Uranium Overmass and Hydraulic Fluid Leak, J. J. Lichtenwalter, T. L. Wilson *(Consolidated Nuclear Services)*

Molten Salts in Nuclear Fuel Cycle Processes
Sponsored by FCWMD
Session Organizer: Kenneth C. Marsden *(INL)* **Chair:** Jinsuo Zhang *(Virginia Tech)*
Location: Bonnet Creek III **Time:** 1:30-3:40 pm

1:35 pm: Thermodynamic Properties of Nd(II) and Nd(III) in Eutectic LiCl-KCl Molten Salt, Wentao Zhou *(Shanghai Jiao Tong Univ.)*, Evan Wu *(Ohio State)*, Jinsuo Zhang *(Virginia Tech)*

2:00 pm: Electrochemical Study of La (III) in LiF-NaF-KF Eutectic Melt, Yafei Wang, Shaoqiang Guo, Qiufeng Yang, Jinsuo Zhang *(Virginia Tech)*

2:25 pm: Development of Continuous Processes for a Molten Salt Reactor Safeguards Model, Nathan Shoman, Benjamin B. Cipiti *(SNL)*

2:50 pm: Electrochemical Behavior of Iodide in LiCl-KCl Molten Salts and Anionic Salts, Nikunja Shrestha, Brandon Day, Vivek Utgikar, Krishnan S. Raja *(Univ. Idaho)*, Guy Fredrickson, Steven Frank *(INL)*

3:15 pm: Electrochemistry of Uranium and Europium In Room-Temperature Molten Salts, Martin Straka, Lorant Szatmary *(UJV Rez)*

Nuclear Installations Safety: General—I
Sponsored by NISD
Session Organizer: Girija S. Shukla *(NRC)* **Chair:** N. Reed LaBarge *(Westinghouse)*
Location: Bonnet Creek IV **Time:** 1:30-3:40 pm

1:35 pm: An Evolutionary Process of Stakeholder Engagement to Develop the ROP, Hiroko Kondo (*Matrix K)*

2:00 pm: Thermal Effects to the Transmission Signals of the Nuclear Grade Optical Fibers, Huai-En Hsieh *(Xiamen Univ.)*, Mei-Shiue Chen *(National Tsing Hua Univ.)*

2:25 pm: Surrogate Model of Severe Accident Analysis Code for SBO Aiming Probabilistic Safety Margin Analysis, Masaki Matsushita, Tomohiro Endo, Akio Yamamoto *(Nagoya Univ.)*

2:50 pm: Experimental Studies of Core Melt Behavior During Severe Accidents at the Karlsruhe Institute of Technology, A. Miassoedov, G. Albrecht, T. Cron, X. Gaus-Liu, B. Fluhrer, T. Wenz *(KIT)*

3:15 pm: Damage Assessment Methodology for Beyond Design Basis Man-Made External Events Using PSA Results, Sok Chul Kim, Hyo Won Kim, Nam Chul Cho, Yong Jin Lee *(KINS)*

Reactor Physics in Test and Research Reactors—I
Sponsored by RPD
Session Organizer: Zeyun Wu *(Virginia Commonwealth Univ)* **Cochairs:** Zeyun Wu *(Virginia Commonwealth Univ),* Yunlin Xu *(Purdue Univ)*
Location: Bonnet Creek V **Time:** 1:30-3:15 pm

1:35 pm: Preliminary Design of a Fast Flux User Facility at the University of Tennessee, Wes Hines, John Pevey *(U.T., Knoxville)*, Vladimir Sobes *(ORNL)*

2:00 pm: Evaluation of Control Rod Designs for a Potential Configuration of the Versatile Test Reactor, Abdalla Abou-Jaoude, Gilles J. Youinou *(INL)*

2:25 pm: Comparison of Displacement Damage Calculations Supporting MIMIC Analysis and Design for TREAT, John D. Bess, James R. Parry, Connie M. Hill, Nicolas E. Woolstenhulme, Colby B. Jensen, Kevin G. McQuate *(INL)*

2:50 pm: Optimized Design Performance Analysis Tools for a High Flux Isotope Reactor Low-Enriched Uranium Core, B. R. Betzler, D. Chandler, E. E. Davidson, G. Ilas *(ORNL)*

TUESDAY, NOVEMBER 13
TECHNICAL SESSIONS - 1:30 PM

Micro Nuclear Reactor Concepts for Special Purpose Applications–Panel
Sponsored by YMG; **Cosponsored by** RPD, OPD
Session Organizer: Nicolas E. Stauff *(ANL)* **Chair:** Taek Kyum Kim *(ANL)*
Location: Bonnet Creek VI **Time:** 1:30-3:40 pm

Micro nuclear reactors are being developed for different applications such as deployment at harsh locations, long-term electricity supply to a remote area, emergency power to a natural disaster location, etc. For easy and quick deployment to locations where the external power grid and operation man-power are limited, a very small reactor not only in power rate but also in physical size is favorable. A power rate less than 20 MW and factory manufacturing are preferred, together with a high level of passive safety and an autonomous reactor control system. This session will discuss the needs for micro reactors that are under development by the industry and national labs.

Panelists: Jess C. Gehin (*INL),* Keith Bradley *(ANL),* Chang Ho Lee *(ANL),* Patrick McClure *(LANL),* Claudio Filippone *(HolosGen LLC),* Paolo Venneri *(USNC)*

Aerospace Nuclear Science and Technology: General
Sponsored by ANSTD
Session Organizer: John D. Bess *(INL)* **Chair:** Jeffrey C. King *(CSM)*
Location: Collier, Columbia **Time:** 1:30-3:40 pm

1:35 pm: Reenergizing U.S. Space Nuclear Power Generation, Michael Obal *(Obal Technologies Group)*, Marco Concha *(Relative Dynamics)*

2:00 pm: Theoretical Research of Characteristic of Thermoelectric Conversion of Ignited Cesium Thermionic Energy Converter, Wuye Zhong, Jianping Zheng, Zheng Lv, Qifa Yang *(China Inst. Atomic Energy*)

2:25 pm: Thermal Hydraulic Analysis of SP-100 Space Reactor Power System, Wenwen Zhang, Yao Xiao, Hanyang Gu *(Shanghai Jiao Tong Univ.)*

2:50 pm: Internally Pressurized Creep Testing of Mo-Nb Alloy Single Crystal, Wang Weijun, Qingluan He, Jianping Zheng *(China Inst. Atomic Energy)*

3:15 pm: Total Power System Mass Optimization for Space Applications, Alexander Swenson, Becky Sondelski, Paul P. H. Wilson, Greg Nellis, Mark Anderson *(U.W., Madison)*

Design of Robotic and Remote Systems for Use in Radioactive Environments
Sponsored by RRSD
Session Organizer: Mitch W. Pryor *(Univ of Texas, Austin)* **Chair:** Leonel L. Lagos (*FIU)*
Location: Citrus **Time:** 1:30-3:15 pm

1:35 pm: Human Fatigue Quantification and Assessment of Robotic Manipulators in Glove Box Operations, Aparna Aravelli, Ou Bai *(Florida International Univ.*), Erik Engeberg (Florida Atlantic Univ.), Leonel Lagos *(Florida International Univ.*), Rick Demmer *(INL)*

2:00 pm: Development of a Highly Mobile Robot for Remote Inspection, Timothy Williams, Shannon Rideway, Carl Crane *(Univ. Florida)*

2:25 pm: Development of Mobile Inspection Units Using Thrust and Suction-Based Surface Adhesion Mechanisms, Mackenson Telusma, Yew Teck Tan, Leonel Lagos *(Florida International Univ.)*

2:50 pm: Robotic Systems for Environmental Management Applications, Dwayne McDaniel, Leonel Lagos, Anthony Abrahao *(Florida International Univ.)*

TECHNICAL SESSIONS - 3:55 PM

Monte Carlo Methods—II
Sponsored by MCD
Session Organizer: Steven P. Hamilton *(ORNL)* **Chair:** David P. Griesheimer *(NNL)*
Location: Floridian G **Time:** 3:55-6:05 pm

4:00 pm: Fitting Nuclear Data with Chebyshev Polynomials, Colin Josey, Forrest B. Brown *(LANL)*

4:25 pm: Development of a Library for Computing Monte Carlo Tallies on Heterogeneous Systems, Timothy P. Burke, Forrest B. Brown *(LANL)*

4:50 pm: Reduced Precision Ray Tracing Performance Enhancements in the DAGMC Toolkit, Patrick C. Shriwise, Paul P. H. Wilson *(U.W., Madison)*

5:15 pm: Whole Core Transport Analysis with the DTMC Method in a Small Modular Reactor, Inhyung Kim, Yonghee Kim *(KAIST)*

5:40 pm: Application of Kinetic Monte Carlo Method to Depletion Equation, Yong Hee Choi, Jin Young Cho *(KAERI)*

Technical Sessions: Tuesday November 13

TUESDAY, NOVEMBER 13
TECHNICAL SESSIONS - 3:55 PM

Advanced Manufacturing and Post Irradiation Examination
Sponsored by MSTD
Session Organizer and Chair: Kenneth J. Geelhood *(PNNL)*
Location: Floridian H **Time:** 3:55- 6:05 pm

4:00 pm: Quenching and Partitioning Heat Treatment of T91 Stainless Steel, Chintan Shah *(Texas A&M)*, Ching-Heng Shiau *(INL)*, Xue Yang *(Texas A&M)*, Cheng Sun *(INL)*

4:25 pm: Development of the Fiber-Optic Radiation Sensor for Remote Detection Based on Inorganic Scintillator, Chan Hee Park, Tae Jin Park *(Korean Association Radiation Application)*, Wook Jae Yoo *(Konkuk Univ.)*, Joo Hyun Moon *(Dongguk Univ.)*

4:50 pm: Radiation Response and Stability of Intragranular Solidification Cellular Structures in 50 dpa Ion-Irradiated Additively-Manufactured 316L Austenitic Stainless Steel, G. Meric de Bellefon, K. M. Bertsch, D. J. Thoma *(U.W., Madison)*

5:15 pm: Neutron Radiography Facility Beam Purity Study at the Oregon State TRIGA Reactor, C. J. Kulah, G. D. Latimer, R. A. Schickler *(Oregon State)*

5:40 pm: Nondestructive Tomographic Mapping of Uranium and Gadolinium 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)*

Getting Involved in a Professional Society–Panel
Sponsored by YMG
Session Organizer: Kelsey Amundson *(DNFSB-UC-Berkeley)* **Chair:** Kathryn A. Mummah *(Univ of Wisconsin, Madison)*
Location: Floridian I **Time:** 3:55- 6:05 pm

Professional societies provide numerous opportunities to further your career. They can create an environment for knowledge transfer, networking, leadership, and informal feedback opportunities. The panelists will discuss their personal experiences and how a professional society has helped further their career.

Panelists: Alyse Scurlock *(Duke Energy),* Ben Holtzman *(NEI),* Lane Carasik *(Ultra Safe Nuclear Corp)*

Focus on Communications—II–Panel
Sponsored by ETWDD
Session Organizer and Chair: Laura Hermann *(Potomac Communication Group, Inc.)*
Location: Floridian J **Time:** 3:55-6:05 pm

We hear a lot about "real news," "fake news," "alternative facts," and many wonder what constitutes real news and real journalists. Do they write blogs, do podcasts, make pronouncements, inform or irritate? In this panel, journalists from media platforms ranging from print to wire services to broadcast that report and break trade, regional and national news will discuss these issues and many more. And they'll give tips on how to recognize real news and debunk "fake news."

Panelists: Justin Griffin *(Tamps Bay Times)*, Gabrielle Russon *(Orlando Sentinel),* Kornty Rolston Duce *(INL)*, Robert Wells *(Univ of Central Florida)*, Karen Heinold *(PCG)*

Isotopes and Radiation: General—III
Sponsored by IRD; **Cosponsored by** BMD
Session Organizer: Kenan Unlu *(Penn State)* **Chair:** Brenden J. Heidrich *(INL)*
Location: Floridian K **Time:** 3:55-6:05 pm

4:00 pm: Organo-Lead Halide Perovskite Crystals for Both Gamma-Ray and Neutron Detection, Lauren Janney, Adam A. Hecht *(Univ. New Mexico)*, Kent B. Pfeifer, Bryan James Kaehr *(SNL)*, Vincent C. Tung *(U.C., Merced)*, Oliver Lin *(UCLA)*, Stanley S. Chou *(SNL)*

4:25 pm: Salt Deposition Measurements in a Simulated Debris Bed Using Radiotracers, Ruhania Tarannum, Hitesh Bindra, William L. Dunn *(Kansas State)*

4:50 pm: Characterizing Americium Using Non-Destructive Method, Jung H. Rim, Donivan R. Porterfield *(LANL)*

5:15 pm: Wave Nature of Beta Particles and Their Interaction with Surface Plasmons, Eric M. Acosta, Jae W. Kwon *(Univ. Missouri, Columbia)*

5:40 pm: A Simulation Platform for Data Generation in Analysis of Detection Algorithms in Radioactive Source Search, Alexi Verney-Provatas *(Purdue)*, Miltos Alamaniotis *(U.T., San Antonio)*, Chan K. Choi, Lefteri H. Tsoukalas *(Purdue)*

TUESDAY, NOVEMBER 13
TECHNICAL SESSIONS - 3:55 PM

Critical and Subcritical Experiments—I
Sponsored by NCSD; **Cosponsored by** NNPD
Session Organizer: Jesson D. Hutchinson *(LANL)* **Chair:** David K. Hayes *(LANL)*
Location: Floridian L **Time:** 3:55-6:05 pm

4:00 pm: Genetic Algorithm-Based Optimization for Nuclear Criticality Experiment Design, A. Ney, D. Fritz, S. Singh, N. Langlitz *(RPI)*

4:25 pm: 2-Exponential PDF and Analytic Uncertainty Approximations for Rossi-α Histograms, M. Y. Hua *(Univ. Michigan & LANL)*, J. D. Hutchinson, G. E. McKenzie, M. A. Nelson *(LANL)*

4:50 pm: Sensitivity Analysis and Uncertainty Quantification of the Feynman Y and Sm2, Alexander Clark *(NCSU),* Jeffrey A. Favorite, Alexander McSpaden, Mark Nelson *(LANL)*

5:15 pm: Comparison of Predicted and Measured Subcritical Benchmark Uncertainties as a Function of Counting Time, J. Hutchinson, J. Arthur, R. Bahran, T. Cutler, T. Grove, A. McSpaden, M. Nelson *(LANL)*

5:40 pm: Bayesian Optimization for Subcritical Benchmark Design, Jennifer Arthur *(LANL & Univ. Michigan)*, Rian Bahran, Jesson Hutchinson *(LANL)*, Sara Pozzi *(Univ. Michigan)*

Transportation and Storage of Used Nuclear Fuel
Sponsored by FCWMD
Session Organizer and Chair: Jean-Francois Lucchini *(LANL)*
Location: Bonnet Creek III **Time:** 3:55-6:55 pm

4:00 pm: Technical Issues to be Addressed in Preparing a Large Program to Transport Nuclear Waste, Daniel G. Ogg *(U.S. Nuclear Waste Technical Review Board)*

4:25 pm: Temperature Prediction of a TN-32 Canister Subjected to Vacuum Drying, Megan Higley, lMustafa Hadj-Nacer, Miles Greiner *(Univ. Nevada, Reno)*

4:50 pm: Dual Purpose Canister Filling Assessment to Support Direct Disposal, Emilian Popov, Kaushik Banerjee, John Scaglione *(ORNL)*

5:15 pm: Estimating Transportation Worker Dose from Hypothetical Spent Nuclear Fuel Shipments, Kevin J. Connolly *(ORNL)*

5:40 pm: Experimental Measurement of Temperature Jump Coefficient in the Slip Regime, Cody Zampella, Mustafa Hadj-Nacer, Miles Greiner *(Univ. Nevada, Reno)*

6:05 pm: A New Cask Additive for Spent Fuel Assembly Storage, Shunjiang Tao, Robert Bean *(Purdue)*, Robert Abboud *(RGA Labs)*

6:30 pm: Design of Spent Fuel Dry Storage Container for Longer Time, Chan Bock Lee, Jun Hwan Kim, Jin Sik Cheon, In Su Han, Byoung Oon Lee *(KAERI)*

Ethics in Nuclear Engineering and Design–Panel
Sponsored by RPSD
Session Organizer: Robert B. Hayes *(NCSU)* **Chair:** Rachel Slaybaugh *(Univ of California, Berkeley)*
Location: Bonnet Creek IV **Time:** 3:55-6:05 pm

This panel will explore the nexus of ethics in quality, safety, cost optimization and schedule driven goals. Issues associated with temptations to compromise on standards or regulatory compliance in a commercial environment will be considered.

Panelists: The ANS Code of Ethics, Vic Uotinen *(CNF)*
Instilling Ethics in the Next Generation of Nuclear Engineers, Rachel Slaybaugh *(Berkeley)*
Ethics in Nuclear Safety, Robert Wilson *(DOE-EM)*
Ethics for Licensed Professional Engineers, Paul Edelmann *(LANL)*
Ethics in Action, B. J. Marshall *(ORNL)*
Ethics under Pressure to Compromise Principles, Robert Hayes *(NCSU)*
Ethics in Radiation Protection Safety and LNT, Alan Waltar *(ANS Past President)*

Reactor Physics in Test and Research Reactors—II
Sponsored by RPD
Session Organizer: Zeyun Wu *(Virginia Commonwealth Univ)*
Cochairs: Zeyun Wu *(Virginia Commonwealth Univ),* Chad Pope *(ISU)*
Location: Bonnet Creek V **Time:** 3:55-5:40 pm

4:00 pm: Verification of the Facet-Based Modeling and Calculation Capabilities of SuperMC with ITER Cilte-V2 Model, Quan Gan, Shengpeng Yu, Lijuan Hao, FDS Team *(Inst. Nucl. Energy Safety Technol.)*

4:25 pm: Proposed Test Reactor for a Molten Chloride Salt Uranium-Plutonium Thermal Breeder, Neal L. Mann, Mihal (Mike) G. Pop *(Consultant)*

4:50 pm: Paralyzable and Non-Paralyzable Dead-Time Corrections for the Area-Ratio Method, A. Talamo, Y. Gohar *(ANL)*, M. Yamanaka, C. H. Pyeon *(Kyoto Univ.)*

5:15 pm: Experimental Breeder Reactor II Reactor Physics Benchmark Evaluation, Edward Lum *(LANL)*, Chad Pope *(Idaho State)*

Technical Sessions: Tuesday November 13

TUESDAY, NOVEMBER 13
TECHNICAL SESSIONS - 3:55 PM

Reactor Physics: General—II
Sponsored by RPD
Session Organizer: Pavel V. Tsvetkov *(Texas A&M)*
Cochairs: Moussa Mahgerefteh *(Exelon Corp)*, William J. Walters *(PSU)*
Location: Bonnet Creek VI **Time:** 3:55-6:30 pm

4:00 pm: Neutron Spectrum vs. Transmutation: A Reactors Comparison, Massimiliano Fratoni *(U.C., Berkeley)*, invited, Reactor Physics Young Member Award

4:25 pm: Core Design Improvement of Small CANDLE Reactor with the Melt-Refining Process, Van Khanh Hoang, Jun Nishiyama, Toru Obara *(Tokyo Inst. Technol.)*

4:50 pm: The Predictive-Correction Method for Solving Deep Penetration Problems, Qingquan Pan, Junjie Rao, Kan Wang *(Tsinghua Univ.)*

5:15 pm: MCS/CTF Multiphysics Solutions to VERA Benchmark Problems 6 and 7, Tung Dong Cao Nguyen, Jiankai Yu, Hyunsuk Lee, Deokjung Lee *(UNIST)*

5:40 pm: Comparative Analysis of a CmOx Target Assembly Using COMSOL Multiphysics, Quang T. Phung *(U.T., Knoxville)*, Susan L. Hogle *(ORNL)*, Guillermo I. Maldonado *(U.T., Knoxville)*

6:05 pm: Editor Services for MCNP6 in the NEAMS Workbench, Kurt A. Dominesey, Wei Ji *(RPI)*

Decommissioning and Environmental Sciences: General
Sponsored by DESD
Chair: James J. Byrne *(Byrne & Associates)*
Location: Collier, Columbia **Time:** 3:55-4:50 pm

4:00 pm: Lessons Learned on Design for Decommissioning and Removing Non- Drainable Sodium From FFTF, D. W. Wootan, R. P. Omberg *(PNNL)*, T. M. Burke *(Westinghouse)*, C. Grandy *(ANL)*

4:25 pm: The Decommissioning and Waste Management Program of the Joint Research Centre of the European Commission, Stéphane Brémier, Vincenzo Rondinella, Paolo Peerani, Francesco Basile, Riccardo Casale *(European Commission)*

Accelerator Applications: General
Sponsored by AAD
Chair: Reginald Ronningen *(Michigan State Univ)*
Location: Citrus **Time:** 3:55-4:50 pm

4:00 pm: Short-Pulse Photoneutron Production on Beryllium Using the Mercury Pulsed Power X-Ray Source, D. L. Duke, T. Archuleta, M. Boswell, M. Espy, A. Gehring, T. Haines, H. Hermann, C. R. Johnson, Y. H. Kim, M. P. McCumber, K. D. Meaney, B. White *(LANL)*, S. Baker, A. Corredor, L. Fegenbush, B. Gall, M. Heika, C. Kruschwitz, K. Montoya *(Mission Support and Test Services)*, S. L. Jackson, A. S. Richardson, J. Schumer, J. C. Zier *(U.S. Naval Research Lab)*, E. Ormond *(SNL)*

4:25 pm: Accelerator-Driven Subcritical System Analysis for Utilizing the Minor Actinides of the U.S. Spent Nuclear Fuel Inventory, Yan Cao, Yousry Gohar, Adam R. Kraus *(ANL)*

WEDNESDAY, NOVEMBER 14
TECHNICAL SESSIONS - 10:15 AM

Uncertainty Quantification and Sensitivity Analysis
Sponsored by MCD
Session Organizer: Steven P. Hamilton *(ORNL)* **Chair:** Forrest Brown *(LANL)*
Location: Floridian G **Time:** 10:15 am-12:00 pm

10:20 am: Application of Functional Expansion Tallies to Monte Carlo Sensitivity Analysis, Timothy P. Burke (LANL), Brian C. Kiedrowski *(Univ. Michigan)*

10:45 am: Preliminary SCALE/TSUNAMI Results for the Sub-Exercises of the OECD/NEA Benchmark for Uncertainty Analysis in Modeling of Sodium-Cooled Fast Reactors, Friederike Bostelmann *(ORNL & École Polytechnique)*, Bradley T. Rearden *(ORNL)*, Winfried Zwermann *(GRS)*, Andreas Pautz *(École Polytechnique)*

11:10 am: Uncertainty Quantification in CFD Simulations of Coolant Subchannel, Xiaoyu Zhang *(Harbin Univ.)*, Jiachang Wang *(Nuclear Power Inst. China)*, Zhaofei Tian *(Harbin Univ.)*, Yang Yu *(Nuclear Power Inst. China)*

11:35 am: Adjoint-Based Sensitivity for Radiation Transport Using an Eddington Tensor Formulation, Ian Halvic, Jean Ragusa *(Texas A&M)*

Transient Fuel Performance
Sponsored by MSTD
Session Organizer: Kenneth J. Geelhood *(PNNL)* **Chair:** Troy Munro *(Brigham Young Univ)*
Location: Floridian H **Time:** 10:15-11:35 am

10:20 am: TREAT Transient Testing to Support ATF Development, Dan Wachs, Colby Jensen, Nicolas Woolstenhulme *(INL)*

10:45 am: Design of a Flow Loop for Visualization and Characterization of Power Transient Critical Heat Flux, Emory Brown, Yikuan Yan, Daniel LaBrier, Wade Marcum *(Oregon State)*

11:10 am: High Efficiency Steady State in Burnup Fuel Performance Module for CTF, A. Abarca, M. Avramova, K. Ivanov *(NCSU)*

Underway on Nuclear Power: A Retrospective–Panel
Sponsored by OPD
Session Organizer: Edward Quinn *(Technology Resources)* **Chair:** Joe Colvin *(NEI)*
Location: Floridian I **Time:** 10:15 am-12:00 pm

"Underway on Nuclear Power" was first transmitted by flashing light at 11:00 am on January 17, 1955, by the submarine USS Nautilus (SSN-571) as she made history as the first seagoing vessel of any kind to be successfully powered by a nuclear reactor. This panel session provides a rare opportunity to hear from the ever-smaller group of people who actually knew and worked with two of the early leaders in nuclear power: Admiral Hyman G. Rickover and Vice Admiral Eugene P. "Dennis" Wilkinson. Their commitment to the highest standards of operating excellence were major contributors to the Navy's safe and reliable nuclear propulsion program. Wilkinson later was the first CEO of the Institute of Nuclear Power Operations (INPO) and led its early contributions to the commercial nuclear power industry.

Panelists: Paul Cantonwine *(author of "The Never-Ending Challenge of Engineering: Admiral H. G. Rickover in His Own Words")*
Ann Winters *(author of "Underway on Nuclear Power: The Man Behind the Words, Vice Admiral Eugene P.'Dennis' Wilkinson USN")*
Captain Richard A. Claytor *(US Navy, retired)*
Joe Colvin *(President Emeritus of Nuclear Energy Institute)*

Research by U.S. DOE NEUP Sponsored Students—I
Sponsored by ETWDD
Session Organizer: Andrew E. Thomas *(INL)* **Chair:** JoAnne Hanners *(DOE)*
Location: Floridian J **Time:** 10:15 am-12:00 pm

10:20 am: Radiation Resistant High Entropy Alloys- High-Throughput Alloy Characterization and Heavy-Ion Irradiation, Calvin Parkin, Michael Moorehead, Mohamed Elbakhshwan, Adrien Couet, Kumar Sridharan, Kaila Bertsch, Dan Thomas *(U.W., Madison)*, Alan Savan, Alfred Ludwig *(Ruhr-Univ., Bochum)*, Shuanglin Chen, Chuan Zhang *(Consultant)*

10:45 am: Irradiation Effects on High Thermal Conductivity Nuclear Fuel Surrogates, Adrien J. Terricabras, Steven J. Zinkle *(U.T., Knoxville)*

11:10 am: Source Term Development and Radiological Signature Analysis for Simulation in Electrochemical Reprocessing Safeguards, Nathan Gilliam, Steven E. Skutnik, Jamie B. Coble, Amanda M. Bachmann, Michael P. Cooper, Jonathan T. Mitchell *(U.T., Knoxville)*

11:35 am: Enhancing the Economics of Nuclear Power Through Heat Storage, W. Neal Mann, Sheldon Landsberger, Michael E. Webber *(U.T., Austin)*

Technical Sessions: Wednesday November 14

WEDNESDAY, NOVEMBER 14
TECHNICAL SESSIONS - 10:15 AM

General Topics in Human Factors and Human Machine Interface
Sponsored by HFICD
Session Organizer and Chair: Jamie Baalis Coble *(Univ of Tennessee Knoxville)*
Location: Floridian K **Time:** 10:15-11:10 am

10:20 am: Analysis of Interface Management Tasks: Focusing on a Computerized Procedure System Operation at the Emergency Scenario Simulation, Jeonghun Choi, Seung Jun Lee (*UNIST)*

10:45 am: Experiment Design for Investigating Human Performances in Diagnostic Task Under Seismic Situation, Gayoung Park *(Chosun Univ.)*, Joohyun Sim *(KAERI)*, Jonghyun Kim *(Chosun Univ.)*

Hand Calculation Methodology and Use–Panel
Sponsored by NCSD; **Cosponsored by** YMG
Session Organizers: James C. Bunsen *(LANL)*, Jerry Hicks *(DOE, retd.)* **Chair:** James C. Bunsen *(LANL)*
Location: Floridian L **Time:** 10:15 am-12:00 pm

A workshop on hand calculations for those interested in criticality safety will be given at the ANS 2018 Winter Meeting in conclusion to the Nuclear Criticality Safety Division's annual Membership Challenge. Solutions to the challenge and suggested methods on best completing the challenge will be discussed. Hand calculations have been used in the criticality safety profession for years to analyze processes with fissionable material to ensure subcriticality. There are multiple methods of hand calculations to use, with two main categories dependent upon the situation: single unit methods and array methods. Single unit methods include diffusion theory, core density conversions, and buckling. The primary array methods used are surface density, density analog, limiting surface density, and solid angle methods.

Panelists: James Bunsen *(LANL),* Jerry Hicks *(DOE, retired)*

Grand Challenge of Closing the Fuel Cycle: Federal, Commercial or Hybrid Ownership of Recycling Facility–Panel
Sponsored by FCWMD
Session Organizer and Chair: Sven O. Bader *(Orano Federal Services LLC)*
Location: Bonnet Creek III **Time:** 10:15 am-12:00 pm

The objective of this panel is to discuss/debate the potentials pros and cons between Federal Government and commercial ownership of a recycling/reprocessing plant in the U.S. This discussion/debate will cover topics associated with: costs, proliferation/safeguards, wastes, regulations, and timelines. At the conclusion of the panel, a summary of the pros and cons of either ownership model (or hybrid models) will be discussed and recommendations on how to push this Grand Challenge forward.

Panelists: Emory Collins *(ORNL),* Jack Law *(INL)*, Francesco Ganda *(ANL),* Steven P. Nesbit *(Duke Energy),* Christina Leggett *(NRC),* Sven Bader *(Orano)*

Outreach for Nuclear Science and Engineering—Tools and Strategies in the Precollege Space–Panel
Sponsored by ETWDD; **Cosponsored by** YMG
Session Organizer and Chair: Lisa M. Marshall *(NCSU)*
Location: Bonnet Creek IV **Time:** 10:15 am-12:00 pm

The talent pool for nuclear engineers starts in the precollege space. This panel discussion will address strategies and tools available to spark and nurture scientists and engineers within the field. How do we grow the pool of interested students? What role does ANS play, especially with the recent launch of "Navigating Nuclear"? This session will discuss tried and new approaches to reach educators and students.

Panelists: Eric Loewen *(GE-Hitachi),* Alyse Scurlock *(Duke Energy),* Mary Lou Dunzik-Gougar *(Idaho State Univ)*, Lisa Marshall *(NCSU)*

WEDNESDAY, NOVEMBER 14
TECHNICAL SESSIONS - 10:15 AM

Reactor Analysis Methods—II
Sponsored by RPD
Session Organizer: Pavel V. Tsvetkov *(Texas A&M)* **Cochairs:** Yunlin Xu *(Purdue Univ)*, Pavel Tsvetkov *(Texas A&M)*
Location: Bonnet Creek V **Time:** 10:15 am-12:50 pm

10:20 am: A Simple Treatment of Bowed Assembly Gap Through Correction of Cross Section, Akio Yamamoto, Tomohiro Endo *(Nagoya Univ.)*, Hiroaki Nagano, Yasunori Ohoka, Kento Yamamoto *(Nuclear Fuel Industries)*

10:45 am: Validation of PARAGON2 for PWR Assemblies with High Enrichments, Mohamed Ouisloumen *(Westinghouse)*

11:10 am: Critical Boron Concentration and Critical Control Rod Position Search Method Based on Adjoint Flux, Guangyao Sun, Xuanxuan Bi, Lijuan Hao, and FDS *(Inst. Nucl. Energy Safety Technol.)*

11:35 am: The Preliminary Study of On-the-Fly Homogenization in RMC Code, Yuan Yuan *(Tsinghua Univ. & China Nuclear Power Engineering Co.)*, Ji Xing, Xiaodong Huo *(China Nuclear Power Engineering Co.)*, Shichang Liu, Kan Wang *(Tsinghua Univ.)*

12:00 pm: Implementation of On-the-Fly Direct Thermal Scattering Sampling in RMC, Wanlin Li, Ganglin Yu, Kan Wang *(Tsinghua Univ.)*

12:25 pm: Implementation of Online Refueling Burnup Calculation in RMC, Wanlin Li, Kan Wang, Ganglin Yu *(Tsinghua Univ.)*

Reactor Physics: General—III
Sponsored by RPD
Session Organizer: Pavel V. Tsvetkov *(Texas A&M)* **Cochairs:** Akio Yamamoto *(Nagoya Univ)*, Javier Ortensi *(INL)*
Location: Bonnet Creek VI **Time:** 10:15 am-12:25 pm

10:20 am: Analysis of the HTR-10 Initial Critical Core with the MAMMOTH Reactor Physics Application, Javier Ortensi, Sebastian Schunert, Yaqi Wang, Vincent Laboure, Frederick N. Gleicher, Richard C. Martineau *(INL)*

10:45 am: Standalone BISON Results from AP1000® Rod Ejection Demonstration in VERA, Shane Stimpson *(ORNL)*, Charles Folsom, Russell Gardner, Stephen Novascone, Richard Williamson *(INL)*

11:10 am: Estimation of Subcriticality in Dollar Units Based on Integral Method for Arbitrary State-Change in Subcritical System, Asahi Nonaka, Tomohiro Endo, Akio Yamamoto *(Nagoya Univ.)*

11:35 am: Metallic Fuel Design Space for Sodium Fast Reactors, Ryan Stewart, Todd S. Palmer *(Oregon State)*

12:00 pm: The Impact of Hydrogen Asymptotic Scattering Approximations on Thermal Reactor Analysis in Deterministic Multi-Group Approach, Hansol Park, Han Gyu Joo *(Seoul National Univ.)*

TECHNICAL SESSIONS - 1:30 PM

Computational Methods: General
Sponsored by MCD
Session Organizer: Steven P. Hamilton *(ORNL)* **Chair:** Rodolfo M. Ferrer *(Studsvik Scandpower)*
Location: Floridian G **Time:** 1:30-3:15 pm

1:35 pm: Unstructured CMFD Capability in MPACT, Brendan Kochunas, Ben C. Yee, Michael Jarrett *(Univ. Michigan)*

2:00 pm: Fast Exponential Function Approximations for the Method of Characteristics with Linear Source, Andrew Fitzgerald, Brendan Kochunas (*Univ. Michigan)*

2:25 pm: A Multi-Dimensional, Moment-Accelerated Deterministic Particle Method for Time-Dependent Thermal Radiative Transfer Problems, Hans Hammer, HyeongKae Park, Luis Chacon *(LANL)*

2:50 pm: Multigroup Deterministic Particle Solver for 1D Curvilinear Geometries, H. Park, L. Chacón, A. Matsekh, G. Chen, H. Hammer *(LANL)*

Technical Sessions: Wednesday November 14

WEDNESDAY, NOVEMBER 14
TECHNICAL SESSIONS - 1:30 PM

Nuclear Fuels and Materials in Fast Reactors—I
Sponsored by MSTD
Session Organizer: Kenneth J. Geelhood (*PNNL*) **Chair**: John R. Kennedy *(INL)*
Location: Floridian H **Time:** 1:30-3:40 pm

1:35 pm: A Mechanistic Creep Fracture Model for HT9 Failure Assessment, A. Karahan *(ANL)*

2:00 pm: Investigation on Creep-Fatigue Interaction of Fe-25Ni-20Cr Austenitic Stainless Steel (Alloy 709), A. S. Alomari *(NCSU & King Abdulaziz City Sci. Technol.)*, N. Kumar *(NCSU & Univ. Alabama)*, K. L. Murty *(NCSU)*

2:25 pm: Development of Experimental Capabilities for Fuels and Materials Testing in the Versatile Test Reactor, Dan Wachs, Kevan Weaver *(INL)*, Mitch Farmer *(ANL)*, Joel McDuffee *(ORNL)*, Piyush Sabharwal *(INL)*, Stu Malloy, D. V. Rao *(LANL)*, David Wooten *(PNNL)*, Tony Hill *(Idaho State)*, Sean McDeavitt *(Texas A&M)*

2:50 pm: Development of Thermal Conductivity Models for U-Zr and U-Pu Alloys, Weiming Chen *(Virginia Tech)*, Xian-Ming Bai *(Virginia Tech & INL)*

3:15 pm: Development of Advanced Low N Ferritic/Martensitic Steel for Reactor Applications, C. J. Rietema, A. J. Clarke *(Colorado School of Mines)*, T. A. Saleh, E. Aydogan *(LANL)*, O. Anderoglu *(Univ. New Mexico)*, K. D. Clarke *(Colorado School of Mines)*

Research by U.S. DOE NEUP Sponsored Students—II
Sponsored by ETWDD
Session Organizer and Chair: Andrew E. Thomas *(INL)*
Location: Floridian J **Time:** 1:30-3:40 pm

1:35 pm: A Robotic Platform for Testing Plasma Pen Decontamination, Christina Petlowany, Mitch Pryor *(U.T., Austin)*

2:00 pm: f-Element Solvent Extractions: A Microscale Study, Katherine Shield, Gauthier Deblonde, Rebecca J. Abergel *(U.C., Berkeley & LBNL)*

2:25 pm: Decontamination Experiments and Modeling for Large-Scale Urban Remediation, Katherine Hepler (Univ. Illinois), Michael D. Kaminski, William C. Jolin *(ANL)*

2:50 pm: Investigation on Mechanical Properties of the Diffusion Bonded Alloy 800H, Urmi Devi, Heramb Mahajan, Tasnim Hassan *(NCSU)*

3:15 pm: Gallium Thermal-Hydraulic Experimental (GaTE) Facility–Understanding Thermal Stratification or Mixing in SFRs, Brendan Ward, Hitesh Bindra *(Kansas State)*

Preview of the 2019 NPIC/HMIT Topical Meeting–Panel
Sponsored by HFICD
Session Organizer: Jamie Baalis Coble *(Univ of Tennessee Knoxville)* **Chair:** Jason Remer *(NEI)*
Location: Floridian K **Time:** 1:30-3:40 pm

Panelists: Brenden Heidrich *(INL)*, Richard Wood *(Univ of Tennessee, Knoxville)*

Critical and Subcritical Experiments—II
Sponsored by NCSD; **Cosponsored by** NNPD
Session Organizer: Jesson D. Hutchinson *(LANL)* **Chair:** William L. Myers *(LANL)*
Location: Floridian L **Time:** 1:30-3:40 pm

1:35 pm: Preliminary Benchmark Analysis of Component Critical Configuration of Kilowatt Reactor Using Stirling Technology *(KRUSTY)*, Kristin Smith *(Texas A&M)*, Jesson Hutchinson, Theresa Cutler, Rene Sanchez *(LANL)*

2:00 pm: Prompt Neutron Decay Constant Measurements on the KRUSTY Cold Critical Configuration, George McKenzie, John Bounds, Theresa Cutler, Travis Grove, David Poston, Rene Sanchez *(LANL)*

2:25 pm: The Zeus Assembly on Comet: Past, Present, and Future Benchmarks, T. Cutler, R. Bahran, J. Hutchinson, J. Goda, J. Bounds, G. Mckenzie, R. Sanchez, D. Hayes, B. Myers *(LANL)*

2:50 pm: Identifying Gaps in Critical Benchmarks, Nicholas Thompson (*LANL & IRSN)*, Rian Bahran, Jesson Hutchinson *(LANL)*

3:15 pm: Udpating the Godvia-IV Benchmark, Victoria Hagopian, Joetta Goda, Jesson Hutchinson, Robert Kimpland, George McKenzie *(LANL)*

WEDNESDAY, NOVEMBER 14
TECHNICAL SESSIONS - 1:30 PM

Progress in DOE's Nuclear Technology Research and Development Programs–Panel
Sponsored by FCWMD; **Cosponsored by** YMG
Session Organizer: Jack D. Law *(INL)* **Chair:** Terry A. Todd *(INL)*
Location: Bonnet Creek III **Time:** 1:30-3:40 pm

The objective of this session is to disseminate information and stimulate discussion regarding recent research and development (R&D) progress by early to mid-career researchers in the U.S. Department of Energy's (DOE's) Nuclear Technology Research and Development Program. The session will consist of technical presentations provided by researchers in several technical areas of the program. Talks will cover a broad range of subjects, including but not limited to: separation technologies, waste form development, innovative fuels, systems analysis, used fuel disposition, advanced reactor systems, material protection and control, and modeling/simulation in these areas. The participants will also be recognized by DOE for their contributions to the Program.

Panelists: Francesco Ganda *(ANL),* Christopher Matthews *(LANL),* Jake Amoroso *(SRNL),* Jeff Sanders *(INL),* David Richmond *(PNNL)*

Computational Tools for Radiation Protection and Shielding
Sponsored by RPSD
Session Organizer: Irina I. Popova *(ORNL)* **Chair:** Lawrence H. Heilbronn *(Univ of Tennessee, Knoxville)*
Location: Bonnet Creek IV **Time:** 1:30-3:15 pm

1:35 pm: Direct One Step Shutdown Dose Rate Calculation Method with Real Time Parameter Generation in SuperMC, Guomin Sun, Hancheng Song, Pengcheng Long, and FDS Team *(Inst. Nucl. Energy Safety Technol.)*

2:00 pm: Comparing Energy Structure Setup for Simple 1-D Response Functions for Neutron Transport in Air, Michael Lorne Fensin, Karen Corzine Kelley, Steven McCready *(LANL)*

2:25 pm: 3D Gamma Source Mapping and Intervention Analysis, Jeremy Hilsabeck *(Transco Products)*, Mike Davis *(NPO)*

2:50 pm: SENSMG: A New Tool for Multigroup Discrete Ordinates Sensitivity Analysis for Shielding, Jeffrey A. Favorite *(LANL)*

Reactor Physics in Test and Research Reactors—III
Sponsored by RPD
Session Organizer: Zeyun Wu *(Virginia Commonwealth Univ)*
Cochairs: Zeyun Wu *(Virginia Commonwealth Univ),* Yunlin Xu *(Purdue Univ)*
Location: Bonnet Creek V **Time:** 1:30-3:40 pm

1:35 pm: RMC/CTF Multiphysics Solutions to VERA Benchmark Problem 9, Yugao Ma *(Tsinghua Univ. & Nuclear Power Inst. China)*, Shichang Liu, Zhen Luo, Kan Wang, Ganglin Yu, Shanfang Huang *(Tsinghua Univ.)*

2:00 pm: Validation of the MC21 Advanced Test Reactor Critical Facility Model, Joseph Nielsen, David W. Nigg *(INL)*

2:25 pm: Using MCNP to Predict Reaction Rates in the Cadmium-Lined In-Core Facilities at the Oregon State TRIGA® Reactor, Robert Schickler, Todd Palmer *(Oregon State)*

2:50 pm: Verification of Transient Analysis Capability of RMC with TREAT Temperature Limited Transients from M8 Calibration Experiments, Junjie Rao, Xiaotong Shang, Kan Wang *(Tsinghua Univ.)*

3:15 pm: MIT Reactor Low Power Transient Tests in Support of Advanced Instrumentation in TREAT Facility, Kaichao Sun, David Carpenter, Michael Ames, Lin-wen Hu *(MIT)*

Technical Sessions: Wednesday November 14

WEDNESDAY, NOVEMBER 14
TECHNICAL SESSIONS - 1:30 PM

Reactor Physics: General—IV
Sponsored by RPD
Session Organizer: Pavel V. Tsvetkov *(Texas A&M)* **Cochairs:** Yunlin Xu *(Purdue Univ)*, Nicolas Stauff *(ANL)*
Location: Bonnet Creek VI **Time:** 1:30-3:40 pm

1:35 pm: Verification of Multidimensional Transport Calculation Capability of MC2-3 for Fast Reactor Analysis, Y. S. Jung, C. H. Lee *(ANL)*, W. S. Yang *(Univ. Michigan)*

2:00 pm: Molten Salt Reactor Analysis Capability of PROTEUS-NODAL, Y. S. Jung, C. H. Lee, M. A. Smith *(ANL)*, M. Jaradat, W. S. Yang *(Univ. Michigan)*

2:25 pm: RMC Solutions to 2D/3D All Kinetic Cases of C5G7-TD Benchmark, Guo Xiaoyu, Shang Xiaotong, Qiu Yishu, Cheng Quan, Song Jing, Li Zeguang, Wang Kan *(Tsinghua Univ.)*

2:50 pm: Real-Time Reactor Physics Modeling of CAP1400 Full-Scale Simulator, Su Wang, Gang Chen, Feng Shen *(State Power Investment Corp.)*

3:15 pm: Quasi-Static Methods Performance Comparison for Neutronics Transient Calculations, J. A. Blanco, P. Rubiolo *(LPSC)*, E. Dumonteil *(IRSN)*

TECHNICAL SESSIONS - 3:55 PM

Analytic Methods and Verification
Sponsored by MCD
Session Organizer: Steven P. Hamilton *(ORNL)* **Chair:** Travis J. Trahan *(LANL)*
Location: Floridian G **Time:** 3:55-5:40 pm

4:00 pm: Revisiting S_N Spatial Convergence Numerical Results for Various Slab-Geometry Discretization Schemes, Rodolfo Ferrer *(Studsvik Scandpower)*, Kord Smith *(MIT)*

4:25 pm: Analytic Solutions for a Homogeneous Sphere Derived Using Ray-Tracing, Jeffrey A. Favorite *(LANL)*

4:50 pm: An Extreme Benchmark for Monoenergetic Scattering in Hydrogen, B. D. Ganapol *(Texas A&M)*

5:15 pm: NEMoSys: A Platform for Adaptive Mesh Refinement and Solution Verification, Sachin R. Natesh, Masoud Safdari *(Illinois Rocstar)*

Nuclear Fuels and Materials in Fast Reactors—II
Sponsored by MSTD
Session Organizer: Gokul Vasudevamurthy *(General Atomics)* **Chair:** John R. Kennedy *(INL)*
Location: Floridian H **Time:** 3:55-5:15 pm

4:00 pm: Post Weld Heat Treatment and Tensile Strain Sensitivity of Zircaloy-4, Lauren M. Garrison *(ORNL)*, Chinthaka M. Silva *(TerraPower)*, Elizabeth G. Lindquist *(U.T., Knoxville)*

4:25 pm: Swelling Behavior of Fe-21Cr-32Ni Model Alloy, Muhammet Ayanoglu, Arthur T. Motta *(Penn State)*

4:50 pm: Low Temperature CVD Coating of Vanadium Carbide on the F/M Cladding Steel to Minimize Fuel Cladding Chemical Interaction, Kookhyun Jeong, Yong Yang *(Univ. Florida)*

[Grand Challenge] Expedite Licensing and Deployment of Advanced Reactor Designs–Panel
Sponsored by NISD
Session Organizer and Chair: Matthew R. Denman *(SNL)*
Location: Floridian I **Time:** 3:55-6:05 pm

"Expedite licensing and deployment of advanced reactor designs" as a grand challenge for ANS. To support the advancement of this challenge, a panel has been formed to discuss how various technologies, companies, organizations, and the NRC are ensuring that innovation can thrive while still protecting the health and safety of the public. This panel will provide a real-time prospective on the state of the future nuclear industry.

Panelists: Mark Holbrook *(INL)*, Amir Afzali *(Southern Company)*, George Apostolakis *(Nuclear Risk Research Center)*, Nicholas V. Smith *(Southern Company)*, Martin Stutzke *(NRC)*

WEDNESDAY, NOVEMBER 14
TECHNICAL SESSIONS - 3:55 PM

Cutting Edge Techniques in Education, Training and Distance Education
Sponsored by ETWDD
Session Organizer and Chair: Lisa M. Marshall *(NCSU)*
Location: Floridian J **Time:** 3:55-6:30 pm

4:00 pm: Conceptual Design of Fuel Assembly for Hybrid Low Power Research Reactor (H-LPRR), Kyungho Yoon, Hyung-Kyu Kim, Sunguk Lee, Yeon-seok Choo, Gyeong-ho Kim, Kyu-hong Noh *(KAERI)*

4:25 pm: An Educational Tool to Simulate γ-Rays Intensity Distribution Around Blocks, Yusuke Kunimi, Hideki Tenzou, Kai Yokoyama, Ayumi Nagoshi *(Kagawa College)*

4:50 pm: The CASL Education Program: A New Generation of LWR Designers, Scientists, and Nuclear Power Professionals, J. Michael Doster, Sherry B. Bailey *(NCSU)*

5:15 pm: Applying Bloom's Taxonomy to Role Definitions in the Nuclear Industry, Kirk D. Atkinson, Simon Jewer *(Defence Academy of the U.K.)*

5:40 pm: How to Write a Proposal: A Course for Graduate Students, Sheldon Landsberger *(U.T., Austin)*

6:05 pm: Making HU Tools and Techniques Effective: An Ingraining Strategy, Bruce O'Brien *(Marathon Consulting)*

Advanced Gen-IV Reactors—II
Sponsored by OPD
Session Organizer: Piyush Sabharwall *(INL)* **Chair:** William N. Mann *(Univ of Texas, Austin)*
Location: Floridian K **Time:** 3:55-4:50 pm

4:00 pm: Simplification of Nuclide Inventory Tracking for Recycled Fuel Elements at the Advanced Test Reactor, Nathan Manwaring, Daren Blight *(INL)*, Richard Christensen *(Univ. Idaho)*

4:25 pm: Experimental Study of Natural Circulation of Liquid Metal Simulated by Water, Min Ho Lee *(UNIST)*, Dong Wook Jerng *(Chung-Ang Univ.)*, In Cheol Bang *(UNIST)*

New Code Developments for Nuclear Criticality Safety Applications
Sponsored by NCSD; **Cosponsored by** RPD, MCD
Session Organizer and Chair: Luiz Carlos Leal *(IRSN)*
Location: Floridian L **Time:** 3:55-6:30 pm

4:00 pm: Evaluating the MCNP6.2 Correlated Fission Multiplicity Models for Criticality Calculations, Daniel Timmons *(Univ. New Mexico & LANL)*, Michael E. Rising *(LANL)*, Anil K. Prinja *(Univ. New Mexico)*

4:25 pm: A Case Study in the Application of TSUNAMI-3D – Part 3, Continuous Energy – Iterative Fission Probability Method, E. L. Jones *(U.T., Knoxville)*, J. B. Clarity, W. J. Marshall, B. T. Rearden *(ORNL)*, G. I. Maldonado *(ORNL & U.T., Knoxville)*

4:50 pm: SCALE Resonance Parameter Sensitivity Coefficient Calculations, Christopher M. Perfetti *(Univ. New Mexico)*, Vladimir Sobes, Andrew M. Holcomb, Dorothea Wiarda, Mark L. Williams, Bradley T. Rearden *(ORNL)*

5:15 pm: Towards a Better Thermal Neutron Scattering Law Generation: oClimax + NJOY2016, Kemal Ramíc, Carl Wendorff, Jinghua Feng, Yaron Danon, Li (Emily) Liu *(RPI)*

5:40 pm: An OpenFOAM Solver for Criticality Safety Assessment in Dynamic Compression Events, Eric Cervi, Stefano Lorenzi, Lelio Luzzi, Antonio Cammi *(Politecnico di Milano)*

6:05 pm: SENSMG: A New Tool for Multigroup Discrete Ordinates Sensitivity Analysis for Criticality, Jeffrey A. Favorite *(LANL)*

Fuel Cycle and Waste Management: General—I
Sponsored by FCWMD
Session Organizer and Chair: Stephanie H. Bruffey *(ORNL)*
Location: Bonnet Creek III **Time:** 3:55-6:05 pm

4:00 pm: Comparison of the SPC/E and SPC/Fw Water Models for ALSEP Extraction, An T. Ta, Govind A. Hegde, Mark P. Jensen, Shubham Vyas *(Colorado School of Mines)*

4:25 pm: Fuel Debris Treatment with the Fluorination Technology, Tetsuo Fukasawa, Kuniyoshi Hoshino, Keita Endo *(Hitachi-GE)*

4:50 pm: Practical Research on Flexible HLW Management System for MA Recovery, Akihiro Suzuki *(Nippon Nuclear Fuel)*, Yaohiro Inagaki *(Kyusyu Univ.)*, Tatsuro Matsumura *(JAEA)*, Yusa Muroya *(Osaka Univ.)*, Tetsuo Fukasawa *(Hitachi)*

5:15 pm: Granulation Behavior of Simulated High Level Waste by Rotary Kiln, Yoichi Endo, Akihiro Suzuki *(Nippon Nuclear Fuel Development)*

5:40 pm: Industrywide Learning Aging Management Program (i-LAMP) for Neutron Absorber Material Monitoring in Spent Fuel Pools, Hatice Akkurt, Emma Wong *(EPRI)*

WEDNESDAY, NOVEMBER 14

TECHNICAL SESSIONS - 3:55 PM

Innovations in Nuclear Technology R&D Awards

Sponsored by ETWDD
Session Organizer: Cathy S. Dixon *(West Texas A&M Univ)* **Chair:** Daniel Vega *(DOE)*
Location: Bonnet Creek IV **Time:** 3:55-6:55 pm

4:00 pm: Pronghorn: Porous Media Thermal-Hydraulics for Reactor Applications, April J. Novak *(U.C., Berkeley)*, Ling Zou, John W. Peterson, Richard C. Martineau *(INL)*, Rachel N. Slaybaugh *(U.C., Berkeley)*

4:25 pm: Application of Multiple Ion Beam Irradiation for the Study of Radiation Damage in Materials, S. Taller, Z. Jiao, G. S. Was *(Univ. Michigan)*

4:50 pm: Mobility of Aqueous and Colloidal Neptunium Species in Field Lysimeter Experiments, Kathryn M. Peruski, Melody Maloubier *(Clemson)*, Daniel I. Kaplan *(SRNL)*, Brian A. Powell *(Clemson)*

5:15 pm: Wearable Detector Device Utilizing Microstructured Semiconductor Neutron Detectors, T. R. Ochs *(Kansas State)*, B. L. Beatty *(Alion Sci. Technol. Corp.)*, S. L. Bellinger *(Rad. Detection Technol. Inc.)*, R. G. Fronk *(Kansas State)*, J. A. Gardner *(Alion Sci. Technol. Corp.)*, L. C. Henson *(Rad. Detection Technol. Inc.)*, D. E. Huddleston, R. M. Hutchins, T. J. Sobering *(Kansas State)*, J. L. Thompson *(Alion Sci. Technol. Corp.)*, A. Van Bergeijk, D. S. McGregor *(Kansas State)*

5:40 pm: Multi-Electron Processes by Neodymium Complexes Assisted by Redox-Active Ligands, Ezra J. Coughlin, Matthias Zeller, Suzanne C. Bart *(Purdue)*

6:05 pm: Preliminary Reliability Analysis of Molten Salt Reactor Experiment Freeze Valves, Brandon Chisholm, Steven Krahn, Paul Marotta *(Vanderbilt)*, Andrew Sowder *(EPRI)*, Nick Smith *(Southern)*

6:30 pm: Efficient Capture of Pertechnetate by a Mesoporous–Organic Framework and Crystallographic Examination of Binding Motifs, Riki J. Drout, Ken-ichi Otake, Ashlee H. Howarth, Timur Islamoglu *(Northwestern Univ)* Jiang Su *(Higher Education Institution)*, Omar K. Farha *(Northwestern Univ/King Abdulaziz Univ)*

Reactor Analysis Methods—III

Sponsored by RPD
Session Organizer: Pavel V. Tsvetkov *(Texas A&M)* **Cochairs:** William J. Walters *(PSU)*, Javier Ortensi *(INL)*
Location: Bonnet Creek V **Time:** 3:55-6:05 pm

4:00 pm: A Hybrid Acceleration Method to Pin-by-Pin Calculations Using the Heterogeneous Variational Nodal Method, Tengfei Zhang, Xiaojing Liu, Jinbiao Xiong, Xiang Chai *(Shanghai Jiao Tong Univ.)*, Hongchun Wu, Liangzhi Cao *(Xi' an Jiaotong Univ.)*

4:25 pm: Reduction of Cross Section Table Size for Core Analysis Using Dimensionality Reduction Technique, Masato Yamamoto, Tomohiro Endo, Akio Yamamoto *(Nagoya Univ.)*

4:50 pm: A Leakage Correction with SPH Factors for Two-Group Cross-Section in GET-Based Pin-by-Pin Core Analysis, Hwanyeal Yu, Woosong Kim, Yonghee Kim *(KAIST)*

5:15 pm: Temperature Feedback Using the Fission Matrix for a TRIGA Reactor, Tyler J. Topham, William J. Walters *(Penn State)*

5:40 pm: Spatially Dependent Kinetic Calculations with Explicit Fission Product Model, Koji Katagiri, Go Chiba *(Hokkaido Univ.)*

Reactor Physics: General—V

Sponsored by RPD
Session Organizer: Pavel V. Tsvetkov *(Texas A&M)* **Chair:** Alberto Talamo *(ANL)*
Location: Bonnet Creek VI **Time:** 3:55-6:30 pm

4:00 pm: Up-to-Date Results of BEAVRS Two-Cycle Benchmark with Internal Couping Between RMC and CTF, Kaiwen Li, Shichang Liu, Juanjuan Guo, Kan Wang *(Tsinghua Univ.)*

4:25 pm: Proposal of Reverse Sampling Method as an Efficient Random Sampling Method, Shunsuke Nihira, Go Chiba *(Hokkaido Univ.)*

4:50 pm: Application of MCS to Monte Carlo Whole-Core Depletion Analysis of Yonggwang Unit 3 Cycle 1, Tuan Quoc Tran, Hyunsuk Lee, Jiwon Choe, Sooyong Choi, Yonggmin Jo, Deokjung Lee *(UNIST)*

5:15 pm: Resonance Integral Validation for MPACT with Hellstrand's Experiments, Yuxuan Liu, Xinyan Wang, William R. Martin *(Univ. Michigan)*

5:40 pm: Target Velocity Sampling for Resonance Elastic Scattering Using Windowed Multipole Cross Section Data, Jingang Liang, Pablo Ducru, Benoit Forget *(MIT)*

6:05 pm: Neutronic Optimization of the Reflector for a Soluble-Boron-Free Small Modular Reactor ATOM, Xuan Ha Nguyen, Hwanyeal Yu, Yonghee Kim *(KAIST)*

THURSDAY, NOVEMBER 15

Reduced Order Modeling
Sponsored by MCD
Session Organizer: Steven P. Hamilton *(ORNL)* **Chair:** Jeremy Roberts *(KSU)*
Location: Floridian G **Time:** 8:00-9:45 am

8:05 am: Analysis of the LRA Reactor Benchmark Using Dynamic Mode Decomposition, Mohammad Abdo, Rabab Elzohery, Jeremy A. Roberts *(Kansas State)*

8:30 am: A Reduced-Order Neutron Transport Model Separated in Space and Angle, Kurt A. Dominesey, Jaron P. Senecal, Wei Ji *(RPI)*

8:55 am: Reduced Order Modeling of Non-Linear Radiation Diffusion via Proper Generalized Decomposition, Anthony L. Alberti, Todd S. Palmer *(Oregon State)*

9:20 am: Application of Proper Generalized Decomposition to Heterogeneous Diffusion-Reaction Problems, Zachary M. Prince, Jean C. Ragusa *(Texas A&M)*

Advanced Measurement Techniques, Fuels, and Reactors—I
Sponsored by MSTD
Session Organizer and Chair: Kenneth J. Geelhood *(PNNL)*
Location: Floridian H **Time:** 8:00-10:10 am

8:05 am: Temperature Sensing Using Type-II FBGs in Sapphire Optical Fiber in a Reactor, Brandon A. Wilson, Kelly M. McCary, Thomas E. Blue *(Ohio State)*

8:30 am: Diamond Semiconductor-Based Gamma-Ray Detector for a Severe Environment, Katsunori Ueno, Keisuke Sasaki *(Hitachi)*, Junichi Kaneko *(Hokkaido Univ.)*

8:55 am: Investigation of Flow Accelerated Corrosion Behavior of Carbon Steels and Low Alloy Steels via Synchrotron Scanning Tunneling X-Ray Microscopy, Seunghyun Kim, Taeho Kim, Yunju Lee, Ji Hyun Kim *(UNIST)*

9:20 am: Optimizing Moderator Thickness for Reactor Based Positron Sources, Raed Alsulami, Mubarak Albarqi *(Missouri Univ. Sci. Technol. and King Abdulaziz City Sci. Technol.)*, Joseph Graham, Shoaib Usman *(Missouri Univ. Sci. Technol.)*

9:45 am: Design and Modeling of a Neutron Depth Profiling System for the MS&T Nuclear Reactor Beam Port, Mubarak Albarqi, Raed Alsulami *(Missouri Univ. Sci. Technol. & King Abdulaziz City Sci. Technol.)*, Joseph Graham *(Missouri Univ. Sci. Technol.)*

Nuclear Installations Safety: General—II
Sponsored by NISD
Session Organizer and Chair: Girija S. Shukla *(NRC)*
Location: Floridian I **Time:** 8:00-8:55 am

8:05 am: Derivation and Comparison of FLEXPART and Gaussian Plume Models, Matthew J. Krupcale, Megan E. Harkema, John C. Lee *(Univ. Michigan)*

8:30 am: Safety and Safeguards by Design — Glove Box In-Line Waste Assay System, Andrew Elloso, Ryan Murphy, Robert Simpson, Thomas Sullivan, Bahram Nassersharif *(Univ. Rhode Island)*

Research by U.S. DOE NEUP Sponsored Students—III
Sponsored by ETWDD
Session Organizer: Andrew E. Thomas *(INL)* **Chair:** Cheree Novich *(INL)*
Location: Bonnet Creek VII **Time:** 8:00-9:45 am

8:05 am: Wear of Ni Alloys at Elevated Temperature (950°C) Under Helium Environment for Nuclear Reactor Applications, Md Saifur Rahman, Andreas A. Polycarpou *(Texas A&M)*

8:30 am: Probability Analysis of Velocity Distribution in a Facility of Randomly Packed Spheres Featuring Matching-Refractive-Index and Time-Resolved PIV Techniques, S. King, E. Kappes, D. T. Nguyen, Y. A. Hassan, V. Ugaz *(Texas A&M)*

8:55 am: Integration of Multiple Techniques for Air-Water Two-Phase Flow Measurement, D. Wang, K. Song, Y. Fu, Y. Liu *(Virginia Tech)*

9:20 am: High Resolution Transverse Plane PIV Measurements of a 61-Pin LMFBR Fuel Bundle, N. Goth, L. L. A. White, W. Headley, D. T. Nguyen, R. Vaghetto, Y. A. Hassan *(Texas A&M)*

9:45 am: Design of Validation Experiments for Model Improvement of Dispersed Flow Film Boiling in COBRA-TF, Xiaoqin Zhang, Yang Liu, Xiaodong Sun *(Univ. Michigan)*, Nam Dinh *(NCSU)*

THURSDAY, NOVEMBER 15

Technical Sessions: Thursday November 15

TECHNICAL SESSIONS - 8:00 AM

Data, Analysis, and Operations in Nuclear Criticality Safety—III

Sponsored by NCSD
Session Organizer: Theresa E. Cutler *(LANL)* **Chair:** Sandra L. Larson *(21CGI)*
Location: Bonnet Creek VIII **Time:** 8:00-10:10 am

8:05 am: Moderator Evaluation of Non-Water Hydrogenous Materials, Lewis T. Kotredes, Isaac J. Bratton, Christian Erk, Daniel P. Harris *(Naval Nuclear Lab)*

8:30 am: Neptunium Sphere Subcritical Observation (NeSO) Final Experiment Design Update, Alex McSpaden, Theresa Cutler, Rian Bahran, Jesson Hutchinson *(LANL)*

8:55 am: Additive Manufacturing Applications in Nuclear Criticality Safety, Marsha L. Bartholomay *(Y-12)*

9:20 am: Sensitivity Calculations for Systems with Fissionable Reflector Materials Using TSUNAMI, W. J. Marshall, J. B. Clarity, E. M. Saylor *(ORNL)*

9:45 am: Development of a First-Principles Hydrogen Vibrational Spectrum in Liquid H2O, Andrew Antony, Ayman I. Hawari *(NCSU)*

Fuel Cycle and Waste Management: General—II

Sponsored by FCWMD
Session Organizer: Stephanie H. Bruffey *(ORNL)* **Chair:** Jean-Francois Lucchini *(LANL)*
Location: Bonnet Creek XI **Time:** 8:00-10:10 am

8:05 am: The Safeguardability Analysis of the Pyroprocessing Facility, Wentao Zhou *(Shanghai Jiao Tong Univ.)*, Jinsuo Zhang *(Virginia Tech)*, Marat Khafizov *(Ohio State)*, Weiguo Gu *(Shanghai Jiao Tong Univ.)*

8:30 am: Helium Bubble Formation in Neutron Absorber Material Irradiated in Spent Nuclear Fuel Pool, Yunsong Jung, Kiyoung Kim *(Korea Hydro & Nuclear Power Co.)*, Sangjoon Ahn *(UNIST)*

8:55 am: Feasibility of Ultrasonic Temperature Sensor Based on Magnetostrictive Principles, Eun Ju Yoo, Youngwoo Park, Myounggyu D. Noh *(Chungnam National Univ.)*

9:20 am: Conceptual Design of Sensor Transport System with Tunable Magnetic Force, So-Hee Park, Young-Woo Park, Myounggyu D. Noh *(Chungnam National Univ.)*

9:45 am: Spent Fuel Analysis Using Six Group Delayed Neutron Parameters, T. Akyurek *(Marmara Univ.)*, S. Usman *(Missouri Univ. Sci. Technol.)*

Results from the Nuclear Futures Discussion on Community Engagement–Panel

Sponsored by OPD
Session Organizer and Chair: Todd R. Allen *(Univ of Wisconsin, Madison)*
Location: Nassau **Time:** 8:00-10:10 am

In the 1950s, there was exuberance for nuclear energy and the belief that energy from the atom was the future. But after an initial surge in nuclear deployments, the rate of additions in the United States slowed as challenges due to cost and environmental concerns arose. Recently, the nuclear community has embraced the idea that innovation is needed to get beyond a single product (gigawatt-scale electricity production machines) and to provide new functions demanded by a 21st century energy system. In May 2018, 31 experts gathered to discuss what are the key questions that communities must to answer to embrace a new generation of nuclear products. Four of the participants will provide their perspectives from the workshop.

Panelists: Shannon Bragg-Sitton *(INL),* John Jackson *(INL),* Amy Schweikert (*CSM),* Lenka Kollar *(NuScale)*

Reactor Analysis Methods—IV

Sponsored by RPD
Session Organizer: Pavel V. Tsvetkov *(Texas A&M)* **Cochairs:** Cole Mueller *(Texas A&M)*, Pavel Tsvetkov *(Texas A&M)*
Location: Manatee **Time:** 8:00-10:10 am

8:05 am: The Implicit Runge Kutta Method for Solving Point Burnup Equations, Yun Cai, Xingjie Peng, Qing Li, Dong Qin, Zhumin Jiang *(Nuclear Power Inst. China)*

8:30 am: A Diffusion-Based 3D FEM Analysis for Assessment of Reactivity Change due to Support Plate Expansion and Localized Flowering in an SFR, Woong Heo, Yonghee Kim *(KAIST)*

8:55 am: Research on Homogenization Theory of Random Geometry in the RMC Code, Gaochen Wu *(Tsinghua Univ.)*, Massimiliano Fratoni *(U.C., Berkeley)*, Kan Wang *(Tsinghua Univ.)*

9:20 am: Implementation of Monte Carlo Code RMC on Advanced Heterogeneous Architecture, Xin Ye, Zhen Luo, Ganglin Yu, Kan Wang *(Tsinghua Univ.)*

9:45 am: Verification and Validation of DeCART2D/CAPP Code System Using the VHTRC Benchmark, Sung Hoon Choi, Chang Keun Keun Jo, Tae Young Han, Seungsu Yuk *(KAERI)*

THURSDAY, NOVEMBER 15

Advanced Measurement Techniques, Fuels, and Reactors—II

Sponsored by MSTD
Session Organizer: Gokul Vasudevamurthy *(General Atomics)* **Chair:** Kenneth J. Geelhood *(PNNL)*
Location: Floridian H **Time:** 10:25 am-12:10 pm

10:30 am: Multiphysics Simulation of IG-110 Oxidation by Moisture Under MHTGR Normal Operation Conditions, Chengqi Wang, Xiaodong Sun *(Univ. Michigan)*, Richard N. Christensen *(Ohio State & Univ. Idaho)*

10:55 am: Neutron Resonance Radiography and Application to Nuclear Fuel Materials, Yuxuan Zhang, Kristian G. Myhre, Hassina Z. Bilheux *(ORNL)*, Anton S. Tremsin *(U.C., Berkeley)*, Jared A. Johnson, Jean-Christophe Bilheux, Andrew J. Miskowiec, Rodney D. Hunt, Louis J. Santodonato, Jamie J. Molaison *(ORNL)*

11:20 am: Characterization of Boiling Characteristics of Accident Tolerant Fuel (ATF) Cladding Surfaces, HangJin Jo, Hwasung Yeom, Emilio Gutierrez, Kumar Sridharan, Michael Corradini *(U.W., Madison)*

11:45 am: Thermal Conductivity of UO_2-U_3Si_2 Composite Fuel Surrogate, Jungsu Ahn, Gyeonghun Kim, Sangjoon Ahn *(UNIST)*

Research by U.S. DOE NEUP Sponsored Students—IV

Sponsored by ETWDD
Session Organizer: Andrew E. Thomas *(INL)* **Chair:** Cheree Novich *(INL)*
Location: Bonnet Creek VII **Time**: 10:25 am-12:10 pm

10:30 am: Characterization of Flow Instabilities in MHD Pump Systems, Mohammed Shutayfi, Josh Morsell, Steven Shannon *(NCSU)*

10:55 am: Thermal Stratification Modeling and Analysis for Sodium Fast Reactor Technology, James Schneider, Mark Anderson *(U.W., Madison)*, Emilio Baglietto *(MIT)*, Sama Bilbao y Leon (Virginia Commonwealth), Matthew Bucknor *(ANL)*, Sarah Morgan (*Virginia Commonwealth)*, Matthew Weathered *(ANL)*, Zeyun Wu *(Virginia Commonwealth)*, Liangyu Xu *(MIT)*

11:20 am: Distributed Wall Temperature Measurements in a Scaled Water-Cooled RCCS, David Holler, Rodolfo Vaghetto, Yassin Hassan *(Texas A&M)*

11:45 am: Scaling Analysis of a Debris Bed for Salt Deposition Studies, Zayed Ahmed, Hitesh Bindra, Steven Eckels *(Kansas State)*

ANS-8 Standards Forum

Sponsored by NCSD
Session Organizer and Chair: Douglas G. Bowen *(ORNL)*
Location: Bonnet Creek VIII **Time:** 10:25 am-12:35 pm

Panelists to be announced.

Application and Challenges in CFD-Neutronics Coupling

Sponsored by RPD
Session Organizer: Manuele Aufiero *(Univ of California, Berkeley)* **Chair:** Pavel V. Tsvetkov *(Texas A&M)*
Location: Orange **Time:** 10:25-11:20 am

10:30 am: Performance Analysis of the Coupling Schemes for CFD and MOC Codes, Guangliang Chen *(Harbin Univ.)*, Yang Yu, Weihua Yao, Dong Liu, Jiachang Wang *(Nuclear Power Inst. China)*, Zhijian Zhang, Zhaofei Tian, Lei Li *(Harbin Univ.)*

10:55 am: A Design Study of an Aqueous Homogeneous Fission System Using Neutronic-Thermal Hydraulic Coupled Calculation, Seung Jun Kim, Cynthia Buechler *(LANL)*

Embedded Topical Meeting

Embedded Topical Meeting: Advances in Nuclear Nonproliferation Technology and Policy Conference (ANTPC 2018)

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ANTPC 2018 Schedule at a Glance

Monday, November 12

1:00-2:20 pm	Contemporary Practice of Nonproliferation Policy	Flagler
1:00-3:15 pm	Challenges to Computational Radiation Transport Methods in Nuclear Security Applications—I	Gilchrist
2:45-3:40 pm	Weapons-Usable Material Minimization	Flagler
3:50-5:35 pm	Pyroprocessing Material Control mand Accountancy Strategies	Flagler
3:50-5:35 pm	Challenges to Computational Radiation Transport Methods and Nuclear Security—II	Gilchrist

Tuesday, November 13

10:15 am-12:00 pm	Enhancements to Nuclear Data	Flagler
10:15 am-12:00 pm	Sensitivity and Uncertainty Analysis	Gilchrist
11:30 am-1:30 pm	ANTPC Poster Session	Bonnet Creek Salon VII-IX
1:30-3:40 pm	Data Synthesis for Pyroprocessing Safeguards	Flagler
1:30-3:40 pm	Technologies for Arms Control & International Safeguards Verification	Gilchrist
3:55-6:05 pm	Nondestructive and Destructive Assay Methods	Flagler
3:55-4:50 pm	Detection Using Advanced Data Science Methods	Gilchrist
4:55-6:05 pm	Risks of Proliferation–Panel	Gilchrist

Wednesday, November 14

10:15 am-12:00 pm	Human Capital Development	Bonnet Creek VII
1:30-3:40 pm	Education and Training in Nonproliferation–Panel	Bonnet Creek VII
1:30-3:40 pm	Techniques for Nuclear Forensics and Environmental Sampling	Bonnet Creek VIII

MONDAY, NOVEMBER 12
TECHNICAL SESSIONS - 1:00 PM

Contemporary Practice of Nonproliferation Policy
Chair: Camille Parker *(Oregon State Univ.)*
Location: Flagler **Time:** 1:00-2:20 pm

1:05 pm: Rightsizing Export Control Requirements for Light Water Reactor Technology, Steven P. Nesbit *(Duke Energy)*, Paul Dickman *(ANL)*, Craig Piercy *(ANS)*

1:30 pm: Nuclear Security Culture Assessment of Nonnuclear Facilities, Jason T. Harris, Shraddha Rane *(Purdue Univ.)*

1:55 pm: 2018 NTI Nuclear Security Index Findings, Page O. Stoutland, Erin D. Dumbacher *(NTI)*

Challenges to Computational Radiation Transport Methods in Nuclear Security Applications—I, All invited
Chair: Yousry Azmy *(NCSU)*
Location: Gilchrist **Time:** 1:00-3:15 pm

1:05 pm: Rapid 1-D and 3-D Radiation Transport and Detection Response, Dean Mitchell, Gregory Thoreson, Steven Horne *(SNL)*

1:30 pm: Recent Developments and Emerging Research Challenges in Monte Carlo Transport Sensitivity Methods for Nuclear Nonproliferation, Brian C. Kiedrowski *(Univ. Michigan)*, Timothy P. Burke *(LANL)*

1:55 pm: On the Application of the Discrete Ordinates Method to Fixed-Source Problems *(Forward and Adjoint)*, Jeffrey A. Favorite *(LANL)*

2:20 pm: Mitigation of Ray Effects in S_N Solutions Through Monte Carlo Coupling, Nicholas F. Herring, Raffi A. Yessayan *(NCSU)*, Kyle A. Beyer, Robert J. Fonti, Evan S. Gonzalez, Evan C. Leppink, Blake D. Rucinski *(Univ. Michigan)*, Sebastian Schunert *(INL)*, Yousry Y. Azmy *(NCSU)*, Brian C. Kiedrowski *(Univ. Michigan)*

2:45 pm: Hammer: A Monte Carlo Particle Transport Solver to Support Nonproliferation Applications of the THOR Deterministic S_N Code, Evan S. Gonzalez, Kyle A. Beyer, Robert J. Fonti, Evan C. Leppink, Blake D. Rucinski *(Univ. Michigan)*, Nicholas F. Herring, Raffi Yessayan *(NCSU)*, Sebastian Schunert *(INL)*, Brian C. Kiedrowski *(Univ. Michigan)*, Yousry Y. Azmy *(NCSU)*, invited

TECHNICAL SESSIONS - 2:45 PM

Weapons-Usable Material Minimization
Cochairs: Jim Stubbins (Univ. of Illinois), John Mattingly (NCSU)
Location: Flagler **Time:** 2:45-3:40 pm

2:50 pm: High Flux Isotope Reactor Low-Enriched Uranium Core Designs and Challenges, D. Chandler, B. R. Betzler, G. Ilas, D. H. Cook, D. G. Renfro *(ORNL)*

3:15 pm: Progress Toward Eliminating Use of HEU in Mo-99 Production with a Multi-Physics Simulation, Seung Jun Kim, Cynthia Eileen Buechler, Alexander Joseph Wass, Joetta Marie Goda *(LANL)*

Embedded Topical: Advances in Nonproliferation Technology and Policy Conference (ANTPC) 2018

MONDAY, NOVEMBER 12
TECHNICAL SESSIONS - 3:50 PM

Pyroprocessing Material Control and Accountancy Strategies
Chair: Steven Skutnik (UTK)
Location: Flagler **Time:** 3:50-5:35 pm

3:55 pm: PyRe: A Cyclus Pyroprocessing Facility Archetype, Gregory T. Westphal, Kathryn D. Huff *(UIUC)*

4:20 pm: Pyroprocessing Safeguards Approach, Benjamin B. Cipiti, Nathan Shoman *(SNL)*

4:45 pm: Safeguards Analysis of Pyroprocessing Product Ingot Diversions Possible Through Neutron Source Substitutions, Heukjin Boo, Seung Min Woo, Sunil S. Chirayath *(Texas A&M)*

5:10 pm: (α,n) Source Terms as a Novel Signature for Pyroprocessing Safeguards, Nathan Gilliam, Jamie Coble, Steven Skutnik *(UTK)*

Challenges to Computational Radiation Transport Methods and Nuclear Security—II
Chair: Avneet Sood *(LANL)*
Location: Gilchrist **Time:** 3:50-5:35 pm

3:55 pm: Experimental Application of Bayesian Inference to Wide Area Urban Source Search, John Mattingly, Jason Hite *(NCSU)*, invited

4:20 pm: Validation and Detector Location Sensitivity Analysis of the DIMP Inverse Particle Transport Model, Noel Nelson, Yousry Azmy *(NCSU)*

4:45 pm: MCNPX-PoliMi Applications in Nuclear Security, S. A. Pozzi, S. D. Clarke, M. J. Marcath, T. H. Shin *(Univ. Michigan)*

TUESDAY, NOVEMBER 13
TECHNICAL SESSIONS - 10:15 AM

Enhancements to Nuclear Data
Chair: Jeffrey A. Favorite *(LANL)*
Location: Flagler **Time:** 10:15 am-12:00 pm

10:20 am: ^{17,18}O(α,n) Evaluated Cross Sections to Improve National Security Applications, Marco T. Pigni, Ian C. Gauld, Stephen Croft *(ORNL)*

10:45 am: How Accurately Do We Know the Standard ^{252}Cf(sf) Neutron Multiplicity?, R. Capote *(IAEA)*, D. Neudecker *(LANL)*

11:10 am: A Neutron Multiplicity Measurement Parameter for Neutron Source Verification, Alex McSpaden, Mark Nelson, Jesson Hutchinson *(LANL)*

11:35 am: Validation of MCNP6® Using Subcritical Benchmark Experiments, Jennifer A. Arthur, Michael E. Rising, Jesson D. Hutchinson, Alexander T. McSpaden, Rian M. Bahran *(LANL)*

Sensitivity and Uncertainty Analysis
Chair: Yousry Azmy *(NCSU)*
Location: Gilchrist **Time:** 10:15 am-12:25 pm

10:20 am: Statistical Analysis of Fission Product Concentration Uncertainties from MCNP6 Multi-Time Step Depletion Calculation, Yasuhiro Minamigawa, Evans D. Kitcher, Sunil Sunny Chirayath *(Texas A&M)*

10:45 am: Uncertainty Analysis for Neutron Active Interrogation Calculations, Keith C. Bledsoe, Matthew A. Jessee, Douglas E. Peplow *(ORNL)*

11:10 am: Uncertainty Analysis of Fission Product Concentrations in MCNP Depletion Calculations, Robert Schafer, Evans D. Kitcher, Sunil S. Chirayath *(Texas A&M)*

11:35 am: Sensitivity Analysis and Optimization of Cf-252(sf) Observables in CGMF, Austin Carter *(Univ. Michigan, LANL)*, Brian Kiedrowski *(Univ. Michigan)*, Patrick Talou *(LANL)*

12:00 am: Assessing Material Inventory Uncertainties in Integrated Fuel Cycle Simulations, Baptiste Mouginot, Kathryn Mummah, Paul P.H. Wilson *(Univ. Wisconsin–Madison)*

TUESDAY, NOVEMBER 13
POSTER SESSION - 11:30 AM

Poster Session
Location: Bonnet Creek Salon VII-IX **Time:** 11:30 am-1:30 pm

Analysis and Modeling Methods in Nonproliferation
Degree of Separation Invariance of the Prompt Neutron Decay Constant, Michael Hua *(LANL)*, Jesson Hutchinson, Geordie McKenzie, Alex McSpaden, and Mark Nelson

Analysis and Modeling Methods in Nonproliferation
Determining Shielding Configuration of Neutron Sources Using a Genetic Algorithm and Monte Carlo Libraries, John Stooksbury, Nolan Hertel *(Georgia Tech)*

Nonproliferation Policy: Present and Future
Russia's Geopolitical and Expansionist Playbook: How Missiles and Sharp Power are Used to Reclaim Lost Power, Brandon Cortino *(NCSU)*

Nuclear Material Control and Accountability
Simulation Optimization for the Creation of Training Data for Deep Learning Aided X-Ray Radiography in International Safeguards, Wesley Gillis *(Georgia Inst of Technology)*, Anna Erickson

Analysis and Modeling Methods in Nonproliferation
Selecting a UO_2 Empirical PotentialSean Masengale, Emily Togaga'e *(Brigham Young Univ-Idaho)*, Evan Hansen, Yongfeng Zhang

Nonproliferation Policy: Present and Future
Countering Russian Non-Strategic Nuclear Weapons, Maxwell Mueller *(United States Military Academy)*

Analysis and Modeling Methods in Nonproliferation
Foil Activation Analysis for Neutron Spectrum Unfolding, Zachary Sweger *(LBNL)*, James Bevins, Ninad Munshi, Bethany Goldblum, Darren Bleuel, Rachel Slaybaugh

Other
Irradiation of an Avalanche Photodiode to Achieve Increased Gain In Signal Output, Robert Zedric *(Texas A&M Univ)*, Iain Darby, Yacouba Diawara, Craig Marianno, Sunil Chirayath

Nonproliferation Education and Training
Mid/Early-Career Deter-Detect-Prevent Advanced Leadership (MEDAL) Program at LANL, Rian Bahran *(LANL*, Karen Miller, Sean McDonald, Chloe Verschuren

Analysis and Modeling Methods in Nonproliferation
Communication Performance Degradation of the Radiation Transport Code PIDOTS on Massively Parallel, High-Utilization, Multi-User HPC Systems, Raffi Yessayan *(NCSU)*, Yousry Azmy

Analysis and Modeling Methods in Nonproliferation
Adjoint-Based Parameter Estimation Applied to Neutron Multiplicity Counting Experiments, Alexander Clark, John Mattingly *(NCSU)*

TECHNICAL SESSIONS - 1:30 PM

Data Synthesis for Pyroprocessing Safeguards
Chair: R. A. Borrelli *(Univ. Idaho)*
Location: Flagler **Time:** 1:30-3:40 pm

1:35 pm: A Signatures-Based Approach to Electrochemical Reprocessing Safeguards Modeling and Evaluation, Steven E. Skutnik, Jamie B. Coble, Amanda M. Bachmann, Michael P. Cooper, Nathan Gilliam, Jonathan T. Mitchell *(UTK)*

2:00 pm: Elemental and Isotopic Concentration Tracking for Electrochemical Reprocessing Safeguards, Amanda Bachmann, Jamie Coble, Steven Skutnik *(UTK)*

2:25 pm: Applying Radiological Signatures Information for Electrochemical Reprocessing Safeguards, Nathan Gilliam, Jamie Coble, Steven Skutnik *(UTK)*

2:50 pm: Source Term Development and Response Analysis for HKED Simulation in Electrochemical Reprocessing, Jonathan Mitchell, Michael Cooper, Steven Skutnik, Jamie Coble *(UTK)*

3:15 pm: A Semi-Empirical HKED Model for Pyroprocessing Safeguards Evaluation, Michael Cooper, Steven Skutnik, Jonathan Mitchell *(UTK)*

Embedded Topical: Advances in Nonproliferation Technology and Policy Conference (ANTPC) 2018

TUESDAY, NOVEMBER 13
TECHNICAL SESSIONS - 1:30 PM

Technologies for Arms Control and International Safeguards Verification
Chair: Jared Johnson *(ORNL)*
Location: Gilchrist **Time:** 1:30-3:40 pm

1:35 pm: Using Neutron Anisotropy as an Attribute for Arms-Control Verification, Tony H. Shin, Angela Di Fulvio, Shaun D. Clarke *(Univ. Michigan)*, David L. Chichester *(INL)*, Sara A. Pozzi *(Univ. Michigan)*

2:00 pm: Warhead Verification Experiments Using Nuclear Resonance Fluorescence, Jayson R. Vavrek, Brian S. Henderson, Areg Danagoulian *(MIT)*

2:25 pm: Reactor Simulation of Evolution in Detector Baseline for Antineutrino Monitoring at the High Flux Isotope Reactor, Andrew Conant, Anna Erickson *(Georgia Tech)*

2:50 pm: Prompt Neutron Decay Constant Measurements on a Lead Moderated, Copper Reflected Weapons Grade Plutonium System, George McKenzie, Theresa Cutler, Joetta Goda, Travis Grove, Jesson Hutchinson, Rene Sanchez *(LANL)*

3:15 pm: Impact of Fuel Assembly Location on Verification of Dry Cask Contents Using Radiation Detection, Ira Harkness, Andreas Enqvist *(Univ. Florida)*

TECHNICAL SESSIONS - 3:55 PM

Nondestructive and Destructive Assay Methods
Chair: John Mattingly *(NCSU)*
Location: Flagler **Time:** 3:55-6:05 pm

4:00 pm: Analysis of Surrogate Elements for Nuclear Materials in Rapid Setting Cement Using Laser-Induced Breakdown Spectroscopy (LIBS), Riyadh M. Motny, Supathorn Phongikaroon *(VCU)*

4:25 pm: Fast Neutron Detection in a High-Photon Field Using Organic Scintillators, Christopher A. Meert, Cameron A. Miller, Shaun D. Clarke, Sara A. Pozzi *(Univ. Michigan)*

4:50 pm: Comparison of Single- and Multi-Gate Methods for Neutron Multiplicity Uncertainty Analysis, T. Baugher, K. Frame, J. Wendelberger, R. Estep, J. Hutchinson, M. Nelson *(LANL)*

5:15 pm: Grain Size and Density Separation Effects on Luminescence Dose Estimates Using Brick Material, Ryan P. O'Mara, Robert B. Hayes *(NCSU)*

5:40 pm: Evaluation of BC-454 for Gamma Spectroscopic and Neutron Detection Applications, Robert B. Hayes (*NCSU)*

Detection Using Advanced Data Science Methods
Chair: Dean Mitchell *(Sandia)*
Location: Gilchrist **Time:** 3:55-4:50 pm

4:00 pm: Comparison of Passive and Active Neutron Multiplicity Measurements, J. Hutchinson, W. Myers, J. Determan, M. Baruzzini, J. Arthur, M. Nelson *(LANL)*

4:25 pm: Peak Locating in Gamma-Ray Spectra Using Wavelet Processing and Support Vector Regression with Applications to Nuclear Nonproliferation, Miltos Alamaniotis *(UT San Antonio)*, Lefteri H. Tsoukalas *(Purdue Univ.)*

TECHNICAL SESSION - 4:55 PM

Risks of Proliferation–Panel
Chair: Rian Bahran *(LANL)*
Location: Gilchrist **Time:** 4:55-6:05 pm

Panelists: Michelle Decroix *(LANL),* Jeff Munn *(SPA Inc),* Mike Miller *(INL)*

WEDNESDAY, NOVEMBER 14
TECHNICAL SESSION - 10:15 AM

Human Capital Development
Chair: Craig Williamson *(SCUREF)*
Location: Bonnet Creek VII **Time:** 10:15 am-12:00 pm

10:20 am: Safeguards Knowledge Retention and Management at Los Alamos National Laboratory, Alexis Trahan, Rebecca Stevens *(LANL)*, Presented by Paul Mendoza *(LANL)*

10:45 am: Nuclear Engineering and Nonproliferation University Engagement: Providing Unique Technical Opportunities for a Talented Pipeline, C.Verschuren, R. Bahran, J. Miller, A. Trahan *(LANL)*

11:10 am: The Integral Nonproliferation Introduction Teaching and Learning Reactor Module for UC Davis, Paul Mendoza, Rian Bahran *(LANL)*, Wesley Frey *(UC Davis)*

11:35 am: Building an Interdisciplinary Graduate Certificate in Nuclear Nonproliferation Science and Policy at North Carolina State University, William A. Boettcher III *(NCSU)*

TECHNICAL SESSIONS - 1:30 PM

Education and Training in Nonproliferation–Panel
Cochairs: Chloe Verschuren *(LANL)*, John Mattingly *(NCSU)*
Location: Bonnet Creek VII **Time:** 1:30-3:40 pm

Panelists: Rian Bahran *(LANL)*, Kyle Hartig *(UFL)*, Alicia Swift *(Y-12)*, Craig Williamson *(SCUREF)*

Techniques for Nuclear Forensics and Environmental Sampling
Chair: Bryan Bandong *(LLNL)*
Location: Bonnet Creek VIII **Time:** 1:30-3:40 pm

1:35 pm: Trace Isotopic Ratios Within the Noble Metal Phase as Indicators of Reactor Class, Camille Palmer, Kyzer Gerez *(Oregon State Univ.)*, Richard Clark, Jon Schwantes *(PNNL)*

2:00 pm: Enabling Nuclear Forensics Applications from the Mineral Particulate in Contamination Surveys, Robert B. Hayes, Ryan P. O'Mara *(NCSU)*

2:25 pm: Incremental Gains of a Conservative Transuranic Alpha Activity Assay Method in Air Samples, S. Joseph Cope, Robert B. Hayes *(NCSU)*

2:50 pm: Gross Uncertainties in Treaty Verification by Aerosol Assay, Robert B. Hayes, S. Joseph Cope *(NCSU)*

3:15 pm: Differential Isotopic Diffusion in Nuclear Forensics of Fallout, Robert B. Hayes *(NCSU)*

Embedded Topical Meeting

Embedded Topical Meeting: Advances in Thermal Hydraulics (ATH 2018)

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Karlsruhe Institute of Technology

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Yong Hoon Jeong
Korea Advanced Inst. of Science and Technology

Sponsored by ANS Thermal Hydraulics Division

ATH 2018 Schedule at a Glance

Monday, November 12

1:30-6:00pm	ATH 2018 Opening Plenary		Citrus, Collier

Tuesday, November 13

8:30-10:00 am	Keynote—I		Collier, Columbia
10:15 am-12:00 pm	Technical Sessions:	Computational Thermal Hydraulics—I	Escambia
		Two-Phase Flow and Heat Transfer Fundamentals—I	Nassau
		Lead and LBE Cooled Reactor Thermal Hydraulics	Manatee
1:30-3:40 pm	Technical Sessions:	Operating LWRs Thermal Hydraulics and Safety	Escambia
		Next Generation LWR Thermal Hydraulics	Nassau
		Molten-Salt Reactor Thermal Hydraulics	Manatee
3:55-6:30 pm	Technical Sessions:	Thermal Hydraulics in Accident Management	Escambia
		Boiling and Condensation Phenomena	Nassau
		Simulation and Experiments of Wire-Wrapped Fuel Assemblies	Manatee

Wednesday, November 14

8:30-10:00 am	Keynote—II		Orange
8:30-10:00 am	ATH 2018 Technical Achievement Award Lecture		Nassau
10:15 am-12:25 pm	Technical Sessions:	Thermal Hydraulics of Waste Management, Test Reactors and Advanced Fuels	Escambia
		Thermal Hydraulics Applications of Machine Learning and Data Science—Panel	Nassau
		High Performance Computing Applications in Nuclear Engineering	Manatee
		Advanced Reactor Thermal Hydraulics—I	Orange
1:30-3:40 pm	Technical Sessions:	Rod Bundle Thermal Hydraulics	Escambia
		Young Professional Thermal Hydraulic Research Competition—I	Nassau
		General Thermal Hydraulics—I	Manatee
		Advanced Reactor Thermal Hydraulics—II	Orange
3:55-6:30 pm	Technical Sessions:	Experimental Methods and Instrumentation	Escambia
		Young Professional Thermal Hydraulic Research Competition—II	Nassau
		General Thermal Hydraulics—II	Manatee
		Advanced Code Development with Verification and Validation	Orange

Thursday, November 15

8:30-10:00 am	Keynote—III		Orange
10:25 am-12:35 pm	Technical Sessions:	Computational Fluid Dynamics	Escambia
		Two-Phase Flow and Heat Transfer Fundamentals—II	Nassau
		General Thermal Hydraulics—III	Manatee
2:00-4:20 pm	Technical Sessions:	Computational Thermal Hydraulics—II	Escambia
		Neutronics/Thermal Hydraulics Coupling	Nassau
		General Thermal Hydraulics—IV	Manatee

TUESDAY, NOVEMBER 13
TECHNICAL SESSIONS - 10:15 AM

Computational Thermal Hydraulics—I
Session Organizer: Ling Zou *(INL)* **Cochairs:** Hisashi Ninokata (Politecnico di Milano), Prashant Jain *(ORNL)*
Location: Escambia **Time:** 10:15 am-11:10 am

10:20 am: A Parallel Implicit Finite-Volume Algorithm for Predicting Compressible Thermal-Hydraulic Flows, Lucian Ivan *(CNL)*, Scott Northrup *(Univ of Toronto)*, Nusret Aydemir *(CNL)*

10:45 am: Numerical Method for Modeling Iodine Sorption in Charcoal Filters, Mark S. Lanza *(Framatome Inc.)*, Donald R. Todd *(PNNL)*

Two-Phase Flow and Heat Transfer Fundamentals—I
Session Organizer: Bao-Wen Yang *(Xi'an Jiaotong Univ)* **Cochairs:** Fan Bill Cheung *(PSU)*, Seungjin Kim *(Purdue)*
Location: Nassau **Time:** 10:15 am-12:25 pm

10:20 am: Bubbly Flow Synthesis and Labeling Using the Bubble Generative Adversarial Networks, Yucheng Fu, Yang Liu *(Virginia Tech)*

10:45 am: Measurement of Steam-Water Flow in a Vertical Annulus, Vineet Kumar, Zhiee Jhia Ooi, Caleb S. Brooks *(Univ of Illinois)*

11:10 am: Interfacial Structures in Bubbly to Slug Transition Flows in a Duct, Guanyi Wang, Qingzi Zhu, Mamoru Ishii *(Purdue Univ)*

11:35 am: Measurement of Two-Phase Natural Circulation in a Vertical Annulus, Zhiee Jhia Ooi, Vineet Kumar, Caleb S. Brooks *(Univ of Illinois)*

12:00 pm: Development of a New Two-Phase Flow Mass Quality Correlation for Reflood Transients, Yue Jin, Faith R. Beek, Fan-Bill Cheung *(Penn State)*, Stephen M. Bajorek, Kirk Tien, Chris L. Hoxie *(NRC)*

Lead and LBE Cooled Reactor Thermal Hydraulics
Session Organizer: Jun Liao *(Westinghouse)* **Cochairs:** Jun Liao *(Westinghouse)*, Katrien Tichelen *(SCK)*
Location: Manatee **Time:** 10:15 am-12:00 pm

10:20 am: CFD Assessment of Pool Thermal Hydraulics for HLM Reactors, F. Roelofs, D. Dovizio, D. Visser, K. Zwijsen, A. Shams *(NRG)*

10:45 am: Study on Reactor Vessel Air Cooling for Westinghouse Lead Fast Reactor, Jun Liao, Danial Utley *(Westinghouse)*

11:10 am: Experimental and Numerical Characterization of the Flow Field at the Core Entrance of a Water Model of a HLM-Cooled Reactor, Philippe Planquart, Chiara Spaccapaniccia, Giacomo Alessi, Sophia Buckingham *(von Karman Inst)*, Katrien Van Tichelen *(SCK-CEN)*

11:35 am: Development of Mechanistic Source Term Analysis Tool SAS4A-Fate for Lead- and Sodium-Cooled Fast Reactors, T. Q. Hua A. Moisseytsev, A. Karahan, A. M. Tentner, T. Sofu *(ANL)*, S. J. Lee, C. Y. Paik *(Fauske & Associates, LLC)*, J. Liao, P. Ferroni *(Westinghouse)*

Operating LWRs Thermal Hydraulics and Safety
Session Organizer: Elia Merzari *(ANL)* **Cochairs:** Bao Wen Yang *(Xian' Jiaotong Univ)*, Youho Lee *(UNM)*
Location: Escambia **Time:** 1:30-3:40 pm

1:35 pm: Flow Behavior Observation of Single-Phase Air Jet Simulating a Nozzle of Terry Turbine Using PIV N. Tsuzuki, M. Chaki *(The Inst of Applied Energy)*, D. T. Nguyen, Y. A. Hassan, K. Vierow Kirkland *(Texas A&M)*

2:00 pm: Terry Turbine Expanded Operating Band: Initial Experimental Efforts, M. Solom, D. Osborn, K. Ross *(SNL)*, Karen Vierow Kirkland, A. Patil *(Texas A&M)*, N. Tsuzuki *(The Inst of Applied Energy)*

2:25 pm: Terry Turbine Expanded Operating Band: Sandia National Laboratories Analytical Efforts, J. Cardoni, K. Ross, B. Beeny, D. Osborn *(SNL)*

2:50 pm: Development of Reactor Core Isolation Cooling System Model for SAMPSON, Chiaki Kino, Yoshihiro Morita, Masao Chaki *(The Inst of Applied Energy)*

3:15 pm: Analysis of Transient Flow Change Aided by a Support Vector Machine Method, Dongjune Chang, Maolong Liu, Youho Lee *(Univ of New Mexico)*

Embedded Topical: Meeting on Advances in Thermal Hydraulics (ATH '18)

TUESDAY, NOVEMBER 13
TECHNICAL SESSIONS - 1:30 PM

Next Generation LWR Thermal Hydraulics
Session Organizer: Sofiane Benhamadouche *(EdF R&D)* **Cochairs:** Xu Cheng *(KIT)*, Victor Petrov *(Univ of Michigan)*
Location: Nassau **Time:** 1:30-3:40 pm

1:35 pm: Improved Prediction of Heat Transfer to Supercritical Water in Circular Tubes, X. Cheng, M. Zhao *(KIT)*

2:00 pm: High Resolution Gamma-Ray Tomography Imaging for Detailed Void Fraction Measurements in High-Pressure Flow Loops, Julio Diaz, Robert Adams, Victor Petrov, Annalisa Manera *(Univ of Michigan)*

2:25 pm: X-Ray Radiography and High-Speed Videography Measurement on Void Fraction in Helical Coil, Nailiang Zhuang *(Univ of Michigan/Harbin Eng Univ)*, Kui Zhang *(Univ of Michigan/Xi'an Jiao Tong Univ)*, Annalisa Manera, Victor Petrov *(Univ of Michigan)*

2:50 pm: Simulation of Boiling Two-Phase Flow in a Helical Coil Steam Generator Using the Spectral Element Code NEK-2P, D. R. Shaver, A. Tomboulides, A. Tentner. P. Vegendla, E. Merzari *(ANL),* N. Salpeter *(AER Consulting)*, W. D. Pointer *(ORNL)*

3:15 pm: Investigation on Steady and Transient States of Thermal-Hydraulic Characteristics for a Helical-Coiled- Type Once Through Steam Generator, Xueyou Ding, Qinglong Wen *(Chongping Univ)*, Cheng Cheng *(Southeast Univ)*, Hongyang Wang, Shenhui Ruan, Zhiqiang Chen *(Chongqing Univ)*

Molten-Salt Reactor Thermal Hydraulics
Session Organizer: Xiaodong Sun *(Univ of Michigan)* **Cochairs**: Xiaodong Sun *(Univ of Michigan)*, Nicholas Brown *(PSU)*
Location: Manatee **Time:** 1:30-3:40 pm

1:35 pm: Neutronics Phenomena Important in Modeling and Simulation of Liquid-Fuel Molten Salt Reactors, David J. Diamond *(BNL)*, Nicholas R. Brown *(Penn State)*, Richard Denning *(Consultant)*, Stephen Bajorek *(NRC)*

2:00 pm: Thermal-Hydraulics Phenomena Important in Modeling and Simulation of Liquid-Fuel Molten Salt Reactors, Stephen Bajorek *(NRC)*, David J. Diamond *(BNL)*, Nicholas R. Brown *(Penn State)*, Richard Denning *(Consultant)*

2:25 pm: Design and Optimization of a Fluted Tube, Counter Flow Intermediate Heat Exchanger for a Molten Salt Fast Reactor Using a Chloride Salt as the Coolant, M. W. Patterson *(INL)*, Kevin Terrill, Stephen Hancock, Joseph Warner *(Univ of Idaho)*

2:50 pm: Preliminary Experiments of Wireless Advanced Instrumentation Toward Packed Pebble Heat Transfer, Dongjune Chang, Youho Lee *(Univ of New Mexico)*

3:15 pm: Heat Transfer Distribution of Randomly Packed Pebble-Bed Fuels for Fluoride Salt-Cooled High Temperature Reactor *(FHR)*, Seong Gu Kim, Maolong Liu, Youho Lee *(Univ of New Mexico)*, Jeong Ik Lee *(KAIST)*

TECHNICAL SESSIONS - 3:55 PM

Thermal Hydraulics in Accident Management
Session Organizer: Elia Merzari *(ANL)* **Cochairs:** John Luxat *(McMaster Univ)*, Sama Bilbao y Leon *(NEA)*
Location: Escambia **Time:** 3:55-6:05 pm

4:00 pm: Hydrogen Generation Crossflow Due To Hardened Containment Venting, Dong Zheng, Julie M. Jarvis, Serena Allison-Ptak, Gregory Brauer, Michael Hopman *(Bechtel NS&E)*

4:25 pm: MAAP5-VVER Validation and IAEA-SPE-3 Modelling, Tom Elicson, Hugh Luo, David Luxat *(Jensen Hughes)*, Lajos Tarczal *(Paks Nuclear Power Plant)*, Tom Kindred *(EPRI)*

4:50 pm: A Semi-Mechanistic Model to Predict Spatial Variation of Critical Heat Flux on an Inclined Surface Facing Downward, Uiju Jeong, Sung Joong Kim *(Hanyang Univ)*

5:15 pm: Verification of Diverse Alternative Shutdown Severe Accident Management Guideline (SSAMG) Entry Conditions for CPR1000, Zhi'ao Huang, Huifang Miao, Huai-En Hsieh, Yifen Chen, Ning Li *(Xiamen Univ)*, Chao Guo *(China General Nuclear Power Research Inst Co. Ltd.)*

5:40 pm: Development of Severe Accident Management Training Simulator for AP1000 Nuclear Power Plant, Gang Jiang, Gang Chen, Weikun Ding, Yanghua Yang *(State Power Investment Corporation Research Inst)*

TUESDAY, NOVEMBER 13
TECHNICAL SESSIONS - 3:55 PM

Boiling and Condensation Phenomena
Session Organizer: Elia Merzari *(ANL)* **Cochairs:** Igor Bolotnov *(NCSU)*, Yang Liu *(Virginia Tech)*
Location: Nassau **Time:** 3:55-6:30 pm

4:00 pm: Using Inverse Heat Transfer in the Analysis of Two-Phase Flow Post-CHF Experiments, Juliana Pacheco Duarte, HangJin Jo, Michael L. Corradini *(Univ of Wisconsin, Madison)*

4:25 pm: Comparison of Steady-State and Transient Condition Flow Boiling Critical Heat Flux (CHF) of FeCrAl Alloy, Zircaloy-4 and Inconel600, Soon K. Lee, Maolong Liu, Edward D. Blandford, Youho Lee *(Univ of New Mexico)*, Nicholas R. Brown *(Penn State)*, Hang Ban *(Univ of Pittsburgh)*, Colby B. Jensen *(INL)*, Kurt A. Terrani *(ORNL)*

4:50 pm: Surface Wettability Measurements and Pool Boiling CHF Prediction of Ion Irradiated Coated Zircaloy, Amir Ali, Edward Blandford, Youho Lee *(Univ of New Mexico)*, Khalid Hattar *(SNL)*, Hyun-Gil Kim, Dong Jun Park *(KAERI)*

5:15 pm: Boiling and Critical Heat Flux on Surfaces of Modified Wettability and Roughness, Joseph L. Bottini, Sabrina Hammouti, David Ruzic, Caleb S. Brooks *(Univ of Illinois)*

5:40 pm: Comparative Analyses of CHF Prediction Performance Between Deep Learning and Physics Approaches to Pool Boiling Enhanced by Microstructures, Mingfu He, Youho Lee *(Univ of New Mexico)*

6:05 pm: Numerical Simulation on Flow Boiling Heat Transfer in Single Rod Channel Near Critical Heat Flux, Haidong Liu, Deqi Chen *(Chongqing Univ)*, Xiang Zhang *(State Nuclear Power Technology Research & Development Center)*

Simulation and Experiments of Wire-Wrapped Fuel Assemblies
Session Organizer: Ferry Roelofs *(NRG)* **Cochairs:** Ferry Roelofs *(NRG)*, Yassin Hassan *(TAMU)*
Location: Manatee **Time:** 3:55-6:30 pm

4:00 pm: Validation of Wire-Wrapped Fuel Assembly CFD Simulations, F. Roelofs, D. Dovizio, H. Uitslag- Doolaard, B. Mikuž, A. Shams *(NRG)*

4:25 pm: CFD Investigation on Conjugate Heat and Mass Transfer in the Wire-Wrapped Fuel Assembly, Su-Jong Yoon, Gilles J. Youinou *(INL)*

4:50 pm: On the Fluid Structure Interactions of a Wire-Wrapped Pin Bundle, C. A. Nixon, W. R. Marcum, A. W. Weiss *(Oregon State Univ)*, K. M. Steer, R. B. Jackson, M. G. Martin *(TerraPower)*

5:15 pm: Thermal-Hydraulic Experimental Testing of the Myrrha Wire-Wrapped Fuel Assembly, G. Kennedy, K. Van Tichelen *(SCK-CEN)*, J. Pacio *(KIT)*, I. Di Piazza *(ENEA)*, H. Uitslag-Doolaard *(NRG)*

5:40 pm: Local Blockages in a Rod Bundle with Wire Spacers: Heat Transfer in LBE for the Safety Assessment of MYRRHA, J. Pacio, M. Daubner, T. Wetzel *(KIT)*

6:05 pm: Flow Visualization on SFR Wire-Wrapped 19 Pin Bundle and Comparison with CFD Analysis, Min Seop Song, Eung Soo Kim *(Seoul Natl Univ)*, Jae Ho Jeong *(KAERI)*

WEDNESDAY, NOVEMBER 14
TECHNICAL SESSIONS - 10:15 AM

Thermal Hydraulics of Waste Management, Test Reactors and Advanced Fuels
Session Organizer: Si Young Lee *(SRNL)* **Cochairs:** Si Young Lee *(SRNL)*, Adrian Tentner *(ANL)*
Location: Escambia **Time:** 10:15 am-12:25 pm

10:20 am: Effect of Glass Viscosity on Foaming Behavior and Heat Transfer in a Laboratory-Scale Waste Glass Melter, Alexander W. Abboud, Donna P. Guillen *(INL)*, Richard Pokorny *(UCT Prague)*

10:45 am: Thermal Safety Analysis of SRS Spent Nuclear Fuel Storage Facility, Si Y. Lee, Dennis W. Vinson *(SRNL)*

11:10 am: On Scaling Theory of Vortex Shedding of Tandem Plates, Trevor Howard, Wade Marcum *(Oregon State Univ)*

11:35 am: Development of Superior Thermal Shock Tolerant Material for Nuclear Components by Engineering Surface Heat Transfer Modes, Divya Jyoti Prakash, Youho Lee *(Univ of New Mexico)*

12:00 pm: Effect of Thermal Expansion on Fluid-Structure Interaction of Curved Plate Deflection Measurement, Gary L. Solbrekken, Gerhard H. Schnieders, Jerome Rivers *(Univ of Missouri, Columbia)*, Adrian Tentner, Cezary Bojanowski, Erik Wilson (*ANL)*

WEDNESDAY, NOVEMBER 14

TECHNICAL SESSIONS - 10:15 AM

Thermal Hydraulics Applications of Machine Learning and Data Science–Panel

Session Organizer: Elia Merzari *(ANL)* **Cochairs:** Sama Bilbao y Leon *(NEA)*, Elia Merzari *(ANL)*
Location: Nassau **Time:** 10:15 am-12:00 pm

Machine learning approaches are becoming increasingly used in various areas of science and technology. Their application in nuclear thermal-hydraulics is still somewhat limited, but several projects and applications are emerging. In this panel we discuss how machine learning is currently used in nuclear thermal-hydraulics and other areas of nuclear engineering. We also examine current issues, challenges and future potential applications.

Panelists: Richard Vilim *(ANL)*, Ling Zou *(INL)*, Sacit Cetiner *(ORNL)*, Matteo Bucci *(MIT)*, Leslie Kerby *(Idaho State Univ)*

High Performance Computing Applications in Nuclear Engineering

Session Organizer: Elia Merzari *(ANL)* **Cochairs:** Sofiane Benhamadouche *(EdF)*, Itzok Tiselj *(Josef Stefan Inst)*
Location: Manatee **Time:** 10:15 am-12:00 pm

10:20 am: High Performance Computing for Nuclear Reactor Design and Safety Applications, Afaque Shams, Dante De Santis *(NRG)*, Adam Padee, Tobiasz Jarosiewicz, Piotr Wasiuk, Tomasz Kwiatkowski, Sławomir Potempski *(National Centre for Nuclear Research)*

10:45 am: Wall-Resolved Large Eddy Simulation of the Flow Through a PWR Guide Card at Reh=10,000, S. Benhamadouche, M.-C. Gauffre, Y. Fournier *(EdF)*

11:10 am: Direct Numerical Simulation of the Turbulent Flow Inside a Differentially Heated Cavity, Javier Martinez, Elia Merzari *(ANL)*, Michael Acton, Emilio Baglietto *(MIT)*

11:35 am: Numerical Simulation of Isothermal Flow Across Slant Five-Tube Bundle with Spectral Element Method Code Nek5000, Mustafa Alper Yildiz, Yassin Hassan *(Texas A&M)*, Haomin Yuan, Elia Merzari *(ANL)*

Advanced Reactor Thermal Hydraulics—I

Session Organizer: Yassin A. Hassan *(Texas A&M)* **Cochairs:** Hitesh Bindra *(KSU)*, Phiippe Planquart *(VKI)*
Location: Orange **Time:** 10:15-12:25 pm

10:20 am: Plenum-to-Plenum Natural Circulation Heat Transfer in a Prismatic Very High-Temperature Reactor for Different Coolants, Salman M. Alshehri *(Missouri S&T/KACST)*, Ibrahim A. Said *(Alexandria Univ/Rice Univ)*, Muthanna H. Al-Dahhan *(Missouri S&T/KACST/Alexandria Univ/Rice Univ)*, Shoaib Usman *(Missouri S&T)*

10:45 am: Experimental Investigation on Heat Transfer in a Prismatic Modular Reactor under Cosine Heat Flux, Salman M. Alshehri, *(Missouri S&T/SACST)* Ibrahim A. Said *(Alexandria Univ/Rice Univ)*, Muthanna H. Al-Dahhan *(Missouri S&T/KACST/Alexandria Univ/Rice Univ)*, Shoaib Usman (*Missouri S&T)*

11:10 am: Sustaining Turbulence in a Very Long Pipe Towards Studying Heat Driven Turbulent Gas Relaminarization, Apoorva Rudra, Masahiro Kawaji *(City College of New York)*, Aleksandr V. Obabko Saumil Patel *(ANL)*

11:35 am: Temperature and Flow Characteristics of the High Temperature Test Facility during Depressurized Conduction Cooldown Testing, Kyle E. Brumback, Seth R. Cadell, Brian G. Woods *(Oregon State Univ)*

12:00 pm: Evaluation of Organic Rankine Cycles in an Air-Brayton Combined Cycle for Microreactor Applications, Joseph Litrel, Donna Post. Guillen *(INL)*, Michael McKellar *(Univ of Idaho)*

TECHNICAL SESSIONS - 1:30 PM

Rod Bundle Thermal Hydraulics

Session Organizer: Elia Merzari *(ANL)* **Cochairs:** Trevor Howard *(ORNL)*, Maria Avramova *(NCSU)*
Location: Escambia **Time:** 1:30-3:40 pm

1:35 pm: Thermal Hydraulics Calculations Plus Uncertainty Analysis of VVER-1000 Fuel Assembly, Alp Tezbasaran, Maria N. Avramova, Kostadin N. Ivanov *(NCSU)*, Osman S. Celikten *(Hacettepe Univ)*

2:00 pm: A Study of Liquid Entrainment in Oscillatory Flows, Faith R. Beck, Yue Jin, Fan-Bill Cheung *(Penn State)*, Stephen M. Bajorek, Kirk Tien, Chris L. Hoxie *(NRC)*

2:25 pm: Experimental Investigation of Axial Flow in the Narrow Gap Regions of a 7-Rod Bundle Using PIV, Robert C. Bowden, Casey Tompkins, Sun-Kyu Yang *(CNL)*

2:50 pm: Wall-Modelled Large Eddy Simulation of the Flow Through PWR Fuel Assemblies at Reh=66,000—Validation on CALIFS Experimental Setup, S. Benhamadouche, M.-C. Gauffre, P. Badel *(EdF)*

3:15 pm: Single Rod and 5x5 Rod Bundle Blowdown Experiments on the Dispersion of Surrogate Fuel, G. D. Latimer, W. R. Marcum *(Oregon State Univ)*, W. F. Jones *(INL)*

WEDNESDAY, NOVEMBER 14
TECHNICAL SESSIONS - 1:30 PM

Young Professional Thermal Hydraulic Research Competition—I
Session Organizer: Dillon R. Shaver *(ANL)* **Cochairs**: Dillon Shaver *(ANL)*, Ling Zou *(INL)*
Location: Nassau **Time:** 1:30-3:15 pm

1:35 pm: Liquid Metal Experimental System for Thermal Stratification or Mixing, Brendan Ward, Hitesh Bindra *(Kansas State Univ)*

2:00 pm: Experimental Studies on Metallic Fuel Relocation in a Pin Bundle Core Structure of a Sodium-Cooled Fast Reactor, Taeil Kim, Dzmitry Harbaruk *(ANL)*, Craig Gerardi *(Kairos Power)*, Mitchell Farmer, Christopher Grandy, Yoon Il Chang *(ANL)*

2:25 pm: Accelerating Introduction of Innovative Claddings Through Microscale Phenomenological Understanding of Thermal Hydraulics, Arunkumar Seshadri, Koroush Shirvan *(MIT)*

2:50 pm: Neutron Imaging of Percolating Hydraulic Flow Through a Simulated Debris Bed, Molly Ross, Adam van Bergeijk, Alan Cebula, Steve Eckels, Hitesh Bindra *(Kansas State Univ)*

General Thermal Hydraulics—I
Session Organizer: Igor A. Bolotnov *(NCSU)* **Cochairs:** David Pointer *(ORNL)*, Theron Marshall *(GE)*
Location: Manatee **Time:** 1:30-3:40 pm

1:35 pm: On Improving Suction Factor: Effect of Bulk Flow, Steam Concentration and Wall Orientation, Dhongik S. Yoon, HangJin Jo, Michael L. Corradini *(Univ of Wisconsin, Madison)*

2:00 pm: Machine Learning: A Key Tool in Future Thermal Hydraulics Research and Development, Ling Zou, Hongbin Zhang *(INL)*

2:25 pm: Development of Analytical Models for RCIC Terry Turbine and Pump, Hongbin Zhang, Ling Zou *(INL)*

2:50 pm: Towards the Development of a Deposition Model for CFD Application, Giulia Agostinelli, Emilio Baglietto *(MIT)*

3:15 pm: Two-Phase Natural Circulation and Flow Boiling Characteristics with Artificial Seawater, Daniel Franken, Zayed Ahmed, Seth Eckels, Steven Eckels, Hitesh Bindra *(Kansas State Univ)*

Advanced Reactor Thermal Hydraulics—II
Session Organizer: Afaque Shams *(NRG)* **Cochairs:** Afaque Shams *(NRG)*, Izabela Gutowska *(Oregon State)*
Location: Orange **Time:** 1:30-3:40 pm

1:35 pm: Overview of the SaS4A Code Metallic Fuel Models and Extended Analysis of a Postulated Severe Accident in the Prototype Gen-IV Sodium-Cooled Fast Reactor, A. M. Tentner, A. Karahan *(ANL)*, S. H. Kang *(KAERI)*

2:00 pm: The Importance of Turbulent Heat Transfer Modelling in Low-Prandtl Fluids, Afaque Shams *(NRG)*

2:25 pm: Mixed Convection with Liquid Metals: Review of Experiments and Model Development, Wadim Jaeger, Wolfgang Hering *(KIT)*

2:50 pm: Design Optimization Study on the Single Tank Packed Bed Thermal Energy Storage System, Junsoo Yoo, Su-Jong Yoon, Thomas E. O'Brien, Konor L. Frick, James E. O'Brien, Piyush Sabharwall, Carl M. Stoots *(INL)*

3:15 pm: Feasibility Analysis of Passive Heat Removal System Coupled with Dry Air Cooling System for the Atom System, Min Wook Na, Doyoung Shin, Sung Joong Kim *(Hanyang Univ)*, Gwang Hyeok Seo *(KINS)*, Jeong Ik Lee *(KAIST)*

WEDNESDAY, NOVEMBER 14
TECHNICAL SESSIONS - 3:55 PM

Experimental Methods and Instrumentation
Session Organizer: Rodolfo Vaghetto *(Texas A&M)* **Cochairs:** Annalis Manera *(Univ of Michigan)*, Marylin Delgado *(TAMU)*
Location: Escambia **Time:** 3:55-6:30 pm

4:00 pm: Velocity and Scalar Fields of a Turbulent Buoyant Jet in the Self-Similar Region, S. Qin, B. Krohn, V. Petrov, A. Manera *(Univ of Michigan)*

4:25 pm: Design and CFD Modelling of Helium 3 Negative Reactivity Insertion Device for the TREAT Reactor, G. Mignot, S. Balderama *(Oregon State Univ)*, N. Woolstenhulme *(INL)*, W. Marcum *(Oregon State Univ)*

4:50 pm: A Brief Investigation of the Repeatability and Reproducibility of PIV Measurements for CFD-Grade Databases, Daniel Nunez, Benedikt Krohn, Victor Petrov, Annalisa Manera *(Univ of Michigan)*

5:15 pm: Pressure Sensitive Paint Measurement Technique on the Surface of a Rod for Steam Generator Applications, Garland Porter, Marilyn Delgado, Yassin Hassan *(Texas A&M)*

5:40 pm: A Review of Nuclear Power Plant Thermal Hydraulic Test Facilities in China, Li Gao *(China Nuclear Power Eng Co., Ltd)*, Yusheng Liu *(Nuclear and Radiation Safety Center)*, Jiqiang Su *(China Nuclear Power Eng Co., Ltd)*

6:05 pm: Three-Layers Wire-Mesh System for Air Bubble Measurement in a Rectangular Channel, Shimo Yu, Xiao Yan, Dawei Zhao, Suijun Gong, Aiwei Xu, Yuanfeng Zan *(Nuclear Power Inst of China)*

Young Professional Thermal Hydraulic Research Competition—II
Session Organizer: Ling Zou *(INL)* **Cochairs:** Ling Zou *(INL)*, Dillon Shaver *(ANL)*
Location: Nassau **Time:** 3:55-6:30 pm

4:00 pm: Machine Learning-Based Critical Heat Flux Predictors in Subcooled and Low-Quality Flow Boiling, Xingang Zhao *(MIT)*, Robert K. Salko *(ORNL)*, Koroush Shirvan *(MIT)*

4:25 pm: Measurement of Droplet Parameters Using a Single Optical Fiber Probe Sensor in a Horizontal Pipe, Byeonggeon Bae, Taeho Kim, Byongjo Yun *(Pusan National Univ)*

4:50 pm: Pool Boiling Experiments for Evaluations of Critical Heat Flux with a Flat-Type Upward Heater Using Fe_3O_4, SiO_2 Nanoparticles, Min Suk Lee, Dong Hoon Kam, Yong Hoon Jeong *(KAIST)*

5:15 pm: Basic Study on Hydrogen Behavior in a Small-Scale Cylindrical Container with Catalysts by Experiment and Numerical Simulation, Gaku Takase, Yoshihisa Hiraki, Kazuyuki Takase *(Nagaoka Univ of Technology)*, Isamu Kudo, Keisuke Tanizawa, Shogo Taira *(Avdan Eng. Co. Ltd.)*

5:40 pm: Evaluation of Sink and Source Terms in Interfacial Area Transport Equation for Bubbly Flow, Hang Liu, Liang-ming Pan, Wen-xiong Zhou, Quan-yao Ren *(Chongqing Univ/Ministry of Education)*

6:05 pm: Assessment and Simulation on the Thermal Mixing Phenomenon with CFD Method in a 45° Horizontal T-Junction, Mingjun Wang, Tangtao Feng, Ping Song, Wenxi Tian, G. H. Su, Suizheng Qiu *(Xi'an Jiaotong Univ)*

General Thermal Hydraulics—II
Session Organizer: Igor A. Bolotnov *(NCSU)* **Cochairs:** Donna Guillen *(INL)*, Jun Wang *(UWM)*
Location: Manatee **Time:** 3:55-5:40 pm

4:00 pm: Analytical Correction for Interfacial Area Measurement with Four-Point Optical Probes, Casey Tompkins, Robert Bowden, Sun-Kyu Yang *(CNL)*

4:25 pm: Validation of S-RELAP5 for Framatome's Realistic Non-LOCA Methodology, C. K. Nithianandan, Kent Able, Chris Molseed, Moses Yeung, Thomas George, Nicole Allen, Keith Higar *(U.S. Fuels, Framatome)*

4:50 pm: New Discoveries in Post-Accident Passive Decontamination of Advanced Reactors, Rohan Biwalkar, Sola Talabi, Kenneth Redus *(Pittsburgh Technical)*

5:15 pm: Sensitivity of Aerosol Removal Mechanisms to Varying Thermal-Hydraulic Parameters in Integrated Small Modular Reactors, Rohan Biwalkar, Sola Talabi, Kenneth Redus *(Pittsburgh Technical)*

WEDNESDAY, NOVEMBER 14
TECHNICAL SESSIONS - 3:55 PM

Advanced Code Development with Verification and Validation
Session Organizer: Elia Merzari *(ANL)* **Cochairs:** Yang Liu *(Univ of Michigan)*, Hangjin Jo *(UWM)*
Location: Orange **Time:** 3:55-5:40 pm

4:00 pm: Adding Confidence to Solution Verification: Using MMS-Informed MEA to Better Understand Discretization Error, Aaron M. Krueger *(Texas A&M)*, Vincent A. Mousseau *(SNL)*, Yassin A. Hassan *(Texas A&M)*

4:25 pm: Effect of ATF Clad Coating During a Short-Term Station Black Out with MELCOR 1.8.6 YU, Jun Wang, Michael L. Corradini, Hangjin Jo *(Univ of Wisconsin, Madison)*

4:50 pm: Comparison of Experimental and Simulated Low-Pressure CHF Tests Using CTF and RELAP5-3D, Jacob P. Gorton, Nicolas R. Brown *(Penn State)*, Soon Kyu Lee, Yonho Lee *(Univ of New Mexico)*

5:15 pm: Inverse Uncertainty Quantification of Turbulence Modeling in Multiphase-CFD Solver Using High-Resolution Data from Particle Image Velocimetry, Yang Liu, Shanbin Shi, Yalan Qian, Xiaodong Sun *(Univ of Michigan)*, Nam Dinh *(NCSU)*

THURSDAY, NOVEMBER 15
TECHNICAL SESSIONS - 10:25 AM

Computational Fluid Dynamics
Session Organizer: Sofiane Benhamadouche *(EdF R&D)* **Cochairs:** Lane Carasik *(UltraSafe Nuclear)*, Afaque Shams *(NRG)*
Location: Escambia **Time:** 10:25 am-12:10 pm

10:30 am: Optimization of Thermal-Hydraulic Performance of a Zigzag Channel Printed Circuit Heat Exchanger Employed as IHX IN HTGR Systems, Raciel de la Torre Valdés, Juan Luis François *(Univ of Mexico)*, Pedro Morales, Lázaro García *(Higher Inst of Technology and Applied Sciences)*

10:55 am: Hydrodynamic Numerical Simulations of a Prototypical Oxide-Metal Corium Melt Representative of Fukushima 1-F1 Severe Accident Conditions, A. Boulin, J. F. Haquet, P. Piluso *(CEA)*, S. Semenov, M. Antoni *(CNRS)*, T. Washiya, A. Nakayoshi, T. Kitagaki *(JAEA)*

11:20 am: Effects of Amplitude of Roughness on Heat Transfer, Muhammad Yousaf (Purdue Univ), Shoaib Usman *(Missouri S&T)*

11:45 am: The Application of Dual-Mesh Coupled Heat Transfer Porous Model on the Numerical Simulation of Shell-Tube Heat Exchanger, Guangdong, Song *(China Inst of Atomic Energy)*, Qingchuan Yang, Binbin Qiu *(Xi'an Jiaotong Univ)*, Hongyi Yang, Huajin Yu, Mengmeng Liu *(China Inst of Atomic Energy)*

Two-Phase Flow and Heat Transfer Fundamentals—II
Session Organizer: Sofiane Benhamadouche *(EdF R&D)* **Cochairs:** Jinyong Feng *(MIT)*, Junsoo Yoo *(INL)*
Location: Nassau **Time:** 10:25 am-11:45 am

10:30 am: Modeling of Bathtub Vortexi in Consideration of Realistic Axial Velocity Distribution, Kei Ito, Daisuke Ito, Yasushi Saito *(Kyoto Univ)*, Toshiki Ezure, Masaaki Tanaka *(JAEA)*

10:55 am: Entrainment Model Evaluation Based on Full-Scale Test Facility, P. Zhang *(State Nuclear Power Technology R&D Center)*, H. J. Chang *(State Nuclear Power Technology R&D Center/Tsinghua Univ)*,

11:20 am: Test Facilities for Passive Safety Pressurized Water Reactors of AP600, AP1000 and CAP1400, Huajian Chang *(State Nuclear Power Technology R&D Cente/Tsinghua Univ)*, Yuquan Li, Bin Gao, Cheng Li, Yanfang Xue, Nang Wang *(State Nuclear Power Technology R&D Center)*

THURSDAY, NOVEMBER 15
TECHNICAL SESSIONS - 10:25 AM

General Thermal Hydraulics—III
Session Organizer: Igor A. Bolotnov *(NCSU)* **Cochairs:** Julio Pacio *(KIT)*, Giacomo Busco *(TAMU)*
Location: Manatee **Time:** 10:25 am-12:10 pm

10:30 am: Modeling and Simulations of 1/16th Full Scale VHTR Upper Plenum, Prasad Vegendla, Rui Hu, Aleksandr Obabko, Haomin Yuan *(ANL)*, Richard Schultz *(Idaho State Univ)*, Yassin Hassan *(Texas A&M)*

10:55 am: CFD Study of the Coolant Flow Mixing Inside VHTR Upper Plenum, Giacomo Busco, Thien Nguyen, Yassin A. Hassan *(Texas A&M)*

11:20 am: SAS4A Simulations of Selected CABRI-1 Oxide Fuel Experiments, A. Karahan (ANL), K. Kawada *(JAEA)*, A. Tentner *(ANL)*

11:45 am: Thermal Stratification and Mixing in SFR Plena Using a One-Dimensional Scalar Transport Model, Graham Wilson, Hitesh Bindra *(Kansas State Univ)*

TECHNICAL SESSIONS – 2:00 PM

Computational Thermal Hydraulics—II
Session Organizer: Ling Zou *(INL)* **Cochairs:** Sofiane Benhamadouche *(EdF)*, Shoaib Usman *(Missouri S&T)*
Location: Escambia **Time:** 2:00-3:20 pm

2:05 pm: Investigation of Flow Through a 2X2 PWR Rod Bundle: Effect of Twisted Tapes, Salman Alzahrani *(Missouri S&T/KACST)*, Shoaib Usman *(Missouri S&T)*

2:30 pm: Study of the Two-Phase Steam Condensation Model under Nuclear Containment Conditions, Jiqiang Su *(China Nuclear Power Eng Co., Ltd)*, Haozhi Bian *(Harbin Eng Univ)*, Li Gao *(China Nuclear Power Eng Co., Ltd)*

2:55 pm: Numerical Simulation on the Saturated Downward Facing Hemispherical Pool Boiling, Xiang Zhang, Daogui Tian, Yanfang Xue, Lian Chen, Yuquan Li *(SNPTC)*

Neutronics/Thermal-Hydraulics Coupling
Session Organizer: Maria N. Avramova *(NCSU)* **Cochairs:** Robert Salko *(ORNL)*, Kevin Segard *(Framatome)*
Location: Nassau **Time:** 2:00-3:55 pm

2:05 pm: ARTEMIS/S-RELAP5 Transient Benchmarks to Support ARITA Non-LOCA Methodology, Kevin Segard, Richard Brock, Keith Higar *(U.S. Fuels, Framatome)*, Sebastian Kuch *(Fuels Germany, Framatome)*

2:30 pm: Advanced Liquid Fuel Molten Salt Reactor Core Simulation Using Gen-Foam, Muhammad Altahhan, Sandesh Bhaskar, Paolo Balestra, Jason Hou, Maria Avramova *(NCSU)*, Nicholas Smith *(Southern Co.)*

2:55 pm: Development of Preliminary VERA-CS Crud-Induced Localized Corrosion Modeling Capability, R. Salko, S. Slattery, T. Lange, M. Delchini, B. Collins *(ORNL)*, W. Gurecky *(Univ of Texas, Austin)*, E. Tatli *(Westinghouse)*, A. Manera *(Univ of Michigan)*

3:20 pm: Advanced Platform for Execution of Coupled Multi-Physics Simulations, Nicolae Bobolea, Randy Ellison, Joshua Parker *(U.S. Fuels, Framatome)*

General Thermal Hydraulics—IV
Session Organizer: Igor A. Bolotnov *(NCSU)* **Chair:** Elia Merzari *(ANL)*
Location: Manatee **Time:** 2:00-3:55 pm

2:05 pm: Vapor Dynamic Behavior on the Hemispherical Downward Facing Heating Surface, Xiang Zhang, Daogui Tian, Lian Chen, Yuquan Li *(SNTPC)*, Huajian Chang *(SNTPC/Tsinghua Univ)*

2:30 pm: Advancement of Numerical Analysis Method for Tube Failure Propagation, Akihiro Uchibori, Tatashi Takata *(JAEA)*, Hideki Yanagisawa *(NESI Corp.)*, Jiazhi Li, Sunghyon Jang *(The Univ of Tokyo)*

2:55 pm: Effectiveness of Secondary and Primary B&F Strategies to Mitigate SAI-SGTR Consequence, Zhi'ao Huang, Huifang Miao, Huai-En Hsieh, Ning Li *(Xiamen Univ)*

3:20 pm: Implication of Transient CHF Model on ATR Fueled Experiments Safety Margin, Yu-Jou Wang, Xingang Zhao, Akshay J. Dave, Koroush Shirvan, Lin-Wen Hu *(MIT)*, Joseph Nielsen, Paul Murray, Ryan Marlow *(INL)*

Embedded Topical Meeting

Embedded Topical Meeting: The Technology of Fusion Energy (TOFE 2018)

GENERAL CHAIR
Leigh Winfrey
Penn State

TECHNICAL PROGRAM COCHAIR
Trey Gebhart
ORNL

TECHNICAL PROGRAM COCHAIR
John Gilligan
NCSU

PUBLICATIONS COCHAIR
Arnie Lumsdaine
ORNL

PUBLICATIONS COCHAIR
Gregory Staack
SRNL

STUDENT PROGRAM CHAIR
Lauren Garrison
ORNL

Sponsored by ANS Fusion Energy Division

TOFE 2018 Schedule at a Glance

Monday, November 12

1:30-3:30 pm	Test Facilities for Materials and Components—I	Bonnet Creek I
1:30-3:15 pm	Fusion Neutronics—I	Bonnet Creek II
4:00-6:35 pm	Transformative Enabling Capabilities: Advanced Materials and Manufacturing	Bonnet Creek I
4:00-6:15 pm	Magnets	Bonnet Creek II

Tuesday, November 13

8:00-9:55 am	Plenary–I	Bonnet Creek I
10:30 am-12:35 pm	Transformative Enabling Capabilities: Can High Temperature Super Conductors Shorten the Path to Fusion Energy?— Papers/Panel	Bonnet Creek I
10:30 am-12:35 pm	Alternative Fusion Concepts	Bonnet Creek II
1:30-3:30 pm	Poster Session—I	Bonnet Creek Foyer
4:00-6:35 pm	Materials Development	Bonnet Creek I
4:00-6:10 pm	Private Fusion Companies	Bonnet Creek II

Wednesday, November 14

8:00-9:45 am	Plenary–II	Bonnet Creek I
10:30 am-12:45 pm	Components	Bonnet Creek I
10:30 am-1:00 pm	Transformative Enabling Capabilities: Fusion Fuel Cycle	Bonnet Creek II
1:30-3:30 pm	Poster Session—II	Bonnet Creek Foyer
4:00-6:25 pm	Fusion Systems Engineering	Bonnet Creek I
4:00-6:55 pm	Licensing and Safety of Fusion and Gen IV Fission Reactors	Bonnet Creek II

Thursday, November 15

8:30-10:05 am	Plenary—III	Bonnet Creek I
10:30 am-12:35 pm	Thermal Hydraulics for Fusion Components	Bonnet Creek X
10:30 am-12:40 pm	Test Facilities for Materials and Components—II	Bonnet Creek XI
1:30-3:20 pm	Plasma Material Interaction	Bonnet Creek X
1:30-3:35 pm	Next Step Fusion Facilities/Power Conversion	Bonnet Creek XI
4:00-5:45 pm	Transformative Enabling Capabilities: Liquid Metal Plasma Facing Components	Bonnet Creek X
4:00-6:00 pm	Fusion Neutronics—II	Bonnet Creek XI

Embedded Topical: The Technology of Fusion Energy (TOFE 2018)

MONDAY, NOVEMBER 12
TECHNICAL SESSIONS - 1:30 PM

Test Facilities for Materials and Components—I
Cochairs: J. P. Allain *(Univ. Illinois)*, Masa Shimada *(INL)*
Location: Bonnet Creek I **Time:** 1:30-3:30 pm

1:35 pm: Status and Recent Results From the Linear Plasma Facility Magnum-PSI for Fusion Materials Research, H. J. N. van Eck, S. Alonso van der Westen, S. Brons, I. G. J. Classen, H. J. van der Meiden, T. W. Morgan, M. J. van de Pol, J. Scholten, J. W. M. Vernimmen, E. G. P. Vos, M. R. de Baar *(DIFFER)*, invited

2:00 pm: MaPLE-U Facility to Explore Multiple Effects in Liquid Metal Blankets in the US/UCLA – EUROfusion Collaboration, Mohamed Abdou, Sergey Smolentsev, Neil Morley, Cyril Courtessole, Alice Ying, Yi Yan *(UCLA)*, Gianfranco Federici, Lorenzo Boccaccini, Leo Buehler, Fabio Cismondi, Marco Utili, David Rapisarda *(EUROfusion)*, invited

2:25 pm: Latest Results From Proto-MPEX and the Future Plans for MPEX, Juergen Rapp, Arnold Lumsdaine *(ORNL)*, Clyde Beers *(ORNL, UTK)*, Theodore Biewer, Timothy Bigelow, Juan Caneses, John Caughman, Richard Goulding *(ORNL)*, Nischal Kafle *(ORNL, UTK)*, Cornwall Lau *(ORNL)*, Elizabeth Lindquist *(ORNL, UTK)*, Pawel Piotrowicz *(ORNL, Univ. Ill., Urbana-Champaign)*, Holly Ray, Melissa Showers *(ORNL, UTK)*, and the MPEX team, invited

2:50 pm: High Heat-Flux Target Design for the Materials Plasma Exposure eXperiment, Venu Varma, Arnold Lumsdaine, Juergen Rapp *(ORNL)*

3:05 pm: Ion Fluxes and Neutral Gas Ionization Efficiency of the 100-kW Light-Ion Helicon Plasma Source Concept for the Materials Plasma Exposure eXperiment, J. F. Caneses, T. M. Biewer, R. H. Goulding, J. B. O. Caughman *(ORNL)*, M. Showers *(ORNL, UTK)*, J. Rapp *(ORNL)*

Fusion Neutronics—I
Cochairs: Katherine Royston *(ORNL)*, Robert Grove *(ORNL)*
Location: Bonnet Creek II **Time:** 1:30-3:15 pm

1:35 pm: Fusion Neutronics Analysis of the Divertor Test Tokamak (DTT) Facility, Rosaria Villari *(ENEA)*, Raffaele Albanese *(Univ. degli Studi Federico II)*, Andrea Colangeli *(LT Calcoli Srl)*, Flavio Crisanti, Aldo Di Zenobio, Davide Flammini, Nicola Fonnesu *(ENEA)*, Raul Luis (Univ. de Lisboa), Giovanni Mariano *(Sapienza Univ. Rome)*, Daniele Marocco, Giuseppe Mazzitelli, Fabio Moro, Gian Mario Polli, Giuseppe Ramogida, Sandro Sandri *(ENEA)*, invited

2:00 pm: Shielding Design for X-Ray Diagnostics at the NIF, Hesham Khater, Lucile Dauffy, Charles Yeamans *(LLNL)*

2:20 pm: MCNP Models for Tokamak Cooling Water System Equipment Evaluations, Georgeta Radulescu, Katherine E. Royston, Stephen C. Wilson, Walter Van Hove, David E. Williamson, Seokho H. Kim *(ORNL)*

2:40 pm: Assessment of Activation on Level L3 of the Tokamak Building due to the ITER Tokamak Cooling Water System, Katherine Royston, Georgeta Radulescu, Walter Van Hove, Stephen Wilson, Seokho Kim *(ORNL)*

3:00 pm: Neutronics Analysis for the Edge Charge Exchange Recombination Spectroscopy in Equatorial Port of ITER, Arkady Serikov *(KIT)*, Luciano Bertalot, Maarten De Bock *(ITER)*, Ulrich Fischer *(KIT)*

TECHNICAL SESSIONS - 4:00 PM

Transformative Enabling Capabilities: Advanced Materials and Manufacturing, all invited
Cochairs: Juergen Rapp *(ORNL)*, Lauren Garrison *(ORNL)*
Location: Bonnet Creek I **Time** 4:00-6:35 pm

4:05 pm: Summary of the FESAC Transformative Enabling Capabilities Panel Report, Rajesh Maingi *(PPPL)* Arnold Lumsdaine *(ORNL)*

4:30 pm: Additive Manufacturing and Architected Materials for Fusion Applications, Christopher M. Spadaccini *(LLNL)*

4:55 pm: Advanced Manufacturing of Ferritic Martensitic Steels for Fusion Reactors, Niyanth Sridharan, Maxim Gussev, Kevin Field *(ORNL)*

5:20 pm: Potential of Emerging Engineering Materials for Fusion Energy Applications, Yutai Katoh, Takaaki Koyanagi, Arunodaya Bhattacharya, Chad M. Parish, Philip D. Edmondson *(ORNL)*, Caen Ang *(ORNL, UTK)*, Lizhen Tan *(ORNL)*, Charles H. Henager, Jr. *(PNNL)*, Lance L. Snead *(SUNY)*, Steven J. Zinkle *(ORNL, UTK)*

5:45 pm: Tungsten Fibre Tungsten and Smart Tungsten Alloys for Fusion Applications, J. W. Coenen, A. Litnovsky *(Forschungszentrum Juelich)*, J. Riesch *(IPP MPG)*, R.Neu *(IPP, Technische Univ. Muenchen)*, Ch. Linsmeier *(Forschungszentrum Juelich)*

6:10 pm: Innovating Architected Self-Healing Materials as Adaptive Plasma-Facing Components Designed for Extreme Plasma-Burning Fusion Environments, J. P. Allain *(Univ. Ill, Urbana-Champaign)*

MONDAY, NOVEMBER 12
TECHNICAL SESSIONS - 4:00 PM

Magnets
Cochairs: Soren Prestemon *(LBNL)*, Robert Duckworth *(ORNL)*
Location: Bonnet Creek II **Time:** 4:00-6:15 pm

4:05 pm: Prototype Coil Evaluation for NSTX-U Replacement Inner Poloidal Field Coils, Yuhu Zhai and the NSTX-U Coil Test Team *(PPPL)*, invited

4:30 pm: Design Overview and Fabrication Status of the ITER Central Solenoid Module, Kevin D. Freudenberg, David A. Everitt, Wayne T. Reiersen *(ORNL)*, R. Leonard Myatt, Kristine B. Cochran *(Myatt Consulting)*, Nicolai N. Martovetsky *(ORNL)*, Nikolai Norausky, Dariusz Appelt *(General Atomics)*, invited

4:55 pm: Technical Challenges and Design Status of Superconducting Magnet System of CFETR, J. X. Zheng *(CAS)*, Y. T. Song, K. Lu, Y. X. Wan, J. G. Li *(CAS, Univ. Sci. Technol.)*, X. F. Liu, L. Zhu, Z. P. Luo, S. S. Du *(CAS)*, S. T.Wu, M. Y. Ye *(CAS, Univ. Sci. Technol.)*, S. M. Liu, Q. X. Yang, J. G. Qin, Y. Si *(CAS)*, B. L. Hou, C. J. Pan *(SW Inst. Phys.)*, and CFETR Team

5:15 pm: Wendelstein 7-X Magnets: Experiences Gained During the First Years of Operation, Thomas Rummel, Konrad Rieße, Michael Nagel, Thomas Mönnich Matthias Schneider, Frank Füllenbach, Hans-Stephan Bosch, and W7-X team *(IPP MPG)*

5:35 pm: Identification of the Postulated Initiating Events (PIEs) in the Magnet System of the EU DEMO, Roberto Bonifetto, Nicola Pedroni, Laura Savoldi, Roberto Zanino *(NEMO Group)*

5:55 pm: Electrical Insulation Tape Winding and Inspection System, Joseph R. Petrella Jr., Michael D'Agostino, Mark Cropper, Jessica Guttenfelder *(PPPL)*

TUESDAY, NOVEMBER 13
TECHNICAL SESSIONS - 10:30 AM

Transformative Enabling Capabilities: Can High Temperature Super Conductors Shorten the Path to Fusion Energy?— Papers/Panel, all invited
Chair: Robert Duckworth *(ORNL)*
Location: Bonnet Creek I **Time:** 10:30 am-12:35 pm

10:35 am: High Temperature Superconductors for Future Fusion Power Plants, Walter H. Fietz, Michael J. Wolf, Alan Preuss, Reinhard Heller, Nadezda Bagrets, Elisabeth Urbach, Klaus-Peter Weiss *(KIT)*

10:50 am: High Temperature Superconductor Technology Can Enable Highly Compact, High Magnetic Field, High Performance Fusion on an Accelerated Time Scale, Joseph V. Minervini, Z. Hartwig, D. Whyte, M. Greenwald, E. Marmar, J. Irby *(MIT),* R., Mumgaard, B. Sorbom, D. Brunner *(Commonwealth Fusion Systems)*

11:05 am: Overcoming Technical Challenges Associated with the Application of HTS to Fusion, Soren Prestemon, Xiaorong Wang *(LBNL)*

11:20 am: Study on High Temperature Superconducting Magnet for Fusion Device in ASIPP, Y. T. Song, J. G. Li, Y. X. Wan, B. N. Wan, J. X. Zheng *(IPP CAS, Univ. Sci. Technol. China)*, K. Lu, X. F. Liu *(IPP CAS)*, R. Kang, Z. S. Zhang *(Univ. Sci. Technol. China)*

11:35 am: Can HTS Magnets Shorten the Path to Fusion Energy? The View From Tokamak Energy, David Kingham *(Tokamak Energy Ltd.)*

11:50 am: Panel Discussion

Alternative Fusion Concepts, all invited
Chair: Leigh Winfrey *(Penn State)*
Location Bonnet Creek II **Time:** 10:30 am-12:35 pm

10:35 am: Magnetothermodynamics in SSX: Measuring the Equations of State of a Compressible Magnetized Plasma, Michael Brown *(Swarthmore College)*

10:55 am: The Dynomak: A Sustained Spheromak Pathway to Economical Fusion Power, Derek A. Sutherland, Thomas R. Jarboe *(CTFusion)*

11:25 am: Plasma Jet Driven Magneto-Inertial Fusion (PJMIF), Y. C. Francis Thio *(HyperJet Fusion)*, Scott C. Hsu *(LANL)*, F. Douglas Witherspoon, Sam Brockington, Andrew Case *(HyperJet Fusion)*, Jason Cassibry *(Univ. Alabama)*, Edward Cruz, John Dunn *(HyperJet Fusion)*, Sam Langendorf *(LANL)*, Marco Luna *(HyperJet Fusion)*, Roman Samulyak *(BNL)*, Ajoke Williams *(HyperJet Fusion)*, Kevin Yates *(LANL)*

11:45 am: Pulsed Power and Laser Driven Magnetized Liner Inertial Fusion, J. Peebles, J. R. Davies, D. H. Barnak, E. C. Hansen, A. B. Sefkow, V. Y. Glebov, R. Betti, E. M. Campbell *(Univ. Rochester)*, K. J. Peterson, D. B. Sinars, M. R. Weis *(Sand)*

12:15 pm: Progress Towards a Compact Fusion Reactor Using the Sheared-Flow Stabilized Z-Pinch, E. G. Forbes, U. Shumlak, B. A. Nelson *(Univ. Washington)*, H. S. McLean *(LLNL)*, E. L. Claveau, R. P. Golingo *(Univ. Washington)*, D. P. Higginson, J. M. Mitrani *(LLNL)*, A. D. Stepanov *(Univ. Washington)*, K. K. Tummel *(LLNL)*, T. R. Weber, Y. B. B. Zhang *(Univ. Washington)*

Embedded Topical: The Technology of Fusion Energy (TOFE 2018)

TUESDAY, NOVEMBER 13
TECHNICAL SESSIONS - 1:30 PM

Poster Session—I
Chair: Trey Gebhart *(ORNL)*
Location: Bonnet Creek Foyer **Time:** 1:30-3:30 pm

1. Lattice Confinement: A New Proposal for Fusion Power Generation Based on Beam Target D-T Fusion Enhancement by Ion Channeling in Single Crystal, Tzu-Yin Chiu *(Consultant)*
2. Nuclear Fusion Integrated Biomass Gasification Fuel Cell Cycle: A Promising Option for Future Energy Sustainability?, Shutaro Takeda (Harvard), Hoseok Nam *(Inst. Advanced Energy)*, Shigeki Sakurai *(Kyoto Univ.)*, Satoshi Konishi *(Inst. Advanced Energy)*
3. Extreme Laser Pulses tor Environmentally Clean Laser Boron Fusion, George H. Miley *(Univ. Ill., Urbana-Champaign)*, Heinrich Hora *(Univ. New South Wales)*
4. Inertial Electrostatic Confinement Fusion Device for Flat Neutron Source, H. Osawa, M. Ohnishi, Y. Yamamoto *(Kansai Univ.)*
5. Conceptual Design of Dual Fluid Fusion-Fission Hybrid System for Waste Transmutation, Seong Hee Hong, Myung Hyun Kim *(Kyung Hee Univ.)*
6. Tritium Breeder Layers Evaluation on Fusion-Fission Hybrid System, Renato V. A. Marque, Carlos E. Velasquez, Claubia Pereira, Maria Auxiliadora F. Veloso, Antonella L. Costa *(UFMG)*
7. Dense Plasma Focus Technology and Applications at the Nevada National Security Site, Brady Gall, Nathan Sipe, Michael Blasco, Michael Heika, Vincent DiPuccio, Stephen Molnar, Dennis Dalley, Lawrence Robbins, E. Chris Hagen *(NNSS)*
8. Steady-State DD Fusion Neutron Production in an Inertial Electrostatic Confinement Device at up to 210 Kilovolts, Aaron N. Fancher, Gerald L. Kulcinski, John F. Santarius, Richard L. Bonomo *(U.W., Madison)*
9. Potential Profile inside a Gridded Cathode at High Potential in a Spherical Inertial Electrostatic Confinement Device, Kai Masuda, Ryosuke Kashima, Mahmoud A. Bakr *(Kyoto Univ.)*
10. Biomass-Fusion Hybrid ver.2: An innovative Energy Application for Carbon Sequestration, Satoshi Konishi, Nam Hoseok, Shutaro Takeda, Keisuke Mukai, Juro Yagi *(Kyoto Univ.)*
11. Beam-Fusion-Triggered Transmutator Transparent, Monitored and Controlled Realtime, A. Necas, T. Tajima, M. Binderbauer *(TAE Technologies)*, G. Mourou *(Ecole Polytechnique)*, S. Gales *(Univ. Paris-SUD)*, M. Leroy *(Univ. Strasbourg)*, J. Tanner, K. Hatfield *(TAE Technologies)*
12. Thermo-Mechanical Solid Breeder Multiple Effects Experiment (TESOMEX) Construction and Volumetric Heating Analysis, Mahmoud Lotfy, Alice Ying, Mohamed Abdou *(UCLA)*, Dong Won Lee *(KAEI)*, Mu-Young Ahn *(NFRI)*
13. Development of RF Ion Source for Neutral Beam Injector, Yahong Xie *(Inst. Plasma Phys.)*, Chundong Hu, Caichao Jiang *(Inst. Plasma Phys. & Univ. Sci. Technol. China)*, Jianglong Wei, Yuming Gu, Qinglong Cui *(Inst. Plasma Phys.)*, Meichu Huang *(Inst. Plasma Phys. & Univ. Sci. Technol. China)*, Lizhen Liang, Yongjian Xu *(Inst. Plasma Phys.)*, Yuanlai Xie *(Inst. Plasma Phys. & Univ. Sci. Technol. China)*, Yuanzhe Zhao *(Inst. Plasma Phys.)*
14. Recent Development of Neutral Beam Injector on EAST Tokamak, Chundong Hu, Caichao Jiang *(Inst. Plasma Phys. & Univ. Sci. Technol. China)*, Yahong Xie, Yuanlai Xie, Sheng Liu, Lizhen Liang *(Inst. Plasma Phys.)*, Caichao Jiang *(Inst. Plasma Phys. & Univ. Sci. Technol. China)*, Yongjian Xu, Yuanzhe Zhao, Jun Li, Zhimin Liu *(Inst. Plasma Phys.)*
15. Thermal Analysis of the Prototype RF-Driven Negative Ion Source for Neutral Beam Injection Application, Yongjian Xu, Chundong Hu, Yahong Xie, Caichao Jiang, Jianglong Wei, Lizhen Liang, Yuming Gu, Ling Yu *(Inst. Plasma Phys.)*
16. Design of Two Experimental Mock-Ups as Proof-Of-Concept and Validation Test Rigs for the Enhanced EU DEMO HCPB Blanket, Guangming Zhou, Bradut-Eugen Ghidersa, Francisco A. Hernández, Qinlan Kang, Heiko Neuberger *(KIT)*
17. Comparison of Tritium Release From FLiNaK and FLiNaBe Under Low Flux Neutron Irradiation, Kohki Kumagai *(SOKENDAI)*, Teruya Tanaka, Juro Yagi, Takuya Nagasaka *(SOKENDAI & National Inst. Fusion Sci.)*, Takashi Watanabe *(National Inst. Fusion Sci.)*, Gaku Yamazaki *(SOKENDAI)*, Fuminobu Sato, Shingo Tamaki, Isao Murata *(Osaka Univ.)*, Satoshi Fukada, Kazunari Katayama *(Kyushu Univ.)*, Akio Sagara *(SOKENDAI & National Inst. Fusion Sci.)*
18. Dynamic Modeling and Simulation of Fuel Delivery Process Under Time-Varying Tokamak Fuel Demand, Jae-Uk Lee, Min Ho Chang, Hyun-goo Kang, Dong-you Chung, Sei-Hun Yun *(NFRI)*
19. In-Situ Calorimetry Performance of Depleted Uranium Bed for Tritium Fuel Cycle, Hyun-goo Kang, Dong-you Chung, Jae-Uk Lee, Min Ho Chang, Sei-Hun Yun *(NFRI)*
20. Impact of Outer Fuel Cycle Tritium Transport on Initial Start-Up Inventory for Next Fusion Devices, Marco Riva, Alice Ying, Mohamed Abdou *(UCLA)*, Mu-Young Ahn, Seungyon Cho *(NFRI)*
21. Assessment of System Failure Criticality by Means of a Probabilistic Approach, D. Elbèze, D. van Houtte, E. Delchambre *(CEA)*

Poster Session—I Continued

22. Importance of Promoting Combustion of Hydrocarbons by Detritiation System in an Event of Fire at Nuclear Fusion Facility, Yasunori Iwai, Yuki Edao, Rie Kurata, Kanetsugu Isobe *(Tritium Technol. Group)*
23. Investigation on Characteristic of Tritium Oxidation by Natural Soils, Yuki Edao, Yasunori Iwai *(National Inst. Quantum Radiol. Sci. Technol.)*
24. Improvement of the Neutron Production Rate of IEC Fusion Device by the Fusion Reaction on the Chamber Inner Surface, Mahmoud Bakr, Kai Masuda, Masaya Yoshida *(Kyoto Univ.)*
25. Neutronics Calculations for a Plasma-Jet-Driven Magneto-Inertial-Fusion Reactor, Lucas M. Rolison, Michael L. Fensin, Scott C. Hsu *(LANL)*, Y. C. Francis Thio, E. Cruz, F. Douglas Witherspoon *(HyperJet Fusion Co.)*
26. Initial Neutronics Investigation of a Liquid Metal Plasma Facing Fusion Neutron Science Facility, Tim D. Bohm, Andrew Davis, Moataz S. Harb, Paul Wilson, and the FESS team *(UW, Madison)*
27. Neutronics Scoping Studies for an Experimental Fusion Device, L. Candido, R. Testoni, M. Zucchetti *(Politecnico di Torino)*
28. A Concept of Liquid Metal Flowing First Wall and Integrated Tub-like Divertor, S. Smolentsev *(UCLA)*, T. Rognlien *(LLNL)*, M. Tillack *(Consultant)*, L. Waganer *(Consultant)*, C. Kessel *(PPPL)*
29. Benchmarking of Neutron Transport in Blanket Module by MCNP with Profile Analysis with Imaging Plate, Yasuyuki Ogino, Keisuke Mukai, Juro Yagi, Satoshi Konishi *(Kyoto Univ.)*
30. An Experimental Reversed Heat Flux Investigation of the Helium-Cooled Modular Divertor with Multiple Jets, S. A. Musa, D. S. Lee, S. I. Abdel-Khalik, M. Yoda *(Georgia Tech)*
31. Thermal-Hydraulics of Helium-Cooled Finger-Type Divertors at Higher Incident Heat Fluxes, D. S. Lee, S. A. Musa, S. I. Abdel-Khalik, M. Yoda *(Georgia Tech)*

TECHNICAL SESSIONS - 4:00 PM

Materials Development
Chair: James Blanchard *(U.W., Madison)*
Location: Bonnet Creek I **Time:** 4:00-6:35 pm

4:05 pm: PHENIX US-Japan Collaboration Investigation of Thermal and Mechanical Properties of Thermal Neutron Shielded Irradiated Tungsten, Lauren Garrison, Yutai Katoh, Wilna Geringer *(ORNL)*, Masafumi Akiyoshi *(Osaka Univ.)*, Xiang Chen *(ORNL)*, Makoto Fukuda, Akira Hasegawa *(Tohoku Univ.)*, Tatsuya Hinoki *(Kyoto Univ.)*, Xunxiang Hu, Takaaki Koyanagi, Michael McAlister, Joel McDuffee *(ORNL)*, Takeshi Miyazawa *(Tohoku Univ.)*, Chad Parish, Janet Robertson, Hsin Wang *(ORNL), invited*

4:30 pm: Challenge to Advanced Fusion Neutron Source, Kentaro Ochiai *(National Inst. Rad. Sci. Technol)*, invited

4:55 pm: Conceptualization and Design of Novel First Wall Structures for Fusion Reactors, Gokul Vasudevamurthy, Wen Wu, Stefan Bringuier, Leo Holland *(General Atomics)*, Yutai Katoh *(ORNL)*, Mark Tillack *(UCSD)*

5:15 pm: Effects of Neutron Irradiation on the Microstructure and Superconductivity of Second Generation High Temperature Superconductors Irradiated in HFIR, Phillip D. Edmondson *(ORNL)*

5:35 pm: Morphology, Erosion, and Retention Characteristics of Tungsten Under Simultaneous Helium and Deuterium Bombardment, Matthew J. Jasica *(UW, Madison)*, Chase N. Taylor *(INL)*, Gerald L. Kulcinski, John F. Santarius *(UW, Madison)*

5:55 pm: Development and Initial Testing of the High Heat Flux Materials Exposure Device, HELIOS, J. R. Echols, A. Rivas, J. Ball *(Univ. Florida)*, A. L. Winfrey *(Penn State)*

6:10 pm: Surface Erosion of Plasma-Facing Materials Using an Electrothermal Plasma Source and Ion Beam Micro-Trenches, J. D. Coburn *(NCSU)*, T. E. Gebhart, C. M. Parish, E. Unterberg, J. Canik *(ORNL)*, M. W. Barsoum *(Drexel Univ.)*, M. Bourham *(NCSU)*

Private Fusion Companies, all invited
Chair: Ales Necas *(Tri Alpha Energy)*
Location: Bonnet Creek II **Time:** 4:00-6:10 pm

4:05 pm: On the Path to Clean Fusion, Michl Binderbauer *(TAE Technologies)*

4:30 pm: Commercial Fusion Energy at Helion Energy, Dave Kirtley *(Helion Energy)*

4:55 pm: Magnetized Target Fusion at General Fusion, Michel Laberge *(General Fusion)*

5:20 pm: Commonwealth Fusion Systems: Status and Prospects, R. T. Mumgaard, D. F. Brunner *(Commonwealth Fusion Systems)*, M. Greenwald, Z. S. Hartwig *(MIT)*, B. S. Sorbom *(Commonwealth Fusion Systems)*, D. G. Whyte *(MIT)*

5:45 pm: Tokamak Energy – A Private Venture that Aims to Accelerate the Development of Fusion Energy, David Kingham *(Tokamak Energy)*

WEDNESDAY, NOVEMBER 14
TECHNICAL SESSIONS - 10:30 AM

Components
Chair: Greg Staack *(SRNL)*
Location: Bonnet Creek I **Time:** 10:30 am-12:45 pm

10:35 am: Diamond Window Technology for ECR Heating and Current Drive – State of the Art, G. Aiello, T. A. Scherer, D. Strauss, A. Meier, S. Schreck *(KIT)*, invited

11:00 am: Design Finalization and Procurement of the ITER Blanket, the First Blanket Designed and Built for Operation in a Fusion Reactor, Rene Raffray *(ITER)*, invited

11:25 am: Design of Chinese DEMO Blanket Concepts and R&D Progress of DFLL TBM, Qunying Huang *(Inst. Nucl. Energy Safety Technol.)*

11:45 am: Advanced Divertor Studies in EAST/DIII-D by SOLPS, H. Si *(IPP CAS)*, H. Y. Guo *(General Atomics)*

12:05 pm: Comparison of Simulation to Experimental Testing of Graphite Foam Monoblock, M. Gehrig *(Missouri Univ. Sci. Technol., ORNL)*, D. L. Youchison, A. Lumsdaine, J. W. Klett *(ORNL)*, G. Mueller *(Missouri Univ. Sci. Technol.)*

12:25 pm: Latest Liquid Lithium/Metal Research Results from the Center for Plasma Material Interactions, D. Andruczyk, R. Rizkallah, M. Szott, S. Stemmley, M. Parsons, A. Shone, C. Moynahan, N. Bartlett, D. N. Ruzic *(Univ. Ill. Urbana-Champaign)*, R. Maingi, A, Carpe, I. Zats *(PPPL)*, J. Hu, G. Zuo, Z. Sun *(Inst. Plasma Phys.)*

Transformative Enabling Capabilities: Fusion Fuel Cycle
Chair: Paul Humrickhouse *(INL)*
Location: Bonnet Creek II **Time:** 10:30 am-1:00 pm

10:35 am: Electrochemical Extraction of Hydrogen Isotopes from Li/LiT Mixtures, Brenda L. Garcia-Diaz *(SRNL)*, Joseph A. Teprovich Jr. *(California State Univ.)*, Hector R. Colon Mercado, Luke Olson *(SRNL)*, Prabhu Ganesan *(Savannah River Consulting)*, Dave Babineau *(SRNL)*, invited

11:00 am: The DEMO Fuel Cycle – Innovative Technologies for Tritium Inventory Reduction, Christian Day (KIT), Barry Butler *(CCFE)*, G. Federici *(EUROfusion)*, Thomas Giegerich *(KIT)*, Bernhard Ploeckl *(IPP MPG)*, invited

11:25 am: Tritium Extraction from Water, W. T. Shmayda *(Univ. Rochester)*, C. R. Shmayda *(Torion Plasma Corp)*, J. Cruz *(Nuclear Services and Sources)*, invited

11:50 am: Design Development and Test Strategy of the Chinese Helium Cooled Ceramic Breeder Test Blanket System, Xiaoyu Wang, Kaiming Feng, Xuru Duan *(Southwestern Inst. Phys.)*, Min Wang *(China Int. Nucl. Fusion Energy Program)*, Deli Luo *(China Academy Eng. Phys.)*, and CN TBM Team, invited

12:15 pm: The ITER Tokamak Exhaust Processing System Design and Substantiation, Jason Wilson, James Becnel *(SRNL)*, David Demange *(ITER)*, Bernice Rogers *(SRNL)*, invited

12:40 pm: The ITER Tokamak Exhaust Processing System Permeator and Palladium Membrane Reactor Design, Jason Wilson, James Becnel *(SRNL)*, David Demange *(ITER)*, Bernice Rogers *(SRNL)*

TECHNICAL SESSIONS - 1:30 PM

Poster Session—II
Chair: John Echols *(Univ. Florida)*
Location: Bonnet Creek Foyer **Time:** 1:30-3:30 pm

1. Development of the Real-Time Thomson Scattering Software for NSTX-U, Roman Rozenblat, Greg Tchilinguirian, Florian Laggner, Egemen Kolemen, Gretchen Zimmer, Paul Sichta *(PPPL)*
2. Examination of Transmutation and Irradiation Damage Effects on Electrical Properties of Chromel and Alumel, Teruya Tanaka *(SOKENDAI, National Inst. Fusion Sci. Technol.)*, Hiroyuki Noto *(National Inst. Fusion Sci. Technol.)*, Fuminobu Sato *(Osaka Univ.)*, Yoshimitsu Hishinuma, Hiroyuki A. Sakaue *(National Inst. Fusion Sci. Technol.)*,Masahito Yohino *(Nagoya Univ.)*
3. Development of Solenoid Driven and Mechanical Punches for Launching High-Z Cryogenic Pellets for Tokamak Disruption Mitigation Experiments, T. E. Gebhart, S. J. Meitner, L. R. Baylor *(ORNL)*
4. Rapid Radiative Disruption Mitigation Through Electromagnetically Driven Killer Pellet Injection, Robert Lunsford *(PPPL)*, Roger Raman *(Univ. Washington)*, A. Brooks, R. A. Ellis *(PPPL)*, W. S. Lay *(Univ. Washington)*
5. Analysis of Impedance Matching Characteristics of Plasma Discharge for MW-Scale RF Ion Source, Ciachao Jiang, Chungdong Hu, Yahong Xie, Yongjian Xu, Junjun Pan, Shiyong Chen, Yuanlai Xie *(Inst. Plasma Physics, Chinese Adacemy of Sciences)*
6. Vapor Shielding Effect on the DEMO Tungsten Divertor Plate, Yuri Igitkhanov, Boris Bazylev, Lorenzo Boccaccini *(KIT)*

Poster Session—II Continued

7. Heat Flux Testing of Prototype NSTX-U Plasma Facing Components, T. K. Gray *(ORNL)*, N. Allen, R. Ellis, M. A. Jaworski, A. Khodak *(PPPL)*, M. L. Reinke *(ORNL)*, G. Smalley *(PPPL)*, D. L. Youchison *(ORNL)*, D. E. Wolfe *(Penn State)*
8. Shaping the Aperture of the Absolute Collimator in DIII-D Neutral Beam Line Upgrade, Wenping Wang, Andrei Khodak, Irving Zatz, Alex Nagy, Peter Titus *(PPPL)*
9. Direct Numerical Simulation of Effective Thermal Conductivity of Particle-sintered Porous Media, Kio Takai, Kazuhisa Yuki, Risako Kibushi, Noriyuki Unno *(Sanyo-onoda Univ.)*, Teruya Tanaka, Akio Sagara *(National Inst. Fusion Sci.)*
10. Effect of Re Doping on W Behavior: Microstructure, Mechanical Properties, and Response to Low Energy He/D Irradiation, Eric Lang (Univ. Ill., Urbana-Champaign), Lauren Garrison, Chad Parish *(ORNL)*, Jean Paul Allain *(Univ. Ill., Urbana-Champaign)*
11. Heat Flux Sensitivity on Heat Transfer Performance of Finger-Type Helium Impinging Jet, Kazuhisa Yuki *(Tokyo Univ.)*, Takehiko Yokomine *(Kyoto Univ.)*, Bailey Zhao, Shekaib A Musa, Minami Yoda, S. I. Abdel-Khalik *(Georgia Tech)*
12. Development and Performance of Tungsten-Coated Graphitic Foam for Plasma Facing Components, D. L. Youchison, A. Lumsdaine, J. W. Klett, B. Jolly *(ORNL)*, M. Gehrig *(Missouri Univ. Sci Technol.)*
13. Tritium Retention in Hexavalent Chromate-Conversion-Coated Alloy, Cody Fagan, Matthew Sharpe, Walter Shmayda, W. U. Schroder *(Univ. of Rochester)*
14. High Temperature Creep Properties of Nuclear-Grade Generation III SiC Fibers, D. R. Patel *(Univ. New Mexico)*, T. Koyanagi *(ORNL)*
15. Distribution of Tritium in the Near Surface of Stainless-Steel 316, Matthew Sharpe, Cody Fagan, Walter Shmayda *(Univ. of Rochester)*
16. Simulation of the Divertor Targets Shielding During Major Disruption in DEMO, Sergey Pestchanyi *(KIT)*
17. Simulation of Structural Damage Mechanisms to Plasma Facing Materials Under ITER-like Heat Loads, Nouf M AlMousa *(Princess Nourah Bint Abdulrahman Univ., NCSU*), Mohamed A Bourham *(NCSU)*
18. Multiple Energy Irradiation of Polycrystalline Tungsten with Helium Ions at Normal Incidence, Karla B. Hall, Gerald L. Kulcinski, John F. Santarius, Richard L. Bonomo *(UW, Madison)*
19. Results of Ion Cyclotron Heating Experiments on Proto-MPEX Utilizing a Movable Stainless Steel Target, R. H. Goulding *(ORNL)*, C. J. Beers *(UTK)*, J. F. Caneses, J. B. O. Caughman *(ORNL)*, N. Kafle, E. G. Lindquist *(UTK)*, P. A. Piotrowicz *(Univ. Ill., Urbana-Champaign)*, J. Rapp *(ORNL)*, M. A. Showers *(UTK)*
20. Design and Analysis of the Liquid Metal Free-Surface Divertor Cooling System, Andrei Khodak, Charles Kessel *(PPPL)*, Mark Tillack *(UCSD)*
21. High-Quality Graphene Membranes as a Coating for Polycrystalline Tungsten in a Nuclear Fusion Environment, Marcos Navarro, Marziyeh Zamiri, Karla Hall, Gerald Kulcinski, Max Lagally, John Santarius, Oliver Schmitz *(U.W., Madison)*, Russ Doerner *(UCSD)*, Martin Griswold, Ales Necas, Toshiki Tajima *(TAE Technologies)*
22. Calculation of Shutdown Dose Rate in Fusion Nuclear Science Facility During A Proposed Maintenance Scheme, M. Harb, T. Bohm *(UW, Madison)* A. Davis *(CCFE)*, P. Wilson *(UW, Madison)*, and the FESS-FNSF
23. Team Demonstration Plan of Nuclear Fusion Power Generation Principle by Supercritical CO^2 Gas Turbine in Oroshhi-2, Shintaro Ishiyama *(Hirosaki Univ.)*, Teruya Tanaka, Akio Sagara, Hirotaka Chikaraishi *(National Inst. Fusion Sci.)*
24. Inboard Divertor Heating and Cooling Design for the NSTX-Upgrade Fusion Device, D. Cai, H. Zhang, A. Brooks, M. Smith, P. Titus, D. Loesser *(PPPL)*
25. Design of a Test Section to Analyze Magneto-Convection Effects in WCLL Blankets, C. Koehly, L. Bühler *(KIT)*
26. An Analytical Study on the Impact of Halo Current Induced Lorentz Load on Center Stack Case in the NSTX-U, Feng Cai, Mark Smith, Jiarong Fang, Han Zhang, Nathaniel Dean, Peter Titus, Arthur Brooks *(PPPL)*
27. Low Heat Flux Plasma Facing Component Design for National Spherical Torus Experiment Upgrade *(NSTX-U)* Recovery, A. Jariwala, B. Linn, N. Allen, N. Dean, A. Brooks, M. Messineo, D. Warner, L. Konkel, S. Jurczynski *(PPPL)*
28. Architectural SiC/SiC Composite Flow Channel Insert Fabrication and Thermal Conductivity Measurement, Jiping Zhang, Arthur Blacklock, Carlos Bacalski *(General Atomics)*, Mark Tillack *(UCSD)*, Leo Holland *(General Atomics)*
29. Analytic Optimization of Free-Surface, Capillary Restrained, Liquid Metal, Plasma-Facing Components, Mike Jaworski *(PPPL)*, Luis E. Aparicio, Satoshi Ito, Hidetoshi Hashizume *(Tohoku Univ.)*
30. The Stress Analysis of PF1A Lower Terminals, Leads, and Bus Bars for NSTX-U, Jiarong Fang, Peter Titus, Dang Cai, Han Zhang *(PPPL)*
31. Design and Analysis of the U.S. ITER CS Module Lifting Fixture, Eric Morris, Kevin Freudenberg, Travis Reagan, Wayne Reiersen *(ORNL)*

Embedded Topical: The Technology of Fusion Energy (TOFE 2018)

WEDNESDAY, NOVEMBER 14
TECHNICAL SESSIONS - 4:00 PM

Fusion Systems Engineering
Chair: Mark Tillack *(UCSD)*
Location: Bonnet Creek I **Time:** 4:00-6:25 pm

4:05 pm: Systems Engineering for NSTX-U, Peter Dugan *(PPPL)*, invited

4:30 pm: Production Control Applied to Fusion Energy, Laudie Jamous, Maria Ortiz De Zuniga, John-Paul McCrone, Francesco Zacchia *(Fusion for Energy)*, invited

4:55 pm: ITER Framework for RAMI Engineering, Didier van Houtte *(CEA)*, invited

5:20 pm: RAMI Analysis of China Test Blanket Modules for ITER, Fang Wang, Dagui Wang, Miao Nie, Jin Wang, Zhibin Chen, Liqin Hu, Yican Wu, FDS Team *(Inst. Nucl. Energy Safety Technol.)*, invited

5:45 pm: Engineering Challenges of W7-X Mechanical Monitoring During Second Phase of Operation, Victor Bykov, Jiawu Zhu, Andre Carls *(IPP MPG)*, Ilia Ivashov *(Forschungszentrum Juelich)*, Joachim Geiger, Bernd Hein, Hans-Stephan Bosch, Lutz Wegener *(IPP MPG)*, and W7-X team

6:05 pm: Radiation Protection Design and Licensing for an Experimental Fusion Facility: The Italian and European Approaches, S. Sandri, G. M. Contessa, M. Guardati, M. Guarracino, R. Villari *(ENEA)*

Licensing and Safety of Fusion and Gen IV Fission Reactors
Chair: Jan Berry *(US ITER - Retired)*
Location: Bonnet Creek II **Time:** 4:00-6:55 pm

4:05 pm: Safety and Licensing Approaches for Modular High Temperature Gas Cooled Reactors, Jim Kinsey, Mark Holbrook, Wayne Moe *(INL)*, invited

4:30 pm: Licensing Small Modular Reactors: Innovation and the Regulator, Thomas A. Bergman *(NuScale Power)*, invited

4:55 pm: Status of ITER Safety Issues, D. Perrault *(IRSN)*, invited

5:20 pm: Progress in International Radioactive Fusion Waste Studies, M. Zucchetti *(Politecnico di Torino)*, L. El-Guebaly *(UW, Madison)*, B. Kolbasov, V. Khripunov *(Kurchatov Inst.)*, Y. Someya *(National Inst. Quantum Radiol. Sci. Technol.)*, R. Testoni *(Politecnico di Torino)*, K. Tobita *(National Inst. Quantum Radiol. Sci. Technol.)*, invited

5:45 pm: Regulatory Guidelines for Setting Design Criteria for Non-Water Reactors, Craig Welling *(U.S.DOE)*, invited

6:10 pm: Fusion Safety R&D in the View of Advanced Fission Reactor Development, Yican Wu and the FDS Team *(Inst. Nucl. Energy Safety Technol.)*, invited

6:30 pm: Safety Goals for Fusion Demonstration Reactors and Beyond, Zhen Wang, Zhibin Chen, Shanqi Chen, Daochuan Ge, Chao Chen, Fang Wang, Liqin Hu, FDS Team *(Inst. Nucl. Energy Safety Technol.)*

THURSDAY, NOVEMBER 15
TECHNICAL SESSIONS - 10:30 AM

Thermal Hydraulics for Fusion Components
Cochairs: Dennis Youchison *(ORNL)*, Joey Tipton *(Lipscomb Univ.)*
Location: Bonnet Creek X **Time:** 10:30 am-12:35 pm

10:35 am: Thermal Hydraulics of the EU Dual-Coolant Lead-Lithium Blanket, David Rapisarda, Iván Fernández-Berceruelo, Fernando Roca-Urgorri *(CIEMAT)*, Tomas Melichar, IvanDofek *(Research Centre Rez)*, Iole Palermo, Belit Garcinuño *(CIEMAT)*, Ladislav Vala *(Research Centre Rez)*, Angel Ibarra *(CIEMAT)*, invited

11:00 am: ITER Tokamak Cooling Water System Design Status, Donato Lioce, Moustafa Moteleb, Donato Lioce *(ITER)*, Seokho Kim *(ORNL)*, invited

11:25 am: NSTX-U Global Thermal Analysis for Bake-Out and Normal Operation Scenarios, Han Zhang, Peter Titus, Arthur Brooks, Joseph Petrella, Stefan Gerhardt *(PPPL)*, invited

11:50 am: Advancements in the Helium Cooled Pebble Bed Breeding Blanket for the EU DEMO: Holistic Design Approach and Lessons Learned, Francisco A. Hernández, Frederik Arbeiter, Lorenzo V. Boccaccini, Wolfgang Hering, Xue Z. Jin, Pavel Pereslavtsev, Guangming Zhou *(KIT)*, invited

12:15 pm: Design and Analysis of a Sub-Size HCPB BSS Mock-Up for the EU DEMO, Antonio Froio, Andrea Bertinetti *(NEMO Group)*, Bradut-Eugen Ghidersa, Francisco A. Hernández *(KIT)*, Laura Savoldi, Roberto Zanino *(NEMO Group)*

THURSDAY, NOVEMBER 15
TECHNICAL SESSIONS - 10:30 AM

Test Facilities for Materials and Components—II, all invited
Chair: Phil Ferguson *(ORNL)*
Location: Bonnet Creek XI **Time:** 10:30 am-12:40 pm

10:35 am: Irradiation Capabilities and Outlook for Fusion Materials Research, Joel McDuffee *(ORNL)*

11:00 am: Safety and Tritium Applied Research Facility for Advancing Fusion Nuclear Science with Tritium-Exposed and Neutron-Irradiated Materials, Masashi Shimada, Chase N. Taylor, Robert J. Pawelko, Paul W. Humrickhouse, Lee C. Cadwallader, Brad J. Merrill *(INL)*

11:25 am: Plasma Materials Interaction Research Using the PISCES Linear Plasma Devices, M. J. Baldwin, D. Nishijima, J. H. Yu, M. J. Simmonds *(UCSD)*, A. Založnik *(Jozef Stefan Inst.)*, M. Patino, S. Abe, S. Chakraborty Thakur, E. Hollmann, R. P. Doerner, G. Tynan *(UCSD)*

11:55 am: Liquid Blanket Collaboration Platform Oroshhi-2 at NIFS with FLiNaK/LiPb Twin Loops, Teruya Tanaka, Akio Sagara, Yagi Juro, Takeo Muroga *(NIFS)*

12:15 pm: A 12 MW/m2 High-Heat Flux Testing Facility of Irradiated Materials Using Infrared Plasma-Arc Lamps, Adrian S. Sabau *(ORNL)*, Kazutoshi Tokunaga *(Kyushu Univ)*, Michael G. Littleton, James O. Kiggans Jr., Charles R. Schaich, Ralph B. Dinwiddie, Daniel T. Moore *(ORNL)*, Yoshio Ueda *(Osaka Univ.)*, Yutai Katoh *(ORNL)*

TECHNICAL SESSIONS - 1:30 PM

Plasma Material Interaction
Chair: David Donovan *(UTK)*
Location: Bonnet Creek X **Time:** 1:30-3:20 pm

1:35 pm: Plasma-Surface Interaction of RAFM Steels, Wolfgang Jacob, K. Sugiyama, R. Arredondo Parra, M. Oberkofler *(IPP)*, invited

2:00 pm: Multiple Analytical Approaches to Isotopic Tungsten Transport Analysis in Magnetic Fusion Devices, Jonah D. Duran *(UTK)*, Ezekial A. Unterberg, Mike P. Zach *(ORNL)*, William R. Wampler (*SNL)*, David C. Donovan *(UTK)*

2:20 pm: Elemental Characterization of Neutron Irradiated Tungsten Using the GD-OES Technique, Nathan C. Reid *(Univ. III, Urbana-Champaign)*, Lauren M. Garrison *(ORNL)*, Jean Paul Allain *(Univ. III, Urbana-Champaign)*

2:40 pm: Surface Roughness and Exposure Energy Effect on the Surface Nanofuzz Growth of Tungsten, Kun Wang, Fred W. Meyer, Mark E. Bannister, Chad M. Parish *(ORNL)*

3:00 pm: Technology and Science of Lithium Delivery Systems and Impact on Plasma Performance in EAST, W. Xu *(Shenzhen Univ.)*, J. S. Hu *(IPP CAS)*, R. Maingi *(PPPL)*, G.Z. Zuo, Z. Sun, X. C. Meng, Y. Z. Qian, M. Huang, J. G. Li *(IPP CAS)*

Next Step Fusion Facilities/Power Conversion
Chair: Arnie Lumsdaine *(ORNL)*
Location: Bonnet Creek XI **Time:** 1:30-3:35 pm

1:35 pm: Japan's Efforts to Develop DEMO Concept During the Past Decade, Kenji Tobita, Ryoji Hiwatari, Yoshiteru Sakamoto, Youji Someya, Nobuyuki Asakura, Hiroyasu Utoh, Yuya Miyoshi, Shinsuke Tokunaga, Yuki Homma *(QST)*, Noriyoshi Nakajima *(NIFS),* The Joint Special Design Team for Fusion DEMO, invited

2:00 pm: Power Conversion Considerations in Fusion Power Plants and Test Reactors, M. S. Tillack *(UCSD)* and the Fusion Energy System Studies Team *(PPPL)*, invited

2:25 pm: Mechanical Design Conception of a Superconducting Magnet System for a Helical Fusion Reactor, Hitoshi Tamura, Nagato Yanagi, Takuya Goto, Junichi Miyazawa, Teruya Tanaka, Akio Sagara *(NIFS)*, Satoshi Ito, Hidetoshi Hashizume *(Tohuku Univ.)*, invited

2:50 pm: The IAEA DEMO Fusion Workshop Series: Highlights of the First Five Meetings, Elizabeth Surrey *(CCFE)*, Sehila Maria Gonzalez-de-Vicente *(IAEA)*, invited

3:15 pm: Overall Introduction of CFETR Remote Maintenance Test Facility, Yong Cheng *(Inst. Plasma Phys.)*, Hongtao Pan *(College Optoelectronic Eng.)*, Shanshuang Shi *(IPP CAS)*, Wenlong Zhao *(College Optoelectronic Eng.)*

THURSDAY, NOVEMBER 15
TECHNICAL SESSIONS - 4:00 PM

Transformative Enabling Capabilities: Liquid Metal Plasma Facing Components
Cochairs: Rajesh Maingi *(PPPL)*, J. P. Allain *(Univ. Illinois)*
Location: Bonnet Creek X **Time:** 4:00-5:45 pm

4:05 pm: An Exploration of Liquid Metal Plasma Facing Components for Fusion, C. E. Kessel *(PPPL)*, D. Andruczyk *(Univ. III, Urbana-Champaign)*, J. P. Blanchard, T. Bohm, A. Davis *(UW, Madison)*, K. Hollis *(LANL)*, P. W. Humrickhouse *(INL)*, M. Hvasta, M. A. Jaworski *(PPPL)*, J. Jiheon, Y. Katoh *(ORNL)*, A. Khodak *(PPPL)*, J. Klein *(SRNL)*, E. Kolemen *(PPPL)*, G. Larsen *(SRNL)*, R. Majeski *(PPPL)*, B. J. Merrill *(INL)*, N. B. Morley *(UCLA)*, G. H. Neilson *(PPPL)*, B. A. Pint *(ORNL)*, M. E. Rensink *(LLNL)*, T. D. Rognlien *(LLNL)*, A. F. Rowcliffe *(ORNL)*, S. Smolentsev *(UCLA)*, M. S. Tillack *(UCSD)*, L. M. Waganer *(Consultant)*, G. M. Wallace *(MIT)*, S.-J. Yoon *(INL)*

4:25 pm: Modeling the Edge-Plasma Interface for Liquid-Metal Walls in FNSF, M. E. Rensink, T. D. Rognlien *(LLNL)*, C. E. Kessel *(PPPL)*

4:45 pm: The Impacts of Liquid Metal Plasma Facing Components on Fusion Reactor Safety and Tritium Management, Paul W. Humrickhouse, Su-Jong Yoon, Brad J. Merrill *(INL)*

5:05 pm: Thermal and Electromagnetic Transients in Liquid Metal Surfaces of the FNSF, James Blanchard, Carl Martin *(UW, Madison)*

5:25 pm: Thermal Convection Loop Testing of an FeCrAlMo Alloy at 450-700°C, J. Jun, B. A. Pint, K. A. Unocic *(ORNL)*

Fusion Neutronics—II
Cochairs: Rosaria Villari *(ENEA)*, Arkady Serikov *(KIT)*
Location: Bonnet Creek XI **Time:** 4:00-6:00 pm

4:05 pm: Advanced Neutronics Modeling and Simulation Development at ORNL Driven by Fusion Applications, Robert Grove, Scott Mosher, Stephen Wilson *(UW, Madison)*, invited

4:30 pm: Linearizing the Transmutation Operator: Beyond Shutdown Dose Rate Calculations, Paul P. H. Wilson, Moataz Harb, Chelsea D'Angelo *(UW, Madison)*, invited

4:55 pm: Development and V&V of SuperMC for Fusion Systems, Yican Wu, Liqin Hu, Pengcheng Long, Jing Song, Tao He, Fang Wang, Lijuan Hao, Bin Wu, Shengpeng Yu, Guangyao Sun, Jun Zou, Quan Gan, Peng He, Lei Wang, Bin Li, Guomin Sun, Jieqiong Jiang, Chao Liu, Yongfeng Wang, Qi Yang, Xiang Ji Zhigang Wang and FDS Team *(Inst. Nucl. Energy Saf. Technol.)*, invited

5:20 pm: Advanced Activation and Shutdown Dose Rate Calculation Capabilities of SuperMC, Liqin Hu, Pengcheng Long, Jing Song, Tao He, Fang Wang, Lijuan Hao, Bin Wu, Shengpeng Yu, Guangyao Sun, Jun Zou, Quan Gan, Peng He, Lei Wang, Bin Li, Guomin Sun, Yican Wu and FDS Team *(Inst. Nucl. Energy Saf. Technol.)*

5:40 pm: Benchmark Experiments on Measurement of Neutron Leakage Spectra from Beryllium/Li_4SiO_4 Spheres, Zaixin Li *(Southwestern Inst. Phys.)*, Tonghua Zhu *(China Academy Eng. Phys.)*, Ziqiang Zhao *(Southwestern Inst. Phys.)*

Committee Meetings

NATIONAL COMMITTEES

Accreditation, Polices & Procedures
SUNDAY, 11 AM – 12 PM | JACKSON

ANS Board of Directors
WEDNESDAY, 4 PM – 5:30 PM | FLORIDIAN AB

ANS Board of Directors
THURSDAY, 7:30 AM – 3:30 PM | FLORIDIAN AB

Bylaws & Rules
SUNDAY, 4 PM – 5:30 PM | FLAGLER

Communications
SUNDAY, 4 PM – 6 PM | BONNET CREEK VI

Diversity and Inclusion in ANS
MONDAY, 1:30 PM – 3:30 PM | PALM BEACH

Finance Meeting
TUESDAY, 2 PM – 6 PM | JACKSON

Honors & Awards
MONDAY, 4 PM – 6 PM | JACKSON

International
SUNDAY, 11:30 AM – 1:30 PM | FLORIDIAN H

Local Sections Committee Workshop
SUNDAY, 9:30 AM – 12 PM | BONNET CREEK III

Membership Committee
SUNDAY, 10:30 AM – 12 PM | TAYLOR

National Program Committee

NPC Screening
SUNDAY, 10 AM – 12 PM | BONNET CREEK V

NPC Subcommittee
WEDNESDAY, 11:30 AM – 1 PM | JACKSON

NPC Committee Meeting
WEDNESDAY, 4 PM – 7 PM | FLORIDIAN C

NEED
MONDAY, 11 AM – 12 PM | JACKSON

President's Meeting w/Committee & Division Chairs
SUNDAY, 8 AM – 9:30 AM | BONNET CREEK II

Professional Development Coordination
TUESDAY, 4 PM – 5 PM | SARASOTA

Professional Divisions Committee Meeting
TUESDAY, 4 PM – 5:30 PM | PALM BEACH

Professional Divisions Training Workshop
SATURDAY, 6:30 PM – 8 PM | FLORIDIAN B

Professional Engineering Exam

PEEC Item Writers Group
SATURDAY, 5 PM – 10 PM | FLORIDIAN C

PEEC Item Writers Training
SUNDAY, 10 AM – 12 PM | FLORIDIAN G

PEEC Exam Prep Subcommittee
SUNDAY, 9 AM – 10 AM | GILCHRIST

PEEC Committee Meeting
SUNDAY, 4 PM – 6 PM | GILCHRIST

NATIONAL COMMITTEES

Public Policy Committee
WEDNESDAY, 12:30 PM – 2:30 PM | PALM BEACH

Publications Steering

Meetings, Proceedings & Transactions
SUNDAY, 9 AM – 10 AM | FLORIDIAN I

Book Publishing
SUNDAY, 11 AM – 12:30 PM | NASSAU

Nuclear News Editorial Advisory
SUNDAY, 4 PM – 5:30 PM | TAYLOR

Technical Journals
SUNDAY, 1 PM – 4 PM | GILCHRIST

Fusion Science & Technology Advisory Committee
SUNDAY, 4:30 PM – 5:30 PM | MANATEE

Publications Steering Committee
MONDAY, 4:30 PM – 6:30 PM | PALM BEACH

Scholarship Policy & Coordination Committee
MONDAY, 12 PM – 1 PM | JACKSON

Student Sections Committee

Executive
MONDAY, 6 PM – 7 PM | NASSAU

Reports
MONDAY, 7 PM – 8 PM | NASSAU

SPECIAL COMMITTEES

Special Committee on the Congressional Fellow Program
TUESDAY, 3:30 PM – 4:30 PM | UNION

OTHER MEETINGS

Christian Nuclear Fellowship
MONDAY, 7 PM – 8:30 PM | PALM BEACH

Christian Nuclear Fellowship Breakfast
WEDNESDAY, 7 AM – 8:30 AM | JACKSON

Diversity Social
TUESDAY, 8 PM – 10 PM | MYTH BAR IN THE LOBBY

I-NERI International Collaboration
THURSDAY, 1 PM – 5 PM | PALM BEACH

Korea Nuclear Society
MONDAY, 5 PM – 7 PM | ORANGE

NEDHO
SUNDAY, 4 PM – 6 PM | BONNET CREEK II

NURETH Planning
TUESDAY, 7 PM – 9 PM | PALM BEACH

VTR Session
MONDAY, 7 PM – 8:30 PM | ORANGE

Committee Meetings

DIVISION COMMITTEES

Accelerator Applications
Executive
MONDAY, 11:30 AM – 1:30 PM | UNION

Aerospace Nuclear Science & Technology
SUNDAY, 12 PM – 1 PM | JACKSON

Biology & Medicine
Executive
SUNDAY, 4 PM – 5:30 PM | ESCAMBIA

Decommissioning and Environmental Sciences
Program
SUNDAY, 3:30 PM – 4:30 PM | ORANGE

Executive
SUNDAY, 4:30 PM – 5:30 PM | ORANGE

Education, Training & Workforce Development
Program
SUNDAY, 10:30 AM – 12 PM | FLORIDIAN L

University/Industry/Government Relations
SUNDAY, 1:30 PM – 2 PM | FLORIDIAN L

Alpha Nu Sigma National Honor Sociey
SUNDAY, 1 PM – 2 PM | BONNET CREEK III

Executive
SUNDAY, 2 PM – 4 PM | FLORIDIAN L

Fuel Cycle & Waste Management
Program
SUNDAY, 12 PM – 1 PM | BONNET CREEK VI

Executive
SUNDAY, 1 PM – 2:30 PM | BONNET CREEK VI

Fusion Energy
Executive
TUESDAY, 6:45 PM – 8:45 PM | SARASOTA

Human Factors, Instrumentation, and Controls
Program
SUNDAY, 11 AM – 12 PM | UNION

Executive
SUNDAY, 12 PM – 2:30 PM | UNION

Isotopes and Radiation
Joint Program Committee-I&R/BM
SUNDAY, 1:30 PM – 2:30 PM | MANATEE

Executive
SUNDAY, 2:30 PM – 4:30 PM | MANATEE

Materials Science & Technology
Executive
MONDAY, 6:45 PM – 8:45 PM | TAYLOR

Mathematics & Computation
Program
SUNDAY, 1 PM – 2 PM | FLAGLER

Executive
SUNDAY, 2 PM – 4 PM | FLAGLER

DIVISION COMMITTEES

Nuclear Criticality Safety
Education Meeting
SUNDAY, 1 PM – 2 PM | NASSAU

Program
SUNDAY, 2 PM – 3 PM | NASSAU

Executive
SUNDAY, 3 PM – 4:30 PM | NASSAU

Nuclear Installations Safety
Program
SUNDAY, 4 PM – 6 PM | FLORIDIAN L

Executive
MONDAY, 6 PM – 8 PM | JACKSON

Nuclear Nonproliferation Policy
Program
SUNDAY, 2:30 PM – 3:30 PM | FLORIDIAN K

Executive
SUNDAY, 3:30 PM – 4:30 PM | FLORIDIAN K

NNTG/IRD/FC&UM Integration
SUNDAY, 4:30 PM – 5 PM | FLORIDIAN K

Operations & Power
UWC Planning
SUNDAY, 12 PM – 1 PM | BONNET CREEK V

Program
SUNDAY, 1:30 PM – 3 PM | BONNET CREEK V

Executive
SUNDAY, 3:30 PM – 6 PM | BONNET CREEK V

Radiation Protection & Shielding
Program
SUNDAY, 1 PM – 2 PM | TAYLOR

Executive
SUNDAY, 2 PM – 4 PM | TAYLOR

Reactor Physics
Strategic Planning
SUNDAY, 10 AM – 12 PM | FLORIDIAN I

Program
SUNDAY, 2 PM – 4 PM | FLORIDIAN I

Executive
SUNDAY, 4 PM – 6 PM | FLORIDIAN I

Robotics & Remote Systems
Executive
SUNDAY, 12 PM – 4 PM | PALM BEACH

Thermal Hydraulics
Program
SUNDAY, 2:30 PM – 4:30 PM | UNION

Executive
SUNDAY, 4:30 PM – 6 PM | UNION

Young Members Group (TG)
Program
MONDAY, 10 AM – 11 AM | JACKSON

Executive
MONDAY, 12:30 PM – 1:30 PM | PALM BEACH

Committee Meetings

STANDARDS COMMITTEES

ANS-3.13 Nuclear Facility Reliability Assurance Program Development
MONDAY, 8 AM – 10 AM | TAYLOR

ANS-3.15 Cybersecurity Standard
SUNDAY, 2 PM – 5 PM | FLORIDIAN G

ANS-8.1 Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors
MONDAY, 3 PM – 5 PM | ORANGE

ANS-8.20 Nuclear Criticality Safety Training
SUNDAY, 10 AM – 12 PM | ORANGE

ANS-8.23 Nuclear Criticality Accident Emergency Planning and Response
SUNDAY, 8 AM – 12 PM | FLAGLER

ANS-8.26 Criticality Safety Engineer Training and Qualification Program
SUNDAY, 11 AM – 1 PM | MANATEE

ANS-8.28 Administrative Practices for the Use of Non-Destructive Assay Measurements for Nuclear Criticality Safety
TUESDAY, 3 PM – 5 PM | TAYLOR

ANS-8.3 Criticality Accident Alarm System
TUESDAY, 8 AM – 10 AM | JACKSON

ANS-19 Reactor Physics Subcommittee
MONDAY, 9 AM – 10:30 AM | UNION

ANS-19.1 Nuclear Data Sets for Reactor Design Calculations
MONDAY, 10:30 AM – 11 AM | UNION

ANS-19.10 Methods for Determining Neutron Fluence in BWR and PWR Pressure Vessel and Reactor Internals
MONDAY, 8 AM – 9 AM | UNION

ANS-19.3.4 Determination of Thermal Energy Deposition Rates in Nuclear Reactor
TUESDAY, 8 AM – 10 AM | UNION

STANDARDS COMMITTEES

ANS-19.6.1 Reload Startup Physics Tests for Pressurized Water Reactors
SUNDAY, 10 AM – 12 PM | PALM BEACH

ANS-19.8 Fission Yields
MONDAY, 11 AM – 11:30 AM | UNION

Environmental and Siting Consensus Committee (ESCC)
WEDNESDAY, 10 AM – 12:30 PM | TAYLOR

Fuel, Waste, and Decommissioning Consensus Committee (FWDCC)
MONDAY, 10 AM – 12 PM | TAYLOR

Large Light Water Reactor Consensus Committee (LLWRCC)
WEDNESDAY, 9 AM – 12 PM | PALM BEACH

New and Used Fuel (Design Only) Subcommittee-Reinvigoration of ANS-57.X Standards
TUESDAY, 9 AM – 12 PM | TAYLOR

Nonreactor Nuclear Facilities Consensus Committee (NRNFCC)
WEDNESDAY, 8 AM – 10 AM | TAYLOR

Nuclear Criticality Safety Consensus Committee (NCSCC)
MONDAY, 2:30 PM – 5 PM | ESCAMBIA

Research and Advanced Reactors Consensus Committee (RARCC)
MONDAY, 11 AM – 1:30 PM | ESCAMBIA

Risk-informed, Performance-based Principles and Policy Committee (RP3C)
MONDAY, 2:30 PM – 6 PM | TAYLOR

Safety and Radiological Analyses Consensus Committee (SRACC)
SUNDAY, 3 PM – 5 PM | JACKSON

Standards Board
TUESDAY, 8:30 AM – 5 PM | ORANGE

Committee/Division/Other Meetings Daily

Saturday, November 10

6:30 pm-8:00 pm	Professional Divisions-Training Workshop	Floridian B
5:00 pm – 10:00 pm	Professional Engineering Exam-PEEC Item Writers Group	Floridian C

Sunday, November 11

8:00 am-9:30 am	President's Meeting w/Committee & Division Chairs	Bonnet Creek II
8:00 am-12:00 pm	ANS-8.23 Nuclear Criticality Accident Emergency Planning and Response	Flagler
9:00 am-10:00 am	PEEC Exam Prep Subcommittee	Gilchrist
9:00 am-10:00 am	Publications Steering Committee-Meetings, Proceedings & Transactions	Floridian I
9:30 am-12:00 pm	Local Sections Committee Workshop	Bonnet Creek III
10:00 am-12:00 pm	PEEC Item Writers Training	Floridian G
10:00 am-12:00 pm	Reactor Physics Division-Strategic Planning	Floridian I
10:00 am-12:00 pm	ANS-8.20 Nuclear Criticality Safety Training	Orange
10:00 am-12:00 pm	National Program Committee-NPC Screening	Bonnet Creek V
10:00 am-12:00 pm	ANS-19.6.1 Reload Startup Physics Tests for Pressurized Water Reactors	Palm Beach
10:30 am-12:00 pm	Education, Training & Workforce Development Division-Program Committee	Floridian L
10:30 am-12:00 pm	Membership Committee	Taylor
11:00 am-12:00 pm	Accreditation Policies & Procedures Committee	Jackson
11:00 am-12:30 pm	Publications Steering Committee-Book Publishing	Nassau
11:00 am-12:00 pm	Human Factors, Instrumentation & Controls Division-Program Committee	Union
11:00 am-1:00 pm	ANS-8.26 Criticality Safety Engineer Training and Qualification Program	Manatee
11:30 am-1:30 pm	International Committee	Floridian H
12:00 pm-1:00 pm	Fuel Cycle & Waste Management Division-Program Committee	Bonnet Creek VI
12:00 pm-1:00 pm	Operations & Power Division-UWC Planning Committee	Bonnet Creek V
12:00 pm-1:00 pm	Aerospace Nuclear Science & Technology Division	Jackson
12:00 pm-2:30 pm	Human Factors, Instrumentation & Controls Division-Executive Committee	Union
12:00 pm-4:00 pm	Robotics & Remote Systems Division-Executive Committee	Palm Beach
1:00 pm-2:00 pm	Education, Training & Workforce Development Division-Alpha Nu Sigma National Honor Society	Bonnet Creek III
1:00 pm-2:00 pm	Mathematics & Computation Division-Program Committee	Flagler
1:00 pm-1:30 pm	First-Time Attendee Orientation	Floridian K
1:00 pm-2:00 pm	Nuclear Criticality Safety Division-Education Meeting	Nassau
1:00 pm-2:00 pm	Radiation Protection & Shielding Division-Program Committee	Taylor
1:00 pm-2:30 pm	Fuel Cycle & Waste Management Division-Executive Committee	Bonnet Creek VI
1:00 pm-4:00 pm	Publications Steering Committee-Technical Journals	Gilchrist
1:30 pm-2:30 pm	Isotopes & Radiation Division-Joint Program Committee-I&R/BM	Manatee
1:30 pm-2:00 pm	Education, Training & Workforce Development Division-University/Industry/ Government Relations Committee	Floridian L
1:30 pm-3:00 pm	Operations & Power Division-Program Committee	Bonnet Creek V
2:00 pm-3:00 pm	Nuclear Criticality Safety Division-Program Committee	Nassau
2:00 pm-4:00 pm	Education, Training & Workforce Development Division-Executive Committee	Floridian L
2:00 pm-4:00 pm	Mathematics & Computation Division-Executive Committee	Flagler
2:00 pm-4:00 pm	Radiation Protection & Shielding Division-Executive Committee	Taylor
2:00 pm-4:00 pm	Reactor Physics Division-Program Committee	Floridian I
2:00 pm-5:00 pm	ANS-3.15 Cybersecurity Standard	Floridian G
2:30 pm-3:30 pm	Nuclear Nonproliferation Policy Division-Program Committee	Floridian K
2:30 pm-4:30 pm	Thermal Hydraulics Division-Program Committee	Union
2:30 pm-4:30 pm	Isotopes & Radiation Division-Executive Committee	Manatee
3:00 pm-5:00 pm	Safety & Radiological Analyses Consensus Committee(SRACC)	Jackson
3:00 pm-4:30 pm	Nuclear Criticality Safety Division-Executive Committee	Nassau
3:30 pm-4:30 pm	Decommissioning and Environmental Sciences Division-Program Committee	Orange
3:30 pm-4:30 pm	Nuclear Nonproliferation Policy Division-Executive Committee	Floridian K
3:30 pm-6:00 pm	Operations & Power Division-Executive Committee	Bonnet Creek V
4:00 pm-5:30 pm	Biology & Medicine Division-Executive Committee	Escambia
4:00 pm-5:30 pm	Bylaws & Rules Committee	Flagler
4:00 pm-6:00 pm	Communications Committee	Bonnet Creek VI
4:00 pm-6:00 pm	NEDHO	Bonnet Creek II
4:00 pm-6:00 pm	Nuclear Installations Safety Division-Program Committee	Floridian L
4:00 pm-5:30 pm	Publications Steering Committee-Nuclear News Editorial Advisory	Taylor
4:00 pm-6:00 pm	Professional Engineering Exam Committee-Committee Meeting	Gilchrist
4:30 pm-5:30 pm	Fusion Science & Technology Advisory Committee	Manatee
4:00 pm-6:00 pm	Reactor Physics Division-Executive Committee	Floridian I
4:30 pm-5:00 pm	Nuclear Nonproliferation Policy Division NNTG/IRD/FC&UM Integration	Floridian K
4:30 pm-5:30 pm	Decommissioning and Environmental Sciences Division-Executive Committee	Orange
4:30 pm-6:00 pm	Thermal Hydraulics Division-Executive Committee	Union
5:00 pm-6:00 pm	Mentor Meeting	Bonnet Creek III

Committee/Division/Other Meetings Daily

Monday, November 12

8:00 am-9:00 am	ANS-19.10 Methods for Determining Neutron Fluence in BWR and PWR Pressure Vessel and Reactor Internals	Union
8:00 am-10:00 am	ANS-3.13 Nuclear Facility Reliability Assurance Program Development	Taylor
9:00 am-10:30 am	ANS-19 Reactor Physics Subcommittee	Union
10:00 am-11:00 am	Young Members Group-Program Committee	Jackson
10:00 am-12:00 pm	Fuel, Waste, and Decommissioning Consensus Committee (FWDCC)	Taylor
10:30 am-11:00 am	ANS-19.1 Nuclear Data Sets for Reactor Design Calculations	Union
11:00 am-1:30 pm	Research and Advanced Reactors Consensus Committee (RARCC)	Escambia
11:00 am-11:30 am	ANS-19.8 Fission Yields	Union
11:00 am-12:00 pm	NEED Committee	Jackson
11:30 am-1:30 pm	Accelerator Applications Division-Executive Committee	Union
12:00 pm-1:00 pm	Scholarship Policy & Coordination Committee	Jackson
12:30 pm-1:30 pm	Young Members Group-Executive Committee	Palm Beach
1:30 pm-3:30 pm	Diversity and Inclusion in ANS	Palm Beach
2:30 pm-5:00 pm	Nuclear Criticality Safety Consensus Committee (NCSCC)	Escambia
2:30 pm-6:00 pm	Risk-informed, Performance-based Principles and Policy Committee (RP3C)	Taylor
3:00 pm-5:00 pm	ANS-8.1 Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors	Orange
4:00 pm-6:00 pm	Honors & Awards Committee	Jackson
4:30 pm-6:30 pm	Publications Steering Committee-Publications Steering Committee	Palm Beach
5:00 pm-7:00 pm	Korea Nuclear Society	Orange
6:00 pm-8:00 pm	Nuclear Installations Safety Division-Executive Committee	Jackson
6:00 pm-8:00 pm	Student Sections Committee-Executive/ Report Committee	Nassau
6:45 pm-8:45 pm	Materials Science & Technology Division-Executive Committee	Taylor
7:00 pm-8:30 pm	Christian Nuclear Fellowship	Palm Beach
7:00 pm-8:30 pm	VTR Session	Orange

Tuesday, November 13

8:00 am-10:00 am	ANS-19.3.4 The Determination of Thermal Energy Deposition Rates in Nuclear Reactors	Union
8:00 am-10:00 am	ANS-8.3 Criticality Accident Alarm System	Jackson
8:30 am-5:00 pm	Standards Board	Orange
9:00 am-12:00 pm	New and Used Fuel (Design Only) Subcommittee-Reinvigoration of ANS-57.X Standards	Taylor
2:00 pm-6:00 pm	Finance Committee	Jackson
3:00 pm-5:00 pm	ANS-8.28 Administrative Practices for the Use of Non-Destructive Assay Measurements for Nuclear Criticality Safety	Taylor
3:30 pm-4:30 pm	Special Committee on the Congressional Fellow Program	Union
4:00 pm-5:00 pm	Professional Development Coordination Committee	Sarasota
4:00 pm-5:30 pm	Professional Divisions Committee-Committee Meeting	Palm Beach
6:45 pm-8:45 pm	Fusion Energy Division-Executive Committee	Sarasota
7:00 pm-9:00 pm	NURETH Planning	Palm Beach
8:00 pm-10:00 pm	Diversity Social	Myth Bar in the Lobby

Wednesday, November 14

7:00 am-8:30 am	Christian Nuclear Fellowship Breakfast	Jackson
8:00 am-10:00 am	Nonreactor Nuclear Facilities Consensus Committee (NRNFCC)	Taylor
9:00 am-12:00 pm	Large Light Water Reactor Consensus Committee (LLWRCC)	Palm Beach
10:00 am-12:30 pm	Environmental and Siting Consensus Committee (ESCC)	Taylor
11:30 am-1:00 pm	National Program Committee-NPC Subcommittee	Jackson
12:30 pm-2:30 pm	Public Policy Committee	Palm Beach
4:00 pm-5:30 pm	ANS Board of Directors	Floridian AB
4:00 pm-7:00 pm	National Program Committee-NPC Committee Meeting	Floridian E

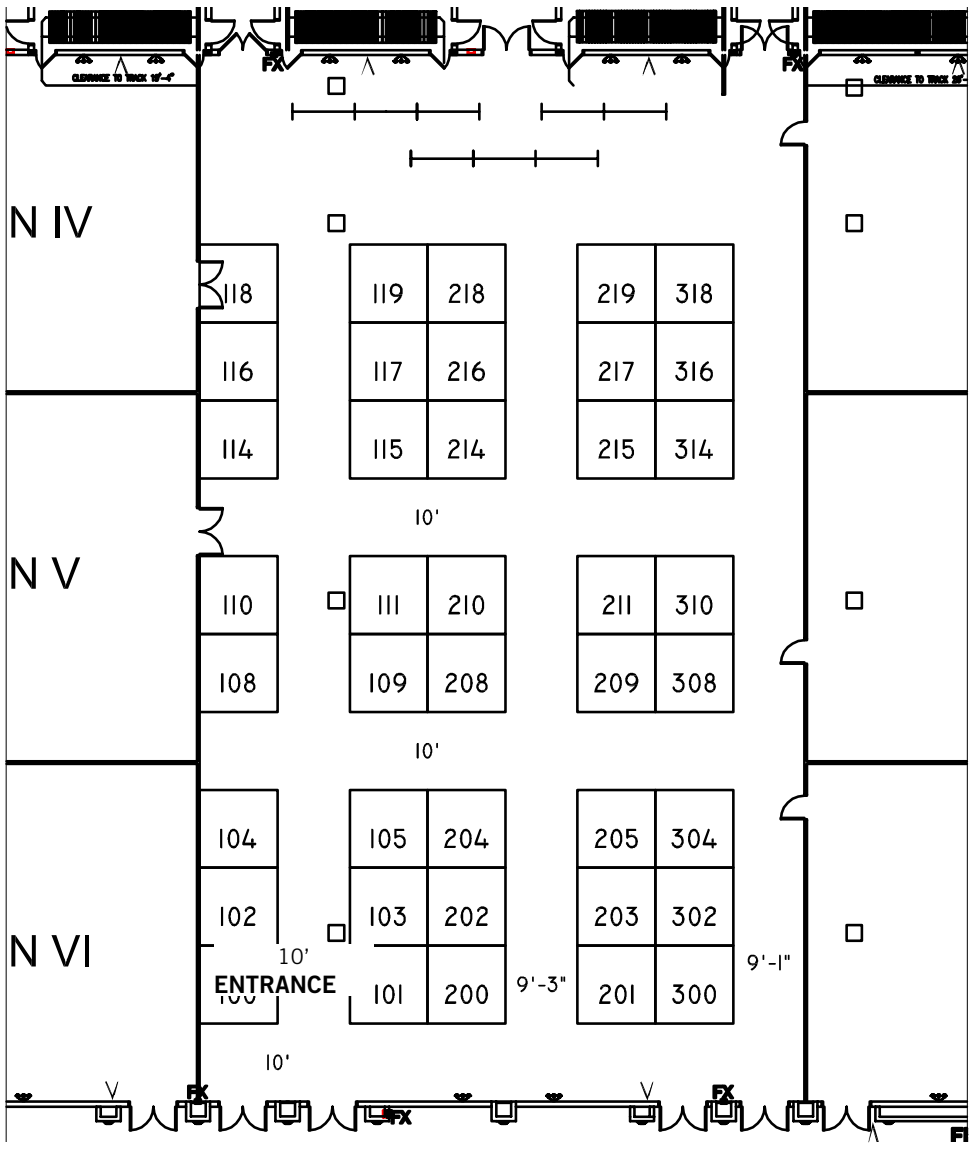
Thursday, November 15

7:30 am-3:30 pm	ANS Board of Directors	Floridian AB
1:00 pm-5:00 pm	I-NERI International Colloaboration	Palm Beach

Exhibitors List

American Nuclear Society . . . . . Booths 209 & 211
Argonne National Laboratory . . . . . Booths 114 & 116
BWX Technologies, Inc. . . . . Booth 203
CAEN Technologies . . . . . Booth 308
Canadian Nuclear Laboratories. . . . . Booth 103
Consortium for Nonproliferation Enabling Capabilities Booth 111
Gateway for Accelerated Innovation in Nuclear (GAIN) Booth 208
IAEA Careers . . . . . Booth 200
Innovative Systems Software . . . . . Booth 101
Institute of Nuclear Energy Safety Technology, CAS . Booth 304
Los Alamos National Laboratory . . . . . Booth 201
NETZSCH Instruments . . . . . Booth 115
Nuclear Energy University Program (NEUP). . . . . Booth 215
Nuclear Plant Journal . . . . . Booth 302
Nuclear Science & Technology (NS&T) . . . . . Booth 210
Nuclear Science User Facilities . . . . . Booth 117
Oak Ridge National Laboratory . . . . . Booth 100
Oak Ridge National Laboratory Nonproliferation Programs. . . . . Booth 102
Otek Corporation . . . . . Booth 300
Pacific Northwest National Laboratory . . . . . Booth 105
Pantex Plant | Y-12 National Security Complex Booth 110
Power System Sentinel Technologies . . . . . Booth 205
SHINE Medical Technologies. . . . . Booth 119
Taylor & Francis Group . . . . . Booth 202
Texas A&M Nuclear Engineering . . . . . Booth 104
Tyne Engineering Inc. . . . . Booth 118
Ultra Electronics Energy . . . . . Booth 214
University of Florida Nuclear Engineering Program Booth 204
Varex Imaging . . . . . Booth 109
Virginia Commonwealth University . . . . . Booth 108

Exhibits



Hours

Sunday, November 11
6:00 pm-8:00 pm

Monday, November 12
7:00 am-4:00 pm

Tuesday, November 13
7:00 am-1:30 pm

Exhibitor & Expo Info

American Nuclear Society

LaGrange Park, IL (Booths 209 & 211)

Visit our booth to learn more about ANS membership and our products and services. Discover ANS's publications including *Nuclear News*, *Radwaste Solutions*, technical journals, industry standards, books and more. And learn about the ANS Center for Nuclear Science and Technology Information, including the new Navigating Nuclear: Energizing Our World™ program.

Argonne National Laboratory

Lemont, IL (Booths 114 & 116)

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.

BWX Technologies, Inc.

Lynchburg, VA (Booth 203)

BWX Technologies, Inc. (BWXT) is a leading supplier of nuclear components and fuel to the U.S. government; provides technical, management and site services to support governments in the operation of complex facilities and environmental remediation activities; and supplies precision manufactured components, services and CANDU® fuel for the commercial nuclear power industry.

CAEN Technologies

Staten Island, NY (Booth 308)

CAEN specializes in both COTS and custom electronics (HV for detector bias as well as front end, digitizers, FPGA solutions, and digital signal processing) and turnkey monitoring and detection solutions designed specifically for applications ranging from experimental nuclear and high energy physics to nuclear security, safeguards, and homeland security.

Canadian Nuclear Laboratories

Ontario, Canada (Booth 103)

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 – reactors and fuels, waste management, nuclear safeguards – and develop novel medical isotopes and devices.

Consortium for Nonproliferation Enabling Capabilities

Raleigh, NC (Booth 111)

The Consortium for Nonproliferation Enabling Capabilities (CNEC) aims to create a preeminent research & education hub dedicated to the development of enabling technologies and technical talent for meeting the present and future grand challenges of nuclear nonproliferation.

Gateway for Accelerated Innovation in Nuclear (GAIN)

Idaho Falls, ID (Booth 208)

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.

IAEA Careers

Lemont, IL (Booth 200)

The International Atomic Energy Agency (IAEA) in Vienna, Austria is the world's center for cooperation in the nuclear field committed to promoting safe, secure and peaceful uses of nuclear technology. The IAEA offers opportunities to engage current, meaningful issues of global peace, security and development while working in a multicultural environment.

The IAEA employs professionals from a variety of scientific and policy backgrounds. The IAEA offers different types of employment opportunities: for professional and general service posts; consultants and experts; junior staff, through internships; and the Junior Professional Officer programme. In addition to IAEA employment opportunities, the IAEA Program Office offers young U.S. professionals and students an opportunity to work as interns and Junior Professional Officers. There are also programs to offer senior professionals an opportunity to temporarily join the IAEA's workforce as Cost-Free Experts. If you would like to contribute to the IAEA at an overseas assignment in Vienna, Austria or Monaco, you can read more at: http://international.anl.gov/careers

Innovative Systems Software

Ammon, ID (Booth 101)

Innovative Systems Software, LLC (ISS) a private, Limited Liability Company, is the developer of the RELAP/SCDAPSIM system thermal hydraulics and FUELSIM LWR fuel behavior codes. ISS manages the SCDAP Development and Training program (STDP), an international consortium of 100+ research, regulatory, and other organizations in 30 countries focused upon the development of improved reactor safety analysis and simulation technology. ISS provides technical support and training on thermal hydraulics and severe accident methods development & analysis.

Institute of Nuclear Energy Safety Technology, CAS

Hefei, China (Booth 304)

FDS Team the team for Frontier Development of Science, founded in 1986, has been devoting to the R&D of advanced nuclear energy systems and safety technology. As a cooperative, interdisciplinary research team, it takes the Institute of Nuclear Energy Safety Technology (INEST), CAS as the core, companies as the technology industrialization platform and has extensive cooperation worldwide.

Exhibitor & Expo Info

Los Alamos National Laboratory
Los Alamos, NM (Booth 201)

Los Alamos National Laboratory is a multi-disciplinary institution with over 10,000 employees located in Northern New Mexico. The Laboratory's mission is to solve national security challenges through scientific excellence. We have world-class capabilities in nuclear disciplines including theory, simulation, and experiments and are currently seeking qualified students, postdocs, and staff.

NETZSCH Instruments
Burlington, MA (Booth 115)

NETZSCH Instruments is the leading supplier of thermal analysis and thermophysical properties instrumentation to the nuclear industry. Our instruments are reliable, robust, accurate and easy to use with modular designs ideally suited for gloveboxes and hot cells. At NETZSCH, you will find solutions for thermal analysis, thermo-physical properties, dynamic-mechanical testing, and accelerating rate calorimetry to meet your every need.

Nuclear Energy University Program (NEUP)
Idaho Falls, ID (Booth 215)

The Department of Energy's Office of Nuclear Energy (DOE-NE) created the Nuclear Energy University Program (NEUP) in 2009 to consolidate its university support under one program. NEUP plays a key role in helping DOE-NE accomplish its mission of leading the nation's investment in the development and exploration of advanced nuclear science and technology by funding nuclear energy research at U.S. colleges and universities and providing student education support.

Nuclear Plant Journal
Downers Grove, IL (Booth 302)

Nuclear Plant Journal, an independent US publication in its 36th year, provides technical information exchange among managers and engineers in nuclear power industry worldwide with over 11,000 readers. The editorial focuses on industry innovation, new plants worldwide and Small Modular Reactors. The Journal is published six-times per year and reaches every country in the world with a civilian nuclear energy program. The Journal is published in digital as well as printed version. Digital versions of the Journal may be upgraded with rich media provided by advertisers. The Products & Services Directory is published yearly in December. Online: nuclearplantjournal.com; facebook.com/nuclearplantjournal; twitter.com/npjtweet. Representatives: Anu Agnihotri

Nuclear Science & Technology (NS&T)
Idaho Falls, ID (Booth 210)

Idaho National Laboratory is the US lead laboratory for nuclear energy research, development, demonstration, and deployment. INL's Nuclear Science & Technology researchers work with unparalleled array of facilities for fabrication, irradiation, post-irradiation examination and modeling & simulation of fuels and materials for current light water and advanced nuclear reactor designs.

Nuclear Science User Facilities
Idaho Falls, ID (Booth 117)

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 (Booth 100)

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

Oak Ridge National Laboratory Nonproliferation Programs
Oak Ridge, TN (Booth 102)

ORNL develops, coordinates, and helps implement domestic and international policy aimed at reducing threats from weapons of mass destruction. The primary focus is to detect, prevent, and reduce the proliferation of illicit nuclear materials, nuclear weapons, and radiological dispersal devices. Work includes research and development, deploying technology, and technical assessments.

Otek Corporation
Tucson, AZ (Booth 300)

OTEK Corporation designs and manufactures a comprehensive line of electronic instrumentation for digital process control and measurement. We specialize in replacements for the nuclear industry and maintain a Nuclear Quality Assurance 10CFR50 Appendix B Program. Our NTM Series is NEI 08-09 cyber compliant, while our SSAM Series is cyber exempt!

Pacific Northwest National Laboratory
Richland, WA (Booth 105)

Pacific Northwest National Laboratory delivers transformational science and technology for energy resiliency, national security, and environmental sustainability. PNNL has a long heritage of supporting our nation's nuclear energy and nuclear nonproliferation programs through interdisciplinary collaborations. Founded in 1965, PNNL is managed by Battelle for the U.S. Department of Energy. pnnl.gov

Exhibitor & Expo Info

Pantex Plant | Y-12 National Security Complex
Amarillo, TX | Oak Ridge, TN (Booth 110)

Both the Pantex Plant | Y-12 National Security Complex are one-of-a-kind manufacturing and fabrication facilities that play an integral role in DOE's Nuclear Security Enterprise. The core missions at both sites center on Stockpile Stewardship, Nuclear Nonproliferation, Safeguards & Security, and Complimentary Work.

Power System Sentinel Technologies
Warrior, AL (Booth 205)

PSStech is a full-service engineering company that provides system design and integration for the electric power industry. We are a leader in the industry providing world-class Open Phase Detection technology. We provide engineering services for new system design and obsolescence form-fit-functional replacement and have a fully equipped, qualified testing facility.

SHINE Medical Technologies
Janesville, WI (Booth 119)

SHINE Medical Technologies has developed an accelerator-driven subcritical assembly design that will provide a safer, cleaner, and more affordable way to produce moly-99. SHINE has received its construction permit from the NRC and is looking to add to their team. Visit shinemed.com/jobs or stop by the booth to learn more.

Taylor & Francis Group
Philadelphia, PA (Booth 202)

Taylor & Francis partners with researchers, scholarly societies, universities and libraries worldwide to bring knowledge to life. As one of the world's leading publishers of scholarly journals, books, ebooks and reference works our content spans all areas of the Humanities, Social Sciences, Behavioural Sciences, Science, Technology, and Medicine.

Texas A&M Nuclear Engineering
College Station, TX (Booth 104)

The Department of Nuclear Engineering at Texas A&M is the largest and one of the most diverse programs in the nation, with a long history of outstanding undergraduate and graduate education, strong research at the graduate level, and an unsurpassed commitment to professional and public service.

Tyne Engineering Inc.
Ontario, Canada (Booth 118)

Tyne Engineering has over 30 years experience of designing and manufacturing complex engineering systems in the fields of process engineering, mechanical engineering, and Instrumentation and Controls for nuclear and tritium-handling industries.

Core competence includes design and manufacture of Radiation monitoring systems, process systems and Glove-boxes, commercial grade dedication and reverse-engineering.

Ultra Electronics Energy
Dorset, UK (Booth 214)

Ultra Electronics Energy specialise in the supply of radiation detection systems to the nuclear industry. Product supplied include measurement instruments for dose-rate, contamination and the measurement of radioactive concentration in air and liquids. Ultra supports operating NPP's, fuel cycle facilities and decommissioning projects around the World.

University of Florida Nuclear Engineering Program
Gainesville, FL (Booth 204)

The Nuclear Engineering Program at the University of Florida offers BS, MS, and Ph.D., degrees, and offers students an opportunity to conduct research in a wide array of nuclear science and engineering topics. Students conduct collaborative research alongside academics and in partnership with national labs, government agencies, and industrial partners.

Varex Imaging
Salt Lake City, UT (Booth 109)

Varex Imaging is a leading innovator, designer and manufacturer of X-ray imaging components - tubes, detectors and other image processing solutions, which are key components of X-ray imaging systems. With a 65+ year history of successful innovation, Varex's components are used in medical, industrial and security systems globally. Visit www.vareximaging.com.

Virginia Commonwealth University
Richmond, VA (Booth 108)

Virginia Commonwealth University (VCU) is Virginia's premier public research university, and currently the only university in Virginia to offer a full suite of degrees in nuclear engineering including ABET accredited BS, MS and PhD. VCU-ANS will be hosting the 2019 ANS Student Conference in Richmond, VA from April 4th – 6th.

ANS Organization Membership

The American Nuclear Society salutes the following industry leaders currently demonstrating their endorsement of ANS programs and efforts by subscribing as Organization Members, aiding our mission of supporting the advancement of nuclear science and technology.*

AEGIS dba Electro Static Technology, an ITW Company

AGT Global Logistics

Alphasource Inc.

Ameren Missouri-Callaway Energy Center

American Electric Power

American Nuclear Insurers

Applied Technical Services

APTIM

Argonne National Laboratory

Arizona Public Service Co.

Barnhart Nuclear Services

Bechtel Nuclear, Security, & Environmental

Black & Veatch

Burns & McDonnell

BWX Technologies, Inc.

Canadian Nuclear Laboratories

Ceradyne, Inc. - a 3M Company

ChemStaff

Copperleaf Technologies

DataGlance

Devbridge Group

Dominion Generation

Duke Energy Corporation

Electric Power Research Institute (EPRI)

Electrical Builders, Inc. (EBI)

Energy Future Holdings (Luminant)

Energy Northwest

Energy Steel

Engineered Solutions, Inc.

EXCEL Services Corporation

Exelon Generation Company

F&J Specialty Products Inc.

FirstEnergy Nuclear Operating Co. (FENOC)

Fluor

Framatome

Frham Safety Products, Inc.

Hagley Museum & Library

Idaho National Laboratory

James C. White Company

Kinectrics, Inc.

Kinemetrics Inc.

KUKA Systems UK Ltd

L3 MAPPS Inc.

Los Alamos National Laboratory

Maxeta Technologies

McCallum-Turner, Inc.

Mega-Tech Services, LLC

Navarro Research & Engineering

Nebraska Public Power District

NGNP Industry Alliance

Nuclear Electric Insurance Limited

Nuclear Energy Institute (NEI)

Nuclear-21.Net

NuScale Power

Nutherm International, Inc.

Ontario Power Generation

OTEK Corporation

Pacific Gas and Electric Company

Phoenix

Power System Sentinel Technologies, LLC

Prince Engineering and Associates

Procedure Solutions Management, LLC

PSC

Reef Industries, Inc.

RENCEL ENERGY & METAL LIMITED

RMS Energy Co. LLC

RSCC Nuclear Cable

S&ME, Inc.

Sargent & Lundy

Savannah River National Laboratory

Southern Nuclear Operating Co.

Struthers-Dunn, LLC

Susquehanna Nuclear, LLC

Teledyne Brown Engineering, Inc.

Terrestrial Energy Inc.

Thermo Fisher Scientific

Thoreact, LLC

TradeTech

Tri Tool, Inc.

TW Metals

ValvTechnologies

Varex Imaging

Virginia Commonwealth University

Western Services Corporation

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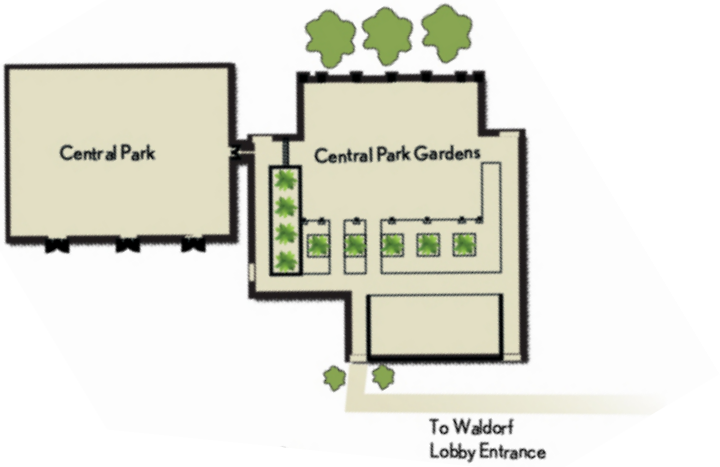
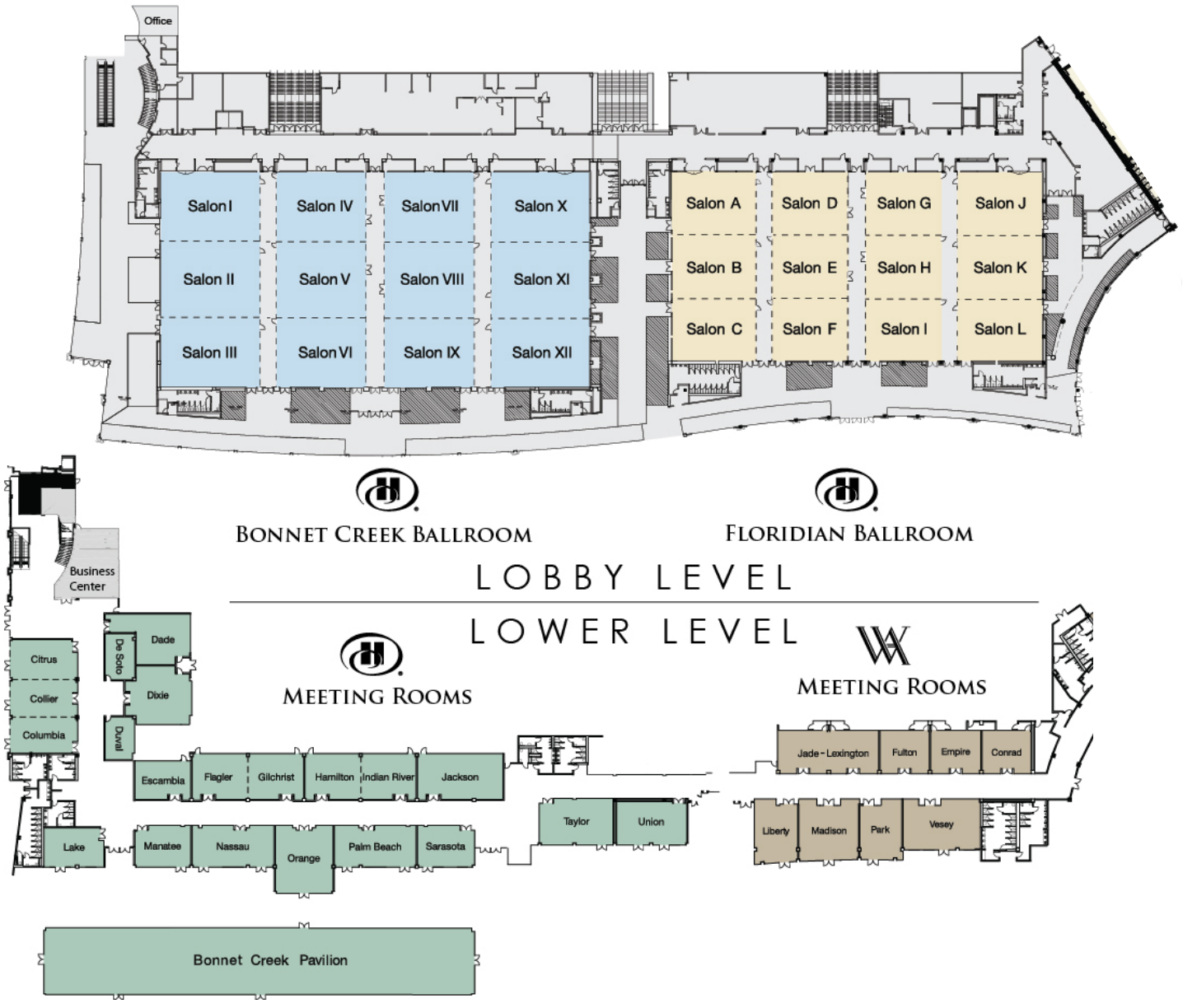
*Post-print roster updates at ans.org/orgmembers/memberlist.

Hotel Floorplan

CONFERENCE

CENTER MAP





See you at future

ANS Winter Meetings

NOVEMBER 17-21, 2019
Marriott Wardman Park, Washington, D.C.

NOVEMBER 15-19, 2020
Chicago Marriott Downtown, Chicago IL

OCTOBER 31-NOVEMBER 4, 2021
Marriott Wardman Park, Washington, D.C.

NOVEMBER 13-17, 2022
Albuquerque Convention Center, Albuquerque NM