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About ANS

The American Nuclear Society is committed to nuclear professionals and the nuclear industry. In addition to providing forums where professionals meet, ANS offers education, publications, outreach and more. Please read below and make sure to explore our website at http://www.ans.org/ to learn about all we have to offer.

HISTORY

ANS continues to be a professional, not-for-profit organization of scientists, engineers, and other professionals devoted to the peaceful applications of nuclear science and technology. Its 10,500+ members (in 46 countries) represent over 1,600 corporations and come from diverse technical disciplines ranging from physics and nuclear safety to operations and power, and from across the full spectrum of the national and international enterprise, including government, academia, research laboratories, and private industry. Making it all succeed are a Board of Directors, 21 standing committees, 18 professional divisions (and one technical group), 54 local sections (including 7 overseas and one affiliated society), 34 student sections, 24 plant branches, liaison agreements with some 30 non-U.S. nuclear societies (and one organization), and a headquarters staff of approximately 50 people.

Vision: ANS will be the recognized credible advocate for advancing and promoting nuclear science and technology.

Mission: ANS provides its members with opportunities for professional development and 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.

Purpose: The core purpose of ANS is to promote the awareness and understanding of the application of nuclear science and technology.

Not a Member? Join ANS!

If you are interested in taking advantage of the member rate, join ANS as a National Member at https://secure.ans.org/join/. Once you complete the member application, you can immediately register at the lower member fee. You must be an ANS National Member before you can register at the member rate. Questions regarding member benefits can be directed to members@ans.org or (800) 323-3044.
Conference Outline

About the Nuclear and Emerging Technologies for Space (NETS-2018) Topical Meeting

In February 2018, the Aerospace Nuclear Science & Technology Division (ANSTD) of the American Nuclear Society (ANS) will hold the 2018 Nuclear and Emerging Technologies for Space (NETS-2018) topical meeting at the Palace Station Hotel & Casino in Las Vegas, Nevada. NETS-2018 is the premier meeting for the sharing of ideas related to nuclear technology research and development, testing, experimentation, deployment and manufacturing for use in space or on non-terrestrial planetary bodies. Specific areas of interest include: (1) electrical power generation (both radioisotope and fission systems) for both space and surface-based applications, (2) nuclear propulsion applications, and (3) the infrastructure, facilities and mission support elements necessary to deploy such technology successfully. With authors from universities, national laboratories, NASA facilities and industry, NETS-2018 will provide an excellent communication network and forum for information exchange. We are also strongly emphasizing and encouraging international participation.

Six Keynote Speakers and a Banquet Speaker

Five Technical Tracks with Multiple Sessions

- Fuels and Materials, special focus on Pu-238 production processes
- Surface and Space Fission Power, special focus on NASA’s kilopower technology
- Nuclear Propulsion, special focus on NTP development innovation
- Radioisotope Power Systems, special focus on advanced power conversion technology
- Nuclear Missions and Nuclear Mission Support, special focus on nuclear launch safety approval process innovation

Technical Tour

Note: due to a recent change in security policy at the Nevada National Security Site (NNSS), we will not be able to enter the Device Assembly Facility which houses the National Criticality Experiments Research Center (NCERC). We apologize for this change. The NNSS site visit will include the following: (1) a drive-by tour of RadioNuC TEC, Tumbleweed and the DAF/NCERC, (2) a visit to the Apple II House and the CTOS training area (ground zero for the Apple II nuclear test), (3) IceCap, (4) the Sedan Crater, and (5) the Rover / NERVA areas of the NNSS.

Three Featured Panel Discussions

- Emerging Missions for Nuclear Technologies—Commercial and Governmental
- Alternative Fission Development Scenarios
- New Initiatives in Nuclear Technologies
Conference Organizing Committee

Steven Clement (LANL)  General Chair
Ron Fraass (Retired)  Asst General Chair
Matthew Griffin (LANL), Logistics & Registration Co-chair
Valerie Lawdensky (UNLV), Logistics & Registration Co-chair
Patrick McDaniel (UNM)  Finance Chair

Jorge Navarro (ORNL), Technical Program Co-Chair
Leonard Dudzinski (NASA), Technical Program Co-Chair
Markku Koskelo (Aquila), Sponsorship Co-chair
Chris Robinson (Y-12), Sponsorship Co-Chair
Bill Flor (LANL)  Publications & Website Chair

Susan Voss (INL), International Outreach Chair
Monia Kazemeini (UNLV), Student Program Chair
Tracy Bower (NSTec)  Media Chair

Track Chairs:

Robert Wham (ORNL)  Fuels & Materials
Patrick McClure (LANL), Surface & Space Fission Power
Michael Houts (NASA MSFC)  Nuclear Propulsion
Steve Johnson (INL), Radioisotope Power Systems
Peter McCallum (NASA GRC)  Nuclear Missions & Mission Support
Program Committees

Technical Program
Co-Chairs:
Jorge Navarro (ORNL)
Leonard Dudzinski (NASA)

Technical Program
Committee:
Ambrosi, Richard (U. Leicester)
Barklay, Chadwick (UDRI)
Barlow-Lopez, Jackie (LANL)
Barnes, Marvin (NASA)
Benensky, Kelsa (U. Tenn.)
Bess, John (INL)
Borowski, Stan (NASA)
Buenconsejo, Reina (IDA S&T Policy Inst)
Cairnes-Gallimore, Dirk (DOE/NE)
Caffrey, Jarvis (NASA)
Cairnes-Gallimore, Dirk (DOE/NE)
Deason, Wesley (USNC)
DePaoli, David (ORNL)
Fallgren, A.J. (LANL)
Gallego, Nidia (ORNL)
Gerrish, Harold (NASA)
Hamley, John (NASA GRC)
Howe, Steven (Howe Industries)
Lal, Bhavya (IDA S&T Policy Inst)
Lee, Young (JPL)
Lively, Kelly (INL)
McCallum, Peter (NASA-GRC)
Norwood, Tina (NASA)
O’Brien, Robert (INL)
Whiting, Christopher (UDRI)
Smith, Nicholas (Southern Research)
Sutliff, Tom (NASA)
Venneri, Paolo (USNC)
Voss, Susan (GNNA)
Watkinson, Emily Jane (U. Leicester)
Wilkerson, Blake (LANL)

Technical Program
Paper Review Committee:
Ambrosi, Richard (U. Leicester)
Aydogan, Fatih (Idaho State)
Barklay, Chadwick (UDRI)
Barlow-Lopez, Jackie (LANL)
Barnes, Marvin (NASA)
Benensky, Kelsa (U. Tenn.)
Bess, John (INL)
Borowski, Stan (NASA)
Caffrey, Jarvis (NASA)
Cairnes-Gallimore, Dirk (DOE/NE)
Deason, Wesley (USNC)
DePaoli, David (ORNL)
Eades, Michael (USNC)
Emrich, William (NASA)
Fallgren, A.J. (LANL)
Gallego, Nidia (ORNL)
Gerrish, Harold (NASA)
Herring, J. Stephen (CSNR)
Hickman, Robert (NASA)
Houts, Michael (NASA)
Howe, Steven (Howe Industries)
Howe, Troy (Howe Industries)
Joyner, Claude (Aerojet Rocketdyne)
Lee, Young (JPL)
Lively, Kelly (INL)
McCallum, Peter (NASA-GRC)
O’Brien, Robert (INL)
Patel, Vishal (USNC)
Smith, Nicholas (Southern Research)
Sutliff, Tom (NASA)
Venneri, Paolo (USNC)
Voss, Susan (GNNA)
Watkinson, Emily Jane (U. Leicester)
Whiting, Christopher (UDRI)
Wilkerson, Blake (LANL)
Sponsors and Exhibitors

Sponsors:

BWXT
https://www.bwxt.com/

Canadian Nuclear Laboratory
http://www.cnl.ca/

Dynetics
https://www.dynetics.com/

ANS Nuclear News
http://www.ans.org/nn/

Aquila
http://www.aquilagroup.com/

Exhibits are located in Salons A & B

<table>
<thead>
<tr>
<th>Date</th>
<th>Times</th>
<th>Comments</th>
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<tbody>
<tr>
<td>Sun 25 Feb</td>
<td>14:00-17:00</td>
<td>Setup</td>
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<tr>
<td>Mon 26 Feb</td>
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<tr>
<td>Tue 27 Feb</td>
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<td>Wed 28 Feb</td>
<td>08:00-12:00</td>
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<tr>
<td></td>
<td>12:00-21:00</td>
<td>Teardown</td>
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Exhibitors:

Advanced Cooling Technologies
https://www.1-act.com/

Aerojet Rocketdyne
http://www.rocket.com/

BWXT
https://www.bwxt.com/

Canadian Nuclear Laboratory
http://www.cnl.ca/

Idaho National Laboratory
https://www.inl.gov/

Los Alamos National Laboratory
Threat Identification and Response
Plutonium Science and Manufacturing
http://www.lanl.gov/

Navarro Research and Engineering Inc.
http://www.navarro-inc.com/

NASA Glenn
https://www1.grc.nasa.gov/

NASA Langley/Marshall
https://www.nasa.gov/langley
https://www.nasa.gov/centers/marshall/

Oak Ridge National Laboratory
https://www.ornl.gov/

Pantex Plant | Y-12 National Security Complex
https://cns-llc.us/
Information for speakers:

- **All speakers must register for either one (1) day or for the full meeting.** If you wish to attend additional activities or have a guest, you will need to register for those as well.

- Please report to your Session Chair, in the room assigned for your session (as listed in the Official Program) to meet your Chair and upload your presentation. If you have not already done so, please provide him/her with brief biographical information. All morning session speakers should report at 10:00; all afternoon session speakers at 12:45.

- Please cooperate with your Session Chair and limit your presentation to the time indicated in the Official Program. This time includes a five-minute discussion period following your formal presentation.

- Please do not ask the Session Chair to reschedule your paper within the session. Many attendees schedule their attendance at various sessions in accordance with the times listed in the Official Program.

- **Technical Session Room AV Setup:** All rooms will have an LCD projector, screen, wireless microphone, wireless slide advancer/laser pointer, and a laptop. LCD projectors will project a resolution of 1024x768.

Registration:

Located just inside the conference rooms entrance, upstairs past the Feast Buffett, on Sunday 25 February from 15:00 to 18:30, and on Monday 26 February and Tuesday 27 February from 07:00 to 17:30. Registration on Wednesday 28 February will be open from 07:00 to 11:00.

The meeting **Office** is located in the Executive Conference Room (room 3015) from 12:00 Sunday 25 February through 14:00 Wednesday 28 February. General business services for meeting registrants are available through the hotel business center.

A **Message Board** is located near the Registration Tables.

The Palace Station and your NETS-2018 sponsors offer free **WiFi connectivity** for meeting attendees. The WiFi password for the meeting dates is: spacenuc

**Student Program** information is inserted in the student registration packet.

There are many exciting activities and entertainment options to experience in and around Las Vegas. The Palace Station concierge desk will be pleased to assist you in planning any outside activities.
## Conference Overview

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Activity</th>
<th>Speakers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Monday 26 Feb</strong></td>
<td>8:15-09:45</td>
<td>Plenary (Keynote Speakers)</td>
<td>Robert N. Coward, ANS</td>
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<td>Terry C. Wallace Jr, LANL</td>
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<td></td>
<td>09:45-10:15</td>
<td>Break/snacks (sponsored by ANS <em>Nuclear News</em>)</td>
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<td>10:15-12:00</td>
<td>Sessions (x3)</td>
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<td>12:00-13:00</td>
<td>Lunch (on your own)</td>
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<td></td>
<td>13:00-14:45</td>
<td>Panel Discussion + Sessions (x2)</td>
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<td></td>
<td>14:45-15:15</td>
<td>Break/snacks (sponsored by CNL)</td>
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<td>15:15-17:00</td>
<td>Sessions (x3)</td>
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<td></td>
<td>18:00-21:00</td>
<td>Reception (sponsored by BWXT)</td>
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<td><strong>Tuesday 27 Feb</strong></td>
<td>08:15-09:45</td>
<td>Plenary (Keynote Speakers)</td>
<td>Jonathan Cirtain, BWXT</td>
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<td>John Casani, JPL</td>
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<td>09:45-10:15</td>
<td>Break/snacks (sponsored by BWXT)</td>
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<td>13:00-14:30</td>
<td>Panel Discussion + Sessions (x2)</td>
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<td>14:30-15:00</td>
<td>Break/snacks</td>
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<td>15:00-17:05</td>
<td>Sessions (x3)</td>
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<tr>
<td><strong>Wednesday 28 Feb</strong></td>
<td>08:15-09:45</td>
<td>Plenary (Keynote Speakers)</td>
<td>Sam Gunderson, Blue Origin</td>
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<td>Jeffrey Sheehy, STMD NASA</td>
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<td>09:45-10:15</td>
<td>Break/snacks (sponsored by Dynetics)</td>
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<td>10:15-12:00</td>
<td>Sessions (x3)</td>
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<td>15:15-17:00</td>
<td>Sessions (x3)</td>
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<td></td>
<td>18:00-21:00</td>
<td>Banquet with speaker (sponsored by CNL)</td>
<td>Alan Carr, LANL Historian</td>
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<tr>
<td><strong>Thursday 1 Mar</strong></td>
<td>07:00-17:30</td>
<td>Technical Tour (NNSS)</td>
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Technical Tour

Technical Tour—limit 40 participants

A visit to the Nevada National Security Site (NNSS) to visit the historical Rover / NERVA areas of the NNSS and various other sites will be offered on Thursday, 1 March 2018. **A bus will load in front of the Palace Station at 07:00 and should return by around 17:30.** The NNSS site visit is limited to U.S. citizens only and is further limited to the first 40 individuals who signed up. Those who are notified via e-mail that they are scheduled to go on the tour are required to fill out the NNSS site access form, which is available from the Tour Registration page of the NETS-2018 web site (http://anstd.ans.org/nets-2018/registration/tour-registration/). All of the information requested in the form must be provided.

The NNSS site visit will include the following:

- A drive-by tour of RadNucECTEC, Tumbleweed and the Device Assembly Facility (DAF) / National Criticality Experiments Research Center (NCERC). Note: due to a recent change in security policy at the Nevada National Security Site (NNSS), we will not be able to enter the DAF which houses NCERC. We apologize for this change.

A visit to the Apple II house and CTOS (ground zero for the Apple II nuclear test); see video at [http://bit.ly/2BXbdsc](http://bit.ly/2BXbdsc)

- A visit to IceCap
- A visit to the Sedan crater
- A visit to the historic Rover / NERVA areas of the NNSS
Bob Coward is Principal Officer of MPR Associates (MPR), an international specialty engineering and technical services company. He is responsible for all aspects of MPR performance in all engineering areas and all business sectors. His career has focused on nuclear power plant design, evaluation, and development, with specific expertise in the areas of project management, safety analysis, and design and development of new nuclear power plants. A special skill is leading multi-organization and multi-discipline teams to achieve their mission and deliver excellence with a focus on collaboration and teamwork.

During his career at MPR, he has worked on over 100 electric generating plants throughout the world, including 58 of the 65 U.S. nuclear power plant sites, as well as others in Asia, Europe and Africa.

He is recognized as a key industry leader in the safe and reliable operation of the U.S. nuclear power fleet, participating on the NEI Nuclear Strategic Issues Advisory Committee and Supplier Advisory Committee. He has also had leadership roles on the EPRI Advanced Light Water Reactor Program, the Department of Energy NP2010 Program, and led the STP 3&4 project to construct two ABWRs at the STP site in Texas. He has held significant senior advisory roles in the preparation of the Design Certification submittal for the NuScale SMR design and the ABWR Design Certification renewal.

Coward has been a member of the American Nuclear Society since 2001, where he serves on the Nuclear Installations Safety Division and the Operations & Power Division.

He graduated in 1983 with honors from Duke University with a B.S. degree in Mechanical Engineering and is a registered Professional Engineer.
Dr. Terry C. Wallace, Jr.
Director
Los Alamos National Laboratory

Dr. Terry C Wallace, Jr, is the 11th director of Los Alamos National Laboratory and current president of Los Alamos National Security, LLC. Los Alamos has played a role in some of the most transformational discoveries of the 20th and 21st centuries. As a premier national nuclear science laboratory, Los Alamos is a principal contributor to the U.S. Department of Energy mission to maintain the nation’s nuclear weapons stockpile but also protects the nation through programs in nuclear counterproliferation and nonproliferation. Los Alamos creates innovative science and technology that define the state of the art, and 2018 marks our 75th anniversary of joining the Manhattan Project, followed by our first intelligence mission the subsequent year.

Prior to becoming Laboratory Director, Wallace was the Laboratory’s Principal Associate Director for Global Security and the Senior Intelligence Executive, leading national security programs—nonproliferation, counterproliferation, and industry partnerships. He served as the Principal Associate Director for Science, Technology, and Engineering and led implementation of the capability model for scientists and engineers and developed the science pillars that guide our institutional investment strategies. He has represented Los Alamos and DOE around the world, meeting with scientists and leaders of allied countries and attending significant collaborations with non-NATO countries.

Wallace is an internationally recognized scientific authority on geophysics and forensic seismology, which is the study of earthquakes and seismic waves as they relate to nuclear weapons testing, and he has evaluated more than 1,700 US and foreign nuclear tests. He is one of a few scientists to have a newly discovered mineral named in his honor for his efforts in education, research, and service to mineralogy (Terrywallaceite). He is a Fellow in the American Geophysical Union and has served on the Board of Earth Sciences & Resources in the National Academy of Science. His awards include the Brown Medal, the Langmuir Medal for Research, the Macelwane Medal, and the Carnegie Mineralogical Award. He was a distinguished educator at the University of Arizona for 20 years and continues to be a notable author through peer-reviewed journals, science magazines, a college textbook, and a blog exploring the nexus of science, running, and travel.

Wallace was raised in Los Alamos and is the first Laboratory Director with such a strong tie to New Mexico. He holds doctorate and master’s degrees in geophysics from the California Institute of Technology and bachelor’s degrees in geophysics and mathematics from New Mexico Institute of Mining and Technology.
Dr. Jonathan Cirtain is the vice president of Advanced Technologies for BWX Technologies, Inc. (BWXT).

Dr. Cirtain joined BWXT after co-founding Astraea, Inc. – a small business created to design and develop a platform for machine learning and data science analytics utilizing Earth-observing satellite and in situ data sources. He served as the organization’s chief scientist and technologist.

Prior to his entrepreneurship, Dr. Cirtain spent nine years with NASA, beginning his career as an astrophysicist and holding positions of increased responsibility at the Marshall Space Flight Center. He concluded his tenure with the agency as the manager of the Science Research Office, overseeing a staff of nearly 170 scientists and contractors in applied science and technology development.

Dr. Cirtain led and contributed to numerous NASA space missions, including the High-resolution Coronal Imager – a sub-orbital telescope known for capturing the highest resolution photos ever of the Sun's corona. In 2010, he received the most prestigious honor given by the U.S. government to scientists and engineers in the onset of their independent research careers – the Presidential Early Career Award for Scientists and Engineers.

Among his various honors and appointments, Dr. Cirtain also serves as a visiting scholar with the University of Virginia Department of Astronomy.

Dr. Cirtain earned his Ph.D. in physics from Montana State. A graduate of the University of Memphis, he also holds bachelor's degrees in physics and mathematics.
Sam Gunderson works on the Business Development and Strategy team for Blue Origin, LLC. This includes working with systems integration and government customers in understanding their architecture requirements and developing interoperable human exploration space systems and rocket engines.

Prior to joining Blue Origin in 2014, Sam led business development at Cimarron, Inc. His experience includes 13 years at Boeing Space Exploration with four years in the International Space Station program leading financial planning and program financial management teams. He was the Business Development lead for human exploration spacecraft during the NASA’s Constellation program and commercial crew programs. Other experience includes two years as the Flight Crew Systems finance manager at Johnson Engineering/Spacehab, and six years of civil service at NASA Johnson Space Center in the Shuttle Orbiter Procurement Office, Lunar and Mars Exploration Program Office, and the EPA Contract Management Division in Research Triangle Park, NC.

Sam earned a B.B.A. in both Finance and Accounting from Texas A&M University. He also earned a M.S. in Future Studies from University of Houston—Clear Lake. He is a CPA and served on Texas A&M University’s MBA Advisory Board for 10 years.
John Casani retired from JPL in 2012, having been a leader in the development and management of spacecraft systems for over 50 years. He was Project Manager for three major space missions at JPL—Voyager, Galileo, and Cassini—and held senior project positions in many of the early space programs, including Explorer, Pioneer, Ranger, and Mariner. He is a recipient of several NASA awards, including the Distinguished Service Medal, the Exceptional Achievement Medal, and the Medal for Outstanding Leadership. He received the AIAA Space System Award and the von Karman Lectureship, the National Space Club Astronauts Engineer Award, the AAS Space Flight Award, and the NAE Founders Award. He holds a BSEE and an Honorary Doctor of Science degree from the University of Pennsylvania and an honorary degree in Aerospace Engineering from the University of Rome. He is an Honorary Fellow of the AIAA and is a member of the National Academy of Engineering and the International Astronautics Academy.
Dr. Jeffrey Sheehy is Chief Engineer of Space Technology Mission Directorate at NASA Headquarters. He holds a PhD in chemical physics and has led research and development projects related to plasma propulsion, high energy density chemical propellants, astrophysics, materials science, and spacecraft thermal protection at NASA Ames Research Center, Air Force Research Laboratory, and NASA Marshall Space Flight Center. He is author or co-author of 40 peer-reviewed journal articles as well as 5 book chapters and 30 technical reports.
Alan B. Carr currently serves as Senior Historian for Los Alamos National Laboratory. During his tenure as a Laboratory Historian, which began in 2003, Carr has produced several publications pertaining to the Manhattan Project, early nuclear weapons design and nuclear testing history. He has lectured for numerous professional organizations and been featured as a guest on many local, national and international radio and television programs. Before coming to Los Alamos, Carr completed his graduate studies at Texas Tech University in Lubbock, TX. His thesis, “The Long Road to Kursk: The Development, Abandonment, and Relearning of Soviet Military Strategy,” traces Soviet operational art from its roots in the early 1920s through its employment in the first half of World War II.
Track Chairs

Track 1: Fuels and Materials, Special Focus on Plutonium-238 Production Processes

Chair: Robert Wham, ORNL

Robert Wham is a Ph.D. Chemical Engineer whose research focus is radioisotope production and radiochemical separations including recycle of used nuclear fuel. He currently serves as Technical Integration Manager for the Pu-238 Supply Project within the Nuclear Security and Isotope Technology Division. Prior to that, he managed several radiochemical processing programs at the Radiochemical Engineering Development Center (REDC). His experience in hot cells and radioisotope production comes from working on the production of heavy elements in the Transuranium Element Program, as well as the recovery of plutonium, americium and curium from targets irradiated at the Savannah River Site.
PATRICK MCCLURE is the project lead for the Kilopower project at Los Alamos. He helped define the groundbreaking approach to reactor development for Kilopower and he was the regulatory lead for the project. Mr. McClure is a former line manager for the Nuclear System Design and Analysis Group. He has been at LANL for 23 years performing nuclear design for very small reactor systems and safety analysis for a variety of reactor concepts with an emphasis on severe nuclear accidents like Three Mile Island and Fukushima. Mr. McClure has a B.S. from the University of Oklahoma and a M.S. from the University of New Mexico.
Dr. Houts has a PhD in Nuclear Engineering from the Massachusetts Institute of Technology. He was employed at Los Alamos National Laboratory for 11 years where he served in various positions including Team Leader for Criticality, Reactor, and Radiation Physics and Deputy Group Leader of the 70 person Nuclear Design and Risk Analysis group. Dr. Houts currently serves as Nuclear Research Manager for NASA’s Marshall Space Flight Center, and is also the principal investigator for NASA’s Nuclear Thermal Propulsion (NTP) project. Recent awards include a NASA Exceptional Service Medal, a NASA Exceptional Engineering Achievement Medal, and being selected as an Associate Fellow of the American Institute of Aeronautics and Astronautics.
Dr. Johnson is currently the Director of the Space Nuclear Power and Isotope Technologies Division in the Nuclear Science and Technology Directorate of the Idaho National Laboratory. He has served as the Director of the Technical Integration Office for DOE’s Office of Space and Defense Power Systems since 2012. Most recently this program fueled, tested and delivered the MMRTG for NASA’s Mars Scientific Laboratory mission to the planet Mars. He holds a B.S. degree with a double major in Mathematics and Chemistry from Lake Superior State University (1984) and a Ph. D. in Physical Chemistry from Iowa State University (1990).
Pete McCallum is the Program Control and Nuclear Launch Approval Manager for NASA’s Radioisotope Power Systems (RPS) Program, located at the Glenn Research Center in Cleveland, OH, managing all business aspects of the RPS Program, as well as providing coordination of the various elements supporting nuclear launch approval. His past experience includes 8 years as the Chief of Glenn Research Center’s Office of Environmental Programs, developing programs and oversight to ensure compliance with regulatory requirements of the Nuclear Regulatory Commission (NRC), the Occupational Safety and Health Administration (OSHA), and the Environmental Protection Agency (EPA). Prior to that, he was the environmental compliance manager for BP Chemicals in Lima, OH and for Kennecott Utah Copper in Salt Lake City. He has a Bachelor’s Degree in Chemical Engineering (University of Minnesota) and a Juris Doctorate (Cleveland State University, Cleveland Marshall College of Law).
Emerging Missions for Nuclear Technologies—Commercial and Governmental

Monday, 26 February 2018, 13:00-14:45, Salon E

Session organizers:
Jorge Navarro (ORNL)
Leonard Dudzinski (NASA)

Session Chairs:
Jorge Navarro (ORNL)
Leonard Dudzinski (NASA)

Panel members:
Ralph McNutt (Johns Hopkins Univ.)
David Schurr (NASA)
Christophe Fongarland (ArianeGroup)

Nuclear technology has played an important role in space exploration by providing compact and reliable power to an array of space crafts. Nuclear power generations are predicted to continue to play an important role in support of missions. This panel will discuss the emerging missions where nuclear technologies can be enabling or significantly enhancing. Nuclear technologies are being considered for commercial applications as well as government-sponsored missions in the next decades. This panel will also address the impact that collaborations between governmental agencies and commercial entities have on how nuclear technologies will be used for future missions. The panel will finally explore the possible roadblocks of using nuclear technologies in today's social and political environment.
Since the early days of the Rover nuclear rocket program, fission systems have been seen as a promising path for fast and efficient transportation. However, the goal of having a sustainable fission system for deep manned missions has not been achieved. On the contrary, fission power system development for space applications have had a frustrating growth history, with many starts and stops. As a result, the US has not had a fission system flown since SNAP 10-A in 1965, and the Russians have not developed a new system since TOPAZ in the 1980s. This panel will discuss the issues with past fission development efforts for space power and propulsion that have prevented them from achieving operational capabilities, and the possibilities for new approaches to system development that could lead to successful flight in the next decade.
New Initiatives in Nuclear Technologies

Wednesday, 28 February 2018, 13:00-14:45, Salon E

Session organizers:
  Jorge Navarro (ORNL)
  Leonard Dudzinski (NASA)

Session Chairs:
  Jorge Navarro (ORNL)
  Leonard Dudzinski (NASA)

Panel members:
  Tim Tinsley (NNL)
  Paolo Venneri (Ultra Safe Nuclear Corp)
  Larry Forsley (Global Energy Corp)

Privatization of space exploration has allowed for a new wave of innovative companies to enter the space exploration arena. In just a few years these innovative companies have joined the race and are at the forefront of bringing new and innovative technologies to the space exploration market. This panel will focus on the different challenges and opportunities that commercial ventures encounter when navigating the emerging space exploration arena, especially when applying and developing nuclear technologies. The panelists’ discussion will focus on the technological aspect, as well as the business components of designing, testing and applying nuclear technologies for space. In addition, the panel will discuss the latest initiatives in nuclear technologies from US Governmental agencies, commercial entities, and international organizations. The panel will also address how new governmental initiatives could enable new capabilities and technologies for nuclear space. The topics will include flight system development, fuel production and innovation, as well as infrastructure and process improvement.
# Technical Program Outline

<table>
<thead>
<tr>
<th>Events</th>
<th>Day</th>
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<tbody>
<tr>
<td><strong>Plenary Sessions with Keynote Speakers</strong></td>
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<tr>
<td>Robert N. Coward, ANS</td>
<td>Mon</td>
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<td>Dr. Terry C. Wallace Jr, LANL</td>
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<tr>
<td>Dr. Jonathan Cirtain, BWXT</td>
<td>Tue</td>
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<td>John Casani, JPL</td>
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<tr>
<td>Sam Gunderson, Blue Origin</td>
<td>Wed</td>
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<tr>
<td>Dr. Jeffrey Sheehy, NASA</td>
<td>Wed</td>
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<tr>
<td><strong>Panel Sessions</strong></td>
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<tr>
<td>Emerging Missions for Nuclear Technologies—Commercial and Governmental</td>
<td>Mon</td>
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<tr>
<td>Alternative Fission Development Scenarios</td>
<td>Tue</td>
<td>E</td>
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<tr>
<td>New Initiatives in Nuclear Technologies</td>
<td>Wed</td>
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<tr>
<td><strong>Other Events</strong></td>
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<td>Exhibitors (Mon 08:00—Wed 12:00)</td>
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<td>Student Social (see student registration packet insert)</td>
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<tr>
<td>Technical Tour (meet in front of hotel at 07:00)</td>
<td>Thu</td>
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<tr>
<td><strong>Tracks / Sessions</strong></td>
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<tr>
<td>Nuclear Fuels, Materials &amp; Processes</td>
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<td>Radioisotope fuels and fuels development</td>
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<td>Radioisotope fuels and fuels development (cont’d)</td>
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<td>Radioisotope fuels and fuels development (cont’d)</td>
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<tr>
<td>Cladding, containment, and aeroentry protective materials</td>
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<tr>
<td>LEU and HEU fuels, fuel forms, and fuels availability</td>
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<td>15:00</td>
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<tr>
<td>Surface &amp; Space Fission Power</td>
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<tr>
<td>Fission system concepts</td>
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<tr>
<td>Fission system development and testing</td>
<td>Mon</td>
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<tr>
<td>Space fission system technologies, including power conversion</td>
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<tr>
<td>Space fission development lessons learned and best practices</td>
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### Tracks / Sessions (cont’d)

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<th>Topic</th>
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<tr>
<td>Nuclear Propulsion</td>
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<td>Nuclear Thermal Propulsion system development and testing</td>
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<td>NTP system concepts</td>
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<tr>
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<tr>
<td>Radioisotope power system technologies, including power conversion</td>
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<tr>
<td>Nuclear Missions Applications &amp; Mission Support</td>
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<tr>
<td>Space fission, NTP, and RPS mission applications and benefits</td>
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<tr>
<td>Nuclear mission development, system integration, and support processes</td>
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<td>D</td>
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<tr>
<td>Nuclear application lessons learned and best practices - overcoming the impediments to using nuclear technologies in space</td>
<td>Tue</td>
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<tr>
<td>Nuclear launch safety and approval processes, including NEPA compliance</td>
<td>Wed</td>
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### Meals and Refreshments

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<th>Event</th>
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<tr>
<td>Hosted Reception (sponsored by BWXT)</td>
<td>Mon</td>
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<tr>
<td>Banquet (sponsored by CNL) (speaker, Alan Carr, LANL)</td>
<td>Wed</td>
<td>A,B</td>
<td>18:00</td>
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<tr>
<td>Morning break/refreshments (sponsored by ANS “Nuclear News”)</td>
<td>Mon</td>
<td>A,B</td>
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<tr>
<td>Afternoon break/refreshments (sponsored by CNL)</td>
<td>Mon</td>
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<td>14:45</td>
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<tr>
<td>Morning break/refreshments (sponsored by BWXT)</td>
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<tr>
<td>Morning break/refreshments (sponsored by Dynetics)</td>
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<td>Afternoon breaks/refreshments</td>
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Technical Program

Monday, 26 February 2018

MONDAY AM - I

Plenary Session

Monday, 26 February 2018, Salons A & B

08:15 – 09:00 Robert N. Coward, President (2017-2018) ANS

09:00 – 09:45 Dr. Terry C. Wallace, Jr., Director, LANL

MONDAY AM - II

Track/Session: Nuclear Fuels, Materials & Processes: Radioisotope fuels and fuels development

Monday, 26 February 2018, 10:15-12:00, Salon E

Session Chair: Jackie Lopez-Barlow (LANL)

10:20 24091 PREDICTING THE GAS PHASE CHEMISTRY INSIDE THE NEXT-GENERATION RTG, Christofer E. Whiting, Univ. of Dayton

10:40 24166 IRRADIATION OF A PROTOTYPIC NEPTUNIUM OXIDE MICROSPHERE TARGET IN NRU, William Robert Richmond, Canadian Nuclear Laboratories; Xiaolin Wang, Canadian Nuclear Laboratories; Geoffrey W. R. Edwards, Canadian Nuclear Laboratories; Aleksandar Vasic, Canadian Nuclear Laboratories; Fred Adams, Canadian Nuclear Laboratories

11:00 24168 Preliminary Analysis of Pu-238 Production in TRIGA® Thermal Columns, Emory Colvin, Oregon State Univ.; Todd S. Palmer, Oregon State Univ.; Steven R. Reese, Oregon State Univ.

11:20 24184 High-Temperature X-ray Diffraction Studies of Americium Oxide Surrogates, Emily Jane Watkinson, Univ. of Leicester; Jens Najorka, Natural History Museum; Richard M. Ambrosi, Univ. of Leicester; Mark J. Sarsfield, National Nuclear Laboratory; Emma Vernon, National Nuclear Laboratory; Tim P. Tinsley, National Nuclear Laboratory; Keith Stephenson, European Space Agency
11:40  24187 DOSIMETRY FLUX CHARACTERIZATION OF THE ADVANCED TEST REACTOR FOR PLUTONIUM-238 PRODUCTION USED IN RADIOISOTOPE THERMOELECTRIC GENERATORS, Dominik A. Fritz, Rensselaer Polytechnic Institute; Ashoak N. Nagarajan, Idaho State Univ.; Grace A. Marcantel, Texas A&M Univ.; Lucas B. Beveridge, Idaho State Univ.; Joshua H. Rhodes, Missouri Univ. of Science and Technology

Track/Session: Nuclear Propulsion: Nuclear Thermal Propulsion system development and testing
Monday, 26 February 2018, 10:15-12:00, Salon C
Session Chairs: Marvin Barnes (NASA), Harold Gerrish (NASA SSC)

10:20  24180 Analytical Modeling of Heat Deposition in Propellant from Nuclear Thermal Propulsion, Alexander Aueron, Complex Systems Integration Lab, Univ. of Alabama in Huntsville; Dale L. Thomas, Univ. of Alabama in Huntsville; Jason Cassibry, Univ. of Alabama in Huntsville

10:40  24206 Operational Characterization and Testing of NASA MSFC’s Compact Fuel Element Environmental Test (CFEET), Kelsa M. Benensky, Univ. of Tennessee; Marvin W. Barnes, NASA; David E. Bradley, NASA Marshall Space Flight Center; Carly J. Romnes, Univ. of New Mexico; Robert R. Hickman, NASA Marshall Space Flight Center

11:00  24269 Lessons Learned from Recent Testing in the Nuclear Thermal Rocket Element Environmental Simulator, William J. Emrich, NASA Marshall Space Flight Center; Michael P. Schoenfeld, NASA/MSFC


11:40  24322 BORGALLOY DEVELOPMENT STATUS FOR PASSIVE NTP REACTIVITY CONTROL, Paolo F. Venneri, Ultra-Safe Nuclear Corporation; Michael J. Eades, Ohio State Univ.

Track/Session: Surface & Space Fission Power: Fission system concepts
Monday, 26 February 2018, 10:15-12:00, Salon D
Session Chair: Paolo Venneri (Ultrasafe Nuclear)

10:20  24081 PRELIMINARY DESIGN AND ANALYSIS OF MULTI-KILOWATT GAS COOLED SPACE NUCLEAR SYSTEM, Tao Meng, Harbing Engineering Univ.; Sichao Tan, Harbin Engineering Univ.; Yuhao He, Harbing Engineer-
FUEL GEOMETRY OPTIONS FOR A MODERATED LOW-ENRICHED URANIUM KILOWATT-CLASS SPACE NUCLEAR REACTOR, Leonardo de Holanda Mencarini, Subdivisão de Dados Nucleares - Instituto de Estudos Avançados (IEAv), Trevo Coronel Aviador José Alberto Albano do Amarante and Colorado School of Mines; Jeffrey C. King, Colorado School of Mines.

NEUTRONICS ANALYSIS OF A PRISMATIC GAS COOLED REACTOR CONCEPT FOR SPACE APPLICATION, Xie Yang, Tsinghua Univ.; Ding She, Institute of Nuclear and New Energy Technology, Tsinghua Univ.; Lei Shi, Institute of Nuclear and New Energy Technology, Tsinghua Univ.; Jun Sun, Tsinghua Univ.; Minggang Lang, Institute of Nuclear and New Energy Technology, Tsinghua Univ.; Zeguang Li, Tsinghua Univ.

MULTIPHYSICS ANALYSIS OF MODERATED SPACE REACTOR, Andrew James Fallgren, LANL; DV Rao, LANL

DESIGN OF THE KRUSTY REACTOR, David I. Poston, LANL; Marc A. Gibson, NASA Glenn Research Center; Thomas Joseph Godfroy, NASA; Patrick McClure, LANL

MONDAY PM - I

Special Panel Session: Emerging Missions for Nuclear Technologies - Commercial and Governmental

Monday, 26 February 2018, 13:00-14:45, Salon E

Session Organizers: Jorge Navarro (ORNL), Leonard Dudzinski (NASA)
Session Chairs: Jorge Navarro (ORNL), Leonard Dudzinski (NASA)
Panel members: Ralph McNutt (Johns Hopkins Univ.), David Schurr (NASA), Christophe Fongarland (ArianeGroup)

(See the Featured Panels description on pg 25 for additional information.)

Track/Session: Nuclear Propulsion: NTP system concepts

Monday, 26 February 2018, 13:00-14:45, Salon C

Session Chairs: Kelsa Benensky (U. Tenn.), Robert O’Brien (INL)

13:05 24182 DESIGN COMPARISON OF NUCLEAR THERMAL ROCKET CONCEPTS, David I. Poston, LANL
13:25  24205 Evaluation of Novel Refractory Carbide Matrix Fuels for Nuclear Thermal Propulsion, Kelsa M. Benensky, Univ. of Tennessee; Carly J. Romnes, Univ. of New Mexico; Michael J. Eades, Ohio State Univ.; Paolo F. Venneri, Ultra-Safe Nuclear Corporation; Kurt A. Terrani, ORNL; Steven J. Zinkle, Univ. of Tennessee, Knoxville


14:05  24212 Use of Molybdenum Cermet to Decrease Mass and Increase Thermal Performance of Nuclear Thermal Rockets, Wesley R. Deason, Ultra Safe Nuclear Corporation (USNC); Michael J. Eades, Ultra Safe Nuclear Corporation (USNC); Vishal K. Patel, Ultra Safe Nuclear Corporation (USNC)

14:25  24215 MESOSCALE SIMULATIONS OF THERMAL TRANSPORT IN W-UO2 CERMET FUEL FOR NUCLEAR THERMAL PROPULSION, Marina Ferreira Fonseca Sessim, Penn State Univ.; Marvin W. Barnes, NASA Marshall Space Flight Center; Robert R. Hickman, NASA Marshall Space Flight Center; Michael R. Tonks, Univ. of Florida

Track/Session: Surface & Space Fission Power: Fission system development and testing
Monday, 26 February 2018, 13:00-14:45, Salon D
Session Chair: Patrick McClure (LANL)

13:05  24146 Radiation Tolerance Testing of Electronics for Space Fission Power Systems, Max F. Chaiken, NASA Glenn Research Center; Marc A. Gibson, NASA Glenn Research Center

13:25  24238 KILOPOWER KRUSTY FISSION POWER DEMONSTRATION UPDATE, Donald Palac, NASA GRC; Marc A. Gibson, NASA GRC; Lee S. Mason, NASA GRC; Patrick McClure, LANL; R. Chris Robinson, Y-12.


14:05  24256 PREDICTED PERFORMANCE OF THE KRUSTY REACTOR, David I. Poston, LANL
MONDAY PM - II

Track/Session: Nuclear Fuels, Materials & Processes: Radioisotope fuels and fuels development (cont'd)
Monday, 26 February 2018, 15:15-17:00, Salon E
Session Chair: Dave DePaoli (ORNL)

15:20 24203 A Program Code for 3D Calculations of the Characteristics for a Thermionic Fuel Element of Nuclear Power Plants for Different Applications, M A Polous, ANO APE Rosatom Technical Academy; V. I. Yarygin

15:40 24213 SORBENT WIPES FOR USE IN HEAT SOURCE PLUTONIUM OXIDE PROCESSING, Rebecca V. Hollis, LANL; W. Kirk Hollis, LANL; Elena Atencio, LANL; Jacqueline N. Hargraves, LANL; Helen Milenski, LANL; Lisa Meyers, LANL

16:00 24217 Overview of Process Improvements and Dose Reduction Strategies for LANL's Heat Source Plutonium Production Operations, Elizabeth A. Bluhm, LANL

16:20 24221 Converting Research and Development Facilities and Operations into a 238Pu Production Process, Emory D. Collins, ORNL; Robert M. Wham, ORNL

Track/Session (combined):
Nuclear Propulsion: NTP development lessons learned and best practices
Nuclear Propulsion: NTP systems technologies
Monday, 26 February 2018, 15:15-17:00, Salon C
Session Chairs: Steven Howe (Howe Industries), Stan Borowski (NASA)

15:20 24202 Preliminary investigation of thermal-hydraulic characteristic in pellet bed reactor for nuclear thermal propulsion, Yu Ji, Tsinghua Univ.; Jun Sun, Tsinghua Univ.; Zeguang Li, Tsinghua Univ.; Minggang Lang, Institute of Nuclear and New Energy Technology; Lei Shi, Tsinghua Univ.


16:00 24239 CONCEPTUAL DESIGN OF A HOMOGENEOUS FOAM CORE FAST REACTOR, Daniel W. Gould, Kansas State Univ.; Richard L. Reed, Kansas State Univ.

16:40 24348 HOT HYDROGEN TESTING & CERMET MATERIALS DEVELOPMENT SUPPORTING NUCLEAR THERMAL PROPELLSION, Joseph D. Elkins, Georgia Inst. of Technology; Kelsa M. Benensky, Univ. Tennessee; Dennis Tucker, NASA MSFC; Marvin W. Barnes, NASA, MSFC

Track/Session: Surface & Space Fission Power: Space fission system technologies, including power conversion

Monday, 26 February 2018, 15:15-17:00, Salon D

Session Chair: Jonathan Witter (BWXT)

15:20 24178 STUDY ON THE METHOD OF TOPAZ-II SHIELDING CALCULATION, Jing Shao, China institute of atomic energy; Sun Zheng, China institute of atomic energy; Zhang Yan, China institute of atomic energy; Zhao Shouzhi, China institute of atomic energy; Xie Jiachun, China institute of atomic energy; Guo Jian, China institute of atomic energy

15:40 24183 Progress On Commercializable 10 kg/kW Brayton Space Nuclear Power Conversion Systems, Christopher G. Morrison, Ultra Safe Nuclear Corporation; Michael Eades, Ultra Safe Nuclear Corporation.


16:20 24252 FLOW BOILING AT SUBATMOSPHERIC PRESSURE, Nathan Colgan, Univ. of Illinois Urbana Champaign; Joseph L. Bottini, Univ. of Illinois; Caleb S. Brooks, Univ. of Illinois

Reception at Palace Station (included in registration)

18:00-21:00 Please join us in Salons A&B for a reception
Tuesday, 27 February 2018

TUESDAY AM - I

Plenary Session
Tuesday, 27 February 2018, Salons A & B

08:15 – 09:00 Dr. Jonathan Curtin, VP Advanced Technologies & Director of Space, BWXT

09:00 – 09:45 John Casani, Special Assistant to the Director, JPL

TUESDAY AM - II

Track/Session: Nuclear Fuels, Materials & Processes: Cladding, Containment, and Aeroentry protective materials

Tuesday, 27 February 2018, 10:15-12:00, Salon E

Session Chair: Chris Whiting (UDRI)

10:20 24172 Investigation of a Replacement for Fine Weave Pierced Fabric in Space Generators, Laura Hawkins, Texas A&M Univ.; Syed Zameeruddin Mazharuddin, Univ. of Southern California; Matthew Wells, Univ. of Tulsa; Darrell Shien-Lee Cheu, Purdue Univ.; Steve Herring, Center for Space Nuclear Research

10:40 24195 AEROSHELL RE-ENTRY MODELLING FOR THE EUROPEAN SPACE NUCLEAR POWER PROGRAM, Richard M. Ambrosi, Univ. of Leicester; Benjamin Foxcroft, Univ. of Leicester; Alessandra Barco, Univ. of Leicester; Hugo Williams, Univ. of Leicester; Emily Jane Watkinson, Univ. of Leicester; Alexander Godfrey, Lockheed Martin UK; Colin Stroud, Lockheed Martin UK; Christophe Fongarland, Ariane Group; Martin Libessart, Ariane Group; Caroline Nguyen, Ariane Group; James Merrifield, Fluid Gravity Engineering Ltd; Keith Stephenson, European Space Agency

11:00 24196 AEROSHELL RE-ENTRY AND MATERIAL TESTING FOR THE EUROPEAN SPACE NUCLEAR POWER PROGRAM, Richard M. Ambrosi, Univ. of Leicester; Alessandra Barco, Univ. of Leicester; Hugo Williams, Univ. of Leicester; Emily Jane Watkinson, Univ. of Leicester; Christophe Fongarland, Ariane Group; Martin Libessart, Ariane Group; Thierry Pichon, Ariane Group; Daniel Philip Kramer, Univ. of Dayton;
Chadwick Douglas Barklay, Univ. of Dayton; Keith Stephenson, European Space Agency; Benjamin Foxcroft, Univ. of Leicester; Ramy Mesalam, Univ. of Leicester

11:20 24227 AN INVESTIGATION OF THE MELT, FLOW AND CURE BEHAVIOR OF PHENOLIC RESIN DURING PROCESSING OF CARBON BONDED CARBON FIBER INSULATION, Glenn Roy Romanoski, ORNL; Kyle Lach, Univ. of Dayton; Ashli Clark, ORNL; Nidia C. Gallego, ORNL; Shiba Adhikari, ORNL; George Ulrich, ORNL

11:40 24313 Evaluation of Molybdenum as a Surrogate for Iridium in the GPHS Weld Development, Stanley Pierce, LANL; Paul Moniz, LANL; Andrew Stine, LANL

Track/Session: Radioisotope Power Systems: Radioisotope system development and testing

Tuesday, 27 February 2018, 10:15-12:00, Salon C

Session Chairs: Dirk Cairns-Gallimore (DOE-NE), Dr. Richard Ambrosi (U. of Leicester)

10:20 24169 THE CONSIDERATION OF FUELING AND TESTING A DYNAMIC RPS, Shad Davis, Idaho National Laboratory; Kelly L. Lively, Idaho National Laboratory; Kendal J. Wahlquist, Idaho National Laboratory

10:40 24188 Development of High Efficiency Segmented Couples For Space Applications, Fivos Drymiotis, NASA JPL; Jean-Pierre Fleurial, JPL - CIT; Sabah Bux, JPL - CIT; Samad A. Firdosy, JPL - CIT; Kurt Star, JPL - CIT; Ike Chi, JPL - CIT; Vilupanur Ravi, JPL - CIT; Billy Chun-Yip Lee, JPL - CIT; Sevan Chananian, Michigan State Univ.; Dean Cheikh, Univ. of California Los Angeles; Kathy Lee, JPL - CIT; Kevin Yu, JPL - CIT; Obed Villalpando, JPL - CIT; Kevin Smith, JPL - CIT; David Uhl, JPL - CIT; Chen-Kuo Huang, JPL - CIT; Jong-Ah Paik, JPL - CIT; Zi-Kui Liu, Penn State Univ.; Jorge Paz Soldan Palma, Penn State Univ.; Yi Wang, Penn State Univ.; Xiao Yu Chong, Penn State Univ.; Frances Hurwitz, NASA Glenn Research Center; Dongming Zhu, NASA Glenn Research Center; Haiquan Guo, NASA Glenn Research Center; Gustavo Costa, NASA Glenn Research Center

11:00 24224 IMPROVING THE PERFORMANCE OF LANTHANIDE THERMOELECTRIC MATERIALS, Sabah Bux, JPL, California; Dean Cheikh, JPL/CIT; Brea Hogan, JPL/CIT; Trinh Vo, JPL/CIT; Paul Von Allmen, JPL/CIT; Kathleen Lee, JPL/CIT; Bruce Dunn, Univ. of California Los Angeles; Jean-Pierre Fleurial, JPL/CIT

11:20 24229 Qualifying thermoelectric modules for radioisotope power systems using impedance spectroscopy, Ramy Mesalam, Univ. of Leicester; Hugo Williams, Univ. of Leicester; Richard M. Ambrosi, Univ. of Leicester; Daniel Philip Kramer, Univ. of Dayton; Keith Stephenson, European Space Agency
11:40 24346 TURBO-BRAYTON CONVERTER FOR RADIOISOTOPE POWER SYSTEMS, Jeffrey J. Breedlove, Creare LLC; Mark V. Zagarola, Creare LLC; Thomas M. Conboy, Creare LLC; Ashwin Shah, Sest, Inc.; Cheng-Yi Lu, Aerojet Rocketdyne; Mohamed S. El-Genk, Institute for Space and Nuclear Power Studies, U. New Mexico; Timothy Schriener, Institute for Space and Nuclear Power Studies, U. New Mexico.

Track/Session: Nuclear Missions Applications & Mission Support: Space fission, NTP, and RPS mission applications and benefits

Tuesday, 27 February 2018, 10:15-12:00, Salon D

Session Chair: John Hamley (NASA GRC)


10:40 24214 RPS UTILIZATION - A BALANCE OF PLUTONIUM SUPPLY VERSUS MISSION DEMAND, Thomas Sutliff, NASA

11:00 24295 Radioisotope Power Systems to Enable Extended Lunar Science and In-Situ Resource Utilization Missions, Robert L. Cataldo, NASA Glenn Research Center

11:20 24301 Update on Approaches for LEU NTP Engine Systems and Exploration Implications, Claude Russell Joyner, Aerojet Rocketdyne; Michael Eades, Ultra Safe Nuclear Corporation; Daniel Levack, Aerojet Rocketdyne; James Horton, Aerojet Rocketdyne; Tyler Jennings, Aerojet Rocketdyne; Timothy Kukan, Aerojet Rocketdyne; Matthew Long, Aerojet Rocketdyne; Frederick Widman, Aerojet Rocketdyne

TUESDAY PM - I

Special Panel Session: Alternative Fission Development Scenarios

Tuesday, 27 February 2018, 13:00-14:30, Salon E

Session Organizers: Jorge Navarro (ORNL), Leonard Dudzinski (NASA)

Session Chairs: Jorge Navarro (ORNL), Leonard Dudzinski (NASA)

Panel members: Lee Mason (NASA GRC), Mike Houts (NASA MSFC), Pat McClure (LANL)

(See the Featured Panels description on pg 26 for additional information.)
Track/Session: Radioisotope Power Systems: Radioisotope development lessons learned and best practices
Tuesday, 27 February 2018, 13:00-14:30, Salon C
Session Chairs: Kelly Lively (INL)

13:10 24070 OPTIMIZING MMRTG FUELING AND TESTING FOR FUTURE CAMPAIGNS, Justin Rhys Mansell, Purdue Univ.; Jessica Berry, Colorado School of Mines; Jacob Quint, Univ. of Nebraska-Lincoln; Meng-Jen Wang, Virginia Tech

13:30 24111 Cassini Power During the 20 Year Mission and Until the Final Plunge Into Saturn, Jonathan Grandidier, NASA - JPL; David Woerner, NASA - JPL; Thomas Burk, NASA - JPL

13:50 24167 Radioisotope Power System Dose Estimation Tool, Michael B. R. Smith, Univ. of Tennessee

14:10 24204 CONCEPTUAL DUAL THERMOELECTRIC SPACE RADIOISOTOPE POWER SYSTEM, Daniel P. Kramer, Univ. of Dayton; Richard M. Ambrosi, Univ. of Leicester

Track/Session: Nuclear Missions Applications & Mission Support: Nuclear mission development, system integration, and support processes
Tuesday, 27 February 2018, 13:00-14:30, Salon D
Session Chair: Bhavya Lal (IDA S&T Policy Institute)

13:10 24199 SCIENCE ENABLED BY FISSION KILOPOWER AT TITAN, Ralph D. Lorenz, Johns Hopkins Applied Physics Laboratory


13:50 24189 RPS-powered Pressure Vessel Mission Concepts for In-Situ Ocean World and Venus Exploration, Brian K. Bairstow, JPL-CIT; Young H. Lee, JPL-CIT; and Alexander Austin JPL-CIT.

TUESDAY PM - II

Track/Session: Nuclear Fuels, Materials & Processes: LEU and HEU fuels, fuel forms, and fuels availability
Tuesday, 27 February 2018, 15:00-17:05, Salon E
Session Chair: Chris Whiting (UDRI)

William J. Emrich, Marshall Space Flight Center; Dennis Tucker, Marshall Space Flight Center; Marvin W. Barnes, NASA; Nicolas Donders, Kettering Univ., Flint, MI, 48504; Kelsa M. Benensky, Univ. of Tennessee

15:25 24171 DEMONSTRATION OF SUBSCALE CERMET FUEL SPECIMEN FABRICATION APPROACH USING SPARK PLASMA SINTERING AND DIFFUSION BONDING, Marvin W. Barnes, NASA; Dennis Tucker, NASA; Kelsa M. Benensky, Univ. of Tennessee

15:45 24210 FUEL PELLET FRACTURE AS A FUNCTION OF AGE, Roberta N. Mulford, Los Alamos National Security

Track/Session: Radioisotope Power Systems: Radioisotope system concepts

Tuesday, 27 February 2018, 15:00-17:05, Salon C

Session Chairs: Dr. Emily Jane Watkinson (U. Leicester), Young Lee (JPL)

15:05 24176 Design, development and testing of an 241Am-fuelled RHU for the ESA program, Alessandra Barco, Univ. of Leicester; Richard M. Ambrosi, Univ. of Leicester; Tony Crawford, Univ. of Leicester; Hugo Williams, Univ. of Leicester; Alexander Godfrey, Lockheed Martin UK; Colin Stroud, Lockheed Martin UK; K. Stephenson, ESA; Christopher Bicknell, Univ. of Leicester; Emily-Jane Watkinson, Univ. of Leicester; Ramy Mesalam, Univ. of Leicester; Tony Crawford, Univ. of Leicester; Mark John Sarsfield, national nuclear laboratory; Tim P. Tinsley, National Nuclear Laboratory; Maximilian Chowanietz, Advanced Structural Dynamics Evaluation Centre (ASDEC); Martin Cockrill, Advanced Structural Dynamics Evaluation Centre (ASDEC)

15:25 24177 Design and architecture of the 241Am-fuelled RTG for the ESA program, Alessandra Barco, Univ. of Leicester; Richard M. Ambrosi, Univ. of Leicester; Hugo Williams, Univ. of Leicester; Tony Crawford, Univ. of Leicester; Marie-Claire Perkinson, Airbus; Christopher Burgess, Airbus; K. Stephenson, ESA; Christopher Bicknell, Univ. of Leicester; Emily-Jane Watkinson, Univ. of Leicester; Ramy Mesalam, Univ. of Leicester; Jonathan Sykes, Univ. of Leicester

15:45 24185 THE EUROPEAN SPACE NUCLEAR POWER PROGRAM: DEVELOPMENT OF RADIOISOTOPE THERMOELECTRIC GENERATORS AND HEATER UNITS, Richard M. Ambrosi, Univ. of Leicester; Hugo Williams, Univ. of Leicester; Emily Jane Watkinson, Univ. of Leicester; Alessandra Barco, Univ. of Leicester; Ramy Mesalam, Univ. of Leicester; Edward A. Crawford, Univ. of Leicester; Christopher Bicknell, Univ. of Leicester; Jonathan Sykes, Univ. of Leicester; Keith Stephenson, European Space Agency; Marie-Claire Perkinson, Airbus UK; Christopher Burgess, Airbus UK; Michael Reece, Queen Mary Univ. of London; Kan Chen, Queen Mary Univ. of London; Kevin Simpson, European Thermodynamics Ltd; Mark Robbins, European Thermodynamics Ltd; Richard Tuley, European Thermodynamics
Ltd; Stephen Gibson, Lockheed Martin UK; Alexander Godfrey, Lockheed Martin UK; Colin Stroud, Lockheed Martin UK; Mark Sarsfield, National Nuclear Laboratory; Tim Tinsley, National Nuclear Laboratory; Christophe Fongarland, Ariane Group; Martin Libessart, Ariane Group; Daniel Philip Kramer, Univ. of Dayton; Chadwick Douglas Barklay, Univ. of Dayton; Christopher E. Whiting, Univ. of Dayton

16:05 24186 Preliminary Performance Assessment of Americium-241 as Fuel in Radiisotope Thermoelectric Generators for Deep Space Exploration, Jeremiah S. Dustin, Univ. of Idaho; Bob Borrelli, Univ. of Idaho

16:25 24193 STUDY ON THE DESIGN OF PO-210 BASED RADIOISOTOPE THERMOELECTRIC GENERATORS FOR IMPLEMENTATION ON LOW-EARTH ORBIT SATELLITES, Jonathan Gjemso, Oregon State Univ.; Cliff H. Ghiglieri, Colorado School of Mines

16:45 24201 STUDY ON THE DESIGN OF RTG FOR KOREAN SPACE MISSION, Jintaeh Hong, Korea Atomic Energy Research Institute; Kwang-Jae Son, Korea Atomic Energy Research Institute; Jong-Bum Kim, Korea Atomic Energy Research Institute; Jong-Han Park, Korea Atomic Energy Research Institute; Jin-Joo Kim, Korea Atomic Energy Research Institute

Track/Session: Nuclear Missions Applications & Mission Support: Nuclear application lessons learned and best practices - overcoming the impediments to using nuclear technologies in space

Tuesday, 27 February 2018, 15:00-17:05, Salon D

Session Chair: Tina Norwood (NASA)

15:05 24044 Nuclear Safety Launch Approval: Multi-Mission Lessons Learned, Yale Chang, JHU/APL

15:25 24247 Evolution of the Space Nuclear Launch Safety Review Process, Reina Buenconsejo, STP; Susannah Vale Howieson, IDA Science and Technology Policy Institute; Jonathan Behrens, IDA STPI; Bhavya Lal, Science and Technology Policy Institute

15:45 24248 CURRENT STATUS AND FUTURE OF SPACE NUCLEAR POWER, Bhavya Lal, Science and Technology Policy Institute; Reina Buenconsejo, Science and Technology Policy Institute; Jonathan Behrens, Science and Technology Policy Institute; Susannah V. Howieson, Science and Technology Policy Institute
Plenary Session
Wednesday, 28 February 2018, Salons A & B
08:15 – 09:00  Sam Gunderson, Manager, Business Development, Blue Origin
09:00 – 09:45  Dr. Jeffrey Sheehy, Chief Engineer, STMD, NASA

Track/Session: Surface & Space Fission Power: Space fission development lessons learned and best practices
Wednesday, 28 February 2018, 10:15-12:00, Salon E
Session Chair: Susan Voss (GNNA)

10:20  24154  FISSION POWER SOURCES FOR SPACE AND HUMAN PLANETARY EXPLORATION, Susan S. Voss, Global Nuclear Network Analysis, LLC; Donald Palac, NASA GRC; Marc A. Gibson, NASA GRC
10:40  24321  Avoiding Highly Enriched Uranium for Space Power, Alan J. Kuperman, NPPP

Track/Session: Radioisotope Power Systems: Radioisotope power system technologies, including power conversion
Wednesday, 28 February 2018, 10:15-12:00, Salon C
Session Chairs: Dr. Chadwick Barklay (Univ. of Dayton Research Institute)

10:40  24209  RECENT UNIV. OF DAYTON AND UNIV. OF LEICESTER COLLABORATIONS RELATED TO RADIOISOTOPE POWER SYSTEMS (RPS) AND NUCLEAR ENERGY TECHNOLOGY, Daniel P. Kramer, Univ. of Dayton;
Richard M. Ambrosi, Univ. of Leicester; Emily Jane Watkinson, Univ. of Leicester; Steven M. Goodrich, Univ. of Dayton; Chadwick D. Barklay, Univ. of Dayton; Emma Vernon, National Nuclear Laboratory; Mark J. Sarsfield, national nuclear laboratory; Tim P. Tinsley, National Nuclear Laboratory

11:00 24223 ADVANCED THERMOELECTRIC MATERIALS FOR INFUSION INTO A POTENTIAL NEXT GENERATION RADIOISOTOPE THERMOELECTRIC GENERATOR, Kurt Star, JPL; Sabah Bux, JPL, California; Fivos Drymiotis, NASA JPL; Sevan Chanakian, Michigan State Univ.; Dean Cheikh, Univ. of California Los Angeles; James Ma, JPL, California; Kathleen Lee, JPL-CIT; David Uhl, JPL-CIT; Chen-Kuo Huang, JPL-CIT; Jennifer Ni, JPL-CIT; Jong-Ah Paik, JPL-CIT; Samad Firdosy, JPL-CIT; Vilupanur Ravi, California State Polytechnic Univ., Pomona; Jean-Pierre Fleuriel, JPL-CIT

11:20 24243 STATUS OF DYNAMIC POWER CONVERSION TECHNOLOGY DEVELOPMENT FOR RPS, Salvatore Oriti, NASA Glenn Research Center

11:40 24316 CHARACTERIZATION OF PLATINUM POWDER FOR LIGHT WEIGHT RADIOACTIVE HEATER UNIT FRIT PRODUCTION, Brian Friske, Oak Ridge National Lab

Track/Session: Nuclear Missions Applications & Mission Support: Nuclear launch safety and approval processes, including NEPA compliance

Wednesday, 28 February 2018, 10:15-12:00, Salon D

Session Chair: Reina Buenconsejo (IDA S&T Policy Institute)

10:20 24069 A SIMPLIFIED APPROACH FOR LAUNCH SAFETY APPROVAL FOR SMALL FISSION POWER REACTORS, Allen L. Camp, Consultant; Patrick McClure, LANL

10:40 24090 Developing a Launch Approval Process for Nuclear Fission Reactors: Lessons Learned from Risk Mitigation and Approval Processes in Other Sectors, Jonathan Behrens, IDA STPI; Reina Buenconsejo, IDA Science and Technology Policy Institute; Bhavya Lal, IDA Science and Technology Policy Institute; Susannah Howieson, IDA Science and Technology Policy Institute

11:00 24222 IMPROVING THE NUCLEAR LAUNCH APPROVAL PROCESS, Peter McCallum, NASA; Kelli Markham, DOE

11:20 24250 LEGAL REQUIREMENTS OF NUCLEAR LAUNCH APPROVAL, Susannah Vale Howieson, IDA Science and Technology Policy Institute; Reina Buenconsejo, STP; Bhavya Lal, Science and Technology Policy Institute; Jonathan Behrens, IDA STPI

Special Panel Session: New Initiatives in Nuclear Technologies
Wednesday, 28 February 2018, 13:00-14:45, Salon E
Session Organizers: Jorge Navarro (ORNL), Leonard Dudzinski (NASA)
Session Chairs: Jorge Navarro (ORNL), Leonard Dudzinski (NASA)
Panel members: Tim Tinsley (NNL), Paolo Venneri (Ultra Safe Nuclear Corp.), Larry Forsley (Global Energy Corp)
(See the Featured Panels description on pg 27 for additional information.)

Track/Session: Nuclear Propulsion: NTP system concepts (cont’d)
Wednesday, 28 February 2018, 13:00-14:45, Salon C
Session Chairs: Wesley Deason (USNC), Nicholas Smith (Southern Research)

13:05  24233 Modeling of Compressed Fission Targets for Pulsed Fission-Fusion Hybrids, Kevin John Schillo, Univ. of Alabama Huntsville; Jason Cassibry, Univ. of Alabama in Huntsville; Rob B. Adams, Marshall Space Flight Center
13:25  24240 Fuel Temperature Considerations Due to In-Element Peaking of NTP Fuel, Vishal Patel, Idaho National Laboratory; Michael Eades, USNC; Sam Judd, USNC
13:45  24241 NTR Performance Sensitivity Studies of Thermal-Hydraulic Parameters, Andrew Christopher Denig, Georgia Institute of Technology; Jonathan Tyler Gates, Georgia Institute of Technology; Rahat Ahmed, Georgia Institute of Technology; Vedant Kiritkumar Mehta, Georgia Institute of Technology; Dan Kotlyar, Georgia Institute of Technology
14:05  24254 NUCLEAR TESTING AND SAFETY COMPARISON OF NUCLEAR THERMAL ROCKET CONCEPTS, David I. Poston, LANL
14:25  24296 Feasibility of Low Thrust, Low-Enriched Uranium Nuclear Thermal Propulsion, Samantha Rawlins, Korea Advanced Institute of Science & Technology; Yonghee Kim, Korea Advanced Institute of Science and Technology
Track/Session: Nuclear Fuels, Materials & Processes: Radioisotope fuels and fuels development (cont’d)

Wednesday, 28 February 2018, 13:00-14:45, Salon D

Session Chair: Tom Sutliff (NASA)

13:05 24225 UNDERSTANDING THE CAUSE OF PELLET FRACTURE DURING PRODUCTION OF PU-238 OXIDE HEAT SOURCES THROUGH THE COUPLING OF EXPERIMENTATION AND MODEL DEVELOPMENT, Adam J. Parkison, LANL; Ursula Carvajal-Nunez, LANL; Faith Anne Carver, LANL; Christopher Matthews, LANL; Andrew T. Nelson, LANL

13:25 24230 Logistical Constraints Must Be Considered In Simulation of Pu-238 Supply Process, Steven Randall Sherman, ORNL

13:45 24231 Progress in Chemical Processing for Production of Plutonium-238 from Irradiated Neptunium Oxide Cermet Targets, David DePaoli, ORNL; Dennis Benker, Oak Ridge National Lab.; Laetitia Delmau, ORNL; Emory D. Collins, ORNL; Robert M. Wham, ORNL

14:05 24244 OPTIMIZATION OF PLUTONIUM-238 PRODUCTION IN THE ADVANCED TEST REACTOR FOR RADIOISOTOPE THERMOELECTRIC GENERATORS IN DEEP SPACE EXPLORATION APPLICATIONS, Lucas Beveridge, Idaho State Univ.; Joshua H. Rhodes, Missouri Univ. of Science and Technology; Grace A. Marcantel, Texas A&M Univ.; Dominik A. Fritz, Rensselaer Polytechnic Institute; Ashoak N. Nagarajan, Idaho State Univ.

14:25 24251 The Evolution of HFIR Cermet Pu-238 Production Targets, Richard H. Howard, ORNL

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Track/Session: Radioisotope Power Systems: Radioisotope system concepts (cont’d)

Wednesday, 28 February 2018, 15:15-17:00, Salon C

Session Chairs: Dr. Emily Jane Watkinson (U. Leicester), Young Lee (JPL)

15:20 24242 DEVELOPMENT OF A 1-WATT STIRLING CONVERTOR FOR SMALL RPS, Scott Wilson, NASA Glenn Research Center; Steven Michael Geng, NASA Glenn Research Center; Nicholas A. Schifer, NASA Glenn Research Center; Lawrence Penswick, Consultant

15:40 24282 SMART CRITICAL FISSION CELL FOR SPACE AND TERRESTRIAL APPLICATIONS, Yasser Ragab Shaban, Guangdong Provincial Strategic Alliance of Medical Devices Innovation
Track/Session (combined):
Nuclear Propulsion: NTP systems development and testing
Nuclear Propulsion: NTP systems concepts (cont’d)

Wednesday, 28 February 2018, 15:15-17:00, Salon D
Session Chair: Jorge Navarro (ORNL)

15:20 24059 DEVELOPMENT OF HIGH-TEMPERATURE OUT-OF-PILE EXPERIMENTS FOR TESTING NUCLEAR THERMAL PROPULSION FUEL SURROGATES, Richard Howard, ORNL.

15:40 24228 NEUTRON AND ALPHA PARTICLE YIELD MODELING OF PLASMA JET-DRIVEN MAGNETO-INERTIAL FUSION, Kevin Schillo, Univ. of Alabama in Huntsville; and Jason Cassibry, Univ. of Alabama in Huntsville.

Banquet at Palace Station (included in registration)
18:00-21:00 Please join us in Salons A&B for a dinner banquet, and an exciting and informative presentation on the history of the Rover / NERVA program by Alan Carr, the LANL Historian

Thursday, 1 March 2018

Nevada National Security Site (NNSS) Technical Tour
07:00-17:30 Meet the bus in front of Palace Station Hotel & Casino at 07:00
Limit 40 persons on tour
All personnel must be in possession of a “Real ID” form of identification
(See the Technical Tour description on pg 12 for additional information)
Welcome to Palace Station Hotel & Casino

On behalf of Palace Station Hotel/Casino Management and Staff, we would like to welcome you to our hotel & casino. We are confident that your stay will be a memorable one.

All of our “Beyond the Best” Team Members are here to assist you with anything you need. Below you will find a list of Departments/Extensions should you need to contact any of our Departments:

**Front Desk Department**  
Front Desk Manager – Ext., 2915

**Bell Desk**  
Ext., 6507

**Housekeeping**  
Ext., 2525

**Security**  
Ext., 2449

**Hotel Operator/PBX**  
Ext., Zero

**Restaurants – On Property**

**Charcoal Room**  
Sun-Thu (5pm to 10pm)  
Fri & Sat (5pm to 11pm)  
*Steak & Seafood*

**Grand Café**  
Open 24 hours/day, 7 days/week

**Feast Buffet**  
Sun-Sun (7am to 10pm)

**Restaurants — Within Walking Distance**

**Macaroni Grill**

**Coffee Pub (Breakfast & Lunch only)**

**So-Ho Burrito**

**Maui Rose**

**Café Rio**

**McDonald’s**

Thank you again for choosing Palace Station and all our team members can’t wait to show you our “Beyond the Best” service.
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### Schedule at-a-glance: 26 February 2018

**Monday, 26 February 2018**

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<th>Time</th>
<th>Salon E</th>
<th>Salon C</th>
<th>Salon D</th>
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</thead>
<tbody>
<tr>
<td>8:15 - 9:00</td>
<td>PLENARY (Keynote: Robert N. Coward, President (2017-18), American Nuclear Society) [Salons A,B]</td>
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<tr>
<td>9:00 - 9:45</td>
<td>PLENARY (Keynote: Terry C. Wallace Jr., Director, Los Alamos National Laboratory) [Salons A,B]</td>
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<tr>
<td>9:45 - 10:15</td>
<td>Break (with refreshments) [Salons A,B] (sponsored by ANS “Nuclear News”)</td>
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</tr>
<tr>
<td>10:15 - 12:00</td>
<td>Nuclear Fuels, Materials &amp; Processes: Radioisotope fuels and fuels development</td>
<td>Nuclear Propulsion: Nuclear Thermal Propulsion system development and testing</td>
<td>Surface &amp; Space Fission Power: Fission system concepts</td>
</tr>
<tr>
<td>12:00 - 13:00</td>
<td></td>
<td>Lunch (on your own)</td>
<td></td>
</tr>
<tr>
<td>13:00 - 14:45</td>
<td>Special Panel Session: Emerging Missions for Nuclear Technologies - Commercial and Governmental</td>
<td>Nuclear Propulsion: NTP system concepts</td>
<td>Surface &amp; Space Fission Power: Fission system development and testing</td>
</tr>
<tr>
<td>14:45 - 15:15</td>
<td>Break (with refreshments) [Salons A,B] (sponsored by CNL)</td>
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</tr>
<tr>
<td>15:15 - 17:00</td>
<td>Nuclear Fuels, Materials &amp; Processes: Radioisotope fuels and fuels development (cont’d)</td>
<td>Nuclear Propulsion: NTP development lessons learned and best practices NTP systems technologies</td>
<td>Surface &amp; Space Fission Power: Space fission system technologies, including power conversion</td>
</tr>
<tr>
<td>18:00 - 21:00</td>
<td>Reception (included in registration) (sponsored by BWXT)</td>
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### Tuesday, 27 February 2018

<table>
<thead>
<tr>
<th>Time</th>
<th>Salon E</th>
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</tr>
</thead>
<tbody>
<tr>
<td>8:15 - 9:00</td>
<td>PLENARY (Keynote: Jonathan Cirtain, VP Advanced Technologies &amp; Director of Space, BWXT) [Salons A,B]</td>
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<tr>
<td>9:00 - 9:45</td>
<td>PLENARY (Keynote: John Casani, Special Assistant to the Director, JPL)  [Salons A,B]</td>
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<tr>
<td>9:45 - 10:15</td>
<td>Break (with refreshments) [Salons A,B] (sponsored by BWXT)</td>
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<tr>
<td>10:15 - 12:00</td>
<td>Nuclear Fuels, Materials &amp; Processes: Cladding, Containment, and Aeroentry protective materials</td>
<td>Radioisotope Power Systems: Radioisotope system development and testing</td>
<td>Nuclear Missions Applications &amp; Mission Support: Space fission, NTP, and RPS mission applications and benefits</td>
</tr>
<tr>
<td>12:00 - 13:00</td>
<td>Lunch (on your own)</td>
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<tr>
<td>13:00 - 14:30</td>
<td>Special Panel Session: Alternative Fission Development Scenarios</td>
<td>Radioisotope Power Systems: Radioisotope development lessons learned and best practices</td>
<td>Nuclear Missions Applications &amp; Mission Support: Nuclear mission development, system integration, and support processes</td>
</tr>
<tr>
<td>14:30 - 15:00</td>
<td>Break (with refreshments) [Salons A,B]</td>
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<tr>
<td>15:00 - 17:05</td>
<td>Nuclear Fuels, Materials &amp; Processes: LEU and HEU fuels, fuel forms, and fuels availability</td>
<td>Radioisotope Power Systems: Radioisotope system concepts</td>
<td>Nuclear Missions Applications &amp; Mission Support: Nuclear application lessons learned and best practices - overcoming the impediments to using nuclear technologies in space</td>
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</tbody>
</table>
### Schedule at-a-glance: 28 February 2018

#### Wednesday, 28 February 2018

<table>
<thead>
<tr>
<th>Time</th>
<th>Salon E</th>
<th>Salon C</th>
<th>Salon D</th>
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</thead>
<tbody>
<tr>
<td>8:15 - 9:00</td>
<td>PLENARY (Keynote: Sam Gunderson, Manger, Business Development, Blue Origin)  [Salons A,B]</td>
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<tr>
<td>9:00 - 9:45</td>
<td>PLENARY (Keynote: Jeffrey Sheehy, Chief Engineer, STMD, NASA)  [Salons A,B]</td>
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<tr>
<td>9:45 - 10:15</td>
<td>Break (with refreshments)  [Salons A,B] (sponsored by Dynetics)</td>
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<tr>
<td>10:15 - 12:00</td>
<td>Surface &amp; Space Fission Power: Space fission development lessons learned and best practices</td>
<td>Radioisotope Power Systems: Radioisotope power system technologies, including power conversion</td>
<td>Nuclear Missions Applications &amp; Mission Support: Nuclear launch safety and approval processes, including NEPA compliance</td>
</tr>
<tr>
<td>12:00 - 13:00</td>
<td>Lunch (on your own)</td>
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<td></td>
</tr>
<tr>
<td>13:00 - 14:45</td>
<td>Special Panel Session: New Initiatives in Nuclear Technologies</td>
<td>Nuclear Propulsion: NTP system concepts (cont'd)</td>
<td>Nuclear Fuels, Materials &amp; Processes: Radioisotope fuels and fuels development (cont'd)</td>
</tr>
<tr>
<td>14:45 - 15:15</td>
<td>Break (with refreshments)  [Salons A,B]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15:15 - 17:00</td>
<td>Radioisotope Power Systems: Radioisotope system concepts (cont'd)</td>
<td></td>
<td>Nuclear Propulsion: NTP development lessons learned and best practices NTP systems technologies</td>
</tr>
<tr>
<td>18:00 - 21:00</td>
<td>Banquet at Palace Station (included in registration) (sponsored by CNL); Speaker: Alan Carr, LANL Historian, History of the Rover/NERVA Program</td>
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#### Thursday, 1 March 2018

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00 - 17:30</td>
<td>Nevada National Security Site (NNSS) Technical Tour (limit 40) (meet bus in front of hotel at 07:00)</td>
</tr>
</tbody>
</table>
Venue Map

Palace Station Hotel & Casino
Meeting and Exhibit Spaces