



ANS

Winter Meeting & Expo

Joining Forces to Advance Nuclear

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

CALL FOR PAPERS

EXECUTIVE CHAIRS

General Chair

Daniel Churchman, Southern Nuclear Corporation

Technical Program Chair

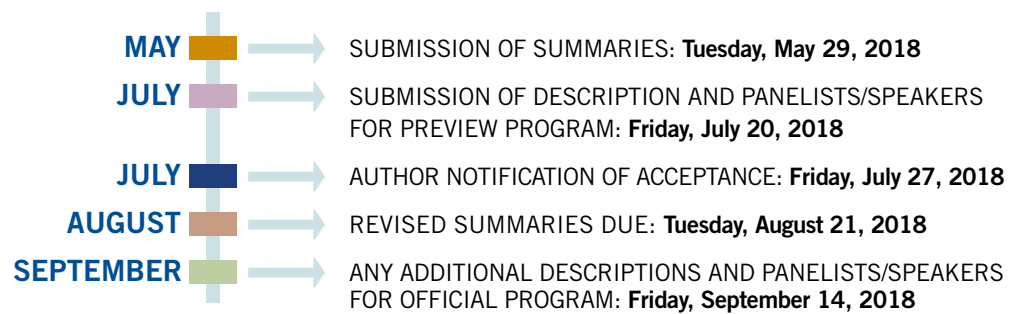
John Bess, Idaho National Laboratory

Assistant Technical Program Chairs

Gokul Vasudevamurthy, General Atomics

Robert Margolis, Florida Power and Light

SUMMARY DEADLINE: TUESDAY, MAY 29, 2018



FORMAT

Authors are now REQUIRED to use the ANS Template and Guidelines for TRANSACTIONS Summary Preparation provided on the ANS Web site at www.ans.org/pubs/transactions. Summaries must be submitted electronically using Adobe Acrobat (PDF) files or original Microsoft Word documents and the ANS Electronic Paper Submission and Review System. Summaries not based on the ANS Template will be REJECTED.

GUIDELINES FOR SUMMARIES

Please submit summaries describing work that is NEW, SIGNIFICANT, and RELEVANT to the nuclear industry. ANS will publish all accepted summaries in the TRANSACTIONS. Papers are presented orally at the meeting, and presenters are expected to register for the meeting. Completed papers may be published elsewhere, but the summaries become the property of ANS. Under no circumstances should a summary or full paper be published in any other publication prior to presentation at the ANS meeting. It is the author's responsibility to protect classified or proprietary information.

CONTENT

1. Introduction: State the purpose of the work.
2. Description of the actual work: Must be NEW and SIGNIFICANT.
3. Results: Discuss their significance.
4. References: If any, must be closely related published works. Minimize the number of references.
5. Do not present a bibliographical listing.

LENGTH

1. The minimum length is one full page.
2. The maximum length is four pages, including references, tables, and figures.
3. Limit title to ten words; limit listing authors to three or fewer if possible.

PAGE CHARGE

ANS charges \$100 per final printed page in the TRANSACTIONS. Authors should be prepared to provide their purchase order numbers when submitting their summaries electronically.

SUBMIT A SUMMARY

ans.org/meetings

TRANSACTIONS COORDINATOR

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INFORMATION SERVICES

Joe Koblich, Director
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708-579-8274 Fax





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SESSION TITLES BY DIVISION

(P) = Panel

1. **ACCELERATOR APPLICATIONS (AAD)**
 - 1a. Accelerator Applications: General
2. **AEROSPACE NUCLEAR SCIENCE AND TECHNOLOGY (ANSTD)**
 - 2a. Aerospace Nuclear Science and Technology: General
3. **BIOLOGY AND MEDICINE (BMD)**
 - 3a. Biology and Medicine: General
4. **DECOMMISSIONING AND ENVIRONMENTAL SCIENCES (DESD)**
 - 4a. Decommissioning and Environmental Sciences: General
5. **EDUCATION, TRAINING, AND WORKFORCE DEVELOPMENT (ETWDD)**
 - 5a. Education, Training and Workforce Development: General
 - 5b. Student Design Competition
 - 5c. Cutting Edge Techniques in Education, Training and Distance Education
 - 5d. Focus on Communication—I (P)
 - 5e. Focus on Communication—II (P)
 - 5f. Innovations in Fuel Cycle Research Awards
 - 5g. Research by U.S. DOE NEUP Sponsored Students I, II
 - 5h. Best of ANS Student Conference
 - 5i. Professional Licensure in the Nuclear Industry Matters: It's NOT the Job You DO, It's How You DO the Job!
6. **FUEL CYCLE AND WASTE MANAGEMENT (FCWMD)**
 - 6a. Fuel Cycle and Waste Management: General
 - 6b. Progress in DOE's Nuclear Technology Research and Development Programs (P)
 - 6c. Recent Research Work on Cementitious Waste
 - 6d. Dry Storage Systems for SNF and HLW
 - 6e. Transportation of UNF/SNF to the Next Destination
 - 6f. Safeguards Approaches and Technologies for Molten Salt Reactors
 - 6g. Used Fuel and High-Level Waste Management – The Long and Winding Road (P)
 - 6h. Molten Salt Electrochemical Properties
 - 6i. Molten Salt Reactors: Separations and Waste Processing
 - 6j. Fuel Cycle Analysis
7. **FUSION ENERGY (FED)**

Sponsoring embedded topical meeting—23rd Topical Meeting on the Technology of Fusion Energy (TOFE)
8. **HUMAN FACTORS, INSTRUMENTATION, AND CONTROLS (HFICD)**
 - 8a. General Topics in Instrumentation and Control
 - 8b. General Topics in Human Factors and Human Machine Interface
 - 8c. Preview of the 2019 NPIC/HMIT Topical Meeting
 - 8d. Cybersecurity Guidance and Practices (P)
9. **ISOTOPES AND RADIATION (IRD)**
 - 9a. Isotopes and Radiation: General
 - 9b. Development of Advanced In-Core Sensors for Fuel Systems R&D
10. **MATERIALS SCIENCE AND TECHNOLOGY (MSTD)**
 - 10a. Challenges and Opportunities with Accelerated Qualification of LWR ATF Cladding and Fuel Materials
 - 10b. Fuels and Materials for Molten Salt Reactors
 - 10c. Fuels and Materials for Small Modular Reactors
 - 10d. Nuclear Fuels
 - 10e. Accident Tolerant Fuels
 - 10f. Nuclear Fuels and Materials in Fast Reactors
 - 10g. Nuclear Science User Facilities
 - 10h. Advanced Measurement Techniques
 - 10i. Post-Irradiation Examination
 - 10j. Advanced Manufacturing
 - 10k. Transient Fuel Performance
11. **MATHEMATICS AND COMPUTATION (MCD)**
 - 11a. Current Issues in Computational Methods—Roundtable (P)
 - 11b. Transport Methods
 - 11c. Computational Methods
 - 11d. Mathematical Modeling
 - 11e. Uncertainty Quantification and Sensitivity Analysis
12. **NUCLEAR CRITICALITY SAFETY (NCSD)**
 - 12a. ANS-8 Standards Forum (P)
 - 12b. NCS Implementation Programs (P)
 - 12c. Impacts to Criticality Safety from Recent Revisions to DOE Standards (P)
 - 12d. New Code Developments for Nuclear Criticality Safety Applications
 - 12e. ENDF/B-VIII.0: Evaluation and Validation (P)
 - 12f. Critical and Subcritical Experiments
 - 12g. Membership Challenge Activity Debrief and Solution Discussion (P)
 - 12h. Recent Nuclear Criticality Safety Program Technical Accomplishments
 - 12i. Data, Analysis and Operations in Nuclear Criticality Safety
 - 12j. Hand Calculation Methodology and Use (P)
13. **NUCLEAR INSTALLATIONS SAFETY (NISD)**
 - 13a. Nuclear Installations Safety: General
 - 13b. Expediting the Licensing and Deployment of Advanced Reactors (P)
 - 13c. Emergent Topics in Consensus Standards
 - 13d. Current Topics in Probabilistic Risk Analysis
14. **NUCLEAR NONPROLIFERATION POLICY (NNPD)**
 - 14a. Nuclear Nonproliferation Policy: General
 - 14b. Specialty Fuel for Space/Defense Reactors: Discussion on Performance Specifications and Nonproliferation Policy (P)
 - 14c. Current Events in Nuclear Nonproliferation (P)
 - 14d. Eighty Years with Nuclear Fission
 - 14e. Eighty Years with Nuclear Fission (P)
15. **OPERATIONS AND POWER (OPD)**
 - 15a. Operations and Power: General
 - 15b. Nuclear Cogeneration for Sustainable Development (P)
 - 15c. New Nuclear Construction Around the World—Status Report (P)
 - 15d. Hybrid Energy Systems (P)
 - 15e. Energy Storage Systems (P)
 - 15f. Advanced/Gen-IV Reactors
 - 15g. Underway on Nuclear Power: A Retrospective (P)
16. **RADIATION PROTECTION AND SHIELDING (RPSD)**
 - 16a. Radiation Protection and Shielding: General
 - 16b. Radiation Protection and Shielding – Roundtable (P)
 - 16c. Ethics in Nuclear Engineering and Design (P)
17. **REACTOR PHYSICS (RPD)**
 - 17a. Reactor Physics: General
 - 17b. Reactor Analysis Methods
 - 17c. Data Analytics in Support of Safety and Security
 - 17d. Reactor Physics in Test and Research Reactors
 - 17e. Application and Challenges in CFD-Neutronics Coupling
 - 17f. Current Issues in LWR Core Design and Reactor Engineering Support (P)
18. **ROBOTICS AND REMOTE SYSTEMS (RRSD)**
 - 18a. Robotics and Remote Systems: General
19. **THERMAL HYDRAULICS (THD)**

Sponsoring embedded topical meeting – International Topical Meeting on Advances in Thermal Hydraulics 2018 (ATH)

2018 WINTER MEETING: TECHNICAL DIVISIONS

ACCELERATOR APPLICATIONS (AAD)

Peter Hosemann, peterh@berkeley.edu

AEROSPACE NUCLEAR SCIENCE AND TECHNOLOGY (ANSTD)

Robert O'Brien, robert.obrien@inl.gov

BIOLOGY AND MEDICINE (BMD)

Robert Greg Downing, Gregory.downing@nist.gov

DECOMMISSIONING AND ENVIRONMENTAL SCIENCES (DESD)

Dustin G. Miller, dmiller@chaseenv.com

EDUCATION, TRAINING, AND WORKFORCE DEVELOPMENT (ETWDD)

Lisa Marshall, lisamarshall@yahoo.com

FUEL CYCLE AND WASTE MANAGEMENT (FCWMD)

Stephanie Bruffey bruffeysh@ornl.gov

FUSION ENERGY (FED)

Arnold Lumsdaine, lumsdainea@ornl.gov

HUMAN FACTORS, INSTRUMENTATION, AND CONTROLS (HFICD)

Jamie Coble jcoble1@utk.edu

ISOTOPES AND RADIATION (IRD)

Kenan Unlu, K-unlu@psu.edu

MATERIALS SCIENCE AND TECHNOLOGY (MSTD)

Kenneth Geelhood, Kenneth.Geelhood@pnl.gov

MATHEMATICS AND COMPUTATION (MCD)

Steven P. Hamilton hamiltonsp@ornl.gov

NUCLEAR CRITICALITY SAFETY (NCSD)

Theresa Cutler, tcutler@lanl.gov

NUCLEAR INSTALLATIONS SAFETY (NISD)

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NUCLEAR NONPROLIFERATION POLICY (NNPD)

Kelsey Amundson kamundson5@gmail.com

OPERATIONS AND POWER (OPD)

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RADIATION PROTECTION AND SHIELDING (RPSD)

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REACTOR PHYSICS (RPD)

Cristian Rabiti, Cristian.rabiti@inl.gov

ROBOTICS AND REMOTE SYSTEMS (RRSD)

Mitch W. Pryor, mpryor@utexas.edu

THERMAL HYDRAULICS (THD)

Elia Merzari, pcchair@thd-ans.org

YOUNG MEMBERS GROUP (YMG)

Nicolas E. Stauff, stauff@anl.gov.com, Alyse Scurlock, alysescurlock@duke-energy.com



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

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

CALL FOR PAPERS

EMBEDDED TOPICAL MEETING CHAIRS

General Chairs

Xu Cheng, Karlsruhe Institute of Technology
John Luxat, McMaster University

Technical Program Chairs

Sofiane Benhamadouche, électricité de France
Sama Bilbao-y-Leon, Virginia Commonwealth University

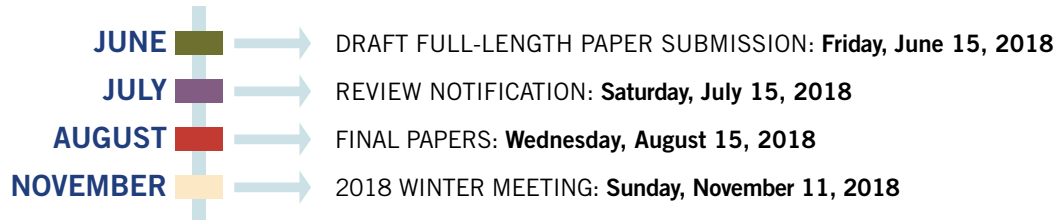
Technical Program Chairs Continued

Elia Merzari, Argonne National Laboratory

Assistant Technical Program Chairs

Piyush Sabharwall, Idaho National Laboratory
Yong Hoon Jeong, Korea Advanced Institute of
Science and Technology

IMPORTANT DATES (NO ABSTRACT SUBMISSION IS NEEDED)



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. Authors and presenters are invited to participate in this event to exchange ideas and knowledge.

SUBMIT FULL PAPERS

Full papers must be submitted electronically using Adobe Acrobat (PDF) files or Microsoft Word documents and the ANS Electronic Submission System. Authors are required to use the full paper template at ans.org/meetings/c_1 under ATH 2018 Meeting. Submit a paper at ans.org/meetings

PAGE CHARGE

Page charges will be \$20 per final printed page under 14 pages and \$40.00 per printed page over 14 pages.

HIGH-QUALITY PAPERS (14 PAGE MAXIMUM) ARE SOLICITED ON THE FOLLOWING TOPICS

- FUNDAMENTAL THERMAL HYDRAULICS**
 - Two-Phase Flow and Heat Transfer Fundamentals
 - Boiling and Condensation Phenomena
 - Experimental Methods and Instrumentation
 - Rod Bundle Thermal Hydraulics
 - Fluid-Structures and Materials Interaction
 - Nano-Fluid Science and Technology Applications to Nuclear Systems
 - Micro-Channel Flow and Heat Transfer Phenomena
 - CODE DEVELOPMENT AND APPLICATIONS**
 - Computational Methods, Modeling, Verification/Validation
 - Advanced Code Development and Validation/Verification/Applications
 - Applications of Computational Methods to Nuclear Systems
 - Novel System Code Development
 - Subchannel Analysis
 - Computational Fluid Dynamics
 - Neutronics/Thermal-Hydraulics Coupling
 - Multiscale Methods
 - OPERATING LWRS THERMAL HYDRAULICS AND SAFETY**
 - Nuclear Reactor Plant Thermal Hydraulics and Safety
 - Operating LWRS Thermal Hydraulics and Safety
 - Thermal Hydraulics in Power Upgrading/Life Extension
 - Best Estimate LOCA
 - SEVERE ACCIDENTS, PHENOMENA, MODELING AND EXPERIMENTS**
 - Combustion and Fires, Modeling and Experiments
 - Thermal Hydraulics in Accident Management
 - GENERATION IV AND FUTURE INNOVATIVE NUCLEAR REACTORS THERMAL HYDRAULICS**
 - Sodium-Cooled Fast Reactor Thermal Hydraulics
 - Gas-Cooled Reactor Thermal Hydraulics
 - Molten-Salt Reactor Thermal Hydraulics
 - Next Generation LWR Thermal Hydraulics
 - Small Modular Reactors
 - THERMAL HYDRAULICS OF NON-ELECTRICITY GENERATING NUCLEAR EQUIPMENT**
 - THERMAL HYDRAULICS OF WASTE MANAGEMENT**
 - SPECIAL SESSIONS**
 - High Performance Computing Applications in Nuclear Engineering
 - Simulation and Experiments of Wire-Wrapped Fuel Assemblies
 - Interface-Resolved Two-Phase Flow Simulation
 - Thermal Hydraulics in Molten Salt Reactors (FHRs and MSR)
- IN ADDITION TO FULL PAPERS WE WILL ALSO ACCEPT SUMMARY SUBMISSIONS (4 PAGES MAXIMUM) FOR THE FOLLOWING TWO TOPICS**
- General Thermal Hydraulics
 - Young Professional Thermal Hydraulic Research Competition.



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CALL FOR PAPERS

EMBEDDED TOPICAL MEETING CHAIRS

General Chair

Leigh Winfrey (Univ. of Florida)

Technical Program Co-Chairs

Trey Gebhart (ORNL)

John Gilligan (NCSU)

Publications Co-Chairs

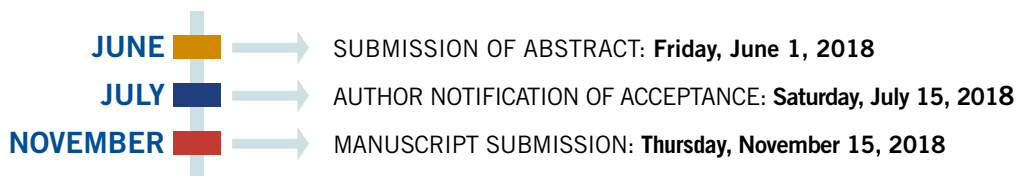
Arnie Lumsdaine (ORNL)

Gregory Staack (SRNL)

Student Program Chair

Lauren Garrison (ORNL)

ABSTRACT DEADLINE: FRIDAY, JUNE 1, 2018



The 2018 TOFE technical program committee invites you to submit abstracts and papers detailing outstanding research in the field of fusion science and technology. Proceedings will be printed in a special issue of Fusion Science & Technology. Expanded papers will be accepted for full peer-review.

PUBLISHING AND FORMATS

Abstracts should be submitted through Fusion Science and Technology using the 1-page TOFE format editorialmanager.com/fst/default.aspx.

Those who attend and present at TOFE 2018 will have the option of submitting a full peer reviewed paper to Fusion Science and Technology

Plenary speakers will have an unlimited page limit, invited papers will have an eight page limit, and contributing authors will be assessed with a 6 page limit.

Submit your abstract at editorialmanager.com/fst/default.aspx.

Project Coordinator: **John Fabian 708-579-8254 jfabian@ans.org**

RELEVANT TOPICS

TOFE 2018 will provide a forum to present and discuss the exceptional progress made in the area of fusion science and supporting technology. The following list outlines areas of particular interest.

1. FUSION RESEARCH FACILITIES

- 1a. Power plant studies
- 1b. Next step facilities – ITER, DEMO
- 1c. Alternate fusion concepts
- 1d. Hybrid Concepts
- 1e. Materials and component test facilities

2. ADVANCED CONFINEMENT

- 2a. Computational tools and validation
- 2b. Neutronics simulation and experiments
- 2c. Plasma material interactions
- 2d. Advanced computational techniques
- 2e. Plasma engineering
- 2f. Plasma heating and transient physics

3. SYSTEMS ENGINEERING

- 3a. Power conversion
- 3b. Safety and environment
- 3c. Non-electric applications of fusion
- 3d. Thermal Hydraulics for Fusion Applications

3. SYSTEMS ENGINEERING CONTINUED

- 3e. Waste Management
- 3f. Licensing
- 3g. RAMI

4. COMPONENTS

- 4a. In-vessel components
- 4b. Divertors and high heat flux components
- 4c. Fabrication, assembly, and maintenance
- 4d. Magnets

5. SUPPORT TECHNOLOGY

- 5a. Materials development and modeling
- 5b. Fuel cycle and breeding
- 5c. Fuel handling and processing
- 5d. Diagnostics (plasma and other)
- 5e. Vacuum technology
- 5f. Cryogenics
- 5g. IFE technology and components
- 5h. Advanced manufacturing techniques
- 5i. Laboratory experiments and results