



THERMAL HYDRAULICS DIVISION NEWSLETTER

Spring 2014

Message from the Chair



Dear Colleagues,
As I write this column, I have just spent time reviewing our Division's priorities, successes and future challenges to share with Board of Directors at the upcoming Annual Meeting in Reno. This review has confirmed what I had already known; namely that the Division is healthy and taking

important steps to improve.

Looking over my time associated with the Executive Committee, I've seen a significant influx of new people being elected to leadership roles in THD. This influx of new people serving alongside a healthy core of more experienced THD leaders has brought new ideas to THD and I believe we have significantly benefited. One of these ideas has been the establishment of the Young Professional Research Competition. I was lucky to have served as a judge in the past competition held at the Winter 2013 meeting. I was genuinely impressed with the quality of work that was presented. I think it is important to find ways to encourage our young members to participate and publish with THD.

As I look at the health of our THD conferences, I see the same exciting mix of new and old. THD will be sponsoring the Advances in Thermal-Hydraulics (ATH'14) at this Annual meeting in Reno. Support of this embedded topical by members of THD has been outstanding. Even with more stringent review standards, 58 full length papers will be presented at ATH'14. The success of ATH'14 follows on the heels of a very successful NURETH-15 held last year in Pisa. Mark your calendars for NURETH-16 which will be held in Chicago from August 30-September 4, 2015. I am confident that the host organization will achieve another in a long line of successful NURETH conferences. It will be time to submit abstracts and papers for NURETH-16 before we know it!

As I stated in the Winter Newsletter, the leadership of THD continues to look for ways that the division can be more relevant to our members who do not attend or publish in THD sponsored meetings or sessions. Among the ideas that have been floated include the sponsoring of Webinars in areas of

interest to THD members. THD leadership is requesting input from division members concerning the value of these Webinars and concerning potential topics. For instance, would technical discussions about topics such as proper use of Computational Fluid Dynamics be of value? Would you rather see professional development topics? If you see value in this idea, please email any of the division officers with your thoughts.

Frequently, I have been asked concerning what new people can do to be more involved in the Thermal Hydraulics Division. There are many different tasks associated with THD. One of the most important tasks is helping to provide high-quality reviews of the papers that are submitted to presentation to THD sponsored sessions and conferences. If you would like to assist in this important role, please contact the Program Committee chairs Xiaodong Sun or Elia Merzari, their email addresses can be found later in this newsletter. If you are interested in serving the division in any other capacity, please send me, or the other division officers, a note. We are always looking for more help.

This newsletter article represents one of the last acts that I will perform as Chair of THD. As I leave this position, I am confident that the incoming division officers will lead the division to new heights. Dr. Si Young Lee, as incoming chair, will need the same support and encouragement that the division provided to me during my time as Chair. I hope I can continue to find ways in which I can serve the division. I truly believe that the work that is performed by the division, most of which is directly tied to the safe operation of nuclear reactors, is among the most important in our industry. That and the people involved in THD are among best, as well!

I hope to see you in Reno! Please don't hesitate to stop me and share your concerns.

Dave

David Aumiller
2013-2014 Chair - ANS Thermal Hydraulics Division
dla12@pitt.edu

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Conference Report – Advances in Thermal Hydraulics (ATH '14)

The second edition of the THD embedded topical, Advances in Thermal Hydraulics will be held in concert with the 2014 ANS Annual Meeting from Tuesday to Thursday, June 17 to 19, in Reno, Nevada.

The meeting is co-chaired by Kurshad Muftuoglu (GE/Hitachi) and Jong Kim (KAIST), with Donna Post Guillen (INL) and Horst-Michael Prasser (PSI) serving as technical program co-chairs.

One highlight of the meeting is a Plenary session honoring the late Novak Zuber. Distinguished speakers from the Nuclear Thermal Hydraulics community will provide short lectures on some topics of Professor Zuber's research career. This session will take place from 8:30-11:30 on Tuesday, June 17 in room N-6. In the afternoon, additional research inspired Professor Zuber's work will be presented.

Including these special sections, ATH '14 will include 10 sessions with presentations of approximately 60 full-length conference papers. The conference proceedings are available as an option for registrants, in lieu of ANS TRANSACTIONS.

Conference Report – NUTHOS-10

The 10th edition of the International Topical Meeting on Nuclear Thermal Hydraulics, Operation and Safety (NUTHOS-10) is scheduled for December 14-18 in Okinawa, Japan.

Abstract submission is now closed. The deadline of submission of full-length draft papers for review has been extended to June 15, 2014.

Conference Report – NURETH-16

The 16th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-16) will be held from August 30 to September 4, 2015 in Hyatt Regency Chicago, IL, USA. The meeting will be sponsored by the American Nuclear Society Thermal Hydraulics Division and hosted by the ANS Chicago Local Section.

Building on the foundation of past meetings, NURETH-16 invites experts in the field of thermal hydraulics from around the world to share their research and discuss important issues related to thermal-hydraulics in nuclear reactors. NURETH-16 will also be a venue for organizations to showcase their expertise in nuclear reactor technology, with opportunities for meeting sponsors to exhibit their products and services to the nuclear reactor thermal-hydraulic community. You will find more information about the meeting at <http://nureth16.anl.gov/> in the near future.

The organization of NURETH-16 conference is in good progress. The ANS Chicago Local Section is working diligently on the conference logistics, including soliciting financial support. If you are interested in sponsorship opportunities, please contact:

Dr. Keith Bradley (ksbradley@anl.gov).

The Technical Program Committee is being finalized. First Call for Papers has been issued and a copy of it is attached to this newsletter. The abstract submission window will open August 1, 2014 and close on November 15, 2014.

Chicago is one of the most easily accessible destinations in the U.S. for travelers from around the world due to its central location. Attendees will just be a short distance from Chicago attractions, such as Navy Pier, architectural boat tours, theatrical and musical entertainment and countless dining and shopping options. On behalf of the NURETH-16 organizing team, we would like to cordially invite you to attend NURETH-16. Welcome to Chicago!

Michael Corradini, University of Wisconsin-Madison
Hisashi Ninokata, Politecnico di Milano
NURETH-16 Co-General Chairs

Program Committee Report

The strong THD presence at the ANS national meetings continues, after a very positive 2013 ANS Winter Meeting. The interest and participation to the sessions organized by our division reached a new high at the ANS Annual Meeting 2014. Considering the ATH'14 embedded topical and the general program of the ANS annual meeting, THD will sponsor a new record of sessions for an annual meeting. Thanks to the support of the session organizers, reviewers, contributing authors and panelists, the program committee has put together another strong arrangement of sessions for the meeting.

At the 2014 Annual Meeting in Reno, THD is organizing a total of three contributed paper sessions in addition to the 10 sessions organized as part of the ATH'14 embedded topical meeting.

For the ANS meeting general program, we received a total of 22 summaries, out of which, based on the reviewer recommendations, a total of 19 summaries are expected to be presented at this Annual Meeting. Again, let us take this opportunity to thank the session organizers and the reviewers for their wonderful efforts: over 80 reviews were completed for this annual meeting. These sessions, in chronological order, are:

- Experimental Thermal Hydraulics [Mon. p.m.]
- Computational Thermal Hydraulics [Wed. p.m.]
- Thermal Hydraulics: General [Thu. a.m.]

The 2014 Winter Meeting will be held in Anaheim, CA. For that meeting our division is planning to sponsor six summary sessions:

- 18a. General Thermal Hydraulics
- 18b. Computational Thermal Hydraulics
- 18c. Experimental Thermal Hydraulics
- 18d. State of the Art in Modeling Fuel Rod Ballooning, Fuel Relocation and High Burnup Issues in LOCA Evaluation Models
- 18f. Experimental Capabilities in Support of Thermal Hydraulics
- 18i. Subchannel Thermal Hydraulic Analysis

In addition to these sessions, a Young Professional Thermal Hydraulics Competition session is being organized by Dr. Rui Hu (ANL), Prof. Wade Marcum (Oregon State University) and Prof. Philippe Bardet (George Washington University). The individual call for papers is available at <http://thd.ans.org/YPTHRC14.pdf>.

In addition to the paper sessions, two panel session are also planned:

- 18g. Thermal Hydraulics Analyst 2.1

18h. Experimental Support for System Code Development and Validation: IETs and SETs

The Thermal Hydraulics Analyst panel session is being organized as a follow-up to last year session at the ANS Winter meeting 2013, which gathered considerable attention. The focus of the session is on the impact that advanced modeling and simulation has or will have on the thermal-hydraulics profession and training. The website (<http://epsr.ans.org/meeting/?m=137>) is open for submission of summaries. The published deadline for the submissions is June 13, 2014.

The 10th International Topical Meeting on Nuclear Thermal Hydraulics, Operation and Safety will be held December 14-18, 2014 in Okinawa, Japan. Please see the conference website <http://www.nuthos10.org/>

The 16th Internal Topical Meeting on Nuclear Reactor Thermal Hydraulics will be held in Chicago from August 30-September 4, 2015. A call for papers is attached to this newsletter. More details about the conference will be available at <http://nureth16.anl.gov/>.

In Reno, NV next month, the THD Program Committee meeting will be held on Sunday June 15, 2014, starting at 2:30 p.m in room Crystal 2. Anyone interested in the program committee activities are invited to participate.

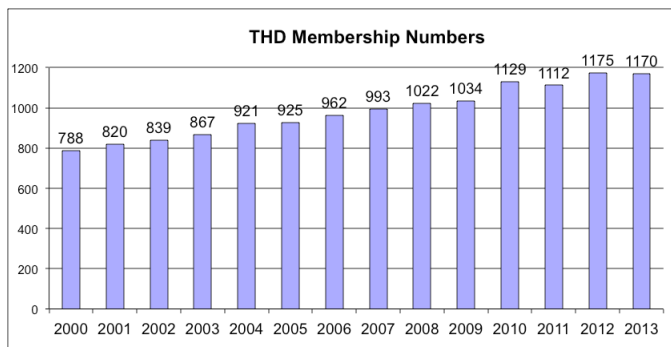
Finally, we would like to express our gratitude to all of the colleagues who devote your time to the Division's activities. Thanks to your dedicated efforts, we are able to put together strong programs at many meetings. These meetings remain as the prominent venue for scientific information exchange in the thermal-hydraulics community. As always, we would like to encourage our members to actively participate by attending our meetings, submitting papers/summaries, volunteering to organize sessions, and supporting the peer-review of the papers. We look forward to many more successful years.

Xiaodong Sun, Ohio State University
2013-14 Program Committee Chair - ANS Thermal Hydraulics Division

Elia Merzari, Argonne National Laboratory
2013-14 Program Committee Assistant Chair - ANS Thermal Hydraulics Division
PCChair@thd-ans.org

Membership Committee Report

While the membership in the ANS has been showing some signs of leveling off in recent years, the membership in the THD has been moderately increasing. From December 2008 to December 2013, the paid ANS membership increased from 10,938 to 11,083, representing a 1.3% increase. For the same time period, the paid THD membership had a 14.5% increase, from 1,022 in 2008 to 1,170 in 2013. It is worth noting that the paid THD student membership increased, for the same period, from 152 to 231, representing a 52% increase. However, there is a slight decrease in the THD's total paid membership in December 2013 (1,170) as compared to that in December 2012 (1,175). Currently, our Division's paid membership stands at 1,011, as of the end of March 2014. As a comparison, THD had 1,004 paid members by the end of March 2013. We expect our division's paid membership number to be close to last year's number by the end of the year. The chart below presents our current membership trend.



The THD cordially invites you to become a member of the Division and participate in the Division's activities. Current activities of the Division include paper review, paper presentation, organizing and chairing technical sessions, sponsoring topical meetings, serving on the various subcommittees, including the very active program and honors and awards committees, and supporting student conferences. If you are interested in becoming a member, you can contact ANS membership directly. If you are currently a member and interested in any of the above activities, please contact any of the THD Officers.

Xiaodong Sun, Ohio State University
2013-2014 Membership Committee Chair – ANS Thermal Hydraulics Division
sun.200@osu.edu

Treasurer's Report

2014 Income and Balance

Revenue from 2014 THD member allocation:
\$586 (Actual 3 months as of March 31, 2014)
Balance forward from 2013:
\$17,706
Estimated balance as of May 27, 2014:
\$16,992

2014 Division Budget (\$4,800)

The THD Executive Committee approved the following budget at the 2013 Winter Meeting:

Awards and plaques:	\$1,800
Donation to Scholarship/NEED:	\$500
Student support:	\$2,500, includes
\$500 for ANS-national directed support of student travel to Annual/Winter meetings	
\$500 for 2014 ANS Student Conference	
\$1,500 of THD-directed student travel support for 2014 Annual and Winter meetings (including the embedded topical).	

2014 Expenses (\$1,300)

THD expenses occurred in 2014 as of May 27 are as follows:

Awards / Plaque:	\$ 0
Donation to Scholarship/NEED:	\$ 500
Student support:	\$ 800, includes
\$500 for 2014 ANS Student Conference;	
\$300 THD-directed student travel support for two students who traveled to 2014 ANS Student Conference (This is to substitute partly for \$1,500 budgeted for THD-directed student travel support for 2013 Winter Meeting which did not occur)	
Currently, there are three students who applied for 2014 THD-directed student travel support for 2014 ANS Annual Meeting (including ATH '14).	
Other expenses:	\$ 0
Total expenses:	\$1300

Seungjin Kim, The Pennsylvania State University
2013-2014 Treasurer - ANS Thermal Hydraulics Division
skim@psu.edu

Nominating Committee Report

Current Division Officers and Executive Committee members are listed below.

Current Year THD Officers (June 2013 – June 2014)

Division Chair

David Aumiller, dla12@pitt.edu

Vice Chair/Chair-Elect

Si Young Lee, si.lee@srnl.doe.gov

Secretary

DuWayne Schubring, dlschubring@ufl.edu

Treasurer

Seungjin Kim, skim@psu.edu

Executive Committee Members (June 2013 – June 2014)

David Aumiller (2014)	dla12@pitt.edu
Fan-Bill Cheung (2014)	fxc4@psu.edu
Yassin Hassan (2014)	y-hassan@tamu.edu
Jong Kim (2014)	jongkim@mail.kaist.ac.kr
Si Young Lee (2014)	si.lee@srnl.doe.gov
DuWayne Schubring (2014)	dlschubring@ufl.edu
Xu Cheng (2015)	xu.cheng@kit.edu
Francesco D'Auria (2015)	francesco.dauria@dimnp.unipi.it
Takashi Hibiki (2015)	hibiki@purdue.edu
Seungjin Kim (2015)	skx86@psu.edu
Kurshad Muftuoglu (2015)	kurshad.muftuoglu@ge.com
W. David Pointer (2015)	pointerwd@ornl.gov
Chul-Hwa Song (2015)	chsong@kaeri.re.kr
Igor Bolotnov (2016)	igor_bolotnov@ncsu.edu
Lane B. Carasik (2016)	lcarasik@tamu.edu
Elia Merzari (2016)	emerzari@anl.gov
Michio Murase (2016)	murase@inss.co.jp
Don Todd (2016)	donaldtodd@numerical.com
Xiaodong Sun (ex-officio)	sun.200@osu.edu
Hans Gougar*	Hans.Gougar@inl.gov

*Chair of the ANS Professional Divisions Committee, ex-officio member without vote

Committee Chairs (June 2013 – June 2014)

Program Committee

Xiaodong Sun, sun.200@osu.edu

Honors and Awards Committee

Karen Vierow, vierow@tamu.edu

Nominating Committee

Xiaodong Sun, sun.200@osu.edu

Membership Committee

Xiaodong Sun, sun.200@osu.edu

Incoming THD Officers (June 2014 – June 2015)

Division Chair

Si Young Lee, si.lee@srnl.doe.gov

Vice Chair/Chair-Elect

DuWayne Schubring, dlschubring@ufl.edu

Secretary

Seungjin Kim, skim@psu.edu

Treasurer

Kurshad Muftuoglu, kurshad.muftuoglu@ge.com

New/Re-elected Executive Committee Members

Si Young Lee (2015)	si.lee@srnl.doe.gov
DuWayne Schubring (2015)	dlschubring@ufl.edu
Fan-Bill Cheung (2017)	fxc4@psu.edu
Paolo Ferroni (2017)	ferronp@westinghouse.com
Donna Post Guillen (2017)	donna.guillen@inl.gov
Jong Kim (2017)	jongkim@mail.kaist.ac.kr
Wade R. Marcum (2017)	wade.marcum@oregonstate.edu
David Aumiller (ex-officio)	dla12@pitt.edu

The Nominating Committee is responsible for the nomination of THD members to leadership positions on both the Program and Executive Committees. The THD would like to encourage members interested in becoming more involved to contact one of the officers listed above. In particular, the division is usually in need of volunteers for technical meeting session organizers and paper reviewers.

Xiaodong Sun, Ohio State University

2013-2014 Nominating Committee Chair – ANS Thermal Hydraulics Division
sun.200@osu.edu

Young Professional's Report

During the 2013 ANS Winter Meeting and Technical Expo, held in Washington D.C., the Thermal Hydraulics Division held its annual "Young Professional Thermal Hydraulics Research Competition". This competition resulted in the presentation of nine high quality summaries from four unique organizations. The winner of this closely scored pool of research competition candidates went to George Washington University's Matthieu Andre. Mr. Andre's award was received as a result of his presentation on "Experimental Interface Tracking Method and Gas Entrainment in Liquid Flows". The quality and quantity of presentations clearly demonstrates that this annual event has maintained itself as a successful opportunity for young researchers within thermal hydraulics to showcase their scientific and engineering efforts.

The session chairs of the Young Professional Thermal Hydraulics Research Competition (Wade Marcum and Rui

Hu), would like to extend their gratitude to the numerous volunteers who diligently evaluated all research presentations. A new Young professional research competition, co-sponsored by the ANS Young Members Group, is planned for the 2014 Annual Meeting in Anaheim, CA. The individual call for papers is available at <http://thd.ans.org/YPTHRC14.pdf>. The deadline to submit contributions is June 13, 2014. For more information about this session, contact: Rui Hu (rhu@anl.gov), Wade Marcum (Wade.Marcum@oregonstate.edu) or Philippe Bardet (bardet@gwu.edu).

The Young Members Group (YMG) is a division of the American Nuclear Society (ANS). YMG provides young professionals with opportunities to expand their technical knowledge and network with internationally recognized authorities and industry leaders. Part of YMG's mission is to collaborate with other Divisions and Groups in developing technical and non-technical content of particular interest to young professionals for topical and national meetings (for more information on YMG's mission check <http://ymg.ans.org/about-us/our-mission/>).

Among the many activities that are currently ongoing with YMG are: the planning for the Young Professionals Congress 2015 (to be held November 8-12 2015 in Washington, DC), initiatives to foster mentorship within the Society and young member division involvement, and a new scholarship to honor the late Hans Loewen (http://ymg.ans.org/wp-content/uploads/2014/05/news_spring_2014.pdf). We are also looking for ways to improve our communication strategy: YMG is currently looking for a Social Media Chair to promote the activities of the group in social media. If you are interested in this opportunity or any activities of YMG please contact Elia Merzari at emerzari@anl.gov.

Wade Marcum and Elia Merzari
Wade.Marcum@oregonstate.edu and emerzari@anl.gov

Student Activities Report

Annual Meeting Student Program Guidelines

The new program provided an opportunity for more students to participate at the winter meeting. Some stats worth stating about the new program from the winter meeting:

1. 115 students signed up for the program at the winter meeting
2. 94% of student were able to find enough opportunities to fulfill the requirements.
3. 50% of students attended a committee meeting that they would not have with the old program.

The new program is felt to be a success by the Student Section Committee and will be continued.

ANS 2014 Penn State Student Conference

The 2014 student conference had 22 students present podium presentations over their research related to thermal hydraulics and 2-3 students present posters. The full listing of student presentations is here: http://meetings.ans.org/student2014/Abstracts/Program_2014.pdf.

ANS 2015 Texas A&M Student Conference

The 2015 student conference will be held at Texas A&M University on April 9-11, 2015. Additional information on the conference will be provided at the summer meeting.

Lane Carasik
2013-2014 Executive Committee Member – ANS Thermal Hydraulics Division
lcarasik@tamu.edu

Web Page Report

The official website of the ANS Thermal Hydraulics Division is located at <http://thd.ans.org>. The THD committee membership and minutes, conference announcements, newsletters, and awards are all updated as they change throughout each year. The website is meant to provide up-to-date information on the division's activities. Recent announcements include the 2014 Young Professional Thermal Hydraulics Research Competition announcement, call for papers to the TH Topical Meeting on Advances in Thermal Hydraulics announcement, and an announcement for NUTHOS-10 and NURETH-16, respectively.

Moreover, the division continues to maintain an online directory of members who are or have been active in division activities at <http://thd.ans.org/people.html>. To update your information or to be included in this directory, please contact the THD Webmaster.

Wade Marcum, Oregon State University
Webmaster – ANS Thermal Hydraulics Division
wade.marcum@oregonstate.edu

August 30—September 4, 2015
Hyatt Regency, Chicago, Illinois, USA

FIRST CALL FOR PAPERS

Honorary Chair		Assistant Technical Program Chairs	
Prof. Y. Hassan	Texas A&M University	Prof. S. Bilbao y Leon	Virginia Commonwealth University
General Chairs		Dr. E. Merzari	Argonne National Laboratory
Prof. M. Corradini	University of Wisconsin	Dr. W. D. Pointer	Oak Ridge National Laboratory
Prof. H. Ninokata	Politecnico di Milano	Steering Committee Chair	
Technical Program Chairs		Dr. M. Peters	Argonne National Laboratory
Prof. X. Sun	The Ohio State University	Local Organizing Committee Chair	
Prof. H. C. No	KAIST	Dr. R. Klann	Argonne National Laboratory
Prof. N. T. Dinh	North Carolina State University		

Paper Deadlines

Abstract Submission – **11/15/2014**
(Submission window opens 08/01/2014)
Abstract Acceptance – **12/31/2014**
Draft Full-Length Paper Submission – **02/28/2015**
Review Notification – **04/30/2015**
Final Paper – **05/31/2015**

The page limit for NURETH-16 papers is **14 pages**.

Selected papers will be published in a special edition of *Nuclear Technology* and *Nuclear Science and Engineering* journals.

About the Meeting

The Chicago Local Section of the American Nuclear Society (ANS) is pleased to host the **16th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-16)** at the Hyatt Regency Chicago from August 30 – September 4, 2015.

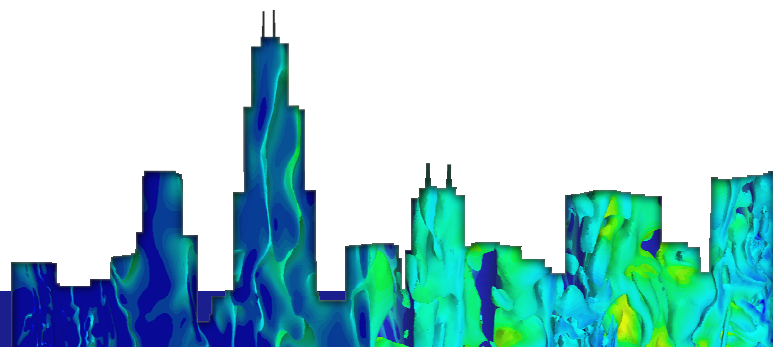
Chicago is one of America's greatest cities, and one of the most easily accessible destinations in the U.S. for

travelers from around the world due to its central location. Chicago has a proven history of hosting past ANS meetings, including the 2012 Annual Meeting.

NURETH-16 attendees will be a short distance from Chicago attractions, such as Navy Pier, architectural boat tours, theatrical and musical entertainment, and countless dining and shopping options.

Building on the foundation of past meetings, including NURETH-15 in Pisa, Italy, NURETH-16 will invite experts in the field of thermal hydraulics from around the world to share their research and discuss important issues related to nuclear reactor thermal hydraulics.

NURETH-16 will also be a venue for organizations to showcase their expertise in nuclear reactor technology, with several opportunities for meeting sponsors to exhibit their products and services to the nuclear reactor thermal-hydraulics community.



Basic Thermal Hydraulics

- Two-Phase Flow and Heat Transfer Fundamentals, Including Experimental Thermal Hydraulics and Instrumentation
- Boiling and Condensation Fundamentals
- Multifield Two-Phase Flow Modeling
- Flow-Induced Vibration in Reactor Components
- Supercritical Fluids Thermal Hydraulics and Heat Transfer
- Interfacial Area Transport (Data base, Modeling, Measurement Techniques)
- Microscale and Nanoscale Phenomena
- Natural Circulation, Passive Safety Systems and Related Phenomena
- Subchannel Fluid Dynamics and Heat Transfer
- Experimental Measurement Techniques and Flow Visualization

Code Development Including Numerics (System TH and CFD)

- Computational Fluid Dynamics (DNS, LES, RANS, etc.)
- Computational Multi-Fluid Dynamics
- Core Thermal Hydraulics and Subchannel Analysis
- Plant System Code Development
- Boron Dilution/Mixing
- Steam Generator Thermal Hydraulics
- Pressure Surges in Nuclear Power Plants
- Containment Analysis
- Accuracy and Uncertainty Analysis
- Fast Transient Modeling
- Enhanced Near-Wall Flow and Heat Transfer Modeling
- Fluid and Structures Mechanical Interactions
- Multiscale Multiphysics Applications in Thermal Hydraulics

Code V&V, Design and Operation of SETF Including Instrumentation

- Computational Fluid Dynamics V&V (DNS, LES RANS, etc.)
- Computational Multi-Fluid Dynamics V&V
- Core Thermal Hydraulics and Subchannel Analysis V&V
- Plant System Code Validation
- Experiments and Data Bases for Assessment and Validation (including of 3D Models)
- Boiling and Condensation Heat Transfer
- CHF and Post CHF Heat Transfer, Flooding and CCFL
- Containment Analysis
- Boron Dilution/Mixing
- Experiment Design for V&V

Operation & Safety of Existing Reactors

- Plant Life Extension and Power Up-Rating
- Instabilities and Nonlinear Dynamics
- NPP Transient and Accident Analysis
- Safety of Sodium-Cooled Reactors
- Safety of VVER Reactors
- Full Spectrum LOCA Evaluation Methodology
- BEPU Analysis and Challenges in Licensing
- Addressing Scaling Issues

Severe Accidents

- Molten Core Natural Convection and Physical-Chemical Phenomena
- Modeling and Experiments of Severe Accidents
- Natural Convection and Mixing Phenomena, Modeling and Experiments
- Fuel Coolant Interaction, Modeling and Experiments
- Direct Containment Heating by Dispersed Molten Fuel
- Debris Bed Cooling
- Combustion and Fires, Modeling and Experiments
- Advanced Design Features for Severe Accident Mitigation
- Analytical Activities on the Accident Progression and In-core Status of Fukushima Dai-Ichi Units
- Hydrogen and Fission Product Behavior

Thermal Hydraulics in Advanced Reactors

- Thermal Hydraulics in High-Temperature Gas-Cooled Reactors
- Thermal Hydraulics in Salt-Cooled High-Temperature Reactors
- Thermal Hydraulics in Sodium-Cooled Fast Reactors
- Thermal Hydraulics in Supercritical Water Reactors
- Thermal Hydraulics in Lead-Cooled and Lead-Bismuth-Cooled Fast Reactors
- Thermal Hydraulics in Small Modular Reactors

Others, Including Waste Management and Fusion Technology

Abstract Submission Website (ANS website):

www.ans.org

Questions: nureth16@anl.gov

