



Your THD Leadership Team

We all thank you for joining THD and look forward to working with you to advance our field. Please do not hesitate to reach out to anyone on the leadership team with suggestions or if you'd like to get involved.

Officers

Chair

Wade R. Marcum
Wade.Marcum@oregonstate.edu

Vice Chair/Chair-Elect

Elia Merzari
ebm5351@psu.edu

Secretary

Bao-Wen Yang
bwy01@deltenergygroup.com

Treasurer

Annalisa Manera
manera@umich.edu

Immediate Past Chair

Chul-Hwa Song
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Executive Committee

Terms Expiring June 2020

Fan-Bill Cheung
Yong Hoon Jeong
Dillon R. Shaver
Xiaodong Sun
Mathew D. Zimmer

Terms Expiring June 2021

Fatih Aydogan
Igor Bolotnov
Lane Carasik
Yassin Hassan
Robert P. Martin

Terms Expiring June 2022

Yang Liu
John Luxat
Hiashi Ninokata
Piyush Sabharwal
Caleb Brooks

Standing Committees

Technical Program Chair

Igor Bolotnov

Honors & Awards Chair

Seungjin Kim

Webmaster

Marilyn Delgado

YMG Liaison

Mathew D. Zimmer

A Message from the Chair

Dear Friends and Colleagues,

Optimism and Opportunity – I believe these two words reflect well the state our Division, Society and Industry at the moment. In spite of the additional barriers that our community has experienced over the past year, we have come together, continuing to support the mission of the American Nuclear Society through the advancement and promotion of nuclear science and technology.

Our Society has hosted two fully virtual national conferences and will host its third in June of 2021 at the 2021 ANS Virtual Annual Meeting. Following federal and state guidance, the Society plans on hosting its first in-person national meeting in over a year at the 2021 ANS Winter Meeting and Technology Expo. The THD technical program represents a robust and diverse collection of presentations 39 summaries and presentations across eight technical sessions in addition to two panels on “Challenges and Opportunities in Thermal Hydraulics of Load-Following Nuclear Systems”, and “Thermal Hydraulics Research in ARPA-E Programs”.

We continue to post relevant and upcoming information on our division's website and are providing all documentation relevant to our program and executive committee meetings there as well to ease access for all those that would like to participate. Our Program Committee and Executive Committee meetings for the Annual Meeting will take place on Sunday June 13, 2021 from 3:00-5:00 pm EDT and from 5:00-6:30 pm EDT, respectively. I hope to see you there.

In addition to the ANS National Conferences, we continue to support the organize our international topical meetings, such as NURETH-19, planned for March of 2022 and NUTHOS-13, planned for September 2022. The Division would also like to draw your attention to the **call for proposal to host NURETH-20**, to take place in 2023. If you are interested or if you



know of a good candidate please feel free to reach out to the points of contact noted on the call for proposals for further information.

Leveraging our Division's strong membership and ushering in a cohort of next-generation thermal hydraulicists, we continue to grow our division-sponsored scholarship opportunities. Additionally, we have recently established new division honors recognizing the recently passed Dr. Bal Raj Segal. Please consider application nominees by submitting package information through the ANS honors and awards site. And we have adjusted our honorarium for the Division's technical achievement award.

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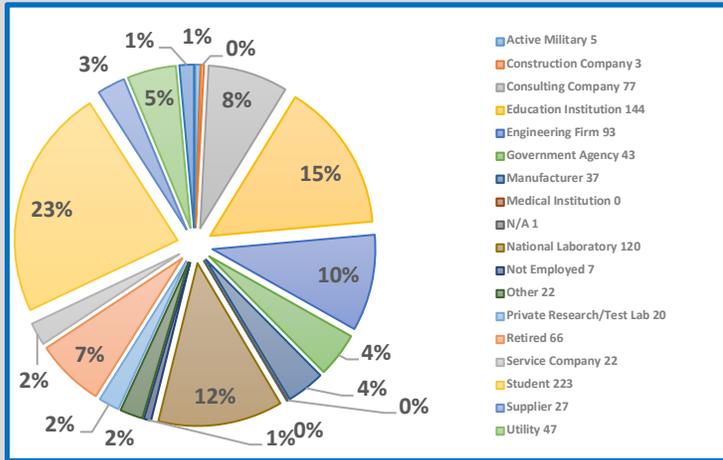
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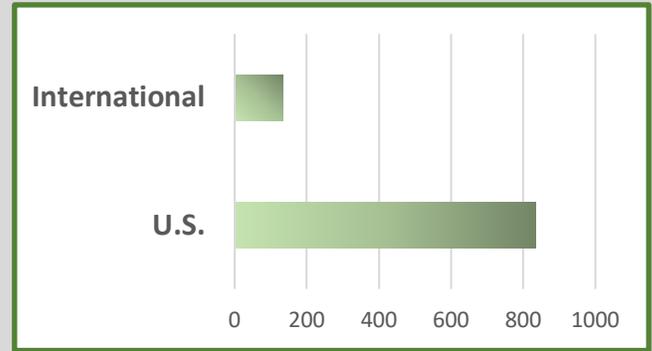
Membership Committee Report

Membership of the ANS Thermal Hydraulics Division is tracked based on membership renewals and applications submitted during each calendar year. The data from early 2021 indicate a total of 971 members. Continued membership support is vital to our furthering the mission of our division. We note that, while this is a considerable drop in membership compared to the latest 2020 number, this is not unusual at this time of the year. All THD members are encouraged to contribute to the THD-sponsored meetings, encourage colleagues to join ANS and THD, and to participate in THD governance as their time permits.

Chul-Hwa Song
 Membership Committee Chair
 THD Membership Committee Chair (2020-2021)
 chsong@kaeri.re.kr



THD membership by industry



THD membership: U.S. and international

Message from the Chair, cont.

On behalf of the executive committee members, I thank you all for your continued involvement and dedication toward the Division and wish you a productive Spring and Summer. I hope to see you all at the ANS Annual Meeting virtually and the winter meeting when we are able to join in-person. It has been an honor to serve as the Chair of the Thermal Hydraulics Division Executive Committee; I look forward to the strong leadership of our incoming Chair – Prof. Elia Merzari.

Wade R. Marcum
 ANS 2020-2021 THD Chair
 wade.marcum@oregonstate.edu

Technical Program Committee Report

The strong THD presence at the ANS national meetings continues during the global pandemic and transitioning to virtual meeting format.

As the world deals with COVID-19 the 2021 Annual Meeting will be held in virtual format as well. Despite that, THD have a very impressive program planned for the June event.

A total of **40** summaries were submitted, out of which, based on the reviewer recommendations, a total of **39** summaries are expected to be presented at this Annual Meeting. Again, let us take this opportunity to thank the session organizers and reviewers for their efforts: 136 reviews were completed for this Annual Meeting (on average, about 3.4 reviews per paper). All 10 sessions sponsored by THD are listed on the right. One of those sessions (on VTR and TCR) is co-sponsored with RPD. The links to connect to each session will appear on the Annual Meeting website 30 minutes before the session start for registered conference participants.

The submission website for the 2021 ANS Winter Meeting is now open and the summaries are due July 12th, 2021. This meeting is currently planned to be held in Washington, DC in November 30 – December 4, 2021. THD is again offering a vibrant program with 14 sessions (including two panels):

1. High Performance Computing applications in TH [P]
2. TH issues in Licensing of Advanced Reactors [P]

2021 ANS Annual THD Technical Sessions June 14-16, 2021

Session	# of papers	Time Slot (ET)
Computational Thermal Hydraulics – I	5	Monday 1pm
General Thermal Hydraulics and Heat Transfer Fundamentals	5	Monday 3:15pm
Challenges and Opportunities in Thermal Hydraulics of Load-Following Nuclear Systems	Panel	Tuesday Noon
Thermal Hydraulics Research in ARPA-E Programs	Panel	Tuesday 2:15pm
Thermal Hydraulic R&D Activities in Printed-Circuit Steam Generators for Advanced Nuclear Reactors	6	Tuesday 4:30pm
Thermal Hydraulics Research in VTR and TCR Programs	5	Tuesday 4:30pm
Thermal Hydraulics for Advanced Reactors	5	Wednesday Noon
Computational Thermal Hydraulics - II	5	Wednesday 2:15pm
Experimental Thermal Hydraulics	5	Wednesday 4:30pm
Computational Thermal Hydraulics - III	3	Wednesday 4:30pm

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3. Computational Thermal Hydraulics
4. Experimental Thermal Hydraulics
5. General Thermal Hydraulics
6. Two-phase Flow and Heat Transfer Fundamentals
7. Young Professional Thermal-hydraulic Research Competition
8. Advanced Reactor Thermal Hydraulics
9. Advancements in Experimental Thermal Hydraulics
10. Application of Digital Twins for Thermal Hydraulics
11. TH Applications in the Advanced Reactor Demonstration Program
12. Thermal Hydraulics for SMR and Micro-Modular Reactors
13. Thermal Hydraulics Research and Development in the VTR (co-sponsored with RPD)
14. Thermal Hydraulics Research in the TCR (co-sponsored with RPD)

At the 2021 ANS Virtual Annual Meeting, the THD Program Committee meeting will be held on Sunday June 13th, 2021, starting at 3:00 pm (EDT)

(<https://www.ans.org/meetings/am2021/calendar/event-134/>). Anyone interested in the Program Committee activities is invited to participate.

Finally, we would like to express our gratitude to all of the colleagues who devote their 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 paper summaries, volunteering to organize

sessions, and supporting the peer-review of the papers.

Igor A. Bolotnov
NC State University
THD PC Chair

Dillon Shaver
Argonne National Lab

NUTHOS-13

September 5-9 2022
Taichung, Taiwan

See more information in the following page!

19th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-19)

March 6-11 2022 • Brussels, Belgium

With vaccination programs in place all over the world, we look forward to the organization of the NURETH-19 conference in March 6-11, 2022. The response to our call for abstracts was overwhelming. We received well **over 1000 high-quality abstracts**. All authors are now asked to submit their draft papers for peer review ultimately by the end of June. We continue to look forward to hosting you in Brussels very soon.

Lead the Flow. SCK CEN and the von Karman Institute, in collaboration with NRG and ANS, are hosting the 19th International Topical Meeting on Nuclear Reactor Thermal Hydraulics in Brussels, Belgium. Brussels is more than the capital of Belgium: it is the vibrant heart of Europe. In Brussels cultures swirl together in a creative mix of art de vivre, know-how, heritage and surrealism.

With more than 1000 abstracts submitted, the Technical Program Committee is confident in developing an attractive program. Additionally, we have received confirmation on fifteen high-level keynotes. Students and young professionals are challenged to present their innovative research in the best poster contest. All participants can send in their most stunning CFD simulation or experiment recording for the movie competition. More information on these competitions with a deadline of November 30, 2021 is available at the conference website www.nureth19.com.

The meeting will start with pre-conference workshops on Sunday morning (see the "Workshops" tab on our website for a tentative program) and will officially kick-off on Sunday evening with a Welcome reception. The technical program will run from Monday to Thursday. Special events are planned like a traditional conference dinner in a location of architectonic heritage, a social event for young professionals and students, and an atomic jogging in the royal park with reference to "mens sana in corpore sano". On Friday, technical tours to research facilities and high-tech industrial plants are planned. Can you already feel the positive energy? We do and we are ready to welcome you!

NUTHOS-13

NUTHOS-13 will be held in Taichung, Taiwan, from September 5th to 9th, 2022, with the Chun Hua Nuclear Society (CHNS) being the host sponsor of the conference. The theme of the conference will be “**Advancing the Sustainable Development of Nuclear Energy.**” The co-sponsors of the conference include the American Nuclear Society, Atomic Energy Society of Japan, Canadian Nuclear Society, Chinese Nuclear Society, and Korean Nuclear Society.

Hosting NUTHOS-13 in 2022 is very special to the nuclear engineering community in Taiwan. Having the 13th NUTHOS conference held in Taiwan allows us to demonstrate that nuclear power is adopted by many countries worldwide as an important vehicle to fight global climate changes and that we have the support of the nuclear community around the world. Taichung is a lively industrial city, with a population of about 3 million, on the western side of central Taiwan. In the bustling city center are museums, temples, the ornate brick Taichung Station, and National Taichung Theater (an opera house) designed by Japanese architect Toyo Ito. On behalf of the NUTHOS-13 organizing team, we look forward to your participation in the conference.

Prof. Min Lee
NUTHOS-13 General Chair
National Tsing Hua University
mlee@ess.nthu.edu.tw

Nominating Committee Report

The goal of the THD Nominating Committee is to nominate members for division committees, including division officers. The current nominating committee members serving 2020-21 term consists of Chul-Hwa Song (Chair), Wade R. Marcum, Elia Merzari, and Igor Bolotnov (ex-officio, without Vote). The Nominating Committee is happy to report THD officials who are elected to serve 2021-22 term include: Elia Merzari (Chair), Bao-Wen Yang (Vice Chair/Chair Elect), Annalisa Manera (Secretary), and Igor A. Bolotnov (Treasurer). The Nominating Committee would like to recognize members of Executive Committee (EC) whose terms expire at the conclusion of 2021 ANS Annual Meeting in June. They are: Fan-Bill Cheung, Yong Hoon Jeong, Matt Zimmer and Chul Hwa Song (Ex-officio, as immediate past chair). We would also like to welcome new EC members who will begin their three-year terms in 2021. They are: W. David Pointer, Xiaodong Sun, Dillon Shaver, Hyoung Kyu Cho, and Musa Moussaoui.

Detailed composition of other Division standing committees, such as Honors and Awards Committee, Scholarship Committee, Conference Screening

Honors and Awards Committee Report

The 2020 Thermal Hydraulics Division Technical Achievement Award (TAA) is awarded to Dr. Michael Z. Podowski (see photo), Professor of Nuclear Engineering at Rensselaer Polytechnic Institute (RPI). He is recognized for his significant contributions toward nuclear reactor



thermal-hydraulics, including: BWR stability analysis, Multiphase Computational Fluid Dynamics (MCFD), mechanistic modeling of boiling heat transfer, and severe accidents, among many other research areas. The citation on his award plaque reads: “**For his ground-breaking technical accomplishments in the modeling and computer simulation of single and multiphase flow and heat transfer.**” Professor Podowski will be delivering a lecture concerning his TAA award at a future ANS conference.

The 2020 THD Best Paper Award was awarded to Grant Robert Garrett (Pennsylvania State University, PSU), Faith Rose Beck (PSU), Douglas J. Miller (PSU), Brian Lowery (PSU), Fan-Bill Cheung (PSU), Stephen M. Bajorek (U.S. Nuclear Regulatory Commission, U.S. NRC), Chris L. Hoxie (U.S. NRC), and Kirk Tien (U.S. NRC) for their paper titled “**Pressure and Oscillatory Effects on the Two-Phase Flow and Heat Transfer in a Rod Bundle**” submitted to the International Topical Meeting on Advances in Thermal Hydraulics 2020 (ATH’20).

Prof. Seungjin Kim
Purdue University
THD H&A Committee Chair (2020-2021)
seungjin@purdue.edu

Committee, and Program Committee, can be found in the Division 2020 winter EC meeting minutes.

On behalf of the Nominating Committee, I thank all of our new officials and committee members for their service to the Division in the next years along with all of those rolling off the committee for their past services.

Chul-Hwa SONG
Nominating Committee Chair (2020-2021)
chsong@kaeri.re.kr; chs7266@gmail.com

Nominations sought for new awards

A reminder that THD has recently created two new awards. **We are now accepting nominations!** Following is a brief description of both awards. *For more information see: <https://www.ans.org/honors/>*

The *Bal-Raj Sehgal Memorial Award* recognizes an early-career to a mid-career individual for his/her exceptional and/or sustained contributions to the thermal-hydraulics field with a particular focus on the application of thermal-hydraulics to nuclear reactor safety. The award consists of an engraved plaque and a monetary award of \$2,000. It is awarded every two years and presented at the nearest NURETH conference to arrive. **The next deadline for nominations is August 1st, 2021.** The recipient is expected to deliver a keynote lecture at the NURETH conference at which the award is presented in coordination with the conference organizers.

A highly visible and respected world leader in thermal hydraulics and nuclear safety research, Professor Sehgal was a fixture at the NURETH conferences with which he had a special affinity, regularly invited to deliver keynote or plenary lectures. While he would engage in serious technical discussions with his peers and colleagues, he would often be seen interacting with the younger generations to transfer his considerable knowledge and experience. He was active in THD affairs, serving as THD Division Chair and receiving the Thermal Hydraulics Technical Achievement Award.

Dr. Sehgal was an outstanding scientist and researcher, a great teacher and mentor, a prolific author (360 articles), and a tireless servant to the community. During the course of his career, he was inducted into numerous societies and academies, notably as elected member of the Swedish Royal Academy of Engineering Sciences, the U.S. National Academy of Engineering, and the Lithuanian Academy of Sciences, and Fellow of the American Nuclear Society and the American Society of Mechanical Engineers. For his wide-ranging and impactful contribution to research and science of nuclear safety, he was recognized with numerous awards, including the Seaborg Medal, the Technical Achievement Award, and the Thomson Award for Reactor Safety from the American Nuclear Society. The *Bal-Raj Sehgal Memorial Award*, established in collaboration with his family, honors his legacy.

The *Thermal Hydraulic Meritorious Service Award* recognizes an individual for sustained and exemplary service to the nuclear thermal-hydraulics profession.

Webmaster Report

As it is now more than a year that the American Nuclear Society has been conducting conferences virtually, the website is continually updated to provide a platform for THD members access to important documents. It has also provided an opportunity for documents from previous Executive Committee Meetings to be stored and revisited if the need arises. The website will continue to provide support to the committee for meetings but is also a platform for information for upcoming meetings as events open back up to in-person attendance. As this year's ANS Annual Meeting will still be held virtually, the website is expected to see similar traffic as last year and hopefully attract new members and interest from the ANS community.

Ms. Marilyn Delgado
Texas A&M University
THD Webmaster
mdelgad17@tamu.edu

Service can be in the form of: (1) Leadership in the THD of ANS. (2) Leadership in national and international research and engineering programs related to thermal hydraulics. (3) Individual non-technical contributions that lead to the betterment and growth of the profession as a whole. (4) Educational contributions aimed at the next generation of thermal-hydraulics engineers. (5) Advocacy for thermal-hydraulic research and development.

Emphasis is placed on sustained, well-recognized, service contributions over a number of years but single exceptional one-time contributions may also be considered. The award consists of an engraved plaque and a monetary award of \$1,000. It is presented at the ANS Annual Meeting. **The next deadline for nominations is March 1st, 2022.**

Please consider nominating yourself or a colleague for these awards.

Elia Merzari
Pennsylvania State University
THD Vice-Chair (2020-2021)
ebm5351@psu.edu

Financial Report

The budget for 2021 is was approved at the June meeting last year. As shown in the attached Table 1 for all three award funds,

1. The TAA award account started at a fund level of \$35,881, with incomes from investment gain (\$7,255, a 20.22% annual gain) and division designated fund transfer (\$8,192 transferred from the general account), after deducting \$1,000 for TAA award and \$72.5 for the plaque, the expected budget balance will be **\$50,255** (not account for the investment gain/loss in 2020). This new balance will raise the spending limit to \$2,472.55 (4.92%) sufficient to support the increase of TAA award from \$1,000 to \$2,000.

Table 1: ANS THD Awards Funds

	Hochreiter	TAA	Services
Balance Forward from 12/31/2018 Year	\$ 63,000	\$ 35,881	\$ -
Budget Funds			Starting 2020
Investment Gain (up to 12/31/2019)	\$ 12,739	\$ 7,255	\$ -
Division Designated (2020)		\$ 8,192	\$ 21,000
Total Income	\$ 12,739	\$ 15,447	\$ 21,000
Budget Expenses			
Awards	\$ -	\$ 1,000	\$ -
Plaques	\$ -	\$ 73	\$ -
Other Expenses	\$ -	\$ -	\$ -
Total Expenses	\$ -	\$ 1,073	\$ -
Net	\$ 12,739	\$ 14,374	\$ 21,000
Total Year End Funds	\$ 75,739	\$ 50,255	\$ 21,000
Spending Limit (4.92)	\$ 3,726	\$ 2,473	\$ 1,033

Table 2: ANS THD Budget (June 6, 2020)

	2019	2019		2020		2021
	Budget	Actual through 12/31/2019	Approved Budget	Actual through 3/31/2020	Proposed Budget	
Balance Forward from Previous Year	\$ 51,459	\$ 51,459	\$ 87,682	\$ 72,984	\$ 43,698	
Budget Funds						
Member Dues Allocation (\$2/ full-member; \$1 reduced-member)	\$ 2,300	\$ 1,325	\$ 2,300	\$ 406	\$ 2,300	
Student Support (ANS Change Plan)	\$ -	\$ -	\$ -	\$ -	\$ 3,000	
Division Income	\$ 39,173	\$ 25,054	\$ -	\$ -	\$ -	
Total Income	\$ 41,473	\$ 26,379	\$ 2,300	\$ 406	\$ 5,300	
Budget Expenses						
Newsletters, Website	\$ -	\$ -	\$ -	\$ -	\$ -	
Awards & Plaques	\$ 1,250	\$ 851	\$ 1,250	\$ -	\$ 645	
Dispersement to Award Funds	\$ -	\$ -	\$ -	\$ 29,192	\$ -	
National Meeting Costs	\$ -	\$ -	\$ -	\$ -	\$ -	
Topical Meeting Costs	\$ -	\$ -	\$ -	\$ -	\$ -	
Division Officer Expenses	\$ -	\$ -	\$ -	\$ -	\$ -	
Student Support	\$ 3,500	\$ 3,000	\$ 2,500	\$ 500	\$ 2,500	
Future Activity	\$ -	\$ -	\$ -	\$ -	\$ -	
Scholarship/NEED Funding	\$ 500	\$ 1,000	\$ 500	\$ -	\$ 500	
YMG Support	\$ -	\$ -	\$ -	\$ -	\$ -	
Other Expenses	\$ -	\$ 3	\$ -	\$ -	\$ -	
Total Expenses	\$ 5,250	\$ 4,854	\$ 4,250	\$ 29,692	\$ 3,645	
Net	\$ 36,223	\$ 21,525	\$ (1,950)	\$ (29,286)	\$ 1,655	
Total Year End Funds	\$ 87,682	\$ 72,984	\$ 85,732	\$ 43,698	\$ 45,353	

2. With the investment gain of \$12,739 (20.22% gain), the Lawrence Hochreiter scholarship account reaches a new balance of \$75,739, not including the investment gain/loss in 2020.
3. The newly established Service Award fund was set up with a disbursement of \$21,000 from the General account, which will allow a pending limit of \$1,033 (4.92%).
4. There were two major movements in the general account: an income of \$25,054 (thanks to the generous contribution from NUTH-18) and a major disbursement of \$29,192 to the award funds (\$21,000 to fund the service award, and \$8,192 to support the increase of TAA fund). The general account has new balance of \$43,792 (see Table 2).

Annalisa Manera
THD Treasurer (2020-2021)

June 2021
ANS Thermal Hydraulics
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Elia Merzari, Editor
THD Vice Chair (2020-2021)
<http://thd.ans.org>



American Nuclear Society
Thermal Hydraulics Division