

Thermal Hydraulics

Professional Division

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 Vice-Chair: Igor Bolotnov
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 Treasurer: Ferry Roelofs
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 Immediate Past Chair:
 Bao-Wen Yang
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Executive Committee

Terms expiring 2024:

Xiaodong Sun
 Dillon Shaver
 W. David Pointer
 Hyoung Kyu Cho
 Musa Moussaoui

Terms expiring 2025:

Yassin Hassan
 Maria Avramova
 Jun Liao
 Bob Martin
 Marilyn Delgado

Terms expiring 2026:

Fan-Bill Cheung
 Chul-Hwa Song
 Izabela Gutowska
 Donna P. Guillen
 Ling Zou

A Message from the Chair

Dear colleagues,

It has been an honor to serve as Chair of our Division for the 2023-2024 term. I want to express my heartfelt gratitude to the division colleagues for all their support.

We continue to live in exciting times with rapid advancements in nuclear energy worldwide. I am very pleased to share that our membership has reached its highest number in several years, reversing the declining trend we observed last year. Notably, we have seen a significant increase in student memberships. To further engage our younger members, we will be launching a THD monthly webinar series focused on educational topics in nuclear reactors thermal-hydraulics. I extend my sincere thanks to Marilyn Delgado for her leadership in this initiative. Another highlight is the very successful 2024 ANS Student Conference hosted this past April by Pennsylvania State University, which saw 600 participants from academia, industry, and research laboratories. Jun Liao, our industrial liaison, continues to lead the THD industrial advisory board, fostering participation of industrial leaders in the division conference panel discussions and other activities to promote and boost engagement and membership across the nuclear industry. Our international liaison, Ferry Roelofs, is instead working at increasing engagement between ANS and the international communities. Among the efforts, noteworthy is the connection with the newly established European Thermal-hydraulic Community (ETHC).

Under the leadership of Prof. Xiaodong Sun, the Honors and Award Committee (H&AC) has diligently selected the best candidates for our THD awards. I am pleased to extend my heartfelt congratulations to Prof. Seungjin Kim, the recipient of the THD 2023 Technical Achievement Award. His TAA lecture will be delivered at the 2024 Advances in Thermal Hydraulics (ATH 2024) conference in Orlando, FL, this upcoming November. Congratulations also to Prof. Fan-Bill Cheung of Pennsylvania State University, recipient of THD's 2024 Meritorious Service Award, and to Dr. SuJong Yoon, recipient of the 2023 THD Excellence in Review Award.



Standing Committees

Technical Program Chair: Dillon Shaver
Honor & Awards Chair: Xiaodong Sun
Scholarship Chair: W. David Pointer
Nomination Chair: Bao-Wen Yang
Webmaster: Trevor Kent Howard
Membership Chair: Matthew D. Zimmer
Conference Screening Chair: Fan-Bill Cheung
YMG Liaison: Matthew D. Zimmer

Thanks to the dedicated efforts of Trevor Kent Howard, our division webpage is continuously being modernized and will soon transition to a new format which will allow for more engagement in the community. The website provides comprehensive details about our activities and upcoming events. THD will host the now traditional Town Hall event to informally discuss our activities and engage young researchers in THD on Sunday, June 16, 2:30pm-3:30pm PDT in Banyan F room. Immediately after, the Executive Committee meeting for the Annual Meeting will take place on Sunday, June 16, from 3:30pm to 5:30pm PDT. Please, check our webpage (thd.ans.org/meetings/) for meeting details. Anyone is welcome to attend those events.

We continue to uphold strong technical conferences of which ATH 2024 and NUTHOS 2024 are the next in line. Excitingly, the NUTHOS conference will be held in-person after a five-year break in Vancouver, Canada in August 2024. The preparation of the NURETH-21 conference, under the leadership of Dr. Chul-Hwa Song, is well under way. The conference is scheduled for 2025 in Busan, Korea. More information can be found on the conference website (www.nureth-21.org).

As my term comes to an end, I would like once again to thank the THD colleagues for their support, I would like to express my deepest appreciation to all THD officers and the leaders of our standing committees for their invaluable efforts in organizing the various THD activities. Last but not least, I would like to welcome my successor and Chair of THD for the 2024-2025 term, Dr. Igor Bolotnov.

I wish you all a successful year and fruitful discussions at the upcoming ANS Annual Meeting in Las Vegas, NV, 2024.

Annalisa Manera
 ANS 2023-2024 THD Chair
maneraa@ethz.ch

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Conference Selection Committee

Now that preparation for NURETH-21 to be hosted by the Korean Nuclear Society (KNS) in the city of Busan, Korea, in August 31-September 5, 2025 is well underway, the Conference Screening Committee of the ANS Thermal Hydraulics Division has begun the process of preparing a Request for Proposal (RFP) for the next series of the conference, i.e., NURETH-22, scheduled to take place in 2027 in the United States. Tentatively, the RFP along with the criteria for proposal evaluation will be distributed via ANS/THD in July 2024 with the submission deadline of November 15, 2024. Selection of NURETH-22 (2027) is expected to be completed in January/February 2025.

Fan-Bill Cheung
 Chair, ANS/THD Conference Screening Committee
fxc4@psu.edu

Technical Program Committee

The THD program committee is pleased to welcome everyone to Las Vegas, NV, for the [2024 ANS Annual Meeting](#). The technical program for THD will include a total of 45 summary presentations in 9 technical sessions. Also included is are 3 THD panel session on the CFD and System Code Validation for HTGR Applications Leveraging HTTF Data, Enabling Thermal Hydraulics Technologies for Digital Twins and Verification, Validation, and Uncertainty Quantification of Machine Learning

Models. All technical sessions (including panels) are listed in the table on the right. We are still looking for volunteers to serve as session chairs or co-chairs, so if you are planning to attend and wish to volunteer, please contact us!

A total of 48 summaries were submitted to THD with 121 reviews completed by 30 reviewers. We had an average of 2.52 reviews per submission with reviewers contributing on average 4.03 reviews each of those who participated. Notably, four reviewers contributed 10 or more reviews and we would like to take this opportunity to thank the session organizers and reviewers for their efforts.

The 2024 International Congress on Advances in Nuclear Power Plants ([ICAPP](#)) will be held as an international embedded topical meeting during the 2024 ANS Annual Meeting, and the registration fee will give access to both conferences.

Papers, summaries, and lightning talk abstracts are solicited for the Advances in Thermal Hydraulics ([ATH 2024](#)) conference, to be held as an embedded topical meeting at the 2024 ANS Winter Conference on November 17-21, 2024, at the Renaissance Orlando at SeaWorld. Organized by the American Nuclear Society Thermal Hydraulics Division, this embedded topical meeting is the seventh in a growing series featuring peer-reviewed, full-length technical papers, summaries, and abstracts covering recent advances in thermal hydraulics. We expect to have an exciting program with summaries on the following subject areas:

- Fundamental Thermal Hydraulics
- Code Development and Applications
- Operating LWRs Thermal Hydraulics and Safety

2024 Annual Meeting Technical Sessions

June 16-19, 2024

Session	# of papers	Time Slot (EDT)
CFD and System Code Validation for HTGR Applications Leveraging HTTF Data	panel	Monday 1:00pm
General Thermal Hydraulics: I	5	Monday 1:00pm
Computational Thermal Hydraulics	6	Monday 3:15pm
Enabling Thermal Hydraulics Technologies for Digital Twins	panel	Tuesday 10:00am
Verification, Validation, and Uncertainty Quantification of Machine Learning Models	panel	Tuesday 1:00pm
Computational Fluid Dynamics	6	Tuesday 3:15pm
Computational Two-Phase Flow	5	Wednesday 8:00am
Experimental Thermal Hydraulics	4	Wednesday 10:00am
Experimental Two-Phase Flow	4	Wednesday 1:00pm
Advanced Reactor Thermal Hydraulics: I	5	Wednesday 1:00pm
General Thermal Hydraulics: II	5	Wednesday 3:15pm
Advanced Reactor Thermal Hydraulics: II	5	Wednesday 3:15pm

- Severe Accidents, Phenomena, Modeling and Experiments
- Thermal Hydraulics of Advanced Reactors
- Thermal Hydraulics of Nuclear Installations
- AI & ML for Nuclear System and Thermal Hydraulics Modeling
- General Thermal Hydraulics
- Young Professional Thermal Hydraulic Research Competition
- Thermal Hydraulics Lightning Talks
- Special Sessions

Full papers, summaries, and abstracts due: May 31, 2024. The full call for papers can be found [here](#).

The other upcoming conferences are 14th International Topical Meeting on Nuclear Reactor Thermal-Hydraulics, Operation, and Safety ([NUTHOS-14](#)) and 21st International Topical Meeting on Nuclear Reactor Thermal Hydraulics ([NURETH-21](#)). The letter from Dr. Chul-Hwa Song,

NURETH-21 General Chair is attached to this newsletter.

A week before the 2024 ANS Annual Meeting, the THD Program Committee meeting will be held online on Sunday June 9th from 11:00am – 1:00pm (EDT). It can be accessed [here](#) via Zoom. The Password is **THDPC2024**

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.

Thank You,

Izabela Gutowska
Oregon State University
THD Assistant PC Chair

Dillon Shaver
Argonne National Laboratory
THD PC Chair

Honors and Awards

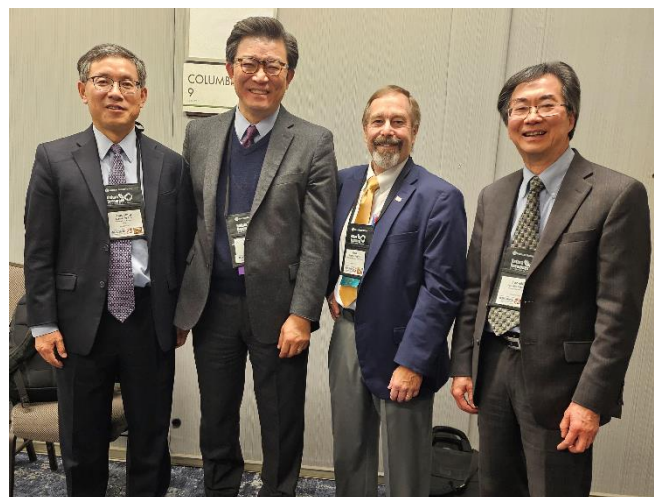
2023 THD Technical Achievement Award

The Thermal Hydraulics Division held an award ceremony on November 13, 2023, Monday, at the ANS 2023 Winter Meeting in Washington, DC. At this ceremony, THD's 2023 Technical Achievement Award (TAA) was presented.

The THD 2023 Technical Achievement Awards was presented to Prof. Seungjin Kim of Purdue University *"In recognition of his outstanding contribution towards advancing two-phase flow experimental capabilities, fundamental understanding of two-phase flow transport phenomena, and reactor thermal-hydraulic analysis."* As a tradition, Prof. Kim is invited to deliver a TAA lecture at the 2024 Advances in Thermal Hydraulics (ATH 2024) to be held on November 17–21, 2024 in Orlando, FL.

2023 THD Best Paper Award

The Honors and Awards Committee received candidate papers from the NURETH-20 Technical Program Committees for the 2023 THD Best Paper



*THD award ceremony at the ANS 2023 Winter Meeting.
Pictured from left to right: Xiaodong Sun, Seungjin Kim,
Steve Bajorek, and Fan-Bill Cheung*

Award. After careful evaluation and deliberations, the Committee selected the following paper as the 2023 THD Best Paper:

"Knowledge Representation to Support EMDAP Implementation in Advanced Reactor Licensing Applications," by Paridhi Athe, Nam Dinh, and Abhinav Gupta, North Carolina State University, presented at NURETH-20 in August 2023 in Washington, DC.

Congratulations to the authors!

2024 THD Meritorious Service Award

The THD Meritorious Service Award recognizes an individual for sustained and exemplary service to the nuclear thermal-hydraulic profession. The Honors and Awards Committee selected Prof. Fan-Bill Cheung of Pennsylvania State University upon nomination as the recipient of THD's 2024 Meritorious Service Award for the award *"In recognition of his long-standing contributions, lifelong leadership, sustained and exemplary service to the nuclear thermal-hydraulics community."* Congratulations Prof. Cheung and thank you for your outstanding service and contribution to the THD!

2023 THD Excellence in Review Award

The THD Excellence in Review Award recognizes our member's outstanding review services for the THD-sponsored technical sessions at the national

meetings and/or topical meetings. Upon nominations by the THD Program Committee, the THD Honors and Awards Committee selected the following awardees for the 2023 THD Excellence in Review Award:

Awardee – Dr. SuJong Yoon
Honorable mention – Dr. Drew Ryan

Please join us to congratulate our recipients and thank them for their excellent services to the Division.

The recipients of the Best Paper Award, Meritorious Service Award, and Excellence in Review Award will be recognized at the upcoming THD Award Ceremony, being scheduled for the afternoon of June 17, Monday at the upcoming ANS 2024 Annual Meeting in Las Vegas, NV.

The THD Honors and Awards Committee encourages and welcomes nominations for the THD awards. The details about these awards can be found at <https://thd.ans.org/awards/>.

Finally, we would like to take this opportunity to thank the THD H&AC members and all the nominators for their dedicated work! Congratulations to all our well-accomplished and deserving colleagues!

Xiaodong Sun
 2021-2024 THD Honors and Award Committee
 Chair
xdsun@umich.edu

Chul-Hwa Song
 2023-2024 THD Honors and Award Committee Vice
 Chair
chsong@kaeri.re.kr

Scholarship Committee

The American Nuclear Society Thermal Hydraulics Division awards two annual graduate student scholarships: the Lawrence E. Hochreiter Graduate Scholarship and the Vincent J. Esposito Graduate Scholarship. Applications for both scholarships are due February 1 each year, and they are awarded for the following academic year. The winner of the 2023 Lawrence E. Hochreiter Graduate Scholarship is Mr. Broderick Sieh of Purdue University. The 2023 winner of the Vincent J. Esposito Graduate

Scholarship is Ms. Carolina da Silva Bourdot Dutra of Penn State University.

The **Lawrence E. Hochreiter Graduate Scholarship** was established by the ANS THD in 2019 and first awarded for the 2020-2021 academic year. The scholarship honors Dr. Lawrence E. Hochreiter, pioneer in nuclear thermal hydraulics modeling and nuclear safety analysis at Westinghouse Electric Company and the Pennsylvania State University, who was an active member of the Thermal Hydraulics Division. The scholarship is awarded to a graduate student in nuclear science and engineering who is studying topics related to nuclear thermal hydraulics.

Lawrence E. Hochreiter Graduate Scholarship
 Recipients

2024 Broderick Sieh
 2023 Victor Coppo Leite
 2022 Arturo Cabral
 2021 Adam Kraus
 2020 Ishak Johnson

The **Vincent J. Esposito Graduate Scholarship** was established by the ANS THD in 2020, with the generous support of the Esposito family, and will be first awarded for the 2022-2023 academic year. The scholarship honors the ongoing contributions of Dr. Vincent J. Esposito, who is an Adjunct Professor at the University of Pittsburgh, former Vice President of the Nuclear Fuel Business Unit of Westinghouse Electric Company, and the 2013 American Nuclear Society Glenn T. Seaborg Congressional Fellow. The scholarship is awarded to a first-year graduate student in nuclear science and engineering who is studying topics related to nuclear thermal hydraulics.

Vincent J. Esposito Graduate Scholarship Recipient

2024 Carolina da Silva Bourdot Dutra
 2023 Fadel Nasr
 2022 Brandon Aranda

Chair: W. David Pointer (ORNL)

European Thermal Hydraulics Community

Europe does not have a structure similar to the ANS with divisions for specific scientific and engineering fields. In Europe, all nuclear R&D stakeholders are united in the Sustainable Nuclear Energy



Technology Platform (SNETP) which targets to support and promote the safe, reliable and efficient operation of Generation II, III and IV civil nuclear systems. SNETP has three pillars and a number of technical areas, but this subdivision is application oriented. Therefore, there is no community similar to the ANS THD.

Recognizing this lack and aiming to establish, stimulate, share and maintain high-level knowledge and expertise in all areas of Nuclear Thermal Hydraulics, a new thermal hydraulics community is being formed in Europe. The initiative has been taken by Katrien van Tichelen (SCK CEN, Belgium) and Ferry Roelofs (NRG, Netherlands) to establish a European Thermal Hydraulics Community (ETHC) under the umbrella of SNETP. This community aims to reach its goals by:

- bringing together experts, students and young professionals,
- stimulating networking and mobility,
- sharing resources and setting up collaborations,
- facilitating knowledge management, expansion, and development
- connecting students and (young) professionals with SNETP and other international organizations (e.g. ANS THD)

An initial ETHC council has been formed which apart from Katrien and Ferry consists of Sanjeev Gupta (BT, Germany), Pierre Ruyer (IRSN, France), and Stefano Lorenzi (PoliMi, Italy).

Apart from the ETHC Council, also a Steering Council and an Advisory Council are being put in place. The Steering Council aims at guiding the ETHC Council in decision on activities to develop and in supporting the Council in organizational matters. The Steering Council will also ensure a close link with SNETP. Initial members will include Luis Herranz (CIEMAT, Spain), Pavel Kral (UJV),



Christophe Schneidesch (ENGIE, Belgium), and Marco Cherubini (NINE, Italy). The Advisory Council aims at support on how to develop and maintain activities and at connecting to other communities. Initial members will include Sofiane Benhamadouche (EDF, France), Graham McPherson (Frazer-Nash, UK) and Jean-Marie LeCorre (Westinghouse, Sweden).

The link with the ANS THD will be close, not in the least thanks to the presence of Ferry Roelofs in both leadership boards, i.e. the ANS EC and the ETHC Council. The ETHC looks forward to collaborate closely with the ANS THD and other similar international TH communities.

Nominating Committee

The Nominating Committee (NC), chaired by the immediate past chair of the Thermal Hydraulics Division (THD), plays a pivotal role in shaping the leadership of the ANS THD. The committee's mandate includes the identification and nomination of qualified candidates for all official positions within the ANS THD. This encompasses the division officer positions as well as the members and chairs for the Executive Committee (EC) and all standing committees.

During the last Spring meeting in November 2023, the NC meticulously selected and proposed a slate of nominees for EC ratification. Subsequently, the endorsed division officers and EC nominees were

presented to the ANS membership for the general election process.

Currently, the nomination for the Program Committee (PC) membership remains the sole item pending approval. The PC has put forth a list of recommended nominees, which the NC has reviewed and adapted. This list is now poised for EC endorsement.

ANS THD Program Committee Nominations 2024

Due to continued service, we recommend that the Program Committee memberships of the following be renewed through 2027:

Steve Bajorek*	Subash Sharma**	Ferry Roelofs
Victor Petrov	Guanyi Wang	Bao-Wen Yang
Caleb Brooks	Hisashi Ninokata	Yang Liu (VT)

*As the incoming vice-chair, Steve Bajorek's term shall be automatically renewed through 2027 with no action from the EC, in accordance with the bylaws.

**Incoming EC members shall automatically have their terms renewed through 2028 with no action from the EC, in accordance with the bylaws.

Due to inactivity in the last 2 years, it is recommended the following be moved to the advisory council for a term to expire in 2029:

Jinyong Feng	Darius Lisowski	John Luxat
Piyush Sabharwal		

Finally, we recommend the following be added to the Program Committee for a term expiring in 2027:

Hitesh Bindra (Purdue)	Victor Coppo-Leite (INL)	Xingang Zhao (ORNL)
Yang Liu (TAMU)	Baris Sarikaya (Constellation)	Vittorio Badalassi (ORNL)
Saya Lee (PSU)	Wei Ji (RPI)	Tomio Okawa (UEC, Japan)

These changes will bring the total membership of the Program Committee to 67 out of the maximum membership of 75.

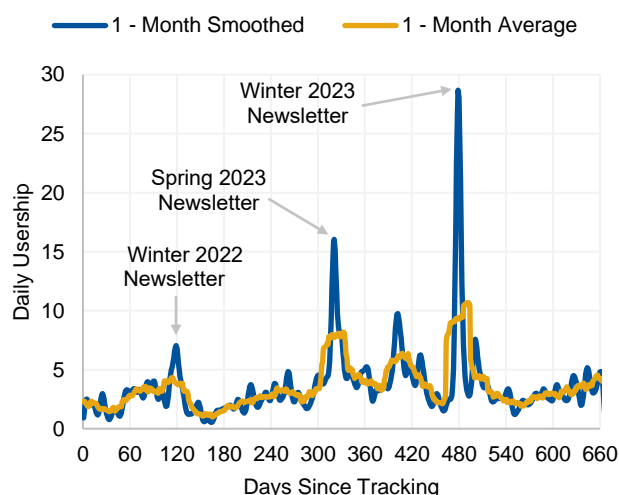
We consistently invite and encourage robust participation in division activities. Those eager to contribute to the division in any role are urged to reach out to the division leadership. We particularly advocate for member involvement in activities spearheaded by the Program Committee, as well as other standing committees, webinars, and task forces.

Bao-Wen Yang

Chair, ANS THD Nomination Committee (2023-2024)

Webmaster report

Thanks to you all, at the last newsletter, we've received the highest engagement on the website so far! Overall, the usership is up about twice from when we first started tracking, and the peak spike was about 4x what it was from a year ago!

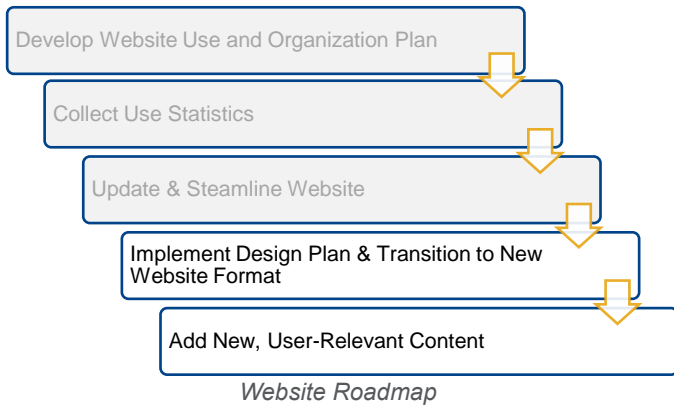


Monthly Website Usership

Since first starting, the plan to further convert the

With that in mind, there are two major changes coming to the THD website in the next six months. First, the website will be converting to the new ANS website platform. As this conversion happens, the website will begin to transition to a new format which allows for more engagement in the community

including hosting links to previous webinars and providing up-to-date content which is quickly and easily editable.



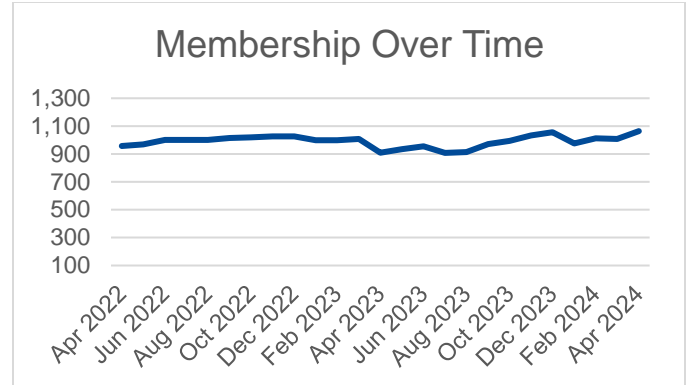
With the new format in place, you'll begin to see new content to help you better engage with the community as a whole and give members new to the community a better way of getting up to speed with everything going on in the community.

I'm excited to see where we are in the next 6 months!

-Trevor Kent Howard
ANS THD Webmaster

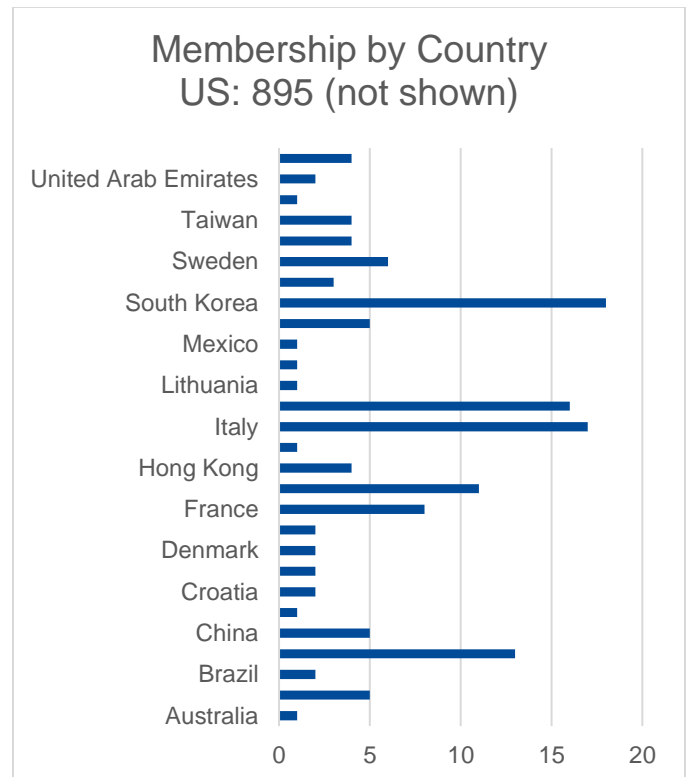
Membership report

THD membership currently sits at 1064. Membership has been on an upward trend so far in 2024 and currently sits at the highest number in several years. This is an encouraging growth and we hope this upward trend continues! Since the last newsletter, the split between members from the American and international members has remained about the same, but it is noted that 29 different countries are represented, with the United States being the largest. ANS has clearly reached an international audience and our international members are encouraged to invite new members to meetings. Our student population has grown from 19.5% of the membership to 22.1%. This is about a 13% increase. This is great to see as students represent the future of the division and their involvement with THD will be crucial to success moving forward.



To all members, if you are interested in becoming more involved with the Thermal Hydraulics Division, please reach out or attend an executive committee meeting at the next conference. These meetings are open to all and your feedback on any discussions would be much appreciated.

Matt Zimmer,
Membership Committee Chair



Financial Report

The budget for 2024 has been proposed and approved by the THD EC in summer 2023. Table 1 summarizes the budget and shows how it has changed. The proposed budget for 2024 does foresee a small loss. This is due to the expected lack of income from our flagship conference NURETH which will not be organized in 2024. However, the actual income in 2023 was much higher than anticipated thanks to a very successful NURETH conference. The \$3000 for student support was agreed by the Executive Committee in support of the ANS Student Conference.

Table 1:	2023	2023	2024	2024
	Proposed	Actual	Proposed	Actual
Balance Forward from Previous Year	\$60,502	\$60,502	\$82,034	\$94,907
Budget Funds				
Member Dues Allocation (\$2/ full dues member; \$1 / reduced dues member)	\$1,536	\$1,478	\$1,500	\$361
Division Income	\$24,746	\$36,126		
Total Income	\$26,282	\$37,604	\$1,500	\$361
Budget Expenses				
Newsletters, Website				
Awards & Plaques	\$1,250	\$1,199	\$1,250	\$500
National Meeting Costs				
Topical Meeting Costs				
Division Officer Expenses				
Student Support	\$3,000	\$0	\$3,000	\$3,000
Future Activity				
Scholarship/NEED Funding	\$500	\$500	\$500	
YMG Support				
Other Expenses		\$1,500		
Total Expenses	\$4,750	\$3,199	\$4,750	\$3,500
Net	\$21,532	\$34,405	(\$3,250)	(\$3,139)
Total Year End Funds	\$82,034	\$94,907	\$78,784	\$91,768

Table 2 shows all four award funds.

1. With an investment gain of \$10,495, the Lawrence Hochreiter scholarship account has a new balance of \$79,430. This accounts for \$3000 scholarship award in 2023. After a year with a loss in 2022, this brings this fund in a very good shape.
2. The TAA+Service award accounts ended the year at a funding level of \$69,296, which is an increase from 2022 thanks to an investment gain (\$9,104) One TAA award of \$2,000 was awarded in 2022.
3. The Esposito Award was originally funded at \$75,000. After losses in 2022, investment

gain in 2023 increased its value to \$74,198 accounting for an award of \$3000. This award will be given every year.

4. The Bal-Raj Sehgal Memorial Award was originally funded \$23,000. After losses in 2022, investment gain in 2023 increased its value to \$20,132 accounting for an award of \$2000. This award will be given every other year.

Table 2				
Income	Hochreiter	TAA/Service	Esposito	Seghal
Balance 12/31/2022	\$71,935	\$62,401	\$67,369	\$19,314
Investment gain/loss	\$10,495	\$9,104	\$9,829	\$2,818
Total Income	\$82,430	\$71,505	\$77,198	\$22,132
Expenses				
Awards	-\$3,000	-\$2,000	-\$3,000	-\$2,000
Plaques	\$0	-\$209	\$0	\$0
Other Expenses	\$0	\$0	\$0	\$0
Net change	\$7,495	\$6,895	\$6,829	\$818
Total Funds 12/31/2022	\$79,430	\$69,296	\$74,198	\$20,132

Treasurer: Ferry Roelofs

Letter from the NURETH-21 General Chair

The NURETH-21 conference will be held in the city of Busan, Korea from Aug. 31 (Sun.) to Sept. 5 (Fri.), 2025 with the Korean Nuclear Society (KNS) being the host sponsor of the Conference. Busan, home to 3.5 million residents, is Korea's second largest city and the world's fifth busiest port. Busan is an ideal location for the NURETH-21 participants for their dedicated discussion of the future of nuclear thermal-hydraulics and their relaxation with cultural experiences on the world-famous seashore area.

Following outstanding experiences of very successful operation of two ANS flagship topical meetings in the past, NURETH-10 (Seoul, 2003) and NUTHOS-11 (Gyeongju, 2016) among others, we are looking forward to continuing and further expanding the long and successful tradition of NURETH Conference series with close cooperation with ANS and other nuclear organizations around the world

The theme of the Conference is “**Innovation in Thermal Hydraulics for Nuclear Future**” and the planned program will provide a full spectrum of activities designed to appeal to all participants, from students to early career professionals as well as senior leaders. The program includes technical sessions, plenary and keynote lectures, workshops for both professionals and students, and a research paper competition for young professionals.

The meeting will get started with the student seminar and associated technical tour on Sunday before the welcome reception on the evening of Sunday Aug. 31, 2025. The meeting will consist of technical and plenary sessions from Monday through Friday and close with two optional technical tours on Friday afternoon. The topics of major technical tracks can be found in the Call-for-Papers (<https://www.ans.org/meetings/view-425/>) The technical sessions will cover typical thermal-hydraulic (TH) topics as well as special topic sessions on advanced technologies-related TH. Panel sessions will also be arranged to cover important topics to be identified based on important and newly emerging TH issues

The technical tour programs include: (1) Tour of the Low and Intermediate Level radioactive Wastes Disposal Center located near Gyeongju city, the capital of the ancient kingdom of Shilla dynasty during a thousand years of reign, having various tourist attractions designated as UNESCO World Heritage Sites, and (2) Tour of the Doosan Enerbility Co., Ltd. possessing the world's most advanced technology in manufacturing NSSS components for nuclear plants. Also, a diverse cultural program will offer uncommon and exciting opportunities to the participants and their accompanying persons.

The Conference organizers will reach out and actively engage young professionals and students who are key to maintaining strong thermal-hydraulics disciplines that will continue to keep NURETH and other topical meetings robust.

As always, we would like to encourage our ANS-THD members to actively participate by attending the Conference, submitting papers, volunteering to organize sessions, and supporting the peer-review of the papers. The Conference website (www.nureth-21.org) will be allowed to provide access to the details of paper templates, and the

sponsorship and exhibitor prospectus sooner or later.

Dr. Chul-Hwa Song
NURETH-21 General Chair
NURETH Fellow
chsong@kaeri.re.kr ; chs7266@gmail.com

2024 ANS Student Conference update

From April 4-6, Pennsylvania State University hosted the 2024 ANS Student Conference. The event was attended by about 600 participants from academia, industry, and national labs, including national and international institutions.

The conference counted with the participation of speakers such as the 2023-2024 ANS Vice-President / President-Elect, Professor Lisa Marshall, Idaho National Laboratory Nuclear Science & Technology Associate Director, Dr. Jess Gehin, the Assistant Secretary of the Office of Nuclear Energy, Dr. Kathryn Huff, and the Westinghouse AP300 SMR Senior Vice President, Dr. Rita Baranwal.

Six workshops were offered during the conference, including virtual reality & STAND, Policy and Advocacy, 3D printing, OpenMC, MOOSE, and Nek5000 workshops, providing students and professionals the opportunity to get in contact with diverse tools used within the industry and academia. In special, during his workshop, Dr. Elia Merzari introduced Nek5000 to the attendees, covering from the simple introductory cases to LES simulations.



Ms. Carolina Dutra and Dr. Elia Merzari

Student members of the ANS Thermal-Hydraulic Division (THD) represented the division during the conference organization, both assuming leadership positions in the conference committee and volunteering during the conference. These students were fundamental to the technical side of the conference, with more than half of the technical committee being composed of THD members. The 2024 Student Conference also featured one hundred fifty-seven summaries, of which fifteen of



From the top left to the bottom right: Professor Lisa Marshall, Dr. Jess Gehin, Dr. Kathryn Huff, and Dr. Rita Baranwal.

them were related to thermal-hydraulics, representing almost 10% of the conference's total works presented. Three thermal-hydraulics-related works were awarded during the conference, including one of the three best overall papers. A short summary of these works is presented below, however, the full version of them can be accessed through the 2024 ANS Student Conference site.



2024 ANS Student Conference Commit Members and Volunteers.

Best Overall Paper - Direct Numerical Simulation of a Sodium Fast Reactor Assembly. Ms. Carolina Dutra and Dr. Elia Merzari were awarded one of the three best overall paper awards presented during the closing dinner. In their work, they performed the Direct Numerical Simulation (DNS) of a seven-pin wire-wrapped fuel rod bundle for a Prandtl of 0.005 and Reynolds ranging from 1,000 to 10,000, comparing their results against a bare seven-pin bundle without spacers.

They performed the DNS simulations through the spectral element Computational Fluid Dynamic (CFD) code NekRS, a GPU-oriented version of the well-known CFD code Nek5000. Their domain was discretized into 4,723,200 hexahedral elements. After conducting a mesh convergence test, they determined that a polynomial order nine should be used to obtain the regulation necessary to resolve the Kolmogorov length scale.

The Nusselt number obtained from the computational model was compared against liquid correlations for the Nusselt number, such as the Subbotin, Mikityuk, and El-Genk, presenting a relative error smaller than 6% against such correlations. Their comparison between the wire-wrapped and bare bundles showed that the presence of the wires significantly improved the mixing and reduced the center temperature, which highlighted the positive thermal-hydraulic impact of sparse wires.

Overall, their results provide new insights into heat transfer and flow physics of wire-wrapped bundles at low Reynolds numbers. Their data can be used to support low order models and the development of new heat transfer correlations for wire-wrapped bundles.

Best Presentation in Thermal-Hydraulics (Graduate Student) - LES at Low Richardson Number to Investigate Thermal Stratification in SFRs Upper Plenums.

During the closing dinner, Mr. Theodore Chu, Mr. Trevor Franklin, and Dr. Lane Carasik were awarded the Best Presentation Award in Thermal-Hydraulics for Graduate Students. Their work investigated the thermal stratification in Sodium Fast Reactors (SFRs) upper plenums for low Richardson numbers through CFD simulations of the Gallium Thermal-hydraulic Experiment (GaTE) facility.

To capture key physics of interest from the GaTE experiments, such as thermal stratification and scalar mixing, Large Edge Simulations were performed through the CFD code Nek5000. A mesh based on the experiment's as-built geometry containing 58,272 finite elements was created using the software Gmsh and the mesh convergence test was performed by varying the polynomial order from 5 to 9, where the highest order was chosen for the simulations.

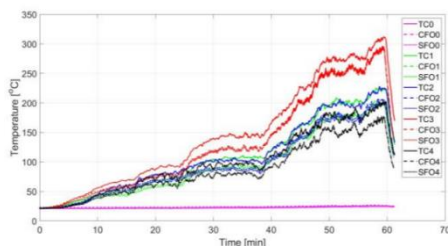
The temperature and instantaneous velocity profiles suggested their computational model is beginning to capture the species mixing and thermal stratification trends in GaTE. These initial results passed to the NuEST group, were preliminary efforts on the training of data-driven statistical mechanics-based reduced order models, which aim to achieve the accuracy of CFD codes with the rapidity of system-level thermal-hydraulic codes.



Mr. Theodore Chu (left) and Dr. Lane Carasik (right)

The authors are now working on thoroughly validating their computational results. Once fully validated, these results can be used to rapidly construct high-quality thermal stratification data, covering a broad range of operational conditions, further improving reactor safety and helping to close the gap in the current knowledge of such phenomenon.

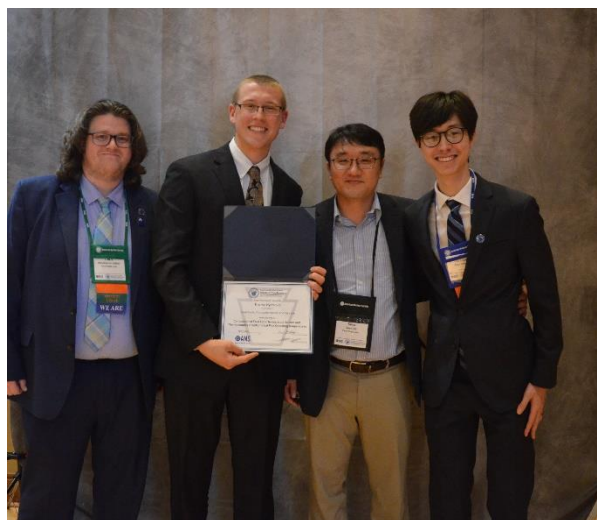
Best Presentation in Thermal-Hydraulics (Undergraduate Student) - Comparison of Fiber Optic Temperature Sensors and Thermocouples at Sodium Heat Pipe Operating Temperatures.



Temperature trends measured by the TCs and FO cables for the first, uninsulated test.

Thermocouples at Sodium Heat Pipe Operating Temperatures" of authorship of Mr. Scout Bucks, Mr. Chris Balbier, and Dr. Saya Lee was awarded the Best Presentation Award in Thermal-Hydraulics for Undergraduate Students. Their work summarized two tests to investigate the use of optical frequency domain reflectometry for temperature measurements on sodium heat pipes, comparing the

The work "Comparison of Fiber Optic Temperature Sensors and



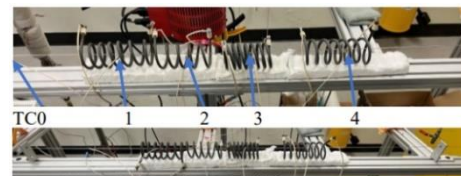
From left to right: Mr. Chris Balbier, Mr. Scout Bucks, Dr. Saya Lee, and Mr. Erik Hisahara

readings from a coated a stripped fiber optic cables to thermocouples between 20 and 800 °C.

The experimental setup consists of a stainless-steel tube suspended between two brackets, with springs maintaining the tension during thermal expansion and contraction. Four resistive heating coils powered by two variable voltage sources heated the tube.

Two Fiber Optic (FO) cables were placed inside the tube, covering its entire length. One of them was an as-manufactured acrylate-coated cable. The other was a stripped version of the same, where the coating, a major reason for the system's limited temperature range, is absent. K-type thermocouples were spot-welded to the stainless-steel tube at the axial midpoint of each heating coil, where the coil around one of them was insulated, with a fifth control thermocouple welded in an unheated section of the tube. Data from each FO was recorded using the Optical Distributed Sensor Interrogator (ODiSI) system in increments of 2.6 mm at 40 Hz for each channel.

They performed two tests using this experimental setup. The first one



Initial experimental setup: closeup with TC locations numbered (top) and full view (bottom).

consists of increasing the voltage on the heating coils from 0 to 115 V over an hour. The second test was performed on the insulated coil. For this test, the

voltage was controlled to maintain several temperatures for around 10 minutes to eliminate the effect of any transient that might occur.

Their preliminary results suggested that the difference between the two FO cables is negligible. However, more tests are necessary to confirm this behavior. For the differences between the TCs and FO measurements, the authors explored several options to explain them. The most likely is that the

difference is caused by the ODiSI calibration, indicating that the error is predictable. The authors also noticed limitations in the ODiSI system during one of their tests, with the FO cables failing to acquire data for high cooling rates. The authors also plan to improve their analysis by increasing the total number of tests performed.

Luiz Carlos Aldeia Machado, Penn State University.