ANS Thermal Hydraulics Division

ISSUE 36

A newsletter of the American Nuclear Society Thermal Hydraulics Division

June 2022

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
Elia Merzari
ebm5351@psu.edu

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Bao-Wen Yang
bwy01@deltaenergygroup.com

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Treasurer
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Immediate Past Chair
Wade R. Marcum
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Executive Committee

Terms Expiring June 2022
Fatih Aydogan
Igor Bolotnov
Lane Carasik
Yassin Hassan
Robert P. Martin

Terms Expiring June 2023
Yang Liu
John Luxat
Hiashi Ninokata
Piyush Sabharwall
Caleb Brooks

Terms Expiring June 2024
Xiaodong Sun
Dillon Shaver
W. David Pointer
Hyoung Cho
M. Moussaoui

Standing Committees

Technical Program Chair
Igor Bolotnov

Honors & Awards Chair
Xiaodong Sun

Nomination Chair
Wade R. Marcum

Webmaster
Trevor Kent Howard

Membership Chair
Mathew D. Zimmer

Screening Committee Chair
Fan-Bill Cheung

YMG Liaison
Mathew D. Zimmer

A Message from the Chair

Dear Colleagues,

As I write to you my term as chair of the Thermal-hydraulics division is coming to an end. The past year has been eventful for THD with several important milestones and developments.

First of all after a two years hiatus, THD started holding topical meetings again. In March 2022, after a six months delay and a transition to a virtual platform, NURETH-19 was finally held. When I last wrote to you in the Fall newsletter we were still hoping to hold the meeting in person in Brussels but the raise of the omicron COVID-19 variant and a rapid surge in cases across Europe forced the organizers to a virtual-only setting. Despite the less than ideal circumstances, the meeting was a resounding success. 615 oral presentations were delivered over 5 intense days, structured to allow participants from all continents to participate despite the time zone difference. Thanks to the efforts of the organizers and the meeting platform there was a remarkable amount of interaction and technical exchange, despite the inherent limitations of a virtual settings. My thanks go to all authors, reviewer, session chairs, committee chairs and all organizers for their contributions and time commitment – this conference could not have happened without you. My thanks also go to SCK CEN VKI and NRG for hosting this remarkable event. Finally, I would to thank in particular Ferry Roelofs, Katrien van Tichelen and Philippe Planquart who for the past three years have worked diligently and with great personal commitment to this conference. We did not manage to have the meeting in person that we hoped, but thanks to you we had a meaningful and highly successful technical event. On behalf of the entire THD community please accept a heartfelt: Thank you!

Despite the still ongoing pandemic, we are continuing the return to in-person meetings. The Society plans to hold the 2022 ANS Annual Meeting in Anaheim, CA on June 12-16 in person. THD will host its first topical meeting in person in over almost three years as an embedded meeting: Advances in Thermal-Hydraulics 2022. The organizers put together a vibrant program that features over 80 technical oral presentations, several keynote lectures as well as a panel on "Thermal Hydraulics Needs, Challenges and Opportunities In the Advanced Reactor Demonstration Program". Please join us in Anaheim if your schedule allows.

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In this issue

Message from the Chair, cont.

Our Program Committee and Executive Committee meetings for the Annual Meeting will take place remotely on Sunday June 5, 2022 from 10:00-12:00 pm EDT and from 12:00-2:00 pm EDT, respectively. The meetings will be held virtually given that a lot of our membership will not be able to attend in person. The links are available on the THD website (http://thd.ans.org/meetings/) – everyone is welcome to join especially the program committee. Note that, If you are plan to attend the annual meeting in person, we will also host an in-person informal gathering at 3:00-4:00 pm PT on June 12th (Mezzanine 3 room) . Everyone is welcome to participate.

At the ANS Annual meeting we will celebrate service to the division. It is my pleasure to announce to the larger community the selection, by the THD honors and award committee, of Dr. Kurshad Muftuoglu as recipients of the 2022 Meritorious Service Award. Dr. Mutfuoglu has served the division in a variety of roles including Program Chair and Division Chair. He was instrumental in getting me involved in the division and he has been over the years an invaluable resource for anything related to the organization of topical meetings and issues related to the society. We will also recognize our reviewers with two excellence in review awards: Dr. Bao-Wen Yang and Dr. Robert P. Martin. Two honorable mentions were also awarded to Dr. Ling Zou and Dr. Jun Wang. It is important to recognize the work of our reviewers which make the rich programs of the division possible. Finally I would like to recognize Dr. Igor Bolotnov, whose 3-year term as program chair is coming to an end this June. Igor has done an amazing job at leading our program activities.

A reminder to please consider submitting nominations for the Technical Achievement Award, the highest award of the division for the next cycle (Fall 2022). For more information on the THD awards program please visit the recently revamped award section of the THD website: http://thd.ans.org/awards/. With the goal of 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, which has been awarded for the first time at NURETH-19, and targets early and mid-career professionals. Please consider application nominees for the next cycle (2023). All package information can be found on the ANS honors and awards site (https://www.ans.org/honors/).

As mentioned in my last message, the difficulties of the past two years have lead the THD leadership to rethink our role and our approach to serving the community. In the past year we have started hosting regular webinars. Our first ANS-wide webinar, held in October, received 279 registrations and 158 attendees. It was a remarkable success. A tutorial for the computational fluid dynamics code Nek5000 hosted in April had similar success. More webinars are planned. We also revamped our communication strategy, long centered on our well established website thd.ans.org which remains an invaluable source of information. The website is now complemented by media that the new generations are consuming. In particular new social media accounts have been created, including a LinkedIn group. An Instagram photo competition has been launched. We plan an aggressive campaign for new content in these media platforms. Finally, working with the vice-chair Dr. Bao-Wen Yang we have revisited the strategic plan of the division to address these concerns (it is attached to this newsletter). Please review it.

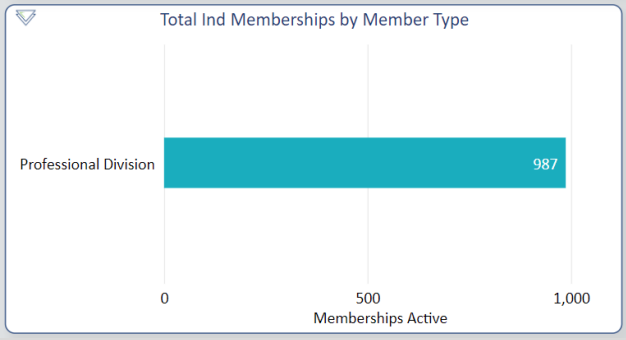
On behalf of the executive committee members, I thank you all for your continued involvement and dedication toward the Division. Thank you for staying with us through two very turbulent years. Please reach to me or Bao-Wen directly if you want to contribute more directly to our activities or if you have new ideas for what THD should do. Now more than ever we need your help to propel us further ahead.

There is no lack of opportunities. There is a growing recognition both nationally and internationally for the potential of advanced nuclear reactors to address energy security concerns and power the transition to a low carbon economy. Thermal-hydraulics art and science, are bound to play a pivotal role in these efforts as advanced reactor designs, which aim typically at much higher temperatures than light water reactors, face several thermal hydraulics challenges. I look at the future with great optimism. Given the positive outlook for thermal-hydraulics research and development there is no reason to have bold aspirations and goals for our membership.

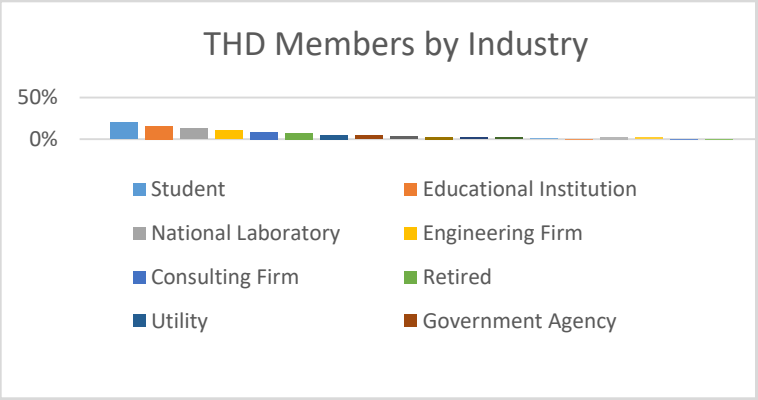
I hope to see you all at the ANS Annual Meeting in person or virtually.

Elia Merzari

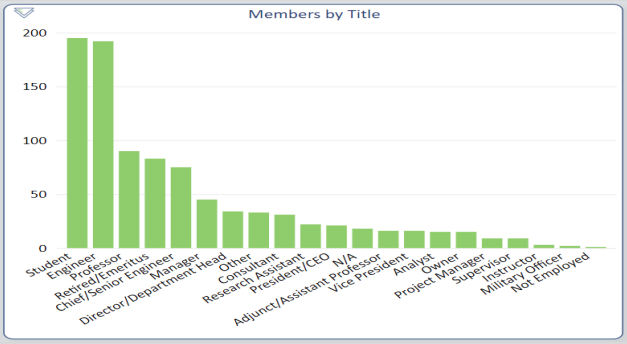
Membership Committee Report



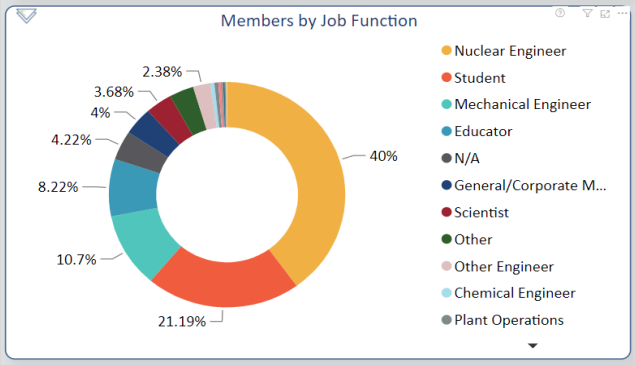
Current THD Membership



THD Members by Industry



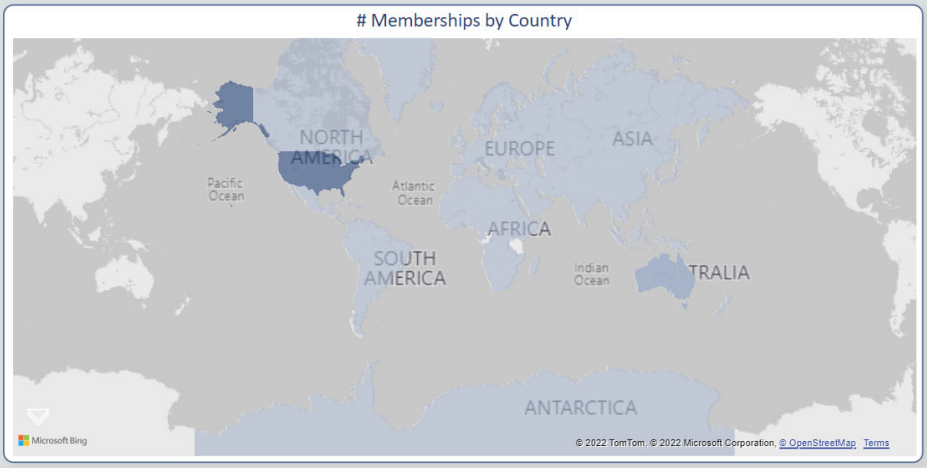
THD Members by Title



THD Members by Job Function

Top N Country

Country	# of Individuals
United States	826
Canada	16
Japan	15
Korea (Republic of)	11
Italy	9
Germany	8
	7
China	6
France	6
Belgium	5
Switzerland	5
United Kingdom	5
Total	**919**



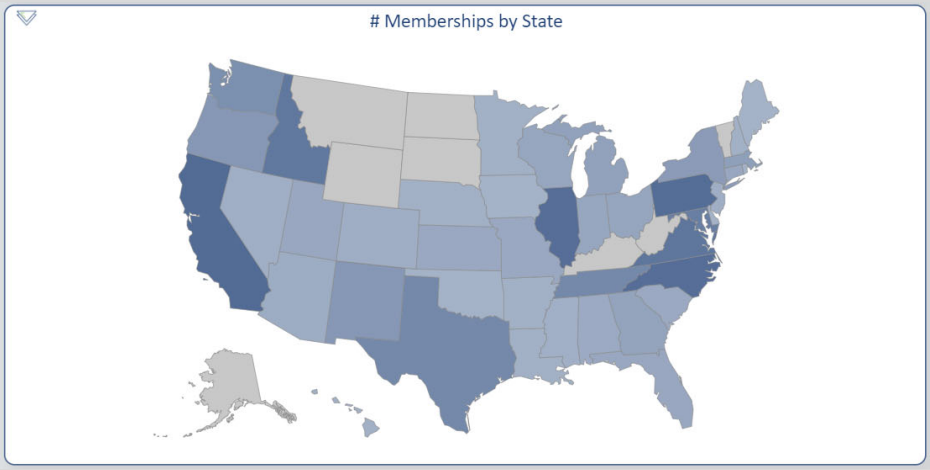
THD Members – Top Ten Countries with Counts

Continued on p. 4

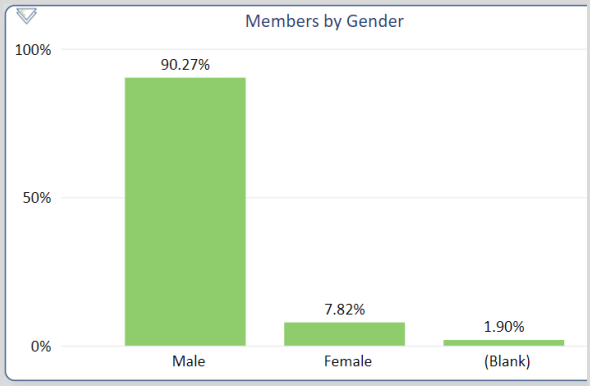
Membership Committee Report cont.

Top N States

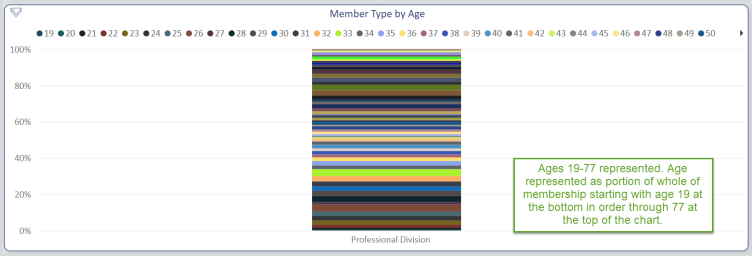
State	# of Individuals
California	67
Pennsylvania	65
Illinois	64
North Carolina	64
Virginia	57
Idaho	55
Maryland	49
Tennessee	40
Texas	40
Washington	34
Total	**535**



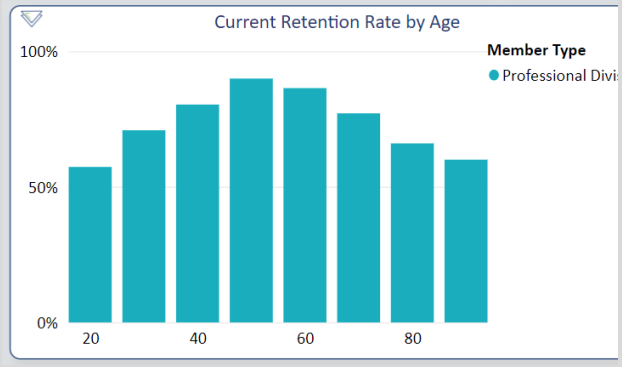
THD Members – Top Ten States with Counts



THD Members by Gender



THD Members by Age



THD Members – Retention Rate by Age

Calendar - Month	Members New	Members Renew	Members Reinstated	Members Rejoin	Members Dropped	Members Active	Net Impact	% Retention
Apr 2022	1	6			94	955	▼	75%
Mar 2022	12	17	8	2	10	1,046	▶	75%
Feb 2022	10	15	3	3	9	1,038	▲	76%
Jan 2022	12	523	11	6	23	1,025	▼	76%
Dec 2021	6	32	4	2	6	1,044	▲	73%
Nov 2021	8	14	3	6	6	1,032	▲	73%
Oct 2021	9	18	5		9	1,017	▶	73%
Sep 2021	8	16	2		10	1,007	▶	74%
Aug 2021	5	3	2	3	3	1,002	▶	75%
Jul 2021	3	7	3	2	4	994	▶	75%
Jun 2021	11	24	3	6	10	991	▶	76%
May 2021	6	14	6	3	8	981	▲	76%
Apr 2021	5	12		2	125	969	▼	76%
Mar 2021	9	20		2		1,077	▶	76%
Feb 2021	4	29	1	4		1,067	▲	78%
Jan 2021	4	498	34	63		1,052	▲	78%

Applied filters:Dues Product is Thermal Hydraulics Division

THD Membership Monthly Member Lifecycle (Jan 2021 – April 8, 2022)

Thermal Hydraulics
Membership Snapshot - 2022

Technical Program Committee Report

The THD program committee is pleased to welcome everyone to the first fully in-person meeting since the beginning of the pandemic. Embedded in this summer meeting is the Advances in Thermal Hydraulics conference.

ATH 2022 will include a total of 81 presentations in 20 technical sessions, from 53 full papers, 19 summaries and 9 Young Professional Research Competition entries. Also included are three panel sessions, rounding out the technical program. All technical sessions (including panels) sponsored by THD are listed in the table on the right. We would like to thank the ATH technical program committee, led by Dave Pointer and Dirk Lucas, for their efforts.

A total of 92 papers were submitted with 217 reviews completed by 54 reviewers. We had an average of 2.4 reviews per submission with reviewers contributing on average 3.9 reviews. Notably, seven 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 call for papers for the upcoming Winter meeting in Phoenix, AZ is now open. We expect to have an exciting program with summaries on the following topics:

- Computational TH
- Experimental TH
- Two-Phase Flow and Heat Transfer
- General TH
- CFD and TH of Microreactors
- TH of Advanced Reactors
- Machine Learning Applications

ATH 2022 Technical Sessions

June 13-16, 2022

Session	# of papers	Time Slot (PDT)
Thermal Hydraulics Needs, Challenges and Opportunities in the ARDP	panel	Monday 3:15pm
TH of Research and Test Reactors	5	
Optimization of Fluid-Surface Interface Heat Transfer and Interactions	5	
Artificial Intelligence in Thermal Hydraulics	4	Tuesday 10:15am
Microreactor Thermal Hydraulics	3	
NEAMS TH IRP: Thermal-Fluids Applications in Nuclear Energy: I	4	
In Memorium: James Sienicki	panel	Tuesday 1:00pm
NEAMS TH IRP: Thermal-Fluids Applications in Nuclear Energy: II	4	
Young Professional Thermal-Hydraulic Research Competition: I	5	
NEAMS TH IRP: Thermal-Fluids Applications in Nuclear Energy: III	5	Tuesday 3:15pm
Sodium-Cooled Fast Reactor TH	5	
Young Professional Thermal-Hydraulic Research Competition: II	4	
TH of LWR Operations and Safety	4	Wednesday 10:15am
Molten-Salt Reactor Thermal Hydraulics: I	5	
Two-Phase and Boiling Flows: Experiment, Modeling and Simulation: I	5	
Natural Convection	3	

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The full call for papers can be found here. The meeting will be held November 13th – 17th. Summaries are due Thursday, June 30th.

At the 2022 ANS Annual Meeting, the THD Program Committee meeting will be held online on Sunday June 5th from 10am – noon (EDT). It can be accessed here via Zoom. (Password: ANSTHD2022)

Finally, at the conclusion of the Anaheim meeting, Igor Bolotnov will conclude his tenure as the Technical Program Committee Chair and Dillon Shaver will take on the role. We would like to express our gratitude to Igor for his service over the last three years and to all of our 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.

Thank You,

Igor A. Bolotnov
NC State University
THD PC Chair

Dillon Shaver
Argonne National Lab
THD Assistant PC Chair
PCChair@thd-ans.org

Session	# of papers	Time Slot (PT)
Molten-Salt Reactor Thermal Hydraulics: II	4	Wednesday 1:00pm
Modeling Combustion and Fires	2	
Two-Phase and Boiling Flows: Experiment, Modeling and Simulation: II	5	
Machine Learning for Reactor TH: Progresses, Challenges, and Opportunities	panel	Wednesday 3:15pm
Small Modular Reactor Thermal Hydraulics	2	
Gas-Cooled Reactor Thermal Hydraulics	4	
Multiphysics-Coupled Thermal-Hydraulic Analysis Methods	3	

NUTHOS-13

September 5-9 2022
Taichung, Taiwan

See more information in the following page!

NUTHOS-13 will take place in Hsinchu City, which is as known as the Silicon Valley of Taiwan. Conference daily tour will be arranged for participants to visit TSMC Museum of Innovation, Industrial Technology Research Institute, National Synchrotron Radiation Research Center to discover the latest showcase of technology development in Taiwan.

NUTHOS-13 update (As of May 9th, 2022), cont.

As of May 9, 2022 (Revised Paper Acceptance: 5/30-6/10)

Abstract

- On-line submission: 204
  - Accepted：190
  - Rejected due to repeated submission：2
  - Author withdrew ：12

Draft Paper

Total: 142/190

- Draft Paper review completion: 35/142

Sum	190

Track – Abstract	Number
1. Fundamental Thermal-Hydraulics	29
2. Computational Thermal-Hydraulics and CFD Method	37
3. Experimental Thermal-Hydraulics	23
4. Safety and Severe Accidents	45
5. Thermal-Hydraulics and Safety of Advanced Reactors	22
6. Plant Operation and Maintenance	5
7. Plant Diagnostics and Monitoring	9
8. Small Module Reactors and Micro Reactors	8
9. Special Sessions- Decommission and Spent Fuel Management	12
Sum	**190**

Track - Draft Paper	Number
1. Fundamental Thermal-Hydraulics	24
2. Computational Thermal-Hydraulics and CFD Method	24
3. Experimental Thermal-Hydraulics	17
4. Safety and Severe Accidents	38
5. Thermal-Hydraulics and Safety of Advanced Reactors	13
6. Plant Operation and Maintenance	3
7. Plant Diagnostics and Monitoring	3
8. Small Module Reactors and Micro Reactors	8
9. Special Sessions- Decommission and Spent Fuel Management	12
Sum	**142**

Country/Region - Abstract	Number
Belgium	1
Canada	1
China	38
Czech Republic	1
Finland	1
France	9
Germany	14
Hong Kong	2
India	6
Italy	4
Japan	27
Lithuania	3
Netherlands	1
Poland	2
Russian Federation	2
South Korea	40
Spain	1
Sweden	5
Switzerland	2
Taiwan	27
United Arab Emirates	1
United States	2

Country/Region - Draft Paper	Number
Belgium	1
Canada	1
China	27
Finland	1
France	4
Germany	13
Hong Kong	2
India	5
Italy	4
Japan	19
Lithuania	3
Netherlands	1
Poland	1
South Korea	26
Spain	1
Sweden	4
Switzerland	2
Taiwan	24
United Arab Emirates	1
United States	2
Sum	**142**

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

March 6-11, 2022 • Virtual Meeting hosted from the Square, Brussels, Belgium

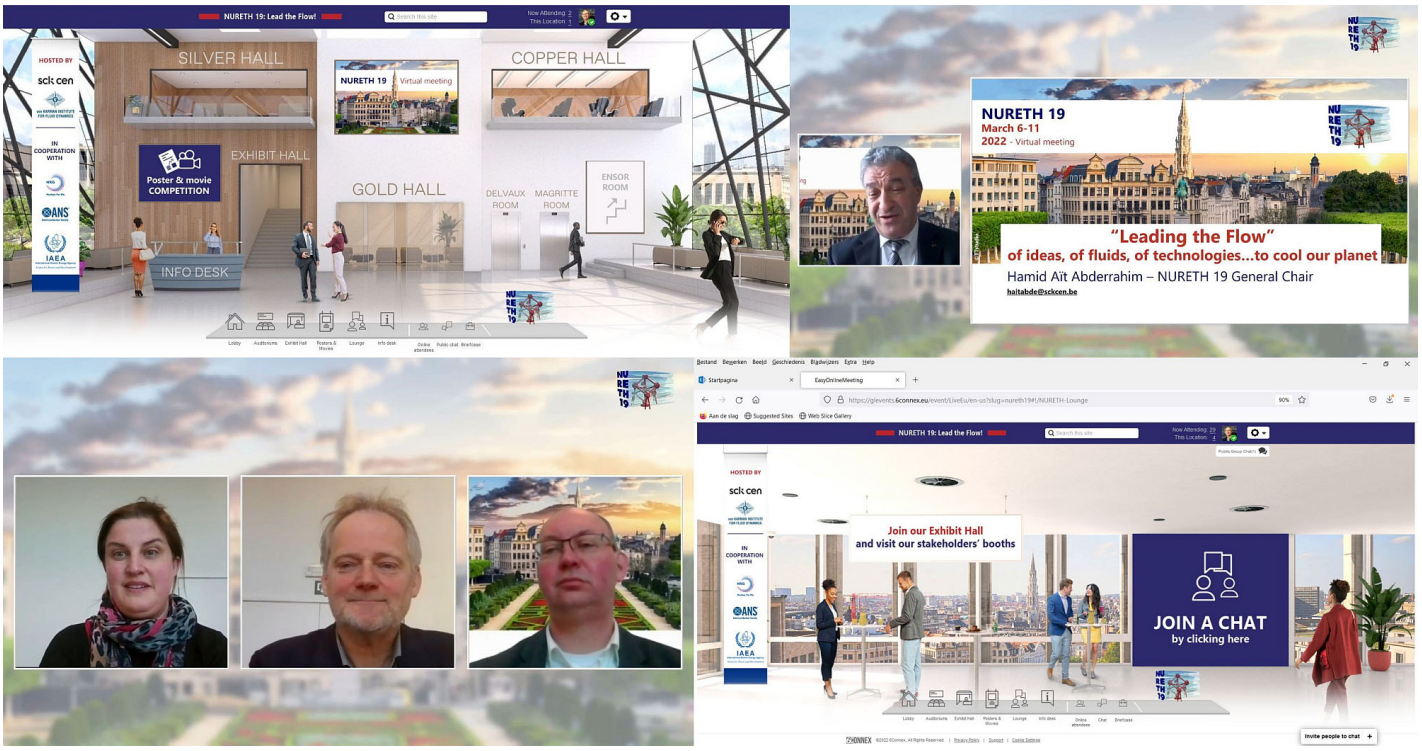
Lead the Flow. From March 6-11, 2022, SCK CEN and the Von Karman Institute, in collaboration with NRG and ANS, hosted the 19th International Topical Meeting on Nuclear Reactor Thermal Hydraulics virtually from the Square, Brussels, Belgium. In the heart of Europe, cultures swirl together in a creative mix of art de vivre, know-how, heritage and surrealism. This creativity allowed us to respond flexibly to the challenges posed by COVID and continuously changing travel restrictions, resulting in the surrealistic but successful experience of organizing NURETH-19 in a virtual setting, with a small team on-site in Brussels for 710 participants connected on-line from 33 countries all over the world.

The NURETH-19 technical team and local organizing team in Brussels

A total of 1035 abstracts submitted to the conference resulted – after a thorough review – in 614 papers accepted to the program, delivered in five very full days, spread over six parallel technical sessions. 11 Excellent keynote speakers highlighted state-of-the-art developments in innovative areas. The Opening Plenary evolved around the conference's main theme *Lead the Flow*. Students and young professionals were challenged in a poster pitch competition and all participants were motivated to compete with their most stunning simulations or experiments in the new movie competition.
There was also time to celebrate and honor distinguished colleagues. We were especially honored to host the Bal Raj Sehgal Memorial Award Inaugural Ceremony. Technical awards were delivered to eight best papers, five young professionals, one

Continued on p.9

poster, one movie, two reviewers and three newly inducted NURETH fellows – prof. Horst-Michael Prasser, dr. Jose Reyes and dr. Chul-Hwa Song.
The combination of highly relevant topics, easy virtual access and free registration for students led to a very strong participation (188 registrants) to the seven pre-conference workshops on Friday March 4. Sponsors could show their knowhow and expertise in virtual booths, sharing various content and interacting on-line with the participants.
We are very thankful for the positive feedback we received from many participants about the virtual meeting platform! The nice and accessible environment, overall good quality of videos and sound and possibilities to interact were clearly appreciated. Also the post-conference video library with recordings of all sessions is considered a strong plus.



Impression of the virtual platform used for the conference.

The smooth organization (with some unavoidable hick-ups) is due to the hard work from the technicians of the Square and the local organizing team behind the scenes. In each of the six virtual meeting studios, four technicians took care of proper sound and visuals as well as smooth transitions between various screens, while the moderator from the local organizing team interacted with the speakers and passed questions from the speakers to the session chairs. In total an average of 40 people were present on-site continuously.
Each 12-hours' day of the conference was roughly divided in three time blocks to make the online meeting as comfortable as possible for attendees from all continents (49% Europe – 26% North America – 25% Asia). In Brussels' morning, presentations from Asian and European colleagues were scheduled, while in the late afternoon papers from USA, Canada and Europe were presented. Plenary events and keynotes were scheduled around the mid of the day to allow all colleagues to join. This reflects in the distribution of regional connections: 60% Europe – 18% North America - 15% Asia – 7% others. Maximum 300 participants were present on the platform concurrently. 350+ Hours were live-streamed over five days. 13987 Auditorium entries have been registered, together with 642 virtual booth entries and 16268 content views.
The local organizing committee would like to thank the general chairs, chairs and members of the different conference committees, sponsors, technical team and all colleagues that have made this unique conference a success! A special thanks goes out to the chair of the Technical Program Committee, prof. Elia Merzari, for generously sharing his experience in the organization of previous NURETH conferences.

Continued on p.10

Honors and Awards Committee Report

The Thermal Hydraulics Division held an award ceremony on December 1, 2021, at the ANS 2021 Winter Meeting in Washington, DC. Two THD 2021 Technical Achievement Awards (TAA) were presented to Professor Francesco D'Auria of the University of Pisa and Dr. Chul-Hwa Song of the Korea Atomic Energy Research Institute (KAERI). Prof. D'Auria virtually attended the Winter Meeting. In addition, the inaugural 2021 Bal-Raj Sehgal Memorial Award was informally presented to Dr. Elia Merzari of the Pennsylvania State University as we then anticipated that the NURETH-19 would be held virtually (The Bal-Raj Sehgal Memorial Awards are expected to be presented at the closest NURETH conferences). As a tradition, Professor D'Auria and Dr. Song are planned to each deliver a TAA lecture at the International Embedded Topical Meeting on Advances in Thermal Hydraulics – 2022 (ATH'22) to be held in conjunction with the 2022 ANS Meeting from June 12-16, 2022, at the Anaheim Hilton, Anaheim, CA. Please refer to the THD 2021 Fall Newsletter for details about these two award selections.

THD award ceremony at the ANS 2021 Winter Meeting. From left to right: Igor Bolotnov, Xiaodong Sun, Merzari, Song, and Bao-wen Yang (not pictured: D'Auria)

At NURETH-19 held in March 2022, the 2020 THD TAA recipient, Prof. Michael Podowski of Rensselaer Polytechnic Institute, delivered a TAA lecture, titled "Personal Remarks on Our Understanding of Multiphase Flow and Heat Transfer, with the Emphasis on Nuclear Reactor Applications." Furthermore, the Bal Raj Sehgal Memorial Award Inaugural Ceremony was organized by Prof. Jong Kim and co-chaired by Prof. Kim and Xiaodong Sun. Professor Sehgal's family attended this ceremony and his son, Dr. Ravinder Sehgal, representing the Sehgal family, shared very memorable stories about Professor Sehgal. The inaugural honoree, Prof. Merzari, delivered an award lecture, titled "Pioneering High-Resolution Full Core Simulations: What has Been Achieved, and Where Next." The Honors and Awards Committee wishes to acknowledge the Sehgal family for the generosity of establishing this award.

2021 NURETH Fellows

The recognition of NURETH Fellow was established in 2013 by the ANS THD with the assistance of the NURETH-15 organizers to recognize scholars who have made outstanding contributions to the NURETH

Continued on p. 11

Report on the 19th International Topical Meeting, cont.

After this unique experience of organizing a virtual NURETH conference, we are now looking forward to NURETH-20, scheduled in 2023 in Washington DC. We hope to meet you there in real life!

Katrien van Tichelen, Philippe Planquart and Ferry Roelofs
Chairs of the NURETH-19 local organizing committee

Behind the scenes picture of studio 2 'the silver room' with four technicians and a moderator

THD CSC Report

Now that Washington, DC has been selected as the local host for NURETH-20 and that the planning of NURETH-20 is well underway, the Conference Screening Committee (CSC) has started to consider NURETH-21 to be held in 2025. Currently, the intention is to hold NURETH-21 outside the US. The CSC is in the process of preparing a CFP for NURETH-21 that will be announced in July 2022. Interested parties are strongly urged to respond to the CFP.

The recently re-established THD Meritorious Service Award recognizes an individual for sustained and exemplary service to the nuclear thermal-hydraulic

Honors and Awards Committee Report, cont.

profession. The Honors and Awards Committee selected Dr. Kurshad Muftuoglu of General Electric-Hitachi Nuclear Energy as the recipient of THD's 2022 Meritorious Service Award for the award. This award recognizes Kurshad's long-standing contributions as THD's Program Committee Chair from 2004 to 2013, as Assistant General Chair of NURETH-12 (Pittsburgh, 2007), as General Co-Chair of NURETH-18 (Portland, 2019), as THD Executive Committee Chair in 2018, and other services to the ANS. Congratulations Kurshad and thank you for your outstanding service and contribution to the THD!

2021 THD Best Paper Award

The Honors and Awards Committee received nominations from the NURETH-19 Technical Program Committee for the 2021 THD Best Paper Award and selected the following paper as the 2021 THD Best Paper:

Julio Pacio, Shih-Kuei Chen, Yu-Min Chen, and Neil E. Todreas, "Identification of Open Issues in the UCTD Model and Proposed Improvements for Uses in Licensing," NURETH-19, March 2022.

Congratulations to the authors!

The recipients of the Excellence in Review Award, the Meritorious Service Award, and the Best Paper Award will be recognized at the THD Award Ceremony (scheduled to

Honors and Awards Committee Report, cont.

conference series and for their widely-recognized technical accomplishments by the international thermal hydraulics community. The THD Honors and Awards Committee selected the following scholars as the 2021 NURETH Fellows:

Professor Horst-Michael Prasser (ETH Zürich),

Dr. Jose Reyes (NuScale Power and Oregon State University), and

Dr. Chul-Hwa Song (Korea Atomic Energy Research Institute)

who were recognized at the NURETH-19 Award Ceremony and Closing Session.

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 THD Excellence in Review Awards:

2020

Awardee – Robert P. Martin (BWXT)

Honorable mention – Jun Wang (Univ. of Wisconsin, Madison)

2021

Awardee – Bao-Wen Yang (DEQD, Delta Energy Group)

Honorable mention – Ling Zou (Argonne National Laboratory)

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

2022 THD Meritorious Service Award

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Scholarship Committee Report

W. David Pointer

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 2022 Lawrence E. Hochreiter Graduate Scholarship is Mr. Arturo Cabral from Virginia Commonwealth University. The inaugural winner of the Vincent J. Esposito Graduate Scholarship is Mr. Brandon Aranda from the Massachusetts Institute of Technology.

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

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
2022 Brandon Aranda

Honors and Awards Committee Report, cont.

be held June 13, Monday) at the upcoming ATH'22 at the ANS 2022 Annual Meeting.

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 Honors and Award Committee members and all the nominators for their dedicated work! Congratulations to all our well-deserved honorees!

Xiaodong Sun
2021-2024 THD Honors and Award Committee Chair
xdsun@umich.edu
Kurshad Muftuoglu
2021-2022 THD Honors and Award Committee Vice Chair

Important Dates

November 1, 2022	ANS Scholarship Program Announced
November 15, 2022	ANS Scholarship Applications Open
February 1, 2023	ANS Scholarship Application Deadline

Nominating Committee Report

The THD Nominating Committee (NC) comprises the current Division Chair, Vice Chair, Program Committee (PC) Chair, and the Immediate Past Division Chair, and is chaired by the Immediate Past Division Chair. The goal of this committee is to nominate members for Division committees, including Division officers. The Division NC for the 2021-2022 ANS business year is composed of Wade Marcum (Chair), Elia Merzari, Bao-Wen Yang, and Igor Bolotnov (Ex-officio).

There is no new updates from the nomination committee during this reporting period. There were some nominees identified in the previous reporting period, and they have been voted in.

Strategic/Succession Plans

ANS THERMAL HYDRAULICS DIVISION
2022-2027 Operational Plan

The primary mission of the Thermal Hydraulics Division (THD) is to advance Thermal-Hydraulic engineering and science related to the nuclear power industry. It is also the goal of the THD to promote technology exchanges and social activities in the nuclear thermal-hydraulic community through various conferences, topical meetings, and webinars. In accomplishing this mission, the THD has the mission to promote high-quality technical publications and presentations relating to nuclear thermal hydraulics and to establish, stimulate, and maintain quality technical and professional approaches in the areas of nuclear thermal hydraulics. The last comprehensive Operational Plan was submitted to the Professional Division Committee (PDC) in 2012 and updated in 2016. It is our understanding that there is now no such requirement. This is a voluntary effort on the part of the division. This document outlines a 5-year (2022-2027) Operational Plan, which should not be considered a binding document, but rather a guide. It should be reviewed and updated as needed by the THD Executive Committee (EC), as appropriate, every year.

Mission:
To establish, stimulate, and maintain quality technical and professional approaches in all areas of nuclear thermal hydraulics. In furtherance of this mission, the Division shall devote itself specifically to:

- The advancement and dissemination of knowledge of thermal and hydraulic phenomena as they pertain to the steady-state design or transient performance of equipment in nuclear power plants and other segments of the nuclear fuel cycle.
- Aid in the integration and dissemination of thermal hydraulics information developed in research and design programs and from experience with operating nuclear reactors.
- Promote effective interchange of thermal hydraulics information among the many professional groups and organizations participating in the development and application of nuclear reactor technology.
- Provide a basis for interaction between the nuclear industry and regulatory groups.

5-year Goals:
The Division has the following goals for the period 2022-2027:

- Maintain the high-quality topical meetings sponsored by the division, with focus, in order of priority, on NURETH, NUTHOS, ATH, and ANS national meetings.
- Develop additional technical exchange programs, such as webinars, that leverage the increase of online professional activity in recent years.
- Promote the value of membership of the division to its members, in particular, those who do not attend the above technical meetings regularly.
- Innovate the communication approach of the division and make it consistent with the expectations of a changing demographic.
- Increase membership in the division, in particular with the under-represented groups, internationally and in

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Webmaster Report

The THD website has seen some new changes in the past six months. Such changes are the continuation of the previous webmaster goal of providing more visual content and organization of auxiliary web pages, the inclusion of social media, deadlines, and more information for events on the home page, and the added advertisements of the new webinar series. For this next meeting, the executive and program meetings will still be held virtually, once again placing importance on the website to provide communication for these meetings.

Looking forward to the future, the website is looking to change to support the ANS THD strategic plan. The THD website was built to serve those most actively involved in ANS THD, within the past year, the shift has been to become more inclusive towards new and less active members. Ove the next year, the goal is to bring more functionality to the THD website to aid not only those who are very involved in THD but provide opportunities for newer members to connect, participate and become more involved within the division.

Trevor Kent Howard
ANS THD Webmaster

industry. We seek to significantly increase the membership of the division in 5 years (target goal = 25%).
- Establish a pipeline for the leadership of the division, investing on young members and students.

Trends:
- After a decade of sustained growth of the membership of the division that has brought us to over 1200 members, the last two years have seen a significant decrease. In 2021, the membership of the division is at 971.
- Prior to the COVID pandemic, non-U.S. participation in the division-sponsored topical meetings (NURETH, NOTHOS, ATH, etc.) continued to be strong. However, the international membership had not captured the benefit from the growth of the international conference participants.
- While the THD continues to contribute high-quality technical papers to both Topical and National meetings and represents a significant fraction of the papers that are contributed to National Meetings, due to the COVID-19 pandemic, the THD has not hosted a topical meeting in 2020 and 2021 (ATH'20 and NUTHOS-13 to be held in 2020 were both cancelled). The division is returning to hosting meetings in 2022.

Resource Requirements:
- The Division's financial requirements are usually met through income from Topical Meetings and the ANS Member Allocation. However, no topical meeting has been held in 2020 and 2021.
- The Thermal Hydraulics Division enjoys a continuing good supply of human resources for governance and technical program activities. However, student and young member participations need to be stimulated as communication with these groups is increasingly challenging. The Officer/Committee structure and Succession Plan are included in Appendix A.

Proposed Metrics corresponding to goals:
- To track program activity. Sum of papers published in the last NURETH, ATH,NUTHOS and the past four ANS national meetings. This value should be computed every year and track upwards. Variations of +/-10% each year should be considered normal but the overall trend over five years should be positive and ideally surpass 5%.
- To track program quality: Sum of papers published in special issues as a fraction of the papers published in the topical meeting as a whole (previous metric). This number should keep constant (yearly variations of +/-5% should be considered normal) or track upwards after five years.
- Total membership. The membership as measured at a fixed point in time (it varies within the year). It should trend upward year by year. The ambitious goal of doubling the division membership is set for 2027.
- Improved communication. Regular (yearly) surveys should be conducted evaluating division communications. Surveys results should be trending upwards in time. An alternative could be social media participation metrics.
- Student and young member participation. Proactive plans should be implemented to promote the number of Young members and student members' participation, especially, in specific activities organized by the division.
- International member participation. The total number of international member participation in the activities of the division should trend upwards.

THD One-Year Tactical Plan for 2021 (Final)

	Status
1. Nominate a THD representative for ANS Young Member Group.	**Complete.**
2. Organize at least five sessions or ATH embedded topical at each national meeting	Complete.
3. Support NURETH topical meeting (biannually)	**Complete.**
4. Support NUTHOS topical meeting (biannually)	**Complete.**
5. Support the Young Professional Research Competition (annually)	**Complete.**
6. Implement budget and spending plan for sustainable THD operation	**Complete.**
7. Encourage publication of THD member's papers in ANS technical journals and other journals devoted to TH topics or a recent THD co-sponsored topical meeting	**Complete**. Special issues of ATH'20.

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8. Contribute to ANS National Student Conference	**Complete for 2022 student conference.**
9. Contribute to NEED/ANS scholarships	Complete.
10. Contribute to ANS for student travel support to national meetings	None this year due to uncertainty.
11. Cover ANS THD Honors and Awards costs as needed	Complete.
12. Select the recipient of the THD Awards (Sehgal, TAA, Service, NURETH Fellows).	**Complete.**
13. Present THD Best Paper Award (BPA) to deserving candidate from past year	None planned this year.
14. Issue two THD newsletters	**Complete.**
15. Use broadcast e-mail to communicate upcoming THD special sessions and topical meetings	**Complete.**
16. Update succession plan for THD governance	**Complete.**
17. Update THD web page.	**Complete.**

THD Five-Year Strategic Plan for 2022-2027

List of strategic activities:

- Maintain or increase quality timeliness of the technical content of the division, with a particular focus on advanced reactor thermal-hydraulics.
- Increase EC member activity assigning specific outreach task. The chair shall be responsible for these assignments in coordination with EC members.
- Identify representatives in EC and/or create a position as industrial liaison or leading special function committee. This EC member would be organizing, in collaboration with other division members, functions dedicated to outreach. These may include: Special Sessions for industrial members, social gatherings, special events, invited industrial speakers.
- Increase international collaboration by nominating foreign members to the THD Executive Committee and by appointing non-U.S. members to the THD Technical Program Committee. International EC members are to be tasked to increase partnership with foreign societies and stimulate membership.
- Develop joint activities with international societies that go beyond co-sponsorship of meetings.
- Increase online activities of the division, including webinars with a regular schedule, and use them to actively recruit hosts. The webinars should target audiences of particular relevance, in particular, industry speakers.
- Appoint and support a YMG liaison.
- Nominate at least one student member and one young member to serve or have one student member serving on THD Executive Committee. These EC members (and the YMG liaison if she/he/they is not a member of EC) are to organize a specific activity EACH targeting young members and EC members.
- Develop outreach to university department concerning thermal-hydraulics research and THD.
- Advertise the scholarships of the Division broadly.
- Empower Membership committee to develop strategies to improve value for the division members.
- Develop an effective communication strategy for THD, including a social media presence.
- Support ANS Student National Conferences and student attendance at National and Topical Meetings by making contributions from THD funds. Aggressively advertise the activities of the division at ANS Student Conferences with at least one EC member representing the division.
- Support the Young Member Group by serving as Technical Division sponsor of YMG-organized technical sessions.
- Develop proposal to use funding in the division (and ANS as a whole) for mission support activities.
- Develop fundraising to fund activities of the division.

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APPENDIX A

THD Office/Committee Structure and Succession Plan

These names are tentative. Officers and committee chairs/vice-chairs must be nominated by the nominating committee and approved by the Executive Committee, according to the bylaws and rules of the division.

Office[1]	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026
Chair	E. Merzari	B. W. Yang	A. Manera	I. Bolotnov	S. Bajorek
Vice-Chair	B. W. Yang	A. Manera	I. Bolotnov	S. Bajorek	
Secretary	A. Manera	I. Bolotnov	S. Bajorek		
Treasurer	I. Bolotnov	S. Bajorek			
Committee					
Technical Program					
Chair	I. Bolotnov	D. Shaver	D. Shaver	D. Shaver	
Ass. Chair	D. Shaver				
Secretary	A. Manera	I. Bolotnov	S. Bajorek		
Honors & Awards[2]					
Chair	X. Sun	X. Sun	X. Sun		
Vice-chair	K. Muftuoglu	W. D. Pointer	C. H. Song	W. Marcum	E. Merzari
Web Page	M. Delgado/ T. Howard	T. Howard	T. Howard		
Newsletter	B. W. Yang	A. Manera	I. Bolotnov	S. Bajorek	
Nominating[3]	W. Marcum	E. Merzari	B. W. Yang	A.Manera	I. Bolotnov
Membership	M. Zimmer	M. Zimmer	M. Zimmer		
Scholarship	D. Pointer	D. Pointer	D. Pointer		
Conference Screening	F.B. Cheung	F.B. Cheung	F.B. Cheung	F.B. Cheung	

(1) Candidates selected by Nominating Committee, preferably selected from the current Executive Committee or Technical Program Committee.

(2) This committee includes the most recent four EC chairs of the THD and three members that are elected by the Nominating Committee.

(3) This committee includes the immediate past division chair, the current division chair, and the current vice-chair of the THD. It is chaired by the immediate past division chair.

Financial Report

The budget for 2022 has been proposed and approved by the THD EC is shown on the right.

Table 1 shows for all five award funds:
1.The Service award account started at a fund level of $21,000, with incomes from investment gain ($2,589). Total value is $23,589 at the beginning of 2022.
2. TAA award starting balance was $54,649. Healthy investment gain ($6,738) allowed to award two TAA this year (as planned) to Dr. Chul-Hwa Song and Dr. Francesco D'Auria ($2000 each). End of year balance is $57,237 at the beginning of 2022. Division sincerely appreciates the donation by Dr. Song to the Esposito fund.
3.With the investment gain of $10,411, the Lawrence Hochreiter scholarship account reaches a new balance of $91,843. This accounts for $3000 scholarship award in 2021 to Adam Kraus. Spending limit for this award is $7,862 for 2022.

Table 1: ANS THD Award Funds (March 31, 2022)

	Service	TAA	Hochreiter	Esposito	Sehgal
Balance Forward from 12/31/2020	**$21,000**	**$54,649**	**$84,433**	**$75,000**	**$23,000**
Budget Funds					
Investment Gain (up to 12/31/2021)	$2,589	$6,738	$10,411	$9,248	$2,836
Division Designated (2021)				$2,000	
Total Income	$2,589	$6,738	$10,411	$11,248	$2,836
Budget Expenses					
Awards		$4,000	$3,000		$2,000
Plaques		$150			$75
Other Expenses					$0
Total Expenses	$0	$4,150	$3,000	$0	$2,075
Net	$2,589	$2,588	$7,411	$11,248	$761
Total Year End Funds	**$23,589**	**$57,237**	**$91,843**	**$86,248**	**$23,761**
Spending Limit (8.56%)	$2,019	$4,900	$7,862	$7,383	$2,034

	2021 Budget	2021 Actual	2022 Proposed
Balance Forward from Previous Year	$43,770	$43,770	$42,425
Budget Funds			
Member Dues Allocation ($2/ full dues member; $1 / reduced dues member)	$2,300	$1,606	$1,604
Division Income			
Total Income	$2,300	$1,606	$1,604
Budget Expenses			
Newsletters, Website			
Awards & Plaques	$645	$1,223	$1,250
National Meeting Costs			
Topical Meeting Costs			
Division Officer Expenses			
Student Support	$2,500	$500	$2,500
Future Activity			
Scholarship/NEED Funding	$500	$500	$500
YMG Support			
Other Expenses		($500)	
Total Expenses	$3,645	$1,723	$4,250
Net	($1,345)	($117)	($2,646)
Total Year End Funds	$42,425	$43,653	$39,779

4.Esposito award has been funded at $75,000, gained $9,248 and received $2000 donation. The balance is $86,248 with spending limit of $7,383.
5.The newly established Bal-Raj Sehgal Memorial Award has been funded by the family at $23,000. The gain of $2,836 fully covered the award to Prof. Elia Merzari given at NURETH-19. The Sehgal award will be given every 2 years at NURETH meetings.
6.The general account is at $43,653 at the end of 2021, and the total value of the 5 award accounts is over $280,000 at the end of 2021 with projected total spending limit of over $24,000.

Igor A. Bolotnov
THD Treasurer (2021-2022)

In Memory -- Recent Passing of Professor Peter "Pete" Griffith [1927-2022]

Professor Peter "Pete" Griffith, a prominent member of the nuclear reactor thermal-hydraulic community, passed away on March 5, 2022 in Belmont, MA. Pete will be greatly missed and fondly remembered by many students, friends, and colleagues. Just like his persistence and enjoyment in biking from Belmont to MIT campus through any weather, Pete's passion for life as well as his dedication in education and research has left us with inspiration and has made long-lasting impacts in the fields of thermal-hydraulics and nuclear safety. The following memory brief was provided by Prof. Neil E Todreas of MIT based on MIT NEWS MEMORIAL ON PETE.

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In Memory -- Recent Passing of Professor Peter “Pete” Griffith [1927-2022], cont.

Peter "Pete" Griffith ScD ’56, professor emeritus of mechanical engineering at MIT and a pioneer in heat transfer and fluid mechanics, passed away at age 94 on Saturday, March 5.

Griffith was born on Sept. 23, 1927, in London but was raised in Huntington, Long Island. He spent a lot of his time in the woods and on the beach by his childhood home. Those closest to him knew that Griffith spent his time making forges and tinkering with debris he’d come across. Following his service in the U.S. Army, Griffith earned his bachelor’s degree in mechanical engineering from New York University in 1950 and his master’s in mechanical engineering in 1952 from the University of Michigan, where he worked as a teaching fellow. That same year, Griffith came to MIT and worked as a research assistant until 1954, when he became an instructor. In 1956, Griffith earned his ScD from MIT, where he then joined the faculty in the Department of Mechanical Engineering and would spend the remainder of his career.

Griffith was the longest-serving member of the MIT Heat Transfer Lab since its inception in the 1870s and performed research with the support of over 200 students in the fields of nuclear reactor design, supercritical water heat transfer, flow stability, two-phase flow, phase separation, and steam bubble collapse induced water hammer. His findings are published in a wide variety of literature, including mechanical, chemical, and nuclear engineering works. Griffith has approximately 100 publications in the fields of heat transfer and fluid mechanics.

Griffith’s research was sponsored by numerous industrial sponsors and government agencies including the Office of Naval Research, the National Science Foundation, the U.S. Department of Energy, the Nuclear Regulatory Commission, General Electric, Mobil, AEP Energy, and others. When he wasn’t teaching, Griffith also spent time consulting for many of those same organizations, as well as Los Alamos National Laboratory, Idaho National Engineering Laboratory, United Technology, IBM, Thermo Electron, and more.

During Griffith’s time at MIT, he helped shape the new undergraduate curriculum by serving on the committee for Thermal Fluids Engineering to develop viable course plans for the four disciplinary course sequences. Rain, shine, or snow, he could be found riding his bike to campus. Griffith was dedicated to helping students understand the complexity of heat transfer and fluid dynamics and served on thesis committees supervising more than 200 theses.

In addition to his membership to the American Society of Mechanical Engineers (ASME), Griffith was a member of the American Nuclear Society. In 1997, a close colleague and mentee of Griffith, John Lienhard, established the Peter Griffith Prize, where Griffith’s friends, colleagues, and former students contributed to the award in his honor. It’s granted each year to the best undergraduate experimental project in the Department of Mechanical Engineering. During that same year, Griffith also received the J.P. Den Hartog Distinguished Educator Award. In addition to the many best paper awards he received, Griffith was awarded the Melville Medal from ASME in 1986.

Griffith is survived by his daughter and son-in-law, Kat Griffith and Soren Hauge; his stepdaughter and son-in-law, Sara and Stephen Young; and his five grandchildren.

Link to : MIT NEWS MEMORIAL ON PETE https://lyris.asmestaff.org/t/685227/4656780/116261/0/

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Bao-Wen Yang, Editor
THD Vice Chair (2021-2022)
http://thd.ans.org

American Nuclear Society
Thermal Hydraulics Division