MEETING MINUTES

American Nuclear Society – Thermal Hydraulics Division Program
Committee Meeting
2021 ANS Annual Meeting
3 PM – 5 PM US Eastern Time, Sunday, June 13, 2021
https://www.ans.org/meetings/am2021/calendar/event-134/
Password: 089300

Attendees (see Attachment A): Igor Bolotnov (NCSU), Wade Marcum (OSU), Elia Merzari (PSU), Bao-Wen Yang (DEQD, Delta Energy Group), Fan-Bill Cheung (PSU), Dillon Shaver (ANL), Xiaodong Sun (University of Michigan), Matthew Zimmer (NNL), Yassin Hassan (Texas A&M), Robert P. Martin (BWXT), Marylin Delgado (Texas A&M), Minghui Chen (University of New Mexico), , Jun Wang (UW), Steve Arndt (NRC), Guillaume Mignot (OSU), Subash Sharma (UMASS), , Ling Zou (ANL), Jun Fang (ANL), Jinyong Feng, Caleb Brooks (UIUC), Rodolfo Vaghetto (Texas A&M University), Guanyi Wang (ANL), Xu Wu (NSCU), Shanbin Shi (RPI), Brain Woods (OSU), Karen Vierow Kirkland, Jun Liao (WEC), Trevor Howard, Stephen Bajorek , M. Moussaoui, Piyush Sabharwall (INL), Michael Riley, Izabela Gutowska, Alper Yildiz (X-Energy), Charles Martin, Chul-Hwa Song (KAREI)

1. Opening: (Bolotnov)

Dr. Igor Bolotnov opened the meeting and referred to his posting on the chat with link to the summary of the paperwork, which Marilyn posted for both PC and EC meetings. In terms of program committee meeting, there are 4 documents uploaded.

2. Approval of Meeting Agenda: (All)

(**ATTACHMENT A** for *PROPOSED AGENDA*)

Dr. Bolotnov went over the proposed agenda (see attached "PC_Agenda_AM_2021-2" for approval. Draft Meeting Agenda provided (see **Attachment B**)

MOTION to approve: Prof. Elia Marzar

SECOND by: Prof. Bao-Wen Yang

Discussion: Prof. Fan-Bill Cheung proposed to include the status report for NUTHOS-13, scheduled to be held next year, to the Agenda as a part of Old or New Business.

Motion to amend the Agenda: Dr. Igor Bolotnov

Second: Dr. Robert Martin

Discussion: No more discussion.

APPROVED Amended Agenda UNANIMOUSLY

3. Approval of Minutes from 2020 Virtual Winter Meeting: (All)

(**ATTACHMENT C** for *MEETING MINUTES*)

Draft Meeting Minutes from 2020 Winter Meeting (see **Attachment C**) is also available on-line.

Motion to approve 2020 WM Meeting Minutes: Dr. Igor Bolotnov

Second: Dr. Robert Martin

Discussion: No discussion.

APPROVED : 2020 WM Meeting Minutes was approved UNANIMOUSLY

4. <u>Update on THD Sessions for the ANS 2021 Virtual Annual Meeting: (Bolotnov/Shaver)</u>

(**ATTACHMENT D** for *2021 ANS Virtual Annual Meeting*)

Dr. Bolotnov reported the status of THD Session in the current ANS 2021 Annual Meeting.

Dr. Igor Bolotnov: For this annual meeting there are 40 summaries submitted, which is in-line, in general, with similar meetings in the past. Met the deadline when submitting the sessions. Plan to have a total of 10 sessions, including 2 panels. All sessions will be via Zoom. Only have 2 parallel sessions, the rest of the sessions are non-conflicting. Each presentation to be kept at 15 minutes, and 5 minutes Questions and Answers. Each session will have an ANS representative monitoring it. Meeting registration is required to access session link, which'll only be available 30 minutes before the start of each session. This year the paper rejection rate is around 15%. Appreciate help of the reviewers, already have final reviews for the sessions. For this meeting there are 136 reviews submitted and 37 reviewers participating. Have an average of 3.4 reviews per paper, which is slightly above average. Out of all the reviewers, 25% are participating in the process. On the list of reviewers, Dr. Robert Martin is number 1 for number of reviews, and there are quite a bit of people who reviewed more than 5. Would like to have the positions of session co-chairs to be filled up, and would like to have both present at the sessions.
List of sessions are in the document. Majority of the sessions have 5 papers, there is one session that has 6, which is organized by Korean colleagues, and they prefer to have a single session, which is also why some sessions are combined.

Maria Avramova and Mihai Diaconeasa: Both could not make it to the PC meeting and couldn't confirm to chair the assigned sessions. Mihai confirmed earlier.

Subash Sharma and Jun Wang: Confirmed good to go for session *General Thermal Hydraulics and Heat Transfer Fundamentals*.

Igor Bolotnov: Confirmed good to go for session *Challenges and Opportunities in Thermal Hydraulics of Load-Following Nuclear Systems [P]*, will confirm with David Pointer that he can make it.

Ling Zou: Because their session, *Thermal Hydraulics Research in ARPA-E Programs [P]*, only has 4 presenters, would most likely assign 20 minute sessions to each, should be good.

Xiaodong Sun: Dr. Kim and Xiaodong Sun will take care of the *Thermal Hydraulics R&D Activities in Printed-Circuit Steam Generators of Advanced Nuclear Reactors* session. Dr. Kim is in Korea, so might not be able to sign in, but Xiaodong Sun should be able to do that.

Igor Bolotnov: This is the only session that'll run longer, but they've checked with ANS in regard to the length.

Trevor Howard: Confirmed that they are good to go for session *Thermal Hydraulics Research in VTR and TCR Programs*.

Bob Martin: Confirmed good to go for session *Thermal Hydraulics for Advanced Reactors.*

Jinyong Feng: Confirmed good to go for session *Computational Thermal Hydraulics – II*.

Shanbin Shi: Confirmed good to go for session *Experimental Thermal Hydraulics*.

Elia Merzari: Confirmed good to go for session *Computational Thermal Hydraulics – III*.

Igor Bolotnov: So for sure have one person per session, and hopefully both chairs. There is recommended format from ANS for starts of sessions, and would have a 5 minutes' buffer before each session starts.

5. <u>Update on THD Program for the Upcoming 2021 Winter Meeting (Bolotnov/Shaver)</u>

(**ATTACHMENT E** for *2021 ANS Winter Meeting*)

Dr. Bolotnov went over some statistics on paper submission and review (see General meeting: Announced Sessions, Deadlines/Submittal Status)

Igor Bolotnov: Dates have changed, the hotel went out of business, so they had to find a new hotel, and so the dates for Winter Meeting (2021 WM) is changed to November 30th through December 4th. The new scheduling is Tuesday through Saturday. For THD, the submission window closes July 12th, 2021. Reviews are due August 13th, 2021. Look out for emails from ANS, which come from Igor Bolotnov. Please help out if possible, very busy, and reach out to contributors to make sure this meeting is a success. Expecting over 100 submissions, which will require 200 plus reviews, need a lot of reviewers.

It will be 14 sessions including 2 panel sessions.

1. High Performance Computing applications in TH [P]:
   Elia Merzari & Igor Bolotnov
2. TH issues in Licensing of Advanced Reactors [P]
   Elia Merzari & Steve Bajorek
3. Computational Thermal Hydraulics

Dillon Shaver & Jun Fang

4. Experimental Thermal Hydraulics
   Bao-Wen Yang & Rodolfo Vaghetto
5. General Thermal Hydraulics
   Ling Zou & Jun Wang
6. Two-phase Flow and Heat Transfer Fundamentals
   Subash Sharma & Caleb Brooks
7. Young Professional Thermal-hydraulic Research Competition
   Matthew Zimmer & Xu Wu
8. Advanced reactor TH
   Lander Ibarra & Lane Carasik
9. Advancements in Experimental Thermal Hydraulics
   Marilyn Delgado & Xiaodong Sun
10. Application of Digital Twins for Thermal Hydraulics
    Donna Guillen & Annalisa Manera
11. TH Applications in the Advanced Reactor Demonstration Program
    Wade Marcum & Dillon Shaver
12. Thermal Hydraulics for SMR and Micro-Modular Reactors
    Bob Martin, Brian Woods & Yassin Hassan
13. Thermal Hydraulics Research and Development in the VTR (co-sponsored with RPD)
    Guillaume Mignot & Jun Kim
14. Thermal Hydraulics Research in the TCR (co-sponsored with RPD)
    Dave Pointer & Lane Carasik

Prashant Jain and Florent Heidet

Elia Merzari: Suggest to switch the order between Elia Merzari and Steve Bajorek for the 2nd session.

Steve Bajorek: It is fine with him to switch the order.

Igor Bolotnov: It seems like August 13th is the deadline for the first review. Do not know when the schedule will be set, did not get anything in regard to the schedule, or when second review is due.

Since this is the first time Xu Wu is co-organizing the Young Professionals research competition session, Dr. Matt Zimmer, please work with Xu Wu and send him a template.

QUESTIONS/COMMENTS:

Xiadong Sun: The call for paper first notification is August 13th, revised summary is due September 1st, pushed back by about a month.

Igor Bolotnov should get an email with the details soon.

Charles Martin: Just asked Paula Cappelletti to let them know, will update if hear anything back.

Xiadong Sun: Plan is going to be some virtual meetings plus some in-person meetings.

Elia Merzari: Others will have the option to upload the videos if they so desire, won't be virtual presentations. Hybrid meetings cost about double regular meetings.

Xiaodong Sun: Virtual meetings watched live may not be possible since the cost is higher, but they may have uploads of the recorded meetings, but even so, recoding of each sessions could be expensive.

Guilaume Mignot: Question with regard to session 13 for the VTR, are they responsible for the RPD side of it? Do they have any names on that side, or do they need to reach out to them? He'll reach out to Florent Heidet (ANL) to confirm.

6. Planning for the Future 2022 Annual Meeting (Bolotnov)

Dr. Bolotnov hosted the discussion and review for 2022 Annual Meeting.

Igor Bolotnov: The situation is special since we have the embedded topical ATH this time. In the past, we either had no general sessions or just one general thermal- hydraulics session because don't want to take away from the embedded topical. Should just do one session as general thermal-hydraulics?

Xiaodong Sun: Tried to have discussion with TPC chairs, Dave Pointer, Doug, and Lucas, but didn't happen yet. Prof. Xiaodong Sun suggests to have the summary session only for the general part of the meeting and then the other 4 paper sessions in the ATH 2022 if that's agreeable with the PC. Having the summary session would still provide the opportunity for members to participate if they don't want to write a full paper, because still have NURETH, NUTHOS, etc.

Elia Merzari: For ATH '18, accepted summaries in the ATH systems. Better because allows them to then move papers in between sessions and have a uniform program. If do the other way, would end up with a mix of things. Suggests summaries listed in the call-for-paper for ATH and have no calls for the Annual meeting.

Igor Bolotnov: Agrees with proposal. Good idea for this transaction option.

Bob Martin: Since, moving forward, ANS will only have these 3-days meetings, would this make it more difficult to squeeze more in, not only the regular meetings, but also the embedded meetings? Could the embedded meetings go on to a 4th day?

Xiaodong Sun: Embedded can go to Thursday if needed. Moving forward, all national meetings, the technical part of meetings will be 3 days. The board meetings could still take place on Thursday. The technical meetings will end, at least for now, on Wednesdays. These apply if meetings start on a Sunday. The winter meeting will start on Tuesdays, so 3-days technical meetings are counted from Tuesday. Elia Merzari has this same understanding as well.

Bob Martin: Provides a lot more latitude for them to do their program. Agrees that ATH summary papers is spot-on.

Baowen Yang: Who will be sharing the financial responsibility for the extra day? ANS or the individual division?

Elia Merzari: Principal meetings can go for extra days, but need to get contracts in early to know for sure if there is going to be a need to negotiate for the extra days as they might not have enough rooms for the meetings. So better to pre-plan. For all meetings ANS takes the financial responsibility. In reality have 2 and a half days, so want to schedule all your sessions, potentially, between Tuesday and Wednesday, which means, if end up with numbers similar to ATH '18, would be a challenge, 4 sessions parallel.

Igor Bolotnov: In the 2022 Annual meeting they will not have ANS general meeting sessions because they'll have embedded ATH for this specific Annual. Anyone who wants to volunteer to be sessions chairs or organizers for the ATH, please get in contact with the organizers.

7. NURETH-19 Update (Merzari)

Dr. Elia Merzari presented the status updates for NUETH-19.

Elia Merzari: The deadline for abstracts was March, and the notifications were sent out. Received 1,030 abstracts, of which most of them were accepted, and were notified at the end of April. Papers are due at the end of June. Review process already started. Please respond in timely manner. Hopeful meeting will take place as planned.
Review period closes out at the end of August. Meeting is March 6th to 11th. The website is nureth19.com. Encourage those who need to apply for visa to do so immediately. To request visa letter there is an email address for organizations concerned.
The meeting is expected to be in person. Many exciting events planned, including the banquet planned at Autoworld Museum in Brussels. We expect to have an excellent meeting.
Currently, there are no hybrid meeting options and no remote joining because of cost. Do not think postponing is an option. If need to cancel, would know in several months. For sure, organizers in Europe would not

organize a virtual meeting, do not have infrastructure for it, but if meeting is cancelled, then might be able to organize virtually through ANS.

Bob Martin: Maybe a compromise could be to record the plenaries or opening plenaries and put on YouTube, or something similar. Could also serve as marketing purpose. The opening plenaries have good content that could be put up long-term, which would be good for their division. Something to consider.

Maybe also include keynotes, awards, special sessions, etc.

Elia Merzari: A comment on hybrid costs and registration. A/V typically doubles. Hybrid registration for M&C would be 75% of the total, so even through its remote, the virtual registration would be 75% of the total. Might be similar for ANS. Not going to be the 300USD that they've been paying for remote meeting, would be 600USD, 700USD, or maybe even more. For ANS meeting, going to be more like 800USD.

8. <u>Planning for ATH'22 Embedded Topical in 2022 ANS Annual (Song/Sun)</u>

Prof. Sun presented the planning for ATH'22 embedded topical meeting.

Xiaodong Sun: Organizing team believes it is best to keep the meeting in June of next year. The meeting was approved with Elia and Igor's help after winter meeting 2019. Only needed one approval from NPC, so the meeting is final. Early this week, also had publication plans approved by NPC Meetings, Proceedings, and Transactions Committee. The meeting is official now. Currently, plan to have call-for-papers published sometime in July, the team is working on a draft for that. The general thermal-hydraulics summary session will be included in the call-for-papers. Currently, the papers will be due January 3rd, (Monday) 2022. Don't know the actual publication plan for the annual meeting yet, but it's going to be perhaps around that time, maybe a week or 2 later, but they decided to have the schedule for the full paper submission January 3rd, and the notification perhaps February 12th, which will be the same day as the annual meeting notification date. And, currently, the final paper will be due March 15th. Elia helped talk with Prof. Andy Klein to have a special issue from the conference in Nuclear Technology, similar to ATH '18 and '20. Page charge will be 25USD per page. As of now, the publications department is seriously examining the possibility of removing page charges, but that decision has not been made yet, and we won't know till winter meeting. Right now it is 25USD per page, which is half rate of the 50USD per page, max length is 14 pages, and will be published by ANS online. .

Wade Marcum: Final submission of papers is March 15th, which is only a week after NURETH-19, might have complications with people submitting in time, any back-up plan?

Xiaodong Sun: Thought about this, but David was not available this past week to discuss. From experience, there should be wiggle room, but don't want to publicize that. Currently, as they are working on CFP, if any members are interested in helping with sessions for ATH 2022 please contact Xiaodong Sun or David Pointer, so that they can include the sessions in the call-for-papers.

Elia Merzari: Typically do not have workshops at ATH because on Sunday there are a lot of committee meetings at the ANS meetings, so a lot of our memberships are tied. Also difficult to get a room on Sundays and the rooms on Sundays are costly. However I agree it should something to explore.

Bob Martin: This might be a good topic for the New Business section. If ANS starts pressuring them, should consider looking at different days besides Sundays. We are the only ones who really start on Sunday for the meetings, other division have started a few weeks ago.

Consider and pay attention to the forum used, hybrid, etc.

Jun Liao: For ATH, would we also be restricted to 2 or 3 days? What would the strategy be for that? More parallel sessions? Extend meeting for longer time? Reduce number of papers, or more selective? Reduce participation time to squeeze more papers in one session?

Xiaodong Sun: Just speaking for himself, do not want to reduce the number of papers if the quality of papers is high. Just need to have a better plan with the ANS meeting department so that they are more aware of our needs. At the end of these meetings there are going to be 3 embedded topics, and ATH is just one of those, might be some possibilities that they have to go into Thursday anyway for the amount of papers received, not just from ATH, but from the other embedded topics as well. Would prefer 20 minutes plus 5 and less parallel sessions. Need to continue working with ANS and the organizing team on these questions.

Karen Vierow Kirkland: See an opportunity for the division on how they do their committee meetings. Virtual methods would open up to more member participation as it'll be easier to join and become more active (more accessible).

9. <u>NURETH-20 Proposal request</u> <u>(Cheung)

Prof. Fan-Bill Cheung presented the status of proposal request for NURETH-20.

(**ATTACHMENT F** for *ANNOUNCEMENT*)

Fan-Bill Cheung: Worked with the Conference Screening Committee (CSC) to finalize the announcement for the call-for-proposal, 3-pages, which also includes the criteria. NURETH-16 was in Chicago, NURETH-17 was in China, NURETH-18 was in Oregon, NURETH-19 will be held in Belgium, so for NURETH-20, it'll most likely be held in USA, unless there are strong proposals from other countries. From geographical considerations, the conference would likely be taken place on the East coast. We are several months behind. Normally the deadline for proposal submission would be early this year, mid-January no later than February, and usually by today the CSC would already have decided on the host for the next conference. With the help of Wade , the announcement with the criteria was posted about a month ago. The deadline for proposal submission is July 15th, and the conference screening members will act immediately following this deadline. Hopefully, by the end of July, the CSC will be ready to recommend the top choice to EC for approval. The EC needs to act very quickly to give host and organization enough time to plan for NURETH-20 meeting.

Elia Merzari: Need to pay attention to time constraints with contract, would need to have calendar placement and preliminary approval around the same time in the September time frame to sign the contracts. Really need fast approval in July to make sure contract with hotel gets signed and budget prepared.

Xiaodong Sun: September 14th, the NPC screening have a meeting to screen some of the proposals, so would be good if EC can take action on the conference screening recommendation way before September 14th.
Needs to be basically within a few days of the July meeting.

Fan-Bill Cheung: The main purpose of creating a screening committee of 9, 3 from Asia, 3 from Europe, and 3 from US/Canada, is to speed up the process and make sure everything is done correctly and consistently. Of course, approval from EC is required for it to be official, but, so far, have not seen recommendation from the screening committee being denied, as the latter would defeat the purpose of creating one. Want to urge all EC members to respond quickly to give host enough time to prepare. Some members of the organizing committee want to postpone NURETH-20 to 2024, but it is critical for NURETH-20 to be held in 2023, as this would be an important milestone for the division to be back on track from the pandemic. Hope to have the host selected by the end of July and approved quickly by the EC in August.

Wade Marcum: Any questions or interested hosts please reach out to Fan-Bill Cheung or Wade Marcum.

10. Old Business (All)

(**ATTACHMENT G** for *PC Membership renewal and nominations*)

Prof. Bolotnov reported the membership renewal and nominations.

Igor Bolotnov: Each program committee members are serving 3 years, renew if the member remains active, don't renew if the member is not active, and can move him/her to advisory role. Also review members whom are active to potentially be members of PC. Have about 1/3rd of program committee members up for renewal or not renewal. The EC members are automatically part of PC, also EC leadership or THD leadership are also part of the PC plus 1 year. This year have a list of 8 names. One issue to fix is on the website, Jun Liao is listed as "Jun Lao", need to still fix that.

The recommendations were originally 5 names, but now moved to 6:

1. Maria Avramova
2. Caleb Brooks
3. Jinyong Feng
4. Donna Gullwn
5. Ferry Roelofs
6. Jun Liao

for another 3 years.

Move to advisory board:

1. Paolo Ferroni
2. Jeffery Lane

New members:

1. Victor Petrov
2. Subash Sharma
3. Guanyi Wang
4. Darius Lisowski

as active reviewers and participants.

New members' term expires in 2024.
23 members' term expire in 2022,
17 members' term expire in 2023,
15 members' term expire in 2024,
and 1 member's term expire in 2025.
PC will have 56 total members.

Fan-Bill Cheung: Made a suggestion that during each meeting make sure to limit the net increase in memberships such that, down the road, there'll always be room for new members to join. Net number of increase in membership should be limited to allow healthy flow in the subsequent years.

Igor Bolotnov: Currently have a net increase of 2 members.

Elia Merzari: The bylaws are unclear on the limit, but there is a total cap. The total cap should include the EC numbers.

Igor Bolotnov: Current official limit might be 75. Typically look at the past 3 years for review on memberships.
Marilyn to fix Jun Liao's last name on the website. When document is finalized, share with Marilyn.

11. New Business (All)

Professors Xiaodong Sun, Fan-Bill Cheung, and Bao-Wen Yang reported updates on NUTHOS-13.

Xiaodong Sun: NUTHOS-13
Supposed to be help in Vancouver, but was cancelled, postponed to 2024. Going to be held in Taichung, Taiwan instead, September 4th to 9th, 2022. Main sponsor is going to be Chung Hua Nuclear Society in Taiwan. ANS, Atomic Energy Society of Japan, Canadian Nuclear Society, Chinese Nuclear Society, and Korean Nuclear Society will co-sponsor the conference as usual. Hosting NUTHOS-13 in 2022 is special to the energy committee in Taiwan as the current Taiwanese policy is against nuclear, so having the 13th NUTHOS in Taiwan is unique and would help demonstrating that nuclear energy is still widely considered and helps fight global emissions. Taichung is only 30 minutes speed rail away from the airport, quite convenient city. Also the local organizing teams are planning on a number of technical tours, including 2.6GWatts pump energy storage, pumping water at night and wind during the daytime. Weather in September appears to be very nice, overall seems like going to be a very nice conference. Have not seen a call-for-papers yet, going to try to inquire.

Fan-Bill Cheung: NUTHOS-13 will be held 4 years since the last time a NUTHOS was held. It is very important for NUTHOS-13 to be successful. Everyone is encouraged to save some papers for NUTHOS-13 and budget their travel funds accordingly . A successful NUTHOS next year will help carry the momentum to 2024 in which year NUTHOS will be held in Canada, in a non-Asian country for the first time. This is critical to assure a smooth transition.

Baowen Yang: NUTHOS-13 is critical, not just for local nuclear community, but historically, Taiwan is the birth place of NUTHOS having the first meeting (NUTHOS-1) took place in Taipei, 1984. It is important to continue supporting this conference there. This is especially important as

the current Taiwanese government very against nuclear. NUTHOS was held 2 times in Taipei and once in Kaohsiung. Taichung can be reached from two international airports, one in Taipei (Taoyuan) and another one in Kaoshiung, both of them are only about 30 minutes speed train away. Recently, NUTHOS-13 received endorsement from Chinese Nuclear Society (CNS) to co-sponsor this conference. This is important news as it eliminates the original concern about support from China. The success of NURETH-19 is very important, but the success of NUTHOS-13 is also very critical to demonstrate how the nuclear community survived and emerge from the pandemic. So, encourage everyone to plan to attend.

Elia Merzari: Recommend to have call-for-paper (CFP) out ASAP.

Xiaodong Sun: Writing email to Prof. Ming Lee regarding CFP.

12. Adjournment (Marcum)

Yassin Hassan: Bad and good news to share.
Just got informed about 3 hours ago, concerning the news of Dr. Ivan Catton, Professor at University of California – Los Angeles, passing away. Professor Catton was a member of the Thermal Hydraulics Division and had many contributions in nuclear thermal hydraulics field.

Good News: Congratulations to Bob Martin, he has been elevated to the ANS Fellow rank.

MOTION: Igor Bolotnov moves to adjourn PC meeting.

PC meeting is adjourned.

ATTACHMENT A

Roll call

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Attendees (see Attachment A):

Attendees (Page 1 of 3)

Name	Organization	Present (Mark as Present)
Igor Bolotnov	NCSU	Present (Chair)
Dillon R. Shaver	Argonne National Laboratory	Present (Vice-Chair)
Bao-Wan Yang	Delta Energy Group	Present
Wade Marcum	OSU	Present
Elia Merzari	PSU	Present
Fan-Bill Cheung	PSU	Present
Xiaodong Sun	University of Michigan	Present
Matt Zimmer	FMP	Present
Yassin Hassan	TAMU	Present
Robert P. Martin	BWXT	Present
Caleb Brooks	UIUC	Present
Stephen Bajorek	NRC	Present
Piyush Sabharwall	INL	Present
Brain Woods	OSU	Present

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Attendees (Page 2 of 3)

Marylin Delgado		Present
Minghui Chen		Present
Jun Wang		Present
Guillaume Mignot		Present
Jinyong Feng		Present
Shanbin Shi		Present
Steven Arndt		Present
Subash Sharma		Present
Xu Wu		Present
Rodolfo Vaghetto		Present
Ling Zou		Present
Jun Fang		Present
Guanyi Wang		Present
Jun Liao		Present

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Karen Vierow Kirkland		Present
Trevor Howard		Present
M. Moussaoui		Present
Izabela Gutowska		Present
Michael Riley		Present
Alper Yildiz	X-Energy	Present
Charles Martin		Present
Chul-Hwa Song	KAREI	Present

ATTACHMENT C

PC Meeting Minutes for Approval (2020 WM)

In order to reduce the file size, the attachments of this Minutes are not included. The complete 2020 WM PC Meeting Minutes can be accessed through link http://thd.ans.org/wp-content/uploads/2021/06/PC_Winter-Minutes_2020-11-15-For_Approval.pdf

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Program Committee Meeting
2020 ANS Winter *Virtual* Meeting
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https://oregonstate.zoom.us/j/91067127660?pwd=cVpQTnluUW9BMHBJZ1hlRE5UbkRndz09
Password: 718144

Attendees (see Attachment A): Igor Bolotnov (NCSU), Wade Marcum (OSU), Elia Merzari (PSU), Bao-Wen Yang (DEQD, Delta Energy Group), Annalisa Manera (University of Michigan), Fan-Bill Cheung (PSU), Dillon Shaver (ANL), Xiaodong Sun (University of Michigan), Matthew Zimmer (NNL), Lane Carasik (Virginia Commonwealth University), Yang Liu (Virginia Tech),Yassin Hassan (Texas A&M), Robert P. Martin (BWXT), Hishashi Ninokata (Politecnico di Milano), Marylin Delgado (Texas A&M), Minghui Chen (University of New Mexico), Ferry Roelofs, Jun Wang (UW), Steve Arndt (NRC), Guillaume Mignot (OSU), Seungjin Kim (Purdue), Subash Sharma (UMASS), David Pointer (ORNL), Ling Zou (ANL), Jun Fang (ANL), Jinyong Feng, Lander Ibarra, Hailei Wang (USU), Caleb Brooks (UIUC), Rodolfo Vaghetto (Texas A&M University), Guanyi Wang (ANL), Donna Guillen, Martin Lopez, Xu Wu (NSCU), Cody Wiggins, Cihang Lu, Shanbin Shi (RPI), Seung Jun Kim (Purdue), Xu Cheng (KIT), Dean Wang (NCU), Brain Woods (OSU), Victor Petrov, Yan

1. **Opening** (Bolotnov)

2. **Approval of Meeting Agenda** (All)
Draft Meeting Agenda provided (see **Attachment B**)
MOTION to approve: Elia Marzari
SECOND by: Bao-Wen Yang

NO DISCUSSION
APPROVED UNANIMOUSLY

3. **Approval of Minutes from 2020 Annual Meeting** (All)
Draft Meeting Minutes from 2020 Annual Meeting (see **Attachment C**)
MOTION to approve: David Pointer
SECOND: Xiaodong Sun

NO DISCUSSION

APPROVED UNANIMOUSLY

4. **Update on THD Sessions for the ANS 2020 Virtual Winter Meeting** (Bolotnov/Shaver)

Dr. Bolotnov gave an update that there are 25 sessions and 3 panels for THD 2020. All sessions and panels will be virtual. It is to be noted that registrations start 30 minutes prior. That is, the zoom links will be available 30 min prior to session starting time. A staff producer is assigned for each session to provide assistance.

Dr. Bolotnov continued with statistics on paper submission and review. This year, the THD division rejected about 24% of papers compared to the 20% the year prior. Review participation this year was sufficient with 42 review participants. This is only 25% of the division. More participation must be stimulated. Please see **ATTACHMENT D** for link to

full report.

The session assignments can be seen online or can be viewed in **Attachment E**.

For the Young Professional Thermal Hydraulic Research Competition program, Dr. Ling Zou went through the list of judges for competition:
Dr. Guanyi Wang
Dr. Subash Sharma
Dr. Jovica Riznic
Dr. Jun Wang
Dr. Justin Thomas
Dr. Guillaume Mignot
Dr. Donald Todd
And a backup judge: Dr. Haomin Yuan (ANL)

Dr. Ling Zou expressed his thanks to all those who participated in organizing or serving as judges for the YP programs in the past, special thanks to Dr. Zimmer for his helps in co-organizing this program. Considering the future and continuation of the Program, he recommended Dr. Xu Wu to take over the role and serve together with Dr. Zimmer for the future **Young Professional Thermal-hydraulic Research competition program.** Dr. Xu agreed to serve.

5. **Update on THD Program for the 2021 Annual Meeting in Providence, RI (Bolotnov/Shaver)**

Dr. Bolotnov announced panels and sessions that were planned for the 2021 Annual Meeting. (Please see **ATTACHMENT D** for link):

June 13-17, 2021
9 sessions and 2 panels;
Review process in January / February – please plan your time!
THD Sessions and organizers:
- Two-phase flow and heat transfer fundamentals o Subash Sharma and Caleb Brooks
- Computational Thermal Hydraulics o Maria Avramova and Jinyong Feng
- General Thermal hydraulics o Guillame Mignot and Jun Wang
- Experimental Thermal Hydraulics o Shanbin Shi and Annalisa Manera
- Thermal Hydraulics Research and Development in the Versatile Test Reactor (co-sponsor with RPD) o Hassan / Marcum / Sun
- Challenges and Opportunities in Thermal Hydraulics of Load-Following Nuclear Systems – Panel o Dave Pointer
- Thermal-hydraulics research in ARPA-E programs – Panel: Ling Zou and Kevin Robb and Jun Liao
- Machine Learning for nuclear thermal-hydraulics o Elia Merzari and Annalisa Manera
- Thermal-hydraulics for advanced reactors o Bob Martin and Dillon Shaver
- Thermal-hydraulics research in TCR (co-sponsored with RPD) o Prashant Jain and Florent Heidet
- Thermal Hydraulic R&D Activities in Printed-Circuit Steam Generators for Advanced Nuclear Reactors o Sang Ji Kim, James Sienicki, and Xiaodong Sun

NO DISCUSSION

6. **Planning for the Future 2021 Winter Meeting in Washington, DC (Bolotnov/Shaver)**

Dr. Bolotnov asked for volunteers and ideas for sessions and panels for 2021 Winter Meeting:
Please refer to **ATTACHMENT F** for further summaries.

- Two-phase flow and heat transfer fundamentals - Sharma and Brooks
- Computational Thermal Hydraulics - Shaver and Jun Fang
- General Thermal hydraulics - Ling Zou and Jun Wang
- Experimental Thermal Hydraulics - Bao-Wen Yang & Rodolfo
- Young Professional Thermal-hydraulic Research competition - Matthew Zimmer/ Xu Wu
- Thermal Hydraulics for SMR and micro-modular reactors - Bob Martin & Brian Woods + Hassan
- Advanced reactor TH - Ibarra & Carasik
- TH issues in Licensing of advanced reactors [P] (*provisional*) - Elia Merzari
- VTR- - Guillame Mignot / Seung Jun Kim
- Thermal-hydraulics research in TCR (Prashant Jain and Florent Heidet, co-sponsored with RPD) - Dave Pointer & Lane Carasik

- High Performance Computing applications in TH [P] Merzari & Bolotnov
- Advancements in experimental thermal hydraulics - Delgado & X. Sun
- ARDP - Marcum & Shaver
- Application of Digital Twins for T/H - Guillen & Manera

DISCUSSION:
Dr. Wiggins suggested to work with Education Division to co-sponsor a NEUP Session

7. **NURETH-19 Update** (Roelofs)

Dr. Roelofs updated that NURETH-19 is postponed to March 6th-11th 2022. Deadlines for papers are not being postponed more than 3 to 4 months in order to minimize any impacts on NUTHOS-13 which is scheduled for Sept., 2022 in Taiwan. The conference thus far is still the same (however this will be double checked in upcoming months in case of changes.) Submitting has already begun and dozens of submissions have already been submitted to date with expectations of many more.

SUBMISSION OF ABSTRACTS: February 14, 2021
ABSTRACT ACCEPTANCE: April 30, 2021
DRAFT PAPER SUBMISSION: June 30, 2021
PAPER REVIEW NOTIFICATION: August 31, 2021
FINAL PAPER SUBMISSION: September 30, 2021

This can also be viewed online. (**See ATTACHMENT G**.)

NO DISCUSSION

8. **Planning for ATH'22 Embedded Topical in 2022 ANS Annual Meeting in Anaheim, CA (Song/Sun)**

Prof. Xiaodong Sun referred to the slides he provided. See below (Also see **ATTACHMENT H** ATH 22 Planning Rev 0.1.pptx):

- Embedded Topical in 2022 ANS Annual Meeting in Anaheim, CA (Anaheim Hilton, June 12-16, 2022)
    - General Chairs: Chul-Hwa Song and Xiaodong Sun
    - Technical Program Chairs: W. David Pointer and Dirk Lucas
    - Assistant TPCs: Dillon Shaver and Xiaojing Liu
    - Paper submission:
        - Draft January 7, 2022 (full paper); Final: March 14, 2022

- NURETH-19: 8/29-9/3, 2021 → 3/6-11,2022
    - Draft paper submission: June 30, 2021
    - Final paper submission: Sept. 30, 2021
- NUTHOS-13: Sept. 5-9, 2022
    - No info on publication plan appears available
    - Estimated full paper submission: End of February or March 2022

Prof. Sun continued to review the history of ATH. The ATH Meeting Series was initiated by THD in 2012 to primarily to provide an avenue for North American Graduate Students and Young Professionals (NAGS-YPs) working in thermal hydraulics to publish their work (as full papers) in the years between NURETH conferences. This is to provide an affordable (financially) opportunity for NAGS-YPs to present their work (In the model of the opportunity that NUTHOS provides to students in Asia).

- International participation is extremely important, and we should continue to grow international submissions to ATH series (such as ATH'20)
- NURETH features many North American student publications, but they are often presented by advisors or co-authors when it is held outside North American due to high international travel costs (which prohibit large-scale participation by university research groups)
- Participations in NUTHOS by North American have been limited (10 to 20 participants)
- If we delay too long after the deadlines for NURETH, there might be a significant risk that the papers that would have likely been submitted to ATH'22 in June will be submitted to meetings hosted by other organizations rather than to NUTHOS-13 (Potentially risk losing many NAGS-YPs to other societies)
- NUTHOS-14 could be held in Vancouver in fall 2024, which could present a stronger conflict between NUTHOS-14 and ATH in 2024 (if it were to be postponed)
- With conference cancellation and postponement during the pandemic, graduate students may have become starved for conference publication/presentation opportunities and there may be an uptick in submissions to all meetings in the subsequent periods
- The ATH'22 organizers recommend:
    - First option: Keeping the current ATH'22 meeting dates (June 2022)
    - Second option: Postponing ATH'22 to be embedded to ANS 2022 Winter Meeting (Phoenix, AZ; Nov. 13-17, 2022)

Prof. Sun indicated that the First Option is preferred.

DISCUSSION:

Dr. Zimmer added to keep in mind budgets for North American Participation when scheduling nationally, he is concerned about too many meetings of similar nature in a short period.

Prof. Yang asked if there was a deadline for a final decision to be made. If we have more time, we might consider delay the decision and make a more informed decision later pending the development of pandemic.

Dr. Merzari answered that there will be an update on that. He planned to speak with Paula and see how Covid-19 develops and see how it affects hotel scheduling. Dr. Merzari suggested to move the meeting to Nov. 2022 in order to avoid 3 major thermal-hydraulic meetings (NURETH, ATH, NUTHOS) in 6 months, which THD never experienced before. [Update: Dr. Merzari emailed Paula Cappelletti of the ANS HQ after the conclusion of the THD PC meeting and Paula replied that she would like to know the THD's decision on the ATH'22 date ASAP since the ANS HQ was in the process of evaluating the hotel meeting space for the possibility of embedding another topical meeting to the ANS 2022 Annual Meeting.]

Dr. Bolotnov suggested to continue the discussion in the EC meeting.

9. **Old Business** (Song/Bolotnov)

Dr. Bolotnov discussed that Victor Petrov will be considered for nomination of PC membership next year.

NO DISCUSSION.

10. **New Business** (All)

Dr. Marcum announced that THD recognized Dr. Podowski as the recipient of the the TAA Thermal Hydraulics Division Award this year. There will be an announcement and recognition event after Monday afternoon THD technical session. However, Dr. Podowski will make his normal TAA award paper presentation in the next NURETH conference.

MOTION: Merzari moved to adjourn.

SECOND: Shaver

APPROVED UNANIMOUSLY

ATTACHMENT D

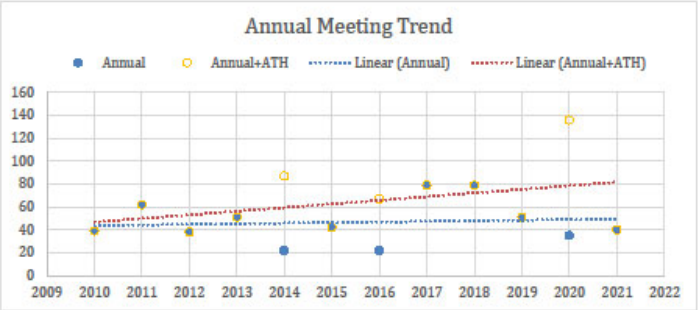
PC Report on 2021 ANS Virtual Annual Meeting

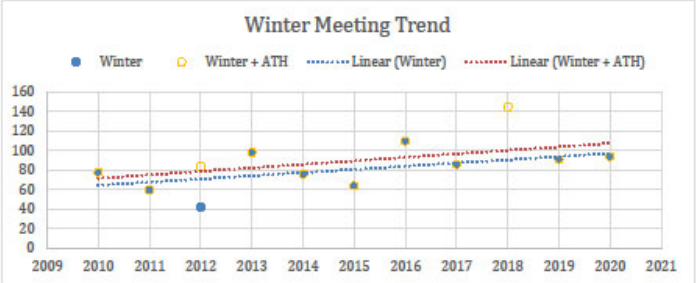
2021 ANS Virtual Annual Meeting

I.A. Bolotnov and D. Shaver

A total of 40 summaries were submitted to the proposed sessions sponsored by the Thermal Hydraulics Division at the ANS 2021 Annual Meeting. The number was in line with the expectations in the virtual format during the COVID-19 pandemic. Our division submitted the session slate in time, meeting the deadline. We will host a total of 10 sessions (including 2 panels). All sessions will be hosted via Zoom meeting, at 2 pairs of sessions being hosted in parallel due to the high number of THD sessions and shortened meeting schedule. Note that each presentation is now 15 minutes + 5 minutes Q&A (5 minute shorter than in previous meetings). ANS representative will be moderating the sessions. Meeting registration is required to access the session link which will be available 30 minutes before the start of each session.

Below are two graphs showing submission trends for the ANS meetings.





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Reconciled review recommendations for the summaries are as follows:

	1	Accept
	33	Accept with Revision (A/R)
	5	Reject Unless Revised (R/R)
	1	Reject
Total	40	

We note that rejection rates (R/R+R) are steady in recent years at roughly 20% and this year this number is at 15%. We also encourage the authors to respect the process and time the reviewers dedicate to evaluate the summaries and thus to strictly follow the ANS template and submit summaries with all the required sections. After another round of rigorous review process for the revised R/R summaries, a total of 39 summaries are included in the ten THD summary sessions at this conference.

Overall, the review participation was sufficient. All the papers received adequate review on a timely basis. *Many thanks to our dedicated reviewers!* The distribution is as follows:

There were 136 review recommendations that needed to be coordinated from 37 reviewers. The average number of reviews per paper was ~3.4, which is slightly above average. We had about 25% of the reviewers participating in the process. The reviewers' support is much appreciated, but we need to stimulate more participation to even out the effort between the program committee members.

Recent reviewer participations were as follows:

Year	Location	Number of Reviews	Number of reviewers
2021	Providence, R.I. (Online)	136	37
2020	Chicago (Online)	278	43
2020	Phoenix (Online)	85	21
2019	D.C.	258	40
2019	Minneapolis	127	24
2018	Orlando	No general sessions (ATH only)	
2018	Philadelphia	188	32
2017	D.C.	222	28
2017	San Francisco	264	39
2016	Las Vegas	337	45
2016	New Orleans	87	20
2015	San Antonio	135	28
2015	Anaheim	212	33
2014	Reno	80	17
2014	D.C.	284	29
2013	Atlanta	137	23
2013	San Diego	129	22
2012	Chicago	116	17
2012	D.C.	179	22
2011	Hollywood	148	14
2011	Las Vegas	148	20
2010	San Deigo	102	21
2010	D.C.	135	22
2009	Atlanta	191	25
2009	Reno	73	11
2008	Anaheim	89	19

The review process was made possible by valuable contributions from:

Martin, Robert	10
Riznic, Jovica	9
Carasik, Lane	8
Bolotnov, Igor	7
Lisowski, Darius	7
Sun, Xiaodong	6
Yoon, Su-Jong	6
Wang, Jun	6
Cho, Hyoung Kyu	5
Guanyi, Wang	5
Jin, Yue	5
Zhang, Sheng	5
Cheng, Xu	4
Kim, Seung Jun	4
Roelofs, Ferry	4
Cheung, Fan-Bill	3
Hua, Thanh	3
Petrov, Victor	3
Shaver, Dillon	3
Wiggins, Cody	3

Zimmer, Matthew	3
Addad, Yacine	2
Brooks, Caleb	2
Chen, Minghui	2
Howard, Trevor	2
Fang, Jun	2
Feng, Jinyong	2
Kong, Ran	2
LaBrier, Daniel	2
Liu, Qingqing	2
Shi, Shanbin	2
Sharma, Subash	2
Ali, Amir	1
Kimber, Mark	1
Ibarra, Lander	1
Lin, Ching-Sheng	1
Marcum, Wade	1
Total:	136

THD has a total of ten (10) sessions including 2 panels.

While ANS system lists Chair and Alt. Chair positions, THD considers both as Co-Chairs and kindly requests to share the Session Chair responsibilities during the session.

Session	# of papers	Time Slot (ET)	Chair	Alt. Chair
Computational Thermal Hydraulics – I	5	Monday 1pm	Maria N. Avramova	Mihai Diaconeasa
General Thermal Hydraulics and Heat Transfer Fundamentals	5	Monday 3:15pm	Jun Wang	Subash L. Sharma
Challenges and Opportunities in Thermal Hydraulics of Load-Following Nuclear Systems [P]	0	Tuesday Noon	W. David Pointer	Igor A. Bolotnov
Thermal Hydraulics Research in ARPA-E Programs [P]	0	Tuesday 2:15pm	Ling Zou	Kevin R. Robb
Thermal Hydraulic R&D Activities in Printed-Circuit Steam Generators for Advanced Nuclear Reactors	6	Tuesday 4:30pm	Sang J. Kim	Xiaodong Sun
Thermal Hydraulics Research in VTR and TCR Programs	5	Tuesday 4:30pm	Wade R. Marcum	Lander Ibarra
Thermal Hydraulics for Advanced Reactors	5	Wednesday Noon	Robert P. Martin	Dillon R. Shaver
Computational Thermal Hydraulics - II	5	Wednesday 2:15pm	Jinyong Feng	Darius D. Lisowski
Experimental Thermal Hydraulics	5	Wednesday 4:30pm	Shanbin Shi	Victor Petrov
Computational Thermal Hydraulics - III	3	Wednesday 4:30pm	Elia Merzari	Guillaume P. Mignot
Total number of papers:	39			

Additional Notes:

- All paper presentations are **20 minutes each** (15-minute talk + 5-minute Q&A and transition to the next speaker).
- ANS recommends to use the following script before the first talk of the session:

> Welcome & thank you for joining the [session title] session. I am [name], the chair for this session. There are a few items that I want to discuss with all of you before we begin.
>
> First, all our meeting sessions will be recorded and posted on the ANS Meeting Portal. The recordings will be available only to registered meeting attendees. Please follow the ANS behavior and ethics policies. Both are listed on the resources page of the meeting portal.
>
> Second, please keep your microphone muted at all times unless you are speaking. During the Q&A session, please use the "participants" menu—the button is at the bottom of the screen next to the green share screen button—to "raise your hand," which is at the bottom of the participant window. Once the session chair calls on you, you may unmute and ask your question. You may also use the chat function to type your question.
>
> Thank you for participating and enjoy the session.

ATTACHMENT E

PC Update on 2021 ANS Winter Meeting

2021 ANS Winter Meeting

Washington, DC
November 30 – December 4, 2021

12 sessions and 2 panels;

Submission window closes: **July 12, 2021**; Reviews are due **August 13, 2021**

Please plan to submit the papers and also contribute to the review process!

Session organizers should actively reach out to the potential contributors for the standard and special sessions

Panel organizers should work on identifying and recruiting the panelists

THD Sessions and organizers:

1. High Performance Computing applications in TH [P]:
    a. Elia Merzari & Igor Bolotnov
2. TH issues in Licensing of Advanced Reactors [P]
    a. Elia Merzari & Steve Bajorek
3. Computational Thermal Hydraulics
    a. Dillon Shaver & Jun Fang
4. Experimental Thermal Hydraulics
    a. Bao-Wen Yang & Rodolfo Vaghetto
5. General Thermal Hydraulics
    a. Ling Zou & Jun Wang
6. Two-phase Flow and Heat Transfer Fundamentals
    a. Subash Sharma & Caleb Brooks
7. Young Professional Thermal-hydraulic Research Competition
    a. Matthew Zimmer & Xu Wu
8. Advanced reactor TH
    a. Lander Ibarra & Lane Carasik
9. Advancements in Experimental Thermal Hydraulics
    a. Marilyn Delgado & Xiaodong Sun
10. Application of Digital Twins for Thermal Hydraulics
    a. Donna Guillen & Annalisa Manera
11. TH Applications in the Advanced Reactor Demonstration Program
    a. Wade Marcum & Dillon Shaver
12. Thermal Hydraulics for SMR and Micro-Modular Reactors
    a. Bob Martin, Brian Woods & Yassin Hassan
13. Thermal Hydraulics Research and Development in the VTR (co-sponsored with RPD)
    a. Guillaume Mignot & Jun Kim
14. Thermal Hydraulics Research in the TCR (co-sponsored with RPD)
    a. Dave Pointer & Lane Carasik
    b. Prashant Jain and Florent Heidet

ATTACHMENT F

NURETH-20 Call For Proposal Announcement

Announcement

The American Nuclear Society (ANS) Thermal Hydraulic Division (THD) sponsors the International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH) with support from domestic local sections or international institutions. This announcement is to solicit proposals for NURETH-20. The NURETH meetings have a history of over four decades:

1	1980	Saratoga Springs, New York USA
2	1983	Santa Barbara, California USA
3	1985	Newport, Rhode Island USA
4	1989	Karlsruhe, Germany
5	1992	Salt Lake City, Utah USA
6	1993	Grenoble, France
7	1995	Saratoga Springs, New York USA
8	1997	Kyoto, Japan
9	1999	San Francisco, California USA
10	2003	Seoul, Korea
11	2005	Avignon, France
12	2007	Pittsburgh, Pennsylvania USA
13	2009	Kanazawa, Japan
14	2011	Toronto, Canada
15	2013	Pisa, Italy
16	2015	Chicago, Illinois USA
17	2017	Xi'an, China
18	2019	Portland, Oregon USA

The next conference in this series, NURETH-19, to be held in Brussels, Belgium was postponed from 2021 because of the pandemic to March 6-11, 2022.

Since 2003, the meeting has been held every other year. Proposals submitted in response to this solicitation will be considered for NURETH-20, to be held in 2023. Currently, the intention is to hold the NURETH-20 conference in USA.

The proposals will be evaluated using the attached criteria. Interested parties should send their proposal electronically by **July 15, 2021** to the Chair of *THD Conference Screening Committee,* Prof. Fan-Bill Cheung (fxc4@psu.edu). The committee will evaluate and rank the proposals and make their recommendation to the *THD Executive Committee* for final approval. Selection of NURETH-20 (2023) is expected to be completed by July 31, 2021, giving the organizers hosting NURETH-20 adequate time for meeting planning and preparation.

The organizers of NURETH-20 are encouraged to attend THD Executive and Program Committee meetings and participate in technical meetings, to acquire knowledge and experience useful in hosting the conference successfully.

Inquiries should be addressed to Prof. Fan-Bill Cheung (fxc4@psu.edu), the Conference Screening Committee Chair or to Prof. Wade Marcum (Wade.Marcum@oregonstate.edu), the THD Chair.

ATTACHMENT G

PC Membership renewal and nominations

PC Membership renewal and nominations

2021 Annual Meeting

PC Members with terms expiring in 2021:

1. Maria Avramova
2. Caleb Brooks
3. Jinyong Feng
4. Paolo Ferroni
5. Donna Guillen
6. Jeffery Lane
7. Jun Liao
8. Ferry Roelofs

Proposed action:

Extend the membership for another 3 years (terms to expire in 2024):

1. **Maria Avramova**
2. **Caleb Brooks**
3. **Jinyong Feng**
4. **Donna Guillen**
5. **Ferry Roelofs**
6. **Jun Liao**

Move to advisory board (term expiring in 2026):

1. **Paolo Ferroni**
2. **Jeffery Lane**

Add new members (term to expire in 2024):

1. **Victor Petrov**
2. **Subash Sharma**
3. **Guanyi Wang**
4. **Darius Lisowski**

PC Members with terms expiring in 2022:

1. Steven Arndt
2. Steven Bajorek
3. Philippe Bardet
4. Sama Bilbao y Leon
5. H. Chang
6. Xu Cheng
7. Fan-Bill Cheung
8. Cesar Frepoli
9. Rui Hu
10. Yong Hoon Jeong
11. Jong Kim
12. Seungjin Kim
13. Si Young Lee
14. Wade Marcum