ANS Reactor Physics Division

SPRING ISSUE

June 2019

A newsletter of the ANS Reactor Physics

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A Message from the Chair

By Todd Palmer

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Greetings fellow members of the Reactor Physics Division!

My term as RPD Chair is drawing to a close, and I'd like to take this opportunity to take stock of where we are as a Division, mention a few things that have happened since my last message, recognize a few folks that have been particularly helpful to me, and consider the future. [I am not much for extrapolation, generally, but there are some "indicators" that are worth spending a bit of time on…]

One of the first things that happened during my time as Chair was that the previously-awarded UK bid for the hosting of the PHYSOR 2020 meeting underwent a restructuring. This was an interesting exercise, as it involved a number of changes: organizers (Eugene Shwageraus, Cambridge University, and Paul Norman, Birmingham Center for Nuclear Education and Research), location (Cambridge/Corpus Christi/St. Catherine's Colleges, co-located), and dates (March 29-April 2, 2020). This newsletter contains an update from the organizing committee, and I want to thank them for their leadership and dedication to hosting this flagship topical meeting for RPD.

I'd also like to point out that with the changes ushered in by the Board of Directors (BoD) at the close of the ANS Meeting in November 2018, the funding produced by topical meetings (which historically served as the most significant source of revenue for the Division) will be decreasing. There are two reasons for this: 1) Class I Topical meetings will now return 75% of the net revenue to ANS Headquarters, with 25% being split by the Division and the Local Section hosting the meeting, and 2) Class II topical meetings must not involve the transfer of any funds from the hosting organization to any part of ANS (National, Division or Local Section). This change is very impactful and requires careful attention to budgeting of funds in the future.

As a member of the BoD, I'd like to express my frustration to the RPD membership about the seriousness of the budgetary situation with which this particular BoD has been faced. The ANS has been allowed to continue to operate in the very unhealthy condition of spending much more money than it generates for quite a long time. I'd like you to know that this BoD actually did something, and may have done more if the changes we adopted didn't already feel so much more significant than they were. Make no mistake – the ANS ship has not yet been righted, and there is much to do if the Society is to evolve into the type of organization that can serve our members' future needs. I expect the Divisions and Local Sections will be faced with other challenges in the near term, but I also think that RPD (and our sister Divisions MCD and THD, and others…) are strong enough to weather the storm and significantly influence the structure of the future ANS. It will require our participation, though, so we need to be ready to get our hands dirty, right now.

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In this issue

A Message from the Chair

(continued from page 1)

I had planned to engage RPD in a Strategic Planning exercise, and while I still believe that there could be value in this, I am concerned that without a clearer vision of what will happen to ANS as an organization (e.g. number of national meetings, emphasis on embedded topicals, role of Local Sections, etc.), the target feels like it is moving just a bit too much right now. Getting a sense of the priorities of RPD's membership, though, is important. I hope that by the time you have received this newsletter, you will have completed a survey I constructed that mirrors an effort that is ongoing in the ANS BoD, and that I'll be able to share the results for in mid-June. If you have not completed it yet, please take the time to provide your valuable input.

At the June 2019 meeting there will be a leadership transition, and Florent Heidet will become the next Chair of RPD. In my assessment, Florent and I have worked very well together and I have great confidence that he will ensure that RPD will continue to be one of the most vibrant Divisions in ANS. I'd like to also thank Anna Erickson, Germina Ilas and Pavel Tsvetkov for their support and assistance. The year flew by, and while I am not certain that I accomplished a great deal, please take the time to go through this newsletter and keep abreast of the activities of RPD.

As always, your Executive Committee members are here to serve, and we'd love to hear from you if you have concerns/suggestions/praise/etc.

See you in Minneapolis!

ANS Reactor Physics Standards

By D. Cokinos, Reactor Physics Standards Chair

cokinos@bnl.gov

Work on the revision of several ANS-19 standards has continued during the past six months.

- The revision of ANS-19.1, "Nuclear Data Sets for Reactor Design" has finally been completed and is in the process of being published.
- Work on the revision of ANS-19.3, "Steady State Neutronics Methods for the Analysis of Power Reactors" continued, with 2022 being the new target date for the next step.
- Similarly, ANS-19.6.1, "Reload Startup Physics Tests for PWRs" is undergoing a revision.
- A major revision of the "Decay Heat Power for Light Water Reactor," ANS-5.1, has been completed and is now at the stage of approvals by our parent committees.
- Working Group ANS-19.10, "Neutron Fluence in the Pressure Vessel and Reactor Internals" has been busy revising the reaffirmed 2011 document. This revision will serve as the basis for the next ISO -19226 revision.

The next ANS-19 meeting will be held in Minneapolis on Monday, June 10, from 9:00am to 10:30 am.

Treasurer's Report

By Anna Erickson, RPD Treasurer

Erickson@gatech.edu

The financials details provided by ANS for the year 2018 showed that RPD ended up with a balance of $49,369. That is a bit above the planned budget, due to a slightly larger number of RPD members and fewer expenses than initially budgeted.

Looking at the first quarter financials for 2019 (as of March 31, 2019), the only expenses occurred are:

- $2,500 in student support
- $6,000 for the RPD Scholarships
- $100 in plaques for award winners

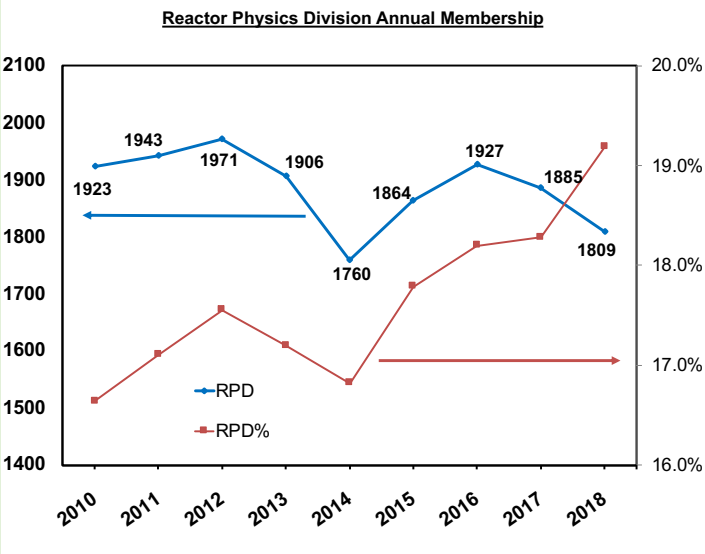
The Division received $1,800 from ANS national in the form of membership dues and $23,660 from the organization of the 2018 PHYSOR conference. RPD continues to have excellent financial health due to its membership and to the successful organization of the PHYSOR conferences.

Membership

By Anna Erickson, RPD Treasurer

Erickson@gatech.edu

The RPD membership numbers for 2018 show a small decrease over the previous year. Consistent with the overall ANS trend, the number of 2018 RPD members was 1809, a reduction of 76 members compared to 2017. However, whereas the ANS experienced an overall drop of 8.6% in members, the RPD decrease was 4%. It should be noted that RPD is slowly, but progressively, increasing its relative importance within ANS: 19.2% of ANS members are RPD members. The RPD membership evolution over the years is shown in the figure below.



Program Committee News

By Pavel Tsvetkov, Program Committee Chair

tsvetkov@tamu.edu

We are expecting a great annual meeting on June 9 – 13, 2019. Over 50 papers in 15 sponsored and co-sponsored sessions bring the current cutting edge in reactor physics. Our sessions are running from Monday through Thursday. There are panels and special sessions organized on the Versatile Test Reactor and Molten Salt Reactors highlighting tremendous advances towards reactor development and deployment. RPD co-sponsored sessions initiated by other divisions focus on computational methods (sponsored by MCD) and near-term deployable advanced nuclear technologies (sponsored by YMG).

On Sunday, the program committee will be discussing upcoming meetings, membership, best paper selections as well as our approaches to technical session facilitation and session leadership among other topics. We encourage all ANS and RPD members, who are interested to engage and contribute, to come and attend our Sunday meeting if present at the conference.
Overall, our division presence at the conference and our footprint in the program are significant. The list of technical sessions and panels is as follows:

Monday, June 10

1:00 p.m. **Current Issues in Computational Methods** – Roundtable. Sponsored by MCD, co-sponsored by RPD. Session Organizer: David Griesheimer (NNL).

1:00 p.m. **Overview of the Versatile Test Reactor I** – Panel. Sponsored by RPD, co-sponsored by MCD, THD, YMG. Session Organizer: Florent Heidet (ANL). Session Chair: Florent Heidet (ANL).

3:50 p.m. **Overview of the Versatile Test Reactor II.** Sponsored by RPD, co-sponsored by MCD, THD, YMG. Session Organizer: Florent Heidet (ANL). Session Chair: Florent Heidet (ANL).

Tuesday, June 11

10:15 a.m. **Reactor Analysis Methods I.** Sponsored by RPD, co-sponsored by THD. Session Organizer: Pavel Tsvetkov (Texas A&M). Session Chair: Pavel Tsvetkov (Texas A&M).

1:30 p.m. **Overview of the Versatile Test Reactor III.** Sponsored by RPD, co-sponsored by MCD, THD, YMG. Session Organizer: Florent Heidet (ANL). Session Chair: Florent Heidet (ANL).

3:55 p.m. **Reactor Physics: General I.** Sponsored by RPD. Session Organizer: Pavel Tsvetkov (Texas A&M). Session Chair: Pavel Tsvetkov (Texas A&M).

3:55 p.m. **Molten Salt Reactors I.** Sponsored by RPD, co-sponsored by THD. Session Organizer: Florent Heidet (ANL). Session Chair: Benjamin Betzler (ORNL).

5:20 p.m. **Advanced Modeling and Simulation Efforts for Light Water Reactors.** Sponsored by RPD. Session Organizer: Benjamin S. Collins (ORNL). Session Chair: Benjamin Collins (ORNL).

Wednesday, June 12

10:15 a.m. **Reactor Physics: General II.** Sponsored by RPD, co-sponsored by ANSTD. Session Organizer: Pavel Tsvetkov (Texas A&M). Session Chair: John Bess (INL).

1:30 p.m. **Reactor Physics Design, Validation and Operational Experience I.** Sponsored by RPD. Session Organizer: Pavel V. Tsvetkov (Texas A&M). Session Chair: Ayodeji Alajo (MUST).

3:55 p.m. **Molten Salt Reactors II.** Sponsored by RPD. Session Organizer: Florent Heidet (ANL). Session Chair: Benjamin Betzler (ORNL).

3:55 p.m. **Reactor Analysis Methods II.** Sponsored by RPD. Session Organizer: Pavel Tsvetkov (Texas A&M). Session Chair: Akio Yamamoto (Nagoya Univ.).

Thursday, June 13

8:00 a.m. **Advanced Nuclear NOW! Showcasing Technology Near Deployment –Panel.** Sponsored by YMG, co-sponsored by RPD. Session Organizer: Abdalla Abou-Jaoude (INL).

8:00 a.m. **Reactor Physics Design, Validation and Operational Experience II.** Sponsored by RPD. Session Organizer: Pavel Tsvetkov (Texas A&M). Session Chair: Bradley Rearden (ORNL).

10:25 a.m. **Reactor Physics: General III.** Sponsored by RPD, co-sponsored by ANSTD. Session Organizer: Pavel Tsvetkov (Texas A&M). Session Chair: Blair Bromley (CNL).

The sessions and panels planned for the ANS Winter meeting 2019 are:

1. **Reactor Physics: General.** This is a standing RPD session with papers on all general reactor physics topics of contemporary interest. The session is expected to consist of invited and contributed papers.

2. **Reactor Analysis Methods.** This is a standing RPD session with papers on all reactor analysis topics of contemporary interest. The session is expected to consist of invited and contributed papers.

3. **Reactor Physics Design, Validation and Operational Experience.** This is a standing RPD session with papers on all reactor physics design, validation and operational experience topics of contemporary interest. The session is expected to consist of invited and contributed papers.

4. **Innovations in Advanced Reactor Technology and Design through the ARPA-E MEITNER Program.** The ARPA-E MEITNER program (Modeling-Enhanced Innovations Trailblazing Nuclear Energy Reinvigoration) seeks to develop innovative technologies that can enable designs for lower cost and safer advanced nuclear reactors. In this special session, the design teams within the MEITNER program will be invited to present their designs and recent progress enabled through the MEITNER program and coordination with DOE resources in advanced modeling and simulation tools and computational and experimental facilities.
Matthew Jessee, jesseema@ornl.gov; Rachel Slaybaugh, Rachel.Slaybaugh@hq.doe.gov

5. **Mark Williams Memorial Session: Sensitivity/Uncertainty Analysis in Reactor Physics.** A session dedicated to the memory of the life and work of ANS Fellow and RPD Wigner Award recipient, Dr. Mark Williams. Mark began his professional career at ORNL in 1974. From 1983 until 2003, Mark was a professor at Louisiana State University. After 2003, Mark returned to ORNL as a Distinguished Research Staff member. Mark Williams was a technical leader in sensitivity and uncertainty analysis and code development. Mark was an active member of the Cross Section Evaluation Working Group (CSEWG) in which for many years he chaired the Thermal Benchmark Committee. This is a solicitation of contributions in research areas impacted by the work of Mark Williams. In particular, direct advancements of methods developed by Mark Williams is highly welcome.
Luiz Leal, luiz.leal@irsn.fr; Vladimir Sobes, sobesv@ornl.gov

6. **"Hands-On" Core Design.** Session will include representative core designs and rely on audience participation for improvements and ideas in the style of a "design sprint". The audience will attempt to meet design goals such as power peaking, energy requirements, peak boron concentration, and burnup limits by leveraging feed size, enrichment, burnable poison, loading pattern, etc. A variety of reactor types will be represented. Discussion will focus on collaborative solutions to recurring core design constraints.
Amanda Lang, Amanda.Lang@duke-energy.com; Erin Wehlage, erin.wehlage@studsvik.com

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RPD Program Committee

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Luiz Leal IRSN, France	Moussa Mahgerefteh Exelon
Bojan Petrovic Georgia Institute of Technology	Pavel Tsvetkov Texas A&M University
William Walters Penn State	

Honors & Awards Committee

Chair: Dimitrios Cokinos, Brookhaven National Laboratory

Robert Little Los Alamos National Laboratory	Farzad Rahnema Georgia Institute of Technology
Charles Rombough CTR Technical Services, Inc.	Paul Turinsky North Carolina State University

Standards Committee

Chair: Dimitrios Cokinos, Brookhaven National Laboratory

Allan Henry/ Paul Greebler Undergraduate Scholarship Committee

Chair: Benoit Forget, MIT

Dimitrios Cokinos Brookhaven National Laboratory	Mark DeHart Idaho National Laboratory
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Scott Palmtag North Carolina State University	

Rudi Stamm'ler Graduate Scholarship Committee

Chair: Benoit Forget, MIT

Mark DeHart Idaho National Laboratory	Fausto Franceschini Westinghouse
Florent Heidet Argonne National Laboratory	

PHYSOR 2020

29th MARCH – 2nd APRIL, 2020

CONFERENCE ANNOUNCEMENT

University of Cambridge, University of Birmingham

The Universities of Cambridge and Birmingham are excited to host the next instalment of the Physics of Reactors conference from 29th March – 2nd April 2020 in Cambridge, UK. PHYSOR 2020 will mark 30 years since the first PHYSOR conference took place in Marseille (France), and it will be the first time the meeting will be held in the UK.

For nuclear to be competitive in the future global energy mix it must be scalable; for effective integration with both energy storage and with other clean energy sources. Ensuring scalability would require optimized design methodologies and computationally efficient, reliable, high-accuracy, multi-physics simulations tools. This inspires the theme of **PHYSOR 2020 – 'Transition to a scalable nuclear future'**. The conference aims to bring together leading experts from around the world to share the latest advances in their research, discuss the challenges facing the nuclear industry in the next decades and exchange ideas for addressing them.

Papers are welcomed across eighteen technical tracks covering a wide range of nuclear science and reactor physics topics. Special sessions are planned to be dedicated to small modular reactors, global nuclear innovation, and nuclear integration into smart energy grids. The conference will also include poster sessions.

Social events will be organised for delegates to explore the famous university city of Cambridge. The welcome reception will take place in the Fitzwilliam Museum, and the gala dinner in King's College. Technical tours of Sizewell B power station and Culham Centre for Fusion Energy will be organised, as well as visits to the birthplace of the neutron, discovered in the world-famous Cavendish Laboratory.

Submissions are open now on www.physor2020.com. Stay connected with us by searching for PHYSOR 2020 on LinkedIn, Facebook, and Twitter.

Flexible sponsorship opportunities are available at different levels.

Please contact us at physor2020@esc.cam.ac.uk for details.

RPD Best Paper Award

Congratulations to the recipients of the RPD Best Paper and Presentation Award at the ANS Winter Meeting in November 2018: Shane Stimpson from Oak Ridge National Laboratory and Charles Folsom, Russell Gardner, Stephen Novascone, and Richard Williamson from Idaho National Laboratory.

The title of the wining paper is:

Standalone BISON Results from AP1000® Rod Ejection Demonstration in VERA

Shane Stimpson (ORNL), Charles Folsom, Russell Gardner, Stephen Novascone, Richard Williamson (INL)

RPD Election Results 2019

Congratulations to the newly elected members of the RPD Executive Committee. Their contributions to the RPD is valued and appreciated. Their one-year term begins at the conclusion of the RPD Executive Committee meeting in Minneapolis on June 9, 2019.

Vice Chair	Anna Erickson, Georgia Tech
Treasurer	Germina Ilas, Oak Ridge National Laboratory
Secretary	Amanda Lang, Duke Energy
Executive Committee	Pavel Tsvetkov, Texas A&M University
Executive Committee	Alireza Haghighat, Virginia Tech
Executive Committee	Nathan Roskoff, Virginia Tech
Executive Committee-Non-US	Hyung Jin Shim, Seoul National University

Honors & Awards

By D. Cokinos, Honors & Awards Committee Chair, *cokinos@bnl.gov*

EUGENE P. WIGNER REACTOR PHYSICIST AWARD

Members of the Reactor Physics Division are invited to nominate qualified candidates for the Eugene P. Wigner Award. This prestigious award was founded in 1990 to honor individuals who have made outstanding contributions to the advancement of the field of reactor physics. This award is presented to the winner during the ANS Winter meeting. A complete description of the requirements for the nomination, including a list of past winners, can be found on the ANS website under the heading of Honors & Awards. Deadline for nomination is April 1, 2020.

EARLY CAREER REACTOR PHYSICIST AWARD

This relatively new award was created to honor outstanding young reactor physicists, who at the time of their nomination are 39 years old or younger. This award is presented during the ANS Annual Meeting. Deadline for nomination is August 1, 2019.

RPD Scholarships

By Benoit Forget, RPD Scholarship Committee Chair, bforget@mit.edu

The Reactor Physics Division is proud to announce the winners of our sponsored undergraduate and graduate scholarships. The Rudi J.J. Stamm'ler undergraduate reactor physics scholarship was awarded to Jonathan Crozier of North Carolina State University, and the Allan Henry / Paul Greebler graduate reactor physics scholarship was given to Ryan Stewart from Oregon State University.

Please join me in congratulating both Jonathan and Ryan, and please encourage undergraduate and graduate students to apply for the reactor physics scholarships in the upcoming year. Application forms can be found at http://www.ans.org/honors/scholarships/forms/.

Program Committee News

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7. **Nuclear Data for Advanced Reactor Applications.** Over the last several ENDF/B releases, many updates in the nuclear data have been introduced that can result in significant changes of computational results. In particular for advanced reactor concepts, these changes can have an important impact because other materials and therefore other nuclide reactions compared to the ones in the historically well investigated light water reactor (LWR) systems play a significant role. A performance assessment of the latest nuclear data libraries for systems relevant for the advanced reactor community is solicited.

8. **Steve Bowman Memorial Session: Evolution of SCALE.** In this panel session we will present the evolution of the SCALE code package, highlighting the contributions of Steve Bowman, who passed away in October 2018. Mr. Bowman began his nuclear career at the Tennessee Valley Authority (TVA), where he worked from 1980-1984 as a core analyst. He then left TVA for Virginia Power in 1984, serving as an analyst and code developer of the NOMAD code system. In 1989, Mr. Bowman joined ORNL where he would stay until his retirement in 2018. He became involved with SCALE early in his ORNL career. From 1993-1995, he successfully ported SCALE to a PC (version 4.4) and drove the development of the ORIGEN-ARP GUI interface and SCALE ENDF/B-V 44-group nuclear data libraries. Mr. Bowman became the manager of the SCALE code system in 1995, a position he would hold for 14 years. The panel will present a survey of SCALE records focusing on Mr. Bowman's achievements, with lighthearted user and sponsor feedback collected over the years. The panel will close with the opportunity for audience driven Q&A.
   William Wieselquist, wieselquiswa@ornl.gov

American Nuclear Society Reactor Physics Division

June 2019
Reactor Physics Division Newsletter

Germina Ilas, RPD Secretary

RPD website: http://rpd.ans.org/