



AMERICAN NUCLEAR SOCIETY
 REACTOR PHYSICS DIVISION
 Fall 2010 Newsletter



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Message from the Incoming Chair

By Ivan Maldonado
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As I sat down to write this note to the RPD membership as your latest Chair, I hoped that I could write a mildly interesting and perhaps even slightly inspirational message for our members. Most importantly, however, I realized that I wanted to highlight our crucial role as a professional society, division, and as individuals in the development of the next generation of nuclear engineers and reactor physicists. I will try to do both.

The first ANS national meeting I attended was a 1992 meeting in Boston. At the time, I hoped to be a last-year Ph.D. student at NC State University. Prof. Paul Turinsky sponsored my trip and I was in awe of being able to meet Prof. Alan Henry as well as one of his well-known

protégés, Dr. Kord Smith. For the young man I was then; out of humble beginnings and a first generation college graduate in my family, that ANS meeting was truly one of the most momentous occasions of my life. Many such professional meetings would follow, but at that particular time, I could've never imagined that in the future I would become a professor of nuclear engineering, that I would design "real-life" BWR bundles and cores for a major vendor, and that 18 short years later I'd be writing a "message from the chair" addressed to our entire professional division, which by the way, continues to be one of the most active, productive, and highly regarded within the ANS.

As I look back, I humbly acknowledge in deep gratitude all the opportunities that have been provided to me as I've grown in the area of reactor physics. I'm thankful for the professors who gave me a hand, and the employers and universities who gave me opportunities, and the many colleagues who empowered me with the ability to contribute; such as folks like Dr. Russ Mosteller and Dr. Jess Gehin, who once upon a time "reeled me" into the role of Technical Program Chair; admittedly the most important and challenging position of any professional division. I learned from them, by their example, to give something back. In the process, however, I also developed a solid professional network that led to many friendships and even to the job I hold today. The list of RDP leaders whose dedication I hold in high regard is too long to provide, but it starts with the past Chair, Bob St Clair, a true gentleman always ready to lend a hand and contribute, and undoubtedly includes our current TPC, Dr. Fausto Franceschini, who I'm now convinced can leap tall buildings in a single bound!

The main point of this message is to simply remind you that the things we do to help, encourage, and empower future generations all do MAKE A DIFFERENCE. The students we support through travel and scholarships, someday sooner than later, will become the engineers, scientists, researchers, managers, professors, and society leaders that will fill our shoes. The time and effort (and budget) we invest in supporting and mentoring the up and coming young professionals, and the manner in which we lead

them by example, will have long lasting and tremendously rewarding ramifications to our entire professional community. So, please don't wait to do something tomorrow; help make a difference today!



Making a Difference Worldwide
*(RPD Chair and Secretary,
Red Square, Moscow, 2009)*

Program Committee News

By Fausto Franceschini
francef@westinghouse.com

New Chair and New Members

I would like to thank the outgoing RPD Chair, Bob St. Clair for all the help, encouragement and patience he showed me throughout his Chairmanship of the Division. I welcome the new Chair, Ivan Maldonado, and wish him all the best in his new assignment.

I would also like to thank the outgoing members of the RPD Program Committee who ended their 3-year tenure: Ugur Mertyurek (ORNL), Andrew H. Nicholson (Dominion), David W. Nigg (INL), Pavel V. Tsvetkov (Texas A&M) and Akio Yamamoto (Nagoya University). Their contribution and efforts have not gone unnoticed.

Welcome to the new members of the Program Committee: Jeffrey A. Borkowski (Studsvik), Albert C. Kahler III (LANL), Shinya Kosaka (TEPSYS), Scott Palmtag (GNF), Cristian Rabiti (INL), Piero Ravetto (University of Turin), Andrei Rineiski (Karlsruhe Institute of Technology), Eugene Shwageraus (Ben Gurion University) and Won Sik Yang (ANL). Their expertise and commitment during their 3-year tenure will be a key to maintaining the current high standards.

Last but not least, my renewed gratitude and appreciation go to the RPD reviewers, session chairs, special session organizers and panel organizers for their enthusiasm, reliability and

unwavering effort. They are the foundation of the many accomplishments achieved by our Division.

ANS 2010 Annual Meeting, San Diego, CA

The 2010 Annual Meeting was held in San Diego, CA (June 13-18 2010). A total of 38 papers, out of the 42 submitted, were accepted and presented in 5 technical sessions. RPD also organized one panel at the meeting, with overall high technical quality and good attendance.

The three standing RPD sessions featured 25 papers divided among Reactor Physics General I and II, chaired by Blair Bromley - 10 papers; Reactor Analysis Methods, chaired by Andy Worrall - 8 papers and Reactor Physics Design, Validation and Operating Experience, chaired by Ben Forget - 7 papers. In addition two special sessions were organized: Advances in Reactor Core Analysis Methods to Meet the Challenges of Next-Generation and Advanced NPP Designs (organizers Mark DeHart and Ivan Maldonado) - 4 papers, and Advances in Small- and Medium-Sized Reactor Designs (organizers: Youssef Shatilla and Pavel Hejzlar) - 9 papers: a renewed success for a topic that evidently gathers wide interest.

In addition to the technical sessions, the panel Current Issues in LWR Core Design and Reactor Engineering Support has been organized by Moussa Mahgerefteh, Bob St. Clair and David Orr. This panel is part of a yearly series focusing on relevant technical challenges faced by the nuclear industry in the field of core design and associated plant operational issues. It features prominent guests from the relevant sectors of the nuclear industry and always commands interest and praises in the audience.

PHYSOR 2012 Bid Results

Three excellent proposals to host our next topical meeting, PHYSOR 2012, were presented at a joint session of the RPD Executive and Program Committee at the 2010 Annual Meeting in San Diego. A vote by RPD members on the best proposal ensued. After scrutiny of the ballots, the proposal led by the Oak Ridge National Laboratory and University of Tennessee, with the Knoxville professional and student ANS chapters, emerged as winner. The remaining two proposals, trailing close second and third, respectively, were from the ANS Trinity local section (covering Albuquerque, Santa Fe and Los Alamos) and the

Idaho Section of the ANS, in collaboration with Idaho National Laboratory.

The technical quality, organizational strength and degree of innovation that distinguished all the proposals confirm the health of the Division and align with the success of the conferences that it organizes (plus made for an amiable but exciting competition among the bidders).

While my congratulations and best wishes for the organization of PHYSOR 2012 go to ORNL/UT and to the conference proposed General Chairs, Jess Gehin and Ivan Maldonado, and the Program Chair, Ron Ellis, I must praise equally all three organizations for their remarkable proposals and conduct during the bid.

Best Paper Award (ANS 2010 Annual Meeting)

Based on the scores provided during the review process and the presentations at the meeting, the RPD Best Paper Award for the ANS 2010 Annual Meeting has been awarded to the paper “MCNP Calculations of Subcritical Fixed Source and Fission Multiplication Factors”, by *Brian C. Kiedrowski and Forrest B. Brown* (Los Alamos National Laboratory, X-Computational Physics Division). Congratulations to the authors and appreciation to the judges.

A special mention should also be made for the papers: “Improving the Thermal Conductivity of UO₂ Fuel with the Addition of Graphite Fibers”, by Daniel F. Hollenbach and Larry J. Ott (Oak Ridge National Laboratory) and “HFIR Post-Irradiation Curium Target Rod Nuclide Inventory Calculations” by David Chandler, R. T. Primm, III (ORNL) and G. Ivan Maldonado (University of Tennessee).

ANS 2010 Winter Meeting, Las Vegas, NV

The RPD sessions at the ANS 2010 Winter Meeting in Las Vegas, NV (November 7-11) featured a record of 56 accepted papers, out of the 61 submitted. In addition to the three RPD standing sessions: Reactor Physics General I and II– 11 papers, Reactor Analysis Methods (cosponsored with MCD) – 7 papers and Reactor Physics Design, Validation and Operating Experience I and II– 14 papers there were four special sessions: “Progress in Reactor Physics Analysis for Thorium-Fuelled Reactors”, organizers Blair Bromley and Ron Ellis - 9 papers, “Burnable Poison Optimization, Design, and

Analysis”, organizers: Moussa Mahgerefteh and Akio Yamamoto- 4 papers, “Methods, Validation and Analysis for Sustainable Nuclear Energy”, organizers Pavel Tsvetkov and Lawrence Miller – 6 papers, and “Numerical Error Estimation in Nuclear Engineering Modeling”, organizer Hany Abdel Khalik – 5 papers.

RPD also organized the panel “The Philosophy of Benchmark Development within the ANS Joint Benchmark Committee“. The organizer of the panel was Mark DeHart (also a panelist), with co-panelists Barry Ganapol, Bernadette Kirk, Jim Gulliford and Blair Briggs. RPD also co-organized with MCD the panel “The CASL Nuclear Energy Modeling and Simulation Energy Innovation Hub.” The panel organizer and panelist is Jess Gehin, with Doug Kothe, Chris Stanek, Bill Martin, John Turner and Jim Stewart as the other panelists.

Finally, RPD co-sponsored the session "Securing and Archiving Fast Reactor Data", organized within OPD by Ronald Omberg- 7 papers.

Thanks and congratulations to the session and panel organizers and to the reviewers for the effort they put forward in the timely resolution of all the papers submitted.

ANS 2011 Annual Meeting, Hollywood, FL

Get ready! Submission of summaries will start on November 1, with a deadline of January 14 2011.

There will be a number of RPD sessions that you may consider submitting to, including our standing sessions (Reactor Physics General, Reactor Analysis Methods, and Reactor Physics Design, Validation and Operating Experience) and **the special sessions** “Advances in Nuclear Reactor Kinetics”, “Design and Analysis for Plutonium and Minor Actinides Transmutation”, “Nuclear Data Covariance: Evaluation, Processing and Application”, “Advances in Small and Medium Sized Reactor Designs” and “Sensitivity, Uncertainty, and Data Assimilation Methodologies in Nuclear Systems Analysis”. The meeting will also feature the panel “Current Issues in LWR Core Design and Reactor Engineering Support”. Details of each session are provided at the end of this newsletter, beginning on page 6.

Reviewers will be greatly appreciated. If you would like to be added to the RPD list of

reviewers please send your request to the Program Chair, Dr. Fausto Franceschini.

Special Sessions at Upcoming ANS Meetings

Please consider organizing a special session or panel at one of the upcoming ANS meetings, such as the 2011 ANS Winter Meeting in Washington D.C. Timely special sessions and panels on topics of interest to academia and industry, with good quality contributions, have kept RPD one of the most active and relevant divisions.

Participation in Program Committee Activities

The success of our division is due to the active involvement of its members. I would like to encourage you to continue to contribute by submitting technical papers, organizing special sessions, reviewing papers, chairing sessions, and as members of the Program Committee and RPD governance in general.

Reactor Physics Division Website

By Benoit Forget
(bforget@mit.edu)

The new website is now up and running (<http://rpd.ans.org/index.html>) and ready to receive your contributions. Please contact me if you have any division related news to post or if you have any suggestions on how to make the website a resource to our division.

Reactor Physics Standards

By Dimitrios Cockinos
(cockinos@bnl.gov)

Revisions

Five of the most popular reactor physics standards are currently in various states of revisions: These are: ANSI/ANS-19.1, *Nuclear Data for Reactor Design*; ANSI/ANS-19.3, *Steady State Neutronics Methods for Power Reactor Analysis*; ANSI/ANS-19.3.4, *Determination of Thermal Energy Deposition Rates in Nuclear Reactors*; ANSI/ANS-19.6.1, *Reload Startup Physics Tests for Pressurized Reactors*, ANSI/ANS-5.1, *Decay Heat Power in Light Water Reactors and Moderator Temperature Coefficient In Pressurized Water Reactors*. Three of these standards, ANSI/ANS-19.3, 19.6.1 and

ANSI/ANS-19.11 are now in the process of balloting and the rest are undergoing revisions by their respective working groups.

Call for Volunteers

Volunteers are sought to join the working groups in the revisions of the following standards: ANSI/ANS-19.4, *A Guide for Acquisition and Documentation of Reference Power Reactor Physics Measurements for Nuclear Analysis Verification*; ANSI/ANS-19.5, *Requirements for Reference Reactor Physics Measurements*. Both these standards require knowledge and expertise in the areas of core design, core follow, analysis of measured power reactor data and benchmarking. Volunteers are also needed to help in the revision of ANSI/ANS-19.3.4, *Thermal Energy Deposition Rates* for which the required background is atomic and nuclear physics, reactor physics with emphasis on familiarity with standard ANSI/ANS-19.3. Persons interested in contributing to the efforts in the above standards should contact Ms. P. Schroeder, ANS Standards coordinator, pschroeder@ans.org.

ANS-19 Meeting

The regular meeting of ANS-19 was held during the ANS national winter meeting in Las Vegas on Sunday, November 7.

Special Session Presentations

The following three papers on standards will be presented during the Wednesday morning session “Reactor Physics Design, Validation and Operating Experience –II”: ANSI-19.6.1, “Reload Startup Physics Tests for Pressurized Water Reactors”, by C. T. Rombough; “A Revised Standard for the Moderator-Temperature Coefficient of Reactivity”, by R. D. Mosteller, R. St. Clair and R. E. Hall and “Proposed Revision of the Decay Heat Standard, ANSI/ANS-5.1”, by I. C. Gauld, M. C. Brady, B. Wilson and F. Schmittroth

Honors & Awards

By Dimitrios Cockinos
(cockinos@bnl.gov)

The Eugene P. Wigner Award

Members of the Reactor Physics Division are invited to submit nominations for the Eugene P. Wigner Reactor Physicist award. This award, one of the most prestigious awards of the society, is presented on a yearly basis, whenever possible, to a person or persons of any nationality who have made outstanding contributions to the field of reactor physics. In addition to the inaugural award presented to Dr. Wigner in December 1990 at Princeton, past recipients of the award include A.M. Weinberg, J. Horowitz, A.F. Henry, E.M. Gelbard, R.L. Murray and N. Corngold. Candidates for the Wigner award need not be members of ANS. More information on nominations for this award may be found in the ANS web site. Deadline for nominations is April 1, 2011.

ANS Fellow Award

Members of The Reactor Physics Division are also reminded that they may submit nominations for the ANS Fellow award. This award is presented twice a year and recognizes technical achievements in the candidate's field. The nomination process is simple. Details about this award and deadlines may also be found in the ANS web site.

Physor 2012

By Ron Ellis
(ellisrj@ornl.gov)

The next "Physics of Reactors Topical Meeting" PHYSOR 2012 will be held in downtown Knoxville, Tennessee, April 15-20, 2012. Key supporting organizations are ORNL/UT-Battelle, UTK, TVA, EPRI, and Y12/B&W. The various Chairs and organizers involved are shown below:

Honorary Chairs:

Lee Dodds, UTK
Kord Smith, Studsvik Scandpower
Paul Turinsky, NCSU

General Chairs:

Jess Gehin, ORNL
Ivan Maldonado, UTK

Technical Program Chair:

Ron Ellis, ORNL

TPC Co-Chairs:

Rakesh Chawla, PSI
Bojan Petrovic, Georgia Tech
T.A. Keys and Jim Lemons, TVA

Finance Chair:

Trent Primm, ORNL

International Chairs:

Jim Gulliford, OECD/NEA
Gary Dyck, IAEA

Student Chair:

UTK ANS Student Chapter President

Corporate Sponsorship:

Chris Robinson, Y12

Website/Registration:

Hanna Shapira

Guest Program:

Wendy Ellis

Publicity:

Ugur Merturyek, ORNL

Technical Tours:

Jessee Cheatham, ORNL

Publications:

Germina Ilas, ORNL

Special Events:

D.J. Lee, ORNL

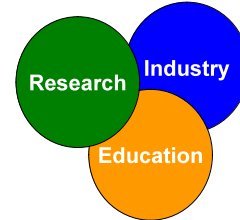
Exhibits:

Dan Ilas, ORNL

Arrangements:

Katherin Goluoglu, ORNL

The theme that was selected for PHYSOR 2012 is "Advances in Reactor Physics – Linking Research, Industry, and Education." This theme will guide a structure for the meeting to emphasize these particular areas. A website is under development at physor2012.org. The application for official ANS approval and the preliminary budget for ANS HQ concurrence have been prepared and were presented at the ANS Winter 2010 Meeting in Las Vegas. Preparations are being made for the release of the Call for Papers, and the establishment of the technical program



committee, paper reviewers, and volunteers. The technical program is currently under development, please contact the TPC on proposals and ideas for technical sessions and topics as well as volunteers for session organizers.

Sessions for 2011 Annual Meeting

SPECIAL SESSIONS

Nuclear Data Covariance: Evaluation, Processing and Application

Over the past ten years there has been a great amount of work devoted to nuclear data covariance. New methodologies have been developed for the evaluation of nuclear data uncertainties in the resonance region as well as in the high-energy region in the US and abroad. The intent of the session is to attract abstracts that can provide a good description of the work developed such as covariance evaluation, processing and application in the nuclear field. The session will provide a good opportunity to learn about the current and the desired target uncertainties for major isotopes present in reactor applications.

Organizers: Luiz C. Leal and Gerardo Aliberti

Advances in Small and Medium Sized Reactor Designs

Since the early 1990s the increased interest of developing countries in nuclear power has resulted in intensified efforts in development of small and medium sized reactors (SMRs). In industrialized countries, electricity market deregulation is calling for power generation flexibility that SMRs may offer. In addition to electricity generation, SMRs are of particular interest for non-electrical applications of nuclear energy, such as desalination of seawater, district heating and liquid fuel production. The recent upward trend in oil prices and the emerging need for finding a readily-available alternative energy source with minimal carbon footprint make SMRs an increasingly more attractive option.

In recognition of the above, this session aims to provide a forum for the exchange of information by interested parties on the technical, economic, environmental and commercial aspects of SMR development and implementation. This session

builds on the success enjoyed by similar sessions held at the ANS 2009 and 2010 Annual Meetings in Atlanta and San Diego. This follow up will present updates in the design, licensing and deployment status of SMRs discussed in the preceding sessions as well as introduce additional SMR designs which did not contribute the previous times.

Organizer: Youssef Shatilla

Advances in Nuclear Reactor Kinetics

Nuclear reactor kinetics has recently experienced several advances and a novel interest has emerged, with special regards to possible applications to advanced reactors. The development of new time- and spatially-dependent methods coupled with increasing computational power allow reactor analysts of all reactor designers to reduce the number of assumptions associated with point kinetics and to fully investigate transient scenarios. For some Generation IV (e.g., pebble bed and molten-salt reactors) and source-driven systems new models and numerical methods are needed. The interpretation of kinetic experiments for source-driven systems has also evidenced the need of new physically consistent approaches. Recent developments in the field include new time-integration techniques, enhanced quasi-statics and multi-scale approaches. Multidimensional features and full transport calculations also attract a great deal of interest. On the other hand, some numerical schemes have shown several shortcomings when applied to time-dependent analyses, leading to some unphysical behaviors. Also the development of physically significant benchmarks constitutes an important issue for validation methods.

Several papers have been scattered at various conferences. The special session here proposed would give a chance to gather the specialists in the field.

Organizers: Piero Ravetto, David Chandler, Akio Yamamoto, Trenton Primm III

Design and Analysis for Plutonium and Minor Actinides Transmutation

Sustainability is a prerequisite for the enduring success of any system of energy production. In order to achieve a fully sustainable nuclear solution, a proper prescription must be identified

to improve fuel utilization while minimizing the legacy on future generations.

Many solutions have been proposed for the management of the Plutonium and minor actinides (MAs) produced in fuel burnup, including partition and transmutation, as this would improve fuel utilization and have the potential to reduce its long- and intermediate-term radiotoxic content.

This special session aims to collect papers on the latest trend in Pu and MA burning in nuclear systems, both from the point of view of system design (Fast Reactors, Gas Reactors, Light Water Reactors and other systems) and/or tools and methodologies to investigate the fuel cycle associated to each system.

Organizers: Fausto Franceschini, Mark D. DeHart, Ivan G. Maldonado

STANDING SESSIONS

Reactor Physics: General

The field of reactor physics covers a wide range of technical areas. This session covers all of the topics that are not represented by any of the special sessions or other standing sessions. Topic areas can include cross sections, lattice physics, core physics, experiments, benchmarks, analysis methods.

Reactor Analysis Methods

The field of Reactor Physics relies heavily on the computational analysis of reactor systems. This session covers all aspects of reactor analysis methods and is a standing session of the Reactor Physics Division. Co-sponsored by the Mathematics and Computation Division.

Reactor Physics Design, Validation, and Operating Experience

This session covers the engineering aspects of Reactor Physics in design of reactor systems, validation of methods and data, and the operating experience of all types of reactors. The session provides a connection to the real-world application of Reactor Physics.

PANEL SESSION

Current Issues in LWR Core Design and Reactor Engineering Support

This panel session will consist of members invited from utilities and/or fuel vendors. The presentations will focus on sharing current core design capabilities, recent operating experience, and methods for addressing issues impacting core designs. Topics may include INPO SOER 96-02, INPO SOER 03-02, fuel performance (cladding failures, crud-induced power shift, distinctive crud pattern, and Zero-by-Ten results), management of competing core design interests (fuel cost, operating margin), refueling outage length and cycle length impacts to core design, multi-cycle optimization strategies, power uprate strategies or experience, and new fuel design implementation strategies or experience.

Organizers: David Orr, Moussa Mahgerefteh

MC 2011, Rio de Janeiro, Brazil

The next ANS Mathematics & Computations Topical meeting will take place on May 8-12, 2011 in Copacabana, Rio de Janeiro, Brazil. The meeting focuses on all areas of computational nuclear science and related application fields, and aims to provide a forum for the exchange of ideas and presentation of state of the art applied mathematical and computational methods against the backdrop of one of the world's most beautiful cities. Reactor Physics naturally figures prominently in the program, and RPD members are thus cordially invited to attend and present their latest work.

The deadline for paper submission is November 30, 2010. The paper should be a concise, self-contained document that will enable the reviewers to establish the novelty and relevance of the work in the context of its field of application. Subject to acceptance, the paper will have subsequent opportunity of being augmented/re-edited, for publication in the conference proceedings. Selected papers will be chosen for publication in a special issue of Nuclear Science and Engineering. More details of the conference can be found at www.mc2011.org.

Important note: visitors from some countries including US are subject to Brazilian visa requirements.

Please check with with your local Brazilian Consulate General the visa guidelines and requirements. For US residents a list of Brazilian Consulates and their jurisdiction can be found in:

<http://www.consulatebrazil.org/jurisd.htm>.

Please also refer to:

<http://tinyurl.com/mc2011visas>,

which gives an outline of the visa procedure and also a list of countries and their respective visa requirements. Finally note that visas once issued have to be used in 90 days.

The conference secretariat will happy to advise on this and any other issue which may arise, and help also with travel plans: secretaria@mc2011.org

We look forward to welcoming you to Rio de Janeiro and to M&C 2011.

Cassiano de Oliveira, Chair (cassiano@unm.edu)

Jorge Spitalnik, Co-Chair (jspitalnik@las-ans.org.br)

Ricardo Barros, Technical Program Chair (rcbarros@mc2011.org)

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2011	2012	2013
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Program	Standard/Honors & Awards	Scholarship/Goals & Membership
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**ANS Reactor Physics Division Program Committee
(Effective June 2010)**

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2008/2011	2009/2012	2010/2013
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