

American Nuclear Society
Nuclear Criticality Safety Division Newsletter
Summer 2012



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Message from the Chair

As I take over the chair of NCS D, I want to thank Doug Bowen for his efforts this past year as chair. Doug has turned over to me a division that continues to grow. The number of members continues to increase and we have strong technical sessions at national meetings. We are also preparing for our stand-alone topical which be held in Wilmington in September of 2013.

NCS D has transitioned from a small to large division which is a significant accomplishment. Our efforts are examples for the other divisions in ANS. We have a very active membership with people who are willing to offer their time and talent both on the local and national levels. I want to thank you for all your efforts and encourage you to continue.

At the Chicago meeting, outgoing president Eric Loewen challenged each of the divisions and technical groups to come up with posters that promote their divisions. His idea was to be able to use these posters as a revenue source for ANS. Posters from some of the divisions would be ones that science teachers might by hanging their classroom, and for other divisions it may be aimed at professionals. We might want to consider both ways, one poster with key parameters effecting criticality which would be of interest to professionals and another one with information on selected critical experiments with pictures, short little write ups and other bits of trivia that may be of interest to both professionals and science teachers. This is something I encourage all of you to think about. If you have thoughts on this or ideas for others posters, please let me or any other members of the Executive Committee know.

Something I did shortly after becoming the division chair was sit down and read the division bylaws (better late than never). Drawing from the bylaws, I've expanded the [governance webpage](#) to list the committees we have and where we have openings. I was also very surprised to learn as division chair how many committees I served on (most of them that is), but this is not a one person show by any means nor do I want to be. The volunteer members make these committees successful. We're looking for some committee chairs and some committee members. The time commitment is not large so please consider volunteering. If you are interested in working on one of these committees, contact the chair of the committee or contact me.

It is also time for me to encourage donations to our scholarship fund. Our goal is to raise \$60,000 to endow a scholarship will be given each year by NCS D. We have made progress but we still have quite a ways to go. I ask everyone to donate even a small amount because with as many members as we have it should not be difficult to fund this endowment. We did have a flurry of donations as a result of our dinner last year in Washington DC. Additionally all the money that was left over from the dinner is being added to the scholarship fund. Please visit our [scholarship page](#) and make a donation today.

I look forward to being the chair of NCS D for the next year and with your support NCS D will continue to grow in ways will benefit all of our members.

Larry Wetzel

llwetzel@babcock.com

Chair, Nuclear Criticality Safety Division

NCS D Pioneers Scholarship 2012 Recipient

This year's recipient is Hsingtzu Wu!

Ms. Wu says the scholarship will help her focus on Ph.D. research in developing a new tightly coupled technique for neutronics and thermal-hydraulics. Nuclear criticality safety analysis will benefit greatly by this research. For example, during a nuclear accident, when the fuel meltdown in the core becomes a possibility, a criticality computation needs to consider both neutronics and thermal-hydraulics. Coupling neutronics and thermal-hydraulics can provide more accurate predictions than those that consider only neutronics or thermal-hydraulics. A tightly coupled method is better than a loosely coupled method in terms of numerical stabilities and convergence. In addition, a tightly coupled method is superior in addressing inter-related multi-physics problem, such as neutronics and thermal-hydraulics inside a nuclear reactor.



The past recipients of the scholarship were:

- 2011 - Christopher (C.J.) Hurt
- 2010 - Jesse Holmes
- 2009 - Not awarded due to lack of funds
- 2008 - Allison Barber

You can read about the recipients on the [Scholarship page](#) of the NCS D website.

Endowed Scholarship Donors

Chair: Ron Knief

NCS D continues to make progress towards raising \$60,000 to create an endowed scholarship that will be awarded every year. A video shown at the 2011 NCS D Awards Dinner highlights the goals and purpose of the fund. You can view the video [here](#).

The number of donors is growing, and as of the publication of the newsletter, the total amount contributed is \$12,100, but we still need more donations. With over 800



members in the division, if everyone would donate just \$75, the goal would be met. Please consider donating to the scholarship fund. Contributing is easy, and can be done online. There is a link on the NCSD main page that connects you to the ANS donation page. Select the [Nuclear Criticality Safety Pioneers Scholarship](#). You can make it in honor or memory of someone if you want. The donations are tax deductible.

The donors so far are:

Supporter (\$25-\$99)	DeLorean Donor (\$100-\$499)	Professor (\$500 - \$999)	Time Traveler (\$1,000+)
Mr. Calvin Hopper General Donation	ANS 8.19 Working Group In honor of - Mrs. Betty Davenport	Mr. Joe Thomas General Donation	Mr. George Bidinger In honor of - Clarence L. Schuske
Mr. Kevin Kimball General Donation	Mr. Harry Felsher General Donation	Ms. Elizabeth Plassmann In honor of - Hugh Paxton	Dr. E. Charles Crume, Jr. In honor of - Dr. A. Dixon Callihan
Mr. Mark Jensen General Donation	Ms. Sandra Larson General Donation	Dr. Robert Frost In honor of - Dr. Hugh Clark	Dr. Ronald Knief In honor of Dr. Raymond L. Murray, Elizabeth (Libby) B. Johnson, David R. Smith, Dr. Hugh C. Paxton, Dr. A. Dixon Callihan, Mr. G. Robert Keepin, Mr. Pierre LeCorche, Dr. Ryohei Kiyose, Mr. Kenneth R. Ridgway, Dr. John C. ("Jack") Courtney
Mr. William Newmyer General Donation	Mr. Brian Matthews General Donation	Mr. Michael J. Vehec In honor of - Mr. Norman Pruvost	
Mr. Lewis Kotredes General Donation	Mr. Dennis Mennerdahl General Donation	Mr. David & Mrs. Carol Cise General Donation	Anonymous in honor of Norm Pruvost
Ms. Beverly Lomax In honor of Robert (Bob) H. Lewis	Mr. J. Chris Dean General Donation		
Mr. David Lindenschmidt In honor of Norm Provost	Mr. Andrew Prichard In honor of Mr. Richard Libby	Mr. Michael Corum General Donation	
Ms. Mackenzie Gorham General Donation	Mr. Larry Wetzel In honor of Mr. Francis Alcorn	Dr. Sedat & Mrs. Katherin Goluoglu General Donation	
	Ms. Barbara Krogfuss General Donation	Mr. Jerry Hicks In honor of David R. Smith	
	Mr. Chris Haight General Donation		
	Dr. Deb Hill General Donation	Dr. Robert D. Busch General Donation	
	Mr. R. Chris Robinson In honor of G. R. Handley, Richard G. Taylor, and Gary D. Ellis		

Supporter (\$25-\$99)	DeLorean Donor (\$100-\$499)	Professor (\$500 - \$999)	Time Traveler (\$1,000+)
	Mr. Randy Shackelford In honor of Norman Pruvost Dr. Douglas Croucher General Donation Mr. Adolf Garcia In honor of Elizabeth (Libby) B. Johnson and David R. Smith Mr. Harry W. Webb In honor of Norman Provost Dr. James A. Morman General Donation Mr. John H. Gertsen General Donation Mr. Scott Finrock General Donation Mr. Dominic (Fred) Winstanley General Donation		

Executive Committee

Chair: Doug Bowen

Doug Bowen convened the Executive Committee meeting at approximately 3:00 pm. All of the Nuclear Criticality Safety Division (NCSD) officers except the past chair were present. The division officers are as follows:

Position	Name	Phone	E-mail Address
Chair	Doug Bowen	(505) 667-5939	dgbowen@lanl.gov
Vice Chair/Chair Elect	Larry Wetzel	(434) 522-6580	llwetzel@babcock.com
Treasurer/Finance	Robert Maurer	(423) 735-5583	rsmaurer@nuclearfuelservices.com
Secretary	Sandi Larson	(865) 483-8247	sandi.larson@nuclearassociates.com
Past Chair (ex officio)	Brad Rearden	(865) 574-6085	reardenb@ornl.gov

A total of five out of nine members of the Executive Committee were present. The Executive Committee members are as follows and those not able to participate are indicated with an asterisk (*):

Term Ending June of (Year)	Name	Phone	E-mail Address
2012	Jerry Hicks	(505) 845-6287	jhicks@nnsa.doe.gov
	Deborah Hill*	(+44)1772 764359	deborah.a.hill@nnl.co.uk
	Ronald Pevey*	(865) 974-7573	rpevey@utk.edu
2013	Chris Robinson	(865) 574-8509	robinsonrc@y12.doe.gov
	Adolf Garcia	(208) 526-4420	garciaas@id.doe.gov
	Nick Brown	(423) 735-5519	NWBrown@nuclearfuelservices.com
2014	Michael Corum	(803) 603-2349	michael.corum@nuclearassociates.com
	Chris Haught*	(865) 576-5522	h7c@y12.doe.gov
	Allison Miller	(505) 845-3684	admille@sandia.gov

Approximately 26 additional NCSD members were present providing broad nuclear industry representation.

Chair's Report

NCS division has had a 3.6% increase in membership, to 931 members. Overall trends for ANS in 2011 include a general decrease in ANS National Meeting participation, a decrease in non-meeting publications, and an overall 2% decrease in ANS membership in 2011 following a 4% increase in previous years.

The Endowed Scholarship fund is at \$12,100, approximately twice where we were at after the Winter meeting. Donor list is on NCSD website. Goal remains at \$65,000.

Election results for 2012-2013 for Division Officers are Chair Larry Wetzel, Vice Chair Sandi Larson, Treasurer Robert Maurer, and Secretary Deborah Hill. New board members are Thomas Miller, Brian Kiedrowski, and John Bess.

Professional Divisions Committee (PDC) website has a lot of useful information including responsibilities and requirements for Division Officers, Bylaws of NCSD Division, and PDC Manual.

Vice Chair's Report

The new ANS Outreach Director is Bonnifer Ballard. She is the point of contact for all NCSD correspondence including meeting minutes, Treasurer's report, etc and activities. Her email address is bballard@ans.org.

As a non-profit, we don't have any financial requirements but we need to show a positive impact for our members. ANS National Chair Eric Loewen challenged each of the divisions to make posters for safety conscious work environment that can be used in the classroom or community. For NCSD, ideas were a poster on what an NCS Engineer needs to know or a poster with pictures of critical experiment assemblies. It was suggested that we allow Young Members Group (YMG) to comment on what would

be useful to high school and college students. He complimented NCS on sending out certificates of participation and suggested we share that practice with other divisions.

Treasurer's Report

NCSD has an excess over-budget of funds of \$26,459. Last year's Awards dinner netted \$2206. It was moved, seconded and passed to give this profit to the NCSD Pioneer's Scholarship Fund.

Program Committee: Allison Miller

NCSD had five sessions at the Chicago meeting. Session chairs for the Winter meeting in San Diego were assigned and topics for Summer 2013 meeting in Atlanta discussed at the Program Committee meeting.

Scholarship Committee: Ron Knief

Andy Prichard presented for Ron Knief. Three applications were received and one candidate was selected to receive the scholarship. None of the candidates were focused on NCS but instead on general nuclear engineering methods, etc. Methods to advertise the scholarship to change this were discussed.

This could be another idea for ANS posters. Andy will take an action to work with Ron on other avenues to advertise the scholarship.

Education Committee: Katherin Goluoglu

Education Committee requested Executive Committee approval to post "Integrating NCS into Design" to the NCSD website for a 60 day comment. Motion was made, seconded and passed to post the paper for comment. Education continues to work on Realism paper.

Publications/Newsletter/Web Site: Larry Wetzel

NCSD web site gets 40-45 hits per day from many countries. ANS National has changed policy to allow meeting presentations to be put on the web site with a signed agreement from presenter. ANS has agreed that we can leave them up indefinitely so Larry will load up all those that he has. Goal remains to get newsletter out within a month of the national meeting and Larry would love to have a volunteer to help.

Honors and Awards Committee: Maria LeTellier

Sandi Larson reported for Maria. Maria has been chair for about 4 years and is ready to step down. She also noted that the committee membership of past award recipients should be reconsidered.

Realism Committee: Donna D'Aquila

No one present from this committee. Reintegrating this committee into the Education Committee was discussed.

ANS Student Conference Presentation - UNLV

UNLV student organizers of the 2012 ANS Student Conference gave a summary. They had 516 attendees: 382 students from 40 colleges, 26 international students from 16 countries, and 134 in presentations or posters. Next year's 2013 conference will be hosted at MIT in Boston MA. They are interested in increasing international participation, both students and professionals, and using social media. Best paper awards and maybe a publication of the best papers are also being considered.

Old Business

As discussed at the last meeting under item 7, the ICNC conference to be hosted by the US in 2015. It will be a Class I Topical. The special committee that was approved to be formed will be formed by the new Chair, Larry Wetzel.

New Business

Adolph Garcia suggests NCS Chair re-establishes or appoints an Industrial Relations Chair to the dormant Industrial Relations Committee with a minimum of a Chair, one DOE and one NRC regulated end-user. This is requested to provide the DOE NCS Program with NCS community input to keep the NCS tools needed by the practitioners ready, because input from end-users group has decreased. However, there could be other uses, such as providing Program ideas for sessions or tutorials. Doug and Larry to take action to look up the charter for this committee and lead further discussions by email. Larry presented Doug with a plaque thanking him for his service as NCS Chair.

Program Committee

Chair: Allison Miller

Highlights of the Chicago Meeting

The sessions were well attended with over 100 people in attendance at most, overflowing the meeting room. The papers are listed below and some of the presentations will be available on the [NCS website](#).



Advancing Criticality Safety Capabilities in a Growing Nuclear World: The sharing of knowledge and experience between developers and nuclear criticality practitioners provides benefits to the overall community. Papers within this session are expected to focus on recent, state-of-the-art developments in production-level radiation transport simulation software (e.g., SCALE, MCNP) and nuclear data sets (e.g., ENDF, JENDL) that are relevant to the criticality safety practitioner. Also, papers relating the experience of practitioners on using new capabilities or those focusing on unaddressed current needs are strongly encouraged.

Session Organizer: Brian C. Kiedrowski

Benchmarking Experiments for Criticality Safety and Reactor Physics Applications: The International Criticality Safety Benchmark Evaluation Project (ICSBEP) and the International Reactor Physics Experiment Evaluation Project (IRPhEP) were established to identify and evaluate a comprehensive set of criticality safety and reactor physics related experimental data and preserve the data in a form that will be easily accessible to users. The projects provide a basis for recording, developing, and validating computational and analytical methods. This tutorial will outline and discuss the benchmark process for the ICSBEP and IRPhEP. Topics consist of the importance of quality experimental measurements, benchmark model development, uncertainty quantification, and utilization of these benchmarks in real-world applications.

Session Organizer: John Bess

Data, Analysis and Operations in Nuclear Criticality Safety: The purpose of this session is to provide a forum for timely presentation of general issues in the area of nuclear criticality safety that are not covered in other special session topics.



Sessions for Winter Meeting in San Diego:

Validation Tutorial:

This tutorial session will discuss the requirements and techniques for a successful validation effort. The tutorial will touch on several topics important to validating a code system. These topics include an overview of the requirements of ANS 8.24. The tutorial will discuss the use of a global validation versus process specific validations and the importance of defining an appropriate area of applicability for the validated code system. Statistical methods for determining a subcritical limit will be reviewed, as well as how much added margin is appropriate for a particular application. Appropriate sources of benchmarks will be discussed, and when it is appropriate to develop benchmark cases not currently available. The NRC/DOE expectations for a code validation will be discussed.

Session Organizer: Katherine L. Goluoglu

FY2011 Nuclear Criticality Safety Program Technical Accomplishments The Nuclear Criticality Safety Program (NCSP) has been doing lots of good, interesting, technical work supporting the DOE criticality safety enterprise, as well as benefiting the nuclear community as a whole. There are few opportunities to learn about these efforts since they cannot all be presented at an ANS meeting. However, an NCSP

Technical Seminar is held annually in the spring at Oak Ridge National Laboratory. The goal of this seminar is to have each NCSP Task Manager present their technical results from the fiscal year. Specifically, the presentations provided a summary of: the work that was done; why the work was done; and who benefited from the work or could potentially benefit across the DOE as well as the nuclear complex.

This annual meeting leads to an opportunity for the NCSP to showcase outstanding NCSP technical accomplishments and as a result, the best technical results that will have the most benefit to the nuclear community as a whole have been compiled and those presenters will provide these technical results at the 2012 Winter American Nuclear Society Meeting.

Session Organizer: A. Nichole Ellis

Data, Analysis and Operations in Nuclear Criticality Safety: The purpose of this session is to provide a forum for timely presentation of general issues in the area of nuclear criticality safety that are not covered in other special session topics.

Upcoming Meetings (at a glance)

Dates and locations of upcoming meetings are listed below:

Dates	Location
Nov. 11-15, 2012	San Diego, CA (ANS Winter Meeting)
June 16-20, 2013	Atlanta, GA (ANS Annual Meeting)
Sept 30 - Oct 3, 2013	NCSD Topical (Wilmington, NC)
Nov. 10-14, 2013	Washington, DC (ANS Winter Meeting)
June 15-19, 2014	Reno, NV (ANS Annual Meeting)
November 9-13, 2014	Anaheim, CA (ANS Winter Meeting)
June 7-11, 2015	San Antonio, TX (ANS Annual Meeting) ICNC (TBD)
November 8-12, 2015	Washington, DC (ANS Winter Meeting)

Education Committee

Chair: Katherin Goluoglu

The Education White Paper on “Integrating Nuclear Criticality Safety into Design” is out for comment until September 11, 2012. Please send comments to Katherin Goluoglu at kgoluoglu@hotmail.com.

ANSI/ANS-8 Volunteers Needed

Several ANSI/ANS-8 Work Group chairs have indicated they could use additional volunteers to support standards revision or maintenance work. If you are interested in supporting one or more of the ANS-8 Work Groups listed below, please contact the listed Work Group Chair or Vice-Chair.

Please note that to become a member of an ANS-8 Work Group, the Work Group Chair must agree to your participation. Volunteers should have the endorsement by their management, since effective standards participation involves travel, labor effort, and potential use of company resources. ANS standard volunteers must also [register](#) with ANS.

ANSI/ANS-8.12 - Nuclear Criticality Control and Safety of Plutonium-Uranium Fuel Mixtures Outside Reactors

Chair: [Debdas Biswas](#)

ANSI/ANS-8.28 NDA Measurements (proposed new standard)

Vice-chair: [Larry Berg](#)

All of the ANSI/ANS-8 standards can be purchased through ANS at the [ANS store](#).

International Standards for Nuclear Criticality Safety

In addition to the ANSI/ANS standards in the US, there are international standards. The US has representation on these standards. These standards are not used by the US Regulators, but it is good for the practitioners to be familiar with them.

The following International Standards Organization (ISO) standards apply to nuclear criticality safety:

- ISO 27467:2009 (Ed.1), "Nuclear Criticality Safety—Analysis of a Postulated Criticality"
- ISO 11311:2011 (Ed. 1), "Nuclear Criticality Safety—Critical Values for Homogeneous Plutonium–Uranium Oxide Fuel Mixtures Outside of Reactors"
- ISO 27468:2011 (Ed. 1), "Nuclear Criticality Safety—Evaluation of Systems Containing PWR UOX Fuels—Bounding Burnup Credit Approach"
- ISO 11320:2011 (Ed. 1), "Nuclear Criticality Safety—Emergency Preparedness and Response"

The following standards have been approved since the June 2011 meeting in London:

- ISO 11311:2011-06-14, *Nuclear criticality safety – Critical values for homogeneous plutonium–uranium oxide fuel mixtures outside of reactors*
- ISO 27468:2011-06-14, *Nuclear criticality safety – Evaluation of systems containing PWR UOX fuels – Bounding burnup credit approach*

- ISO 11320:2011-09-22, *Nuclear criticality safety – Emergency preparedness and response*

The current work in progress involves several standards in different stages of development:

- ISO/CD 16117: *Estimation of the number of fissions of a postulated criticality accident* (Matthieu DULUC – FR) currently in ballot
- Preliminary revisions to ISO 1709 : 1995 are under way (Neil HARRIS – UK)
- ISO Standard on Waste (Duncan ELLIS/Neil HARRIS – UK)
- Revision to ISO 7753 / IEC 860 : 1987, no expectations for immediate revision
- Discussions and reviews about nuclear criticality safety translations between French and English and relevance to ISO TC85/WG1 ISO/NP 12749-3, Terminology, definitions, units, and symbols was examined during a joint meeting with TC85/WG1 and TC85/SC5/WG8.

Resolutions detailing work out to December 2012 were presented at the Standards forum by Calvin M. Hopper. Details on the scope and content of these standards are provided in a paper by Calvin M. Hopper titled "Status and Value of International Standards for Nuclear Criticality Safety," published in proceedings of the International Conference on Nuclear Criticality 2011.

The approved ISO NCS standards may be purchased from http://www.iso.org/iso/iso_catalogue.htm (click on "By TC," "TC 85," then "TC85/SC 5").