Radiation Safety Information Computational Center

No. 608   January 2016

*"Let our New Year's resolution be this: we will be there for one another as fellow members of humanity, in the finest sense of the word." – **Goran Persson***

TABLE OF CONTENTS

CHANGES TO THE RSICC CODE AND DATA COLLECTION

There was one update to the RSICC catalog for those individuals that may be interested.

CCC-831/ADVANTG 3.0.3

Oak Ridge National Laboratory, Oak Ridge, Tennessee, contributed ADVANTG 3.0.3, AutomateD VAriaNce reducTion Generator. ADVANTG is an automated tool for generating variance reduction parameters for fixed-source continuous-energy Monte Carlo simulations with MCNP5 V1.60 (CCC-810, not included in this distribution, not included in this distribution) based on approximate 3-D multigroup discrete ordinates transport solutions generated by Denovo (included in this distribution). The variance reduction parameters generated by ADVANTG consist of space and energy-dependent weight-window bounds and biased source distributions, which are output in formats that can be directly used with unmodified versions of MCNP5. ADVANTG has been applied to neutron, photon, and coupled neutron-photon simulations of real-world radiation detection and shielding scenarios.

ADVANTG implements the Consistent Adjoint Driven Importance Sampling (CADIS) method and the Forward-Weighted CADIS (FW-CADIS) method for generating variance reduction parameters. The CADIS and FW-CADIS methods provide a prescription for generating space- and energy-dependent weight-window targets and a consistent biased source distribution. The CADIS method was developed for accelerating individual tallies, whereas FW-CADIS can be applied to multiple tallies and mesh tallies.

The CD contains ADVANTG and Denovo executables for Linux, Mac OS X, and Windows systems and source code, documentation, and BUGLE-96, DABL69, SCALE 27n19g, and SCALE 200n47g multigroup cross section libraries in ANISN format. C, C++, Fortran 90, and Python; Linux, Mac OS X, and Windows. (C00831MNYCP03)

SINGLE-USER LICENSE AGREEMENT REVISED

The single-user license agreement has been revised to address concerns regarding changes in end-use and employment changes of individuals that have received packages from RSICC. In some instances individuals obtain approvals from our Federal regulators for use of software packages for very specific purposes or while employed or associated with specific organizations. To address this concern, the single-user license agreement has been modified to indicate that the license is only valid for the end-use as stated in the Licensee's request and only while associated with the organization

under which the request is being made. After February 1, 2015, the individual's single-user license would no longer be valid if they change their end-use or are no longer associated with the organization for which they obtained the original license. In these cases, the individual would need to submit a new request to RSICC for the package for the new end-use or the new affiliation.

SCIENCE EDUCATION PROGRAMS AT OAK RIDGE NATIONAL LABORATORY

Looking for an internship or post-graduate opportunity at Oak Ridge National Laboratory? The Science Education Programs at Oak Ridge National Laboratory provide paid opportunities for undergraduates, grad students, recent graduates, and faculty to participate in high-quality research alongside world-class scientists to solve real-world problems. Opportunities are available for internships and co-ops, research appointments, and sabbaticals.

You can access all available opportunities through the website at http://www.orau.org/ornl. The Talent and Opportunity System allows you to create a profile, and then answer only 5 or 6 questions for each program or job posting for which you apply.

All levels of participants from undergraduates to faculty are encouraged to publish research papers with their mentors. Please browse through the Research Profiles on the different participants and their research experiences at the right hand side of the bottom of the web site listed above. Also, there is a video of research participants at ORNL sharing their thoughts on how access to world-class research facilities and staff has catapulted their careers in science and technology. You can find it on YouTube at http://ow.ly/2EQLz.

CONFERENCES, TRAINING COURSES, SYMPOSIA

RSICC attempts to keep its customers and contributors advised of conferences, courses, and symposia in the field of radiation protection, transport, and shielding through this section of the newsletter. Should you be involved in the planning/organization of such events, feel free to send your announcements and calls for papers via email walkersy@ornl.gov with "conferences" in the subject line by the 20th of each month. Please include the announcement in its native format as an attachment to the message. Please provide a website address for the event if one is available.

Every attempt is made to ensure that the links provided in the Conference and Calendar sections of this newsletter are correct; however, if the links become unavailable, please call the point of contact for the event.

CONFERENCES

PHYSOR 2016

The next Reactor Physics Division biannual topical on the Physics of Reactors, PHYSOR 2016 will be held in Sun Valley, Idaho, **May 1-5, 2016**. Based on more than 460 summaries submitted, this is likely to be a well-attended meeting and an opportunity to engage in an international review of

current reactor physics research, developments, and applications. More information on the meeting may be found at www.physor2016.org.
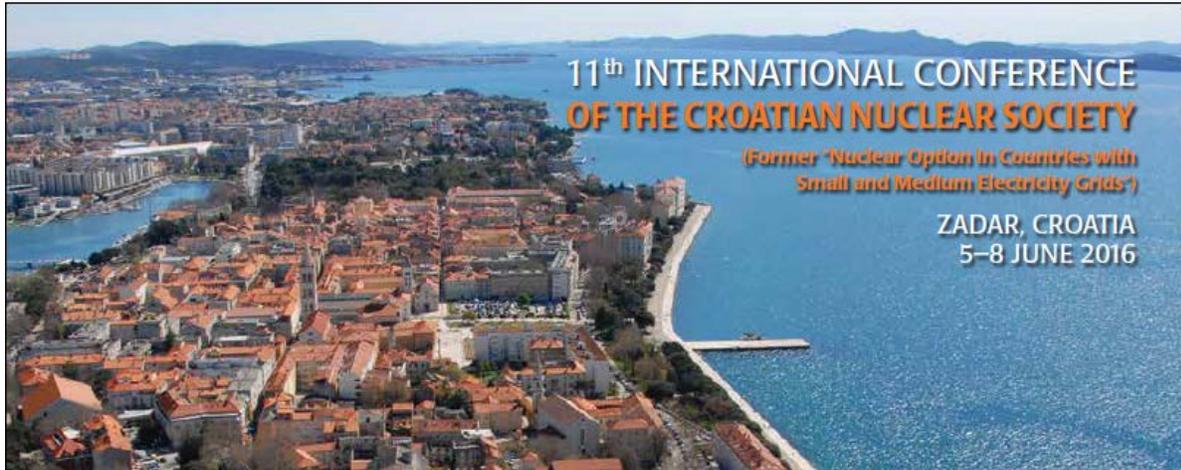
HND2016

The next biennial conference organized by the Croatian Nuclear Society will be organized in Zadar, Croatia, **June 5-8, 2016**. With about 200 participants this conference is covering broad range of nuclear energy related topics from science, engineering, environment to economy. Extended deadline for submitting abstracts is January 15, 2016. All other details are available at http://www.nuclear-option.org/ and https://www.conftool.net/HND2016/.

TRAINING COURSES

Radioactive Material Package Shielding Evaluation and Nuclear Criticality Safety Evaluation Training

The U.S. Department of Energy (DOE) Packaging Certification Program (PCP), Office of Packaging and Transportation, is offering Safety Analysis Report for Packaging (SARP) shielding and nuclear criticality safety (NCS) courses for SARP generalists and analysts.

The SARP Generalist Course is designed for project managers, supervisors, NCS/shielding subject matter experts (SME), or SMEs in non-NCS/shielding technical areas (e.g., structural, thermal, package design, etc.) who need to better understand how the NCS/shielding analyses fit in the broader SARP documentation. Specifically, the Generalist Course provides an overview of the regulations and guidelines for the criticality and shielding analysis for a SARP, and the course shows how the NCS/shielding chapters integrate with the other parts of the SARP. Students in the Generalist Course will review an actual SARP document after the course material is presented to emphasize the key elements of the shielding and criticality analyses.

The Analysts Course will provide detailed training on the radioactive material package shielding analyses and NCS evaluation fundamentals needed by analysts/practitioners (i.e., safety analysts and/or technical reviewers) to prepare and/or review technical analyses for the SARP documentation. The Analyst Course also provides an overview of regulations and guidelines in addition to detailed in-class exercises associated with the package shielding and NCS analyses. With regard to the in-class exercises, analysis teams will be faced with "staged" SARP examples in which a number of important decision processes in the generation of a SARP will be demonstrated and discussed.

The SARP Generalist Course will be held at Oak Ridge National Laboratory (ORNL) in Oak Ridge, Tennessee, **June 6-10, 2016**. The SARP Analyst Course will be **September 12-16, 2016,** at ORNL.

Further information will be posted as soon as it is available. Contact Douglas G. Bowen at bowendg@ornl.gov or (865) 576-0315.

LANL MCNP6 Class Schedule for 2016

Website: https://laws.lanl.gov/vhosts/mcnp.lanl.gov/classes/classinformation.shtml

Date	Course Name and Description	Cost
Mar 28 - Apr 1, 2016 Los Alamos, NM	Introduction to MCNP6 Non-US citizens must register by 2016-01-04 | Mon 10:30 - Fri 12:00	$1800 or $1500*
Apr 4-8, 2016 Los Alamos, NM	Variance Reduction with MCNP6 Non-US citizens must register by 2016-01-11 | Mon 10:30 - Fri 12:00	$1800 or $1500*
Apr 11-13, 2016 Los Alamos, NM	Unstructured Mesh with Attila4MC Non-US citizens must register by 2016-01-15 | Mon 12:30 - Wed 4:30	$1000 or $800*
Apr 18-22, 2016 Los Alamos, NM	Criticality Calculations with MCNP6 Non-US citizens must register by 2016-01-25 | Mon 10:30 - Fri 12:00	$1800 or $1500*
June 6-10, 2016 Los Alamos, NM	Introduction to MCNP6 Non-US citizens must register by 2016-03-14 | Mon 10:30 - Fri 12:00	$1800 or $1500*
Aug 1-5, 2016 Los Alamos, NM	Introduction to MCNP6 Non-US citizens must register by 2016-05-09 | Mon 10:30 - Fri 12:00	$1800 or $1500*
Aug 8-12, 2016 Los Alamos, NM	Criticality Calculations with MCNP6 Non-US citizens must register by 2016-05-16 | Mon 10:30 - Fri 12:00	$1800 or $1500*
Aug 15-17, 2016 Los Alamos, NM	Unstructured Mesh with Attila4MC Non-US citizens must register by 2016-05-20 | Mon 12:30 - Wed 4:30	$1000 or $800*
Oct 31 - Nov 4, 2016 Los Alamos, NM	Introduction to MCNP6 Non-US citizens must register by 2016-08-08 | Mon 10:30 - Fri 12:00	$1800 or $1500*

* Early payment discount: A discount of $300 per student is given when the registration payment is received in full at least 4 weeks before the start of class.

* Classes may be cancelled or postponed if fewer than 8 students register.
* Maximum of 15 students per class.
* If a class is marked as FULL, CANCELLED, or COMPLETED, then you cannot register for it.

<u>**Introductory classes**</u> are for those who have little or no experience with MCNP. This class surveys the features of MCNP so the beginning user will be introduced to the capabilities of the program, and will have hands-on experience at running the code to solve simple problems. Course topics include Basic Geometry, Source Definitions, Output (Tallies), Advanced Geometry (repeated structures specification), Variance Reduction Techniques, Statistical Analysis, Criticality, Plotting of Geometry and Tallies, and Neutron / Photon / Electron Physics.

<u>**Intermediate workshops**</u> cover the entire spectrum of MCNP/MCNPX but proceed at a much faster pace and are more in-depth than introductory classes. These workshops are open to new users; the first day of class is a review of basics. However, the intermediate workshops are targeted toward more experienced users and are more problem solving than lecture classes. Intermediate workshops feature flexible course content, skip topics of least interest to the participants, and provide significantly more depth than introductory classes.

<u>**Advanced classes - Variance Reduction & Criticality**</u> are for people with MCNP experience who want to extend their knowledge and gain depth of understanding. Most areas of MCNP operation will be discussed in detail, with emphasis on Advanced Geometry, Advanced Variance Reduction Techniques, and other advanced features of the program. Time will be available to discuss approaches to specific problems of interest to participants. Classes on specific topics are offered when there is sufficient interest.

NOTE: While MCNP supports a number of platforms, LANL class computers are usually Windows based.

More information about the MCNP courses at LANL is available on their website at
https://laws.lanl.gov/vhosts/mcnp.lanl.gov/classes/classinformation.shtml.

MCNP6 and Visual Editor Training

Website: http://www.mcnpvised.com/index.html

MCNP6 Intermediate Workshops 2016		
April 25-29, 2016	MCNP6 Intermediate Workshop	Paris, France
July 4-8, 2016	MCNP6 Intermediate Workshop	Prague, Czech Republic
August 22-26, 2016	MCNP6 Intermediate Workshop	Livermore, CA
October 17-21, 2016	MCNP6 Intermediate Workshop	Paris, France

Intermediate Workshops cover the entire spectrum of MCNP6 but proceed at a much faster pace and are more in-depth than Introductory Classes. These workshops are open to new users; the first day is a review of basics. However, the intermediate workshops are targeted toward more experienced users and are more problem solving than lecture classes. Intermediate workshops feature flexible course content, skip topics of least interest to the participants, and provide significantly more depth than introductory classes.

The list of workshops is tentative, as workshops may be added, removed, or modified throughout the year, depending on user interests. Workshops with fewer than 12 registrants on the early registration date are subject to cancellation or rescheduling.

In order to process non-U.S. citizens by the class date, non-U.S. citizens must register at least 6 weeks prior to the start of the training class. All non-U.S. citizens who reside in countries listed in the U.S. Code of Federal Regulations, Title 10, Part 810.8, are required to register at least 8 weeks prior to the start of the training class. These participants must be processed by the DOE and should not make travel arrangements until approval from DOE has been obtained.

Additional information about the courses can be found at the website, http://www.mcnpvised.com/train.html.

To register send an email to Randy Schwarz at randyschwarz@mcnpvised.com, indicating the workshop of interest to you.

Visual Editor Classes 2016		
February 22-26, 2016	Intermediate Visual MCNP6 for Shielding Calculations	Richland, WA
February 29-March 4, 2016	Intermediate Visual MCNP6 for Criticality Calculations	Richland, WA
March 7-11, 2016	Intermediate Visual MCNP6 for Shielding Calculations	Richland, WA
March 14-18, 2016	Beginning Visual MCNP6	Las Vegas, NV
March 21-25, 2016	Advanced Visual MCNP6 with Applications in Mesh Tallies and Variance Reduction.	Richland, WA

April 4-8, 2016	Intermediate Visual MCNP6 for Medical Physics Calculations	Barcelona, Spain
April 18-22, 2016	Beginning Visual MCNP6 The NEA handles registration for this class. Click here to register.	Paris, France
May 16-23, 2016	Intermediate Visual MCNP6 for Shielding Calculations	Barcelona, Spain
May 23-27, 2016	Intermediate Visual MCNP6 for Shielding Calculations	Barcelona, Spain
May 30-June 3, 2016	Intermediate Visual MCNP6 for Criticality Calculations	Barcelona, Spain
June 27-July 1, 2016	Beginning Visual MCNP6	Prague, Czech Republic
July 11-15, 2016	Advanced Visual MCNP6 with Applications in Mesh Tallies and Variance Reduction.	Prague, Czech Republic
September 12-16, 2016	Beginning Visual MCNP6	Las Vegas, NV
September 19-23, 2016	Advanced Visual MCNP6 with Applications in Mesh Tallies and Variance Reduction.	Las Vegas, NV
October 10-14, 2016	Beginning Visual MCNP6	Paris, France
November 7-11, 2015	Penelope	Las Vegas, NV

Classes are taught using the most recent (beta) version of the Visual Editor Code. All class attendees must have a valid MCNP/MCNPX RSICC license. Bring proof of receipt (letter or email) to the class.

The introductory workshops combine teaching on MCNP basics and how to create MCNP input files using the Visual Editor. The intermediate Visual Editor workshops focus on more advanced topics such as tallies and variance reduction using the Visual Editor.

Exercises will focus on creating input files and visualizing output data with the Visual Editor. Attendees are encouraged to bring their own input files for viewing and modifying in the Visual Editor; this is particularly important for the intermediate workshop.

The course description and registration information can be found at
http://www.mcnpvised.com/index.html.

NEA Nuclear Energy Agency

These workshops combine teaching by the authors on program physics, along with instructions on how to use the software. The courses include a large number of practical exercises.

Should you be interested in attending, information is available at:

http://www.oecd-nea.org/dbprog/trainingcourses.htm or contact: programs@oecd-nea.org.

The NEA Headquarter is moving to Boulogne-Billancourt.

Please note that our services will be unavailable from 9 to 11 December 2015 inclusive.

The courses scheduled for 2016 will take place at the new address (provided in registration forms). Please note that all attendees must be registered users.

Date	Class	Course Content	Price	Location
29 February-4 March 2016	SCALE Lattice Physics and Depletion	Course description To register, click here	2000 Euros	Paris, France
7-11 March 2016	SCALE/ORIGEN Standalone Fuel Depletion, Activation, and Source Term Analysis	Course description To register, click here	2000 Euros	Paris, France
18-22 April 2016	Beginning Visual MCNP6	Course description To register, click here	2200 Euros	Paris, France
25-29 April 2016	MCNP6 Intermediate	Course description To register, click here	2200 Euros	Paris, France
23-27 May 2016	PHITS Monte-Carlo Particle and Heavy Ion Transport Code System	Course description	500 Euros	Paris, France

* The fee includes the training course, luncheons and coffee breaks.

Contact: programs@oecd-nea.org
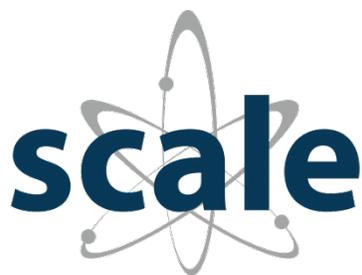
SCALE ORNL and NEADB Training Courses – Winter 2016

Training is provided by developers and expert users from the SCALE team. Courses provide a review of theory, description of capabilities and limitations of the software, and hands-on experience running problems of varying levels of complexity.

All attendees MUST be licensed SCALE 6.2 users. SCALE 6.2 will be available soon from ORNL/RSICC in the USA, the OECD/NEA Data Bank in France, and the RIST/NUCIS in Japan. All currently scheduled SCALE Courses are described below.

Date	Course Name and Description	Location	Cost
February 15-19, 2016	**SCALE Lattice Physics and Depletion Course** 2D lattice physics calculations using TRITON and the new Polaris code to generate few group constants for nodal core simulators; 1D, 2D, and 3D depletion calculations, including the new 3D continuous-energy (CE) Monte Carlo depletion capabilities; resonance self-shielding techniques including Monte Carlo Dancoff factors for non-uniform lattices; generation of ORIGEN reactor libraries for spent fuel characterization	ORNL Oak Ridge, TN USA	$2000*
February 22-26, 2016	**SCALE/ORIGEN Standalone Fuel Depletion, Activation, and Source Term Analysis Course** Isotopic depletion, activation analysis, and source term characterization using ORIGEN/OrigenArp and the new ORIGAMI tool for convenient characterization of used nuclear fuel with radially and axially varying burnup.	ORNL Oak Ridge, TN USA	$2000*
February29-March 4, 2016	**SCALE Criticality Safety and Radiation Shielding Course** Basic criticality calculations with KENO-VI; shielding analysis with automated variance reduction using MAVRIC; and criticality accident alarm system analysis. Calculations will be performed using multigroup and CE cross sections, including resonance self-shielding of multigroup data, optimized CE capabilities in KENO, and new coupled CE neutron and photon transport in Monaco	ORNL Oak Ridge, TN USA	$2000*
March 7-11, 2016	**SCALE Sensitivity/Uncertainty Analysis and Uncertainty Quantification Calculations Course** In this updated class, participants will learn to apply the sensitivity/uncertainty analysis (SA) and uncertainty quantification (UQ) capabilities in SCALE, focusing on two approaches: 1) perturbation theory-based TSUNAMI sequences to perform nuclear data SA and UQ for	ORNL Oak Ridge, TN USA	$2000*

	eigenvalue and reaction rates using 1D, 2D and 3D tools, including multigroup and new CE Monte Carlo capabilities; and 2) stochastic sampling-based UQ analysis using the new Sampler super-sequence to perform UQ for any computed parameter with respect to uncertainties in many input quantities including nuclear data, dimensions, densities, temperatures, etc. Training will include workshop problems analyzing a variety of different systems including LWR (both UO2 and MOX fuel), HTGR, and fast systems.		
February 29-March 4, 2016	**SCALE Lattice Physics and Depletion Course** 2D lattice physics calculations using TRITON and the new Polaris code to generate few group constants for nodal core simulators; 1D, 2D, and 3D depletion calculations, including the new 3D continuous-energy (CE) Monte Carlo depletion capabilities; resonance self-shielding techniques including Monte Carlo Dancoff factors for non-uniform lattices; generation of ORIGEN reactor libraries for spent fuel characterization	OECD/NEA Data Bank, Paris, France	2000 Euro
March 7-11, 2016	**SCALE/ORIGEN Standalone Fuel Depletion, Activation, and Source Term Analysis Course** Isotopic depletion, activation analysis, and source term characterization using ORIGEN/OrigenArp and the new ORIGAMI tool for convenient characterization of used nuclear fuel with radially and axially varying burnup.	OECD/NEA Data Bank, Paris, France	2000 Euro

**Full-time university students can register at a reduced rate. Both professional and student registration fees are discounted $200 for each course over one.*

***FOREIGN NATIONAL VISITORS TO ORNL** - Payment MUST be received at least one week prior to attending the training course. All foreign national visitors must register 40 days before the start date of the training course they plan to attend.*

For more information regarding these classes, visit their website at
http://scale.ornl.gov/training_2016_feb-mar.shtml

SYMPOSIA

2016 CALENDAR

January

Institute of Nuclear Materials Management (INMM) 31st Spent Fuel Management Seminar, January 11-13, 2016, Washington, D.C. See website for more information http://www.inmm.org/31st_Spent_Fuel_Seminar.htm.

February

Nuclear and Emerging Technologies for Space (NETS) 2016, February 22-25, 2016, Huntsville, AL. See website for more information http://www.ans.org/meetings/c_3.

May

47th Annual Meeting on Nuclear Technology (AMNT 2016), May 10-12, 2016, Hamburg, Germany. See website for more information http://www.nucleartech-meeting.com/welcome.html.

June

2016 Society of Nuclear Medicine and Molecular Imaging (SNMMI) Annual Meeting, June 11-15, 2016, San Diego, CA. More information to follow.

2016 American Nuclear Society (ANS) Annual Meeting. June 12-16, 2016. New Orleans, LA.

July

61st Annual Health Physics Society (HPS) Meeting, July 17-21, 2016, Spokane, WA. See website for more information http://hps.org/meetings/meeting39.html.

November

2015 American Nuclear Society (ANS) Winter Meeting and Nuclear Technology Expo. November 6-10, 2016, Las Vegas, NV.

2017 CALENDAR

<u>May</u>

2017 International Symposium on Reactor Dosimetry, ISRD-16. May 7-12, 2017, Santa Fe, New Mexico. See website for more information http://reactordosimetry.org.

<u>June</u>

2017 American Nuclear Society (ANS) Annual Meeting. June 11-15, 2017, San Francisco, CA.

<u>July</u>

62nd Annual Health Physics Society (HPS) Meeting. July 9-13, 2017, Raleigh, NC.

<u>October</u>

2017 American Nuclear Society (ANS) Winter Meeting and Nuclear Technology Expo. October 29-November 2, 2017, Washington, DC.