# **Radiation Safety Information Computational Center**



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"Learn from yesterday, live for today, hope for tomorrow." –Albert Einstein

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# CHANGES TO THE RSICC CODE AND DATA COLLECTION

There are four updates to the RSICC catalog for those individuals that may be interested.

## CCC-784/DIF3D11.2892

Argonne National Laboratory, Argonne, Illinois, contributed DIF3D 11.2892, which revises the performance and accuracy issues associated with the solution techniques of the variational nodal methods introduced in DIF3D8.0/VARIANT8.0 release (distributed by RSICC as CCC-649). The VARIANT option solves the diffusion or transport equations in two-and three-dimensional hexagonal and Cartesian geometries. Eigenvalue, adjoint, fixed source and criticality (concentration) search problems are permitted as are anisotropic diffusion coefficients. Flux and power density maps by mesh cell and region-wise balance integrals are provided. Although primarily designed for fast reactor problems, upscattering and, for the finite difference option only, internal black boundary conditions are also treated. This release is primarily performance improvements and bug fixes over version 11.0.

DIF3D reads and writes the standard interface files specified by the Committee on Computer Code Coordination (CCCC). Additional utilities are provided to allow users to better use the existing software package including a basic visualization capability called DIF3D\_TO\_VTK which generates input files for VISIT or Paraview.

All non - U.S. government funded license requests should be redirected to nera-software@anl.gov.

Distribution includes a tar file which contains source code, code documentation (in pdf format), sample problem input and output, code dependent BCD and binary card image file descriptions, python scripts,

a README installation file, an updated manual describing the revisions to the Variant option. Fortran 90 and C source code for Linux PCs, and MacOSX (RSICC ID: C00784MNYCP02).

#### CCC-822/REBUS V11.2892

Argonne National Laboratory, Argonne, Illinois, USA has contributed a new version of REBUS 11.2892: Code System for Analysis of Fast Reactor Fuel Cycles. REBUS is a code designed for the analysis of fast reactor fuel cycles. Two basic types of analysis problems are solved: 1) the infinitetime, or equilibrium, conditions of a reactor operating under a fixed fuel management scheme, or 2) the explicit cycle-by-cycle, or non-equilibrium operation of a reactor under a specified periodic or nonperiodic fuel management program. For the equilibrium type problems, the code uses specified external fuel supplies to load the reactor. Optionally, reprocessing may be included in the specification of the external fuel cycle and discharged fuel may be recycled back into the reactor. For non-equilibrium cases, the initial composition of the reactor core may be explicitly specified, or the core may be loaded from external feeds and discharged fuel may be recycled back into the reactor as in equilibrium problems. This release is primarily bug fixes and performance improvements over version11.0

REBUS will handle both equilibrium and non-equilibrium problems using several different core geometries including triangular and hexagonal mesh. The neutronics solution may be obtained using finite difference, nodal diffusion-theory and variational nodal transport methods. Fixed source depletion may be done with the three solution methods. Other features include: no restrictions on the number of neutron energy groups, and general external cycle with no restrictions on number of external feeds, reprocessing plants, etc. Fuel management is completely general for non-equilibrium problems. Microscopic cross sections are permitted to vary as a function of the atom density of various reference isotopes in the problem as appropriate for soft spectrum systems. The user may specify control rod positions at each time node in the problem. A number of relational database datasets containing various types of summary results are available for use in tailoring reports.

Related and Auxiliary Programs: DIF3D reads and writes the standard interface files specified by the Committee on Computer Code Coordination (CCCC). DIF3D is embedded into REBUS-3 and thus included in this distribution. Additional utilities are provided to allow users to better use the existing software package including a basic visualization capability called DIF3D\_TO\_VTK which generates input files for VISIT or Paraview. The FTU program is used to extract interface files from the STACK file REBUS generates during execution.

All non - U.S. government funded license requests should be redirected to nera-software@anl.gov.

Package consists of a tar file which includes source code, code documentation (in pdf format), sample problem input and output, code dependent BCD and binary card image file descriptions, python scripts, a README installation file, an updated manual describing the revisions to the Variant option, and a series of documents highlighting the updates made to REBUS-3 since its release. Fortran 90 source code for Linux PCs, MacOSX (C00822MNYWS02).

#### CCC-823/PERSENT 11.2892

Argonne National Laboratory, Argonne, Illinois, USA has contributed PERSENT 11.2892. The PERSENT 11.2892 release is a new package which allows users to perform perturbation and sensitivity calculations on conventional assembly homogenized diffusion and transport problems. It is built around

the VARIANT option of DIF3D (included). For perturbation, calculations can be done that consider typical material and cross section perturbations. For sensitivity calculations, users can compute eigenvalue, reaction rate, reaction rate ratio, power fraction, reactivity worth, prompt neutron lifetime, and beta effective to the microscopic reactions: gamma, alpha, proton, deuteron, tritium fission, nu, and P0 & P1 scatter cross sections.

Related and Auxiliary Programs: DIF3D reads and writes the standard interface files specified by the Committee on Computer Code Coordination (CCCC). Parts of DIF3D are embedded into PERSENT and thus it is included in this distribution. Additional utilities are provided to allow users to better use the existing software package including a basic visualization capability called DIF3D\_TO\_VTK which generates input files for VISIT or Paraview. For PERSENT, additional utility programs are provided to allow users to the cross section data. This release primarily includes bug fixes and performance improvements over the previous release, PERSENT V11.0.

All non - U.S. government funded license requests should be redirected to nera-software@anl.gov.

Included with the PRESENT11.2892 package is a tar file which includes source code, code documentation (in pdf format), sample problem input and output, code dependent BCD and binary card image file descriptions, python scripts, a README installation file, an updated manual describing the PERSENT code and revisions to the Variant option. Fortran 90 source code for Linux PCs, and MacOSX. VARI3D is provided in a mixture of F66 and F77. (RSICC ID C823MNYWS02).

## CCC-824/ARC 11.2892

Argonne National Laboratory, Argonne, Illinois, USA has contributed a new version of ARC 11.2892: Code System for Analysis of Nuclear Reactors. The ARC system comprises a consistent compilation of DIF3D, PERSENT, REBUS-3, VARI3D, DIF3D\_TO\_VTK, and the associated utilities. DIF3D is the diffusion and transport theory solver for neutrons and gammas. PERSENT and VARI3D are perturbation & sensitivity analysis tools built around DIF3D. REBUS-3 is a generic fuel cycle analysis code built around DIF3D.

Related and Auxiliary Programs: DIF3D reads and writes the standard interface files specified by the Committee on Computer Code Coordination (CCCC). Additional utilities are provided to allow users to better use the existing software package including a basic visualization capability called DIF3D\_TO\_VTK which generates input files for VISIT or Paraview. For PERSENT, additional utility programs are provided to allow users to verify their results with direct eigenvalue perturbations by manual adjustments to the cross section data. The FTU program is used to extract interface files from the STACK file REBUS generates during execution.

Given conventional assembly homogenized cross section data, ARC can be used to perform fuel cycle analysis with follow on perturbation and sensitivity calculations. This release is primarily bug fixes and performance improvements over version11.0

All non - U.S. government funded license requests should be redirected to nera-software@anl.gov.

Included in the package are the referenced documents and source transmitted on CD ROM in tar format. Fortran, Python, Linux PCs, and MacOSX (C00824MNYWS02).

Argonne National Laboratory, Argonne, Illinois, USA has contributed PERSENT 11.2892. The PERSENT 11.2892 release is a new package which allows users to perform perturbation and sensitivity calculations on conventional assembly homogenized diffusion and transport problems. It is built around

# **FEE CHANGES**

RSICC does not charge for the packages that we deliver; however, we are required by the Federal government to recoup the cost associated with our operations. This fee is based on the cost for RSICC to maintain its archive, update its archive and support customer requests and registrations. This cost includes the effort required to perform the background and export control compliance checks that are mandated by the Federal government.

The cost recovery fee for those individuals that require more extensive export control and nonproliferation reviews will be \$950 while the cost recovery fee for those individuals that do not require the extensive reviews will be \$450. For those individuals that are only approved for access to RSICC software on RSICC's secure cloud server the fee will be \$1,150. These rates will be effective on October 1, 2018.

An invoice will be sent to you via email if you are required to pay the cost recovery fee. The cost recovery fee is payable via check written on a U.S. bank, postal money order, PayPal account or any method that PayPal provides including debit and credit card. **RSICC does not accept purchase orders or wire transfers.** If payment is received via wire/bank transfer, RSICC will deny future services to both you and your organization.

# SINGLE USER MULTI-ORGANIZATION LICENSE AGREEMENT

In order to support the use of RSICC software by multi-national organizations and international collaborations, RSICC now offers our customers the option to request a Single User Multi-Organization Software License Agreement. The Single User Multi-Organization Software License Agreement addresses issues regarding the "re-export" of software and data packages obtained from RSICC because under Federal export control regulations our customers cannot "re-export" the code to another person in another country.

This agreement is intended to allow our customers to specify additional foreign locations for which they may be approved to utilize RSICC software. In general, the default option will be the standard single user license agreement for the country in which the customer resides and is employed. The following defines the requirements for use of this license agreement.

This SUMO software license agreement is only available for individuals that receive software directly from RSICC. In addition, the point of contact (host or system administrator) at the additional foreign location(s), must be licensed directly from RSICC and must agree to abide by the policies associated with host/server/cluster systems that are summarized following this announcement.

To apply for this license the customer must first register with RSICC and provide full and complete information. When submitting their request, the customer must provide the following information in the COMMENTS section of the request form for each applicable package:

- full name and email address of the point of contact (POC),
- the full name of the organization at which the software will be used, and

• the complete address (no post office boxes) of the organization under which additional access is being requested.

Individuals that would like to utilize this service must have a valid reason for needing this access and provide such justification to RSICC in the END USE statement as well. If this information is not included in the END USE statement, then the customer's request will only be considered for the standard single user license agreement.

When processing the request, RSICC staff will verify that the designated POC(s) has a valid license for the same version of software that is being requested by the applicant and verify that the POC obtained the package directly from RSICC. If the POC, did not obtain the package directly from RSICC, the POC will need to register with RSICC, apply and be approved for the package before the applicant's request can be processed.

The requests will be reviewed for each designated location and a decision will be rendered as to whether or not a license is granted. If an organization or location is denied, then the customer will be notified and may be limited to the standard single user license agreement for their own organization.

Exceptions:

Persons that have any citizenship of or are located in countries that are not listed in Appendix A of 10 CFR 810 are not permitted to utilize the Single User Multi-Organization License Agreement.

Fees:

The customer making the request for the single user multi-organization software license will be required to pay the cost recovery fee for each location at which they are approved. In addition, the POCs at the other foreign locations that have not obtained the software directly from RSICC will have to obtain the software from RSICC and pay the applicable fee.

#### Host/Server/Cluster Guidance

Software obtained from RSICC is export controlled under the jurisdiction of the U.S. Department of Energy, 10 CFR 810, or the U.S. Department of Commerce, 15 CFR 730-744. Additionally, RSICC distributes this software under guidance issued by the U.S. Department of Energy's Office of Nonproliferation and Arms Control. The distribution and use of RSICC software is restricted and controlled under these regulations and guidelines. Individuals that request the software must be cleared through both an export control and a nonproliferation review process prior to the individual being granted a license to receive software for a specific end use.

The software distributed by RSICC is licensed to individual requestors (Licensee) under a single-user license agreement while employed at the organization listed on the license forms and cannot be transferred to any other individual or entity. The Licensee is responsible for the control, management and protection of the software. The Licensee is responsible for compliance with U.S. export control requirements (laws and regulations) and the terms of the license agreement. This includes preventing access to the software by any individual or entity (including IT staff) as such access may be deemed an export control violation. Individual Licensees should protect the software, documentation, and installation accordingly. Neither the software nor manuals should be posted to the Internet or otherwise be made publicly available. Any and all system administrators that are assisting with the installation and maintenance of a licensed code(s) or that would otherwise have access to a licensed code(s) that is placed on a stand-alone system and/or server/cluster must also be licensed for the exact version of the software that is placed on these systems. Individuals whose duties are only that of a System Administrator are not authorized to be users of the licensed code(s).

System administrators and/or hosts should implement standard and customary account access and/or file permissions such that only the licensed individuals may access the program. This should include identity and access management, such as multi-factor authentication, to ensure software is kept secure from unauthorized access. Please note that the single-user license agreement is code and version specific. The Licensee must be licensed for the specific version to which they are granted access. For example, an individual with a license only for MCNP5 should not be permitted access to MCNP6.1. Additionally, some individuals are only licensed for the executable versions of the code(s), and the system administrator(s) must ensure that such individuals do not have access to the source code. Therefore, it is recommended that the source code be removed after installation of the program(s) and furthermore procedures must be implemented such that control software is not lost via decommissioned storage media.

# Network, server, parallel, cluster, or similar installations outside of the United States may not be within a country NOT listed in Appendix A of 10 CFR 810 nor occur at facility identified as an entity under 15 CFR 744.

RSICC software may be hosted on a server, cluster or high-performance computing system with the following conditions:

1) Each server/cluster operator must designate one individual responsible for oversight of the use of RSICC software on the server/cluster. This individual will be responsible for communicating and reporting to RSICC on an annual basis regarding the users of the cluster/server.

2) Each and every system administrator that would have access to any form (source or executable) must register, request, **and** be approved for the software with RSICC for the version to which they would have access.

3) An authorized and approved system administrator may install and maintain the software and must ensure that the software is not distributed or shared with those who do not have a specific license for the version to which they would have access. System administrators are required to utilize protocols that limit access to the software. Users should only be granted access and use of software to which they have a specific license, e.g. users that have a license for SCALE 6.1 should NOT be granted access to SCALE 6.0 or SCALE 6.2.

4) System administrators are not permitted to provide access to RSICC software to individuals **NOT** located within the same country as the server/cluster unless the Licensee has an approved Single User Multi-Organization License Agreement from RSICC.

5) <u>Individuals with citizenship or multiple citizenships that include a country not listed in</u> <u>Appendix A of 10 CFR 810 may be granted access to RSICC software on a server/cluster, if the</u> <u>individual has been approved</u> for access to the software by the U. S. Department of Energy's Office <u>of Nonproliferation and Arms Control.</u>

6) Under no circumstances should an individual with citizenship or multiple citizenships that include a country **NOT** listed in Appendix A of 10 CFR 810 be granted access to RSICC software on the server/cluster, if that individual has **NOT** been approved by the U.S. Department of Energy's Office of Nonproliferation and Arms Control. Additionally, under no circumstances should an individual located at an entity identified under 15 CFR 744 be granted access to RSICC software on the server/cluster.

7) <u>Individuals that have been only granted access to RSICC's secure cloud server MAY NOT be</u> granted access to any other server/cluster.

8) When a Licensee requests access to RSICC software on a server/cluster, the system administrator must follow the following process:

(a) The system administrator will require that the Licensee provide proof of a license by requiring that the Licensee provided an electronic copy of either the Single User License Agreement or the Single User Multi-Organization License Agreement. System administrators cannot provide access to anyone located in another country unless that individual has an approved Single User Multi-Organization License Agreement from RSICC and the organization of the system administrator is listed on the SUMO License Agreement.

(b) As of February 1, 2015, RSICC's single user and export control agreements were restricted to the specific end use provided in the request and to the Licensee's installation (employer, organization, or university) when making the request. The system administrator must ensure that the Licensee's current installation is the same as that on the license agreements.

(c) If the Licensee's current installation is NOT the same as that on license agreements, then access should be denied until the Licensee has updated license agreements with RSICC. This will require the Licensee to update their registration with RSICC and submit a new request with RSICC. The Licensee should not be granted access to the software until they have been authorized. Please note that some approvals are location and organization specific.

9) The system administrator will maintain records of the Licensees that are utilizing the server/cluster and send a record to RSICC (rsic@ornl.gov) that include the Licensee's full name, RSICC customer identification number, installation, and the codes to which the Licensee has access on the system. This information must be provided when the system administrator makes the first request to RSICC to provide such services and must be updated annually by sending updated information to

RSICC no later than November 30 of each calendar year. The record should include the customer's full name, RSICC customer number, customer installation as well as request numbers and software package name and identifier for which they are accessing on the cluster.

Server/cluster operators that agree to comply with these conditions may install RSICC software on the server/cluster that are within their corporate/institutional ownership, physical control, and the individual country identified.

# **END USE STATEMENT**

Customers are strongly encouraged to provide full and complete information regarding the intended end use of the software being requested. End use statements that specify that the code is for research, training or educational activities are not sufficient. RSICC's regulators need to know explicitly for what purpose you intend to use the codes and detail needs to be provided. Requests that lack sufficient detail will be rejected.

# **REGISTRATION REQUIREMENTS**

RSICC does not permit individuals to "pre-register" or "pre-order" software for use at a temporary or alternate location. The single user license and export control agreements are specific to the individual's end use and the location at which the software will be used. During the registration process, individuals are required to provide the name of the institution at which they will use the software, an institutional mailing address and an institutional e-mail address. As an example, students that work at a location other than their university are required to update their registration with RSICC and submit a new request for any software that they intend to use after they have begun work at the new location.

# SINGLE-USER LICENSE AGREEMENT REVISED

The single-user license agreement has been revised to address concerns regarding changes in end-use and/or employment 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 <u>walkersy@ornl.gov</u> with "**Conferences for RSICC Newsletter**" in the subject line by the 15<sup>th</sup> 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**



Strengthening the Economy and Homeland Security with Radiation Measurements and Standards

27TH ANNUAL MEETING • CALL FOR SPONSORS APRIL 8-10, 2019 • NIST, GAITHERSBURG, MD



# 27<sup>th</sup> Annual Meeting of the Council on Ionizing Radiation Measurements and Standards

The 2019 meeting will be held **April 8-10, 2019**, in Gaithersburg, MD, and will focus on Strengthening the Economy and Homeland Security with Radiation Measurements and Standards. Please visit the <u>www.cirms.org</u> for more details. Registration and program details to follow.

For more than twenty-seven years, CIRMS has played an important role in serving as a public forum for discussion of radiation measurements and standards issues for industry, academia and government. The technical program will consist of oral and poster presentations and three parallel working group sessions that address measurement and standards needs in the following areas:

- Medical Applications [microdosimetry, image guided radiation therapy, radiation biology, 3D-printing, phantoms, nuclear medicine, big data and machine learning]
- Radiation Protection and Homeland Security [advances in detection instrumentation, emergency response, nuclear events, radiochemistry, waste analysis, personnel dosimetry, electronic dosimeters, bioassay and internal dosimetry environmental dosimetry, first responder needs]
- Industrial Applications and Materials Effects [radiation processing, material effects, space applications, food irradiation and sterilization, irradiators, low dose standards, safety at radiation facilities, ASTM standards]

Those interested are invited to submit abstracts for oral or poster presentations. Junior investigators (high school through within one year of graduation with a post-graduate degree) can submit essays for the 2019 Junior Investigator Award.



### **ANIMMA 2019**

ANIMMA 2019 is the sixth of a series of conferences devoted to endorsing and promoting scientific and technical activities based on nuclear instrumentation and measurements. It will be held **June 17-21, 2019,** in Portoroz, Slovenia. The main objective of ANIMMA conference is to unite, consolidate and organize an international network of scientific researchers and experts from industry, research institutes, universities dealing with nuclear instrumentation and measurement methodology activities (R&D, Innovation and applications). Application fields: Fundamental physics, Fusion diagnostics and technology, Nuclear Power Reactors Monitoring and Control, Research reactors, Nuclear fuel cycle, Decommissioning, dismantling and remote handling, Safeguards, homeland security, Severe accident monitoring, Environmental and medical sciences, Education, training and outreach.

For more details on this conference, please visit website at http://www.animma.com/.



# 28<sup>th</sup> International Conference Nuclear Energy for New Europe

The Nuclear Society of Slovenia in association with the Jožef Stefan Institute, cordially invites you to attend the 28th International Conference Nuclear Energy for New Europe. The conference will be held in Portorož, **September 9 - 12, 2019**.

The conference is an annual meeting of professionals dealing with different aspects of nuclear energy from all around Europe and worldwide. The primary objective of the meeting is to foster international cooperation amongst professionals active in nuclear research and educational institutions, nuclear vendors, utilities and regulatory bodies.

Portorož, literally "Port of Roses", is a coastal settlement in the southwestern Slovenia, and is one of the country's largest tourist areas. It belongs to the coastal municipality of Piran, located in the north of Adriatic Sea.

For more details on this conference, please visit website at www.nss.si/nene2019/.



## 2019 NCI Radiation Epidemiology & Dosimetry Course

The Radiation Epidemiology and Dosimetry Course is a *FREE* course conducted periodically by the Radiation Epidemiology Branch of the National Cancer Institute's Division of Cancer Epidemiology and Genetics (DCEG). The course is intended for people interested in learning about the health effects of radiation exposure (environmental, occupational, and medical)—particularly the relationship between ionizing radiation and cancer. It will cover the principles of radiation epidemiology, dosimetry, and statistics as well as cutting-edge research. The course will be held on **September 9-13, 2019** in Rockville, MD. Those interested can email <u>NCIREBCourse@mail.nih.gov</u> to be added to the course listserv. Course details and registration will follow.



#### **ICENES 2019**

19<sup>th</sup> International Conference on Emerging Nuclear Energy Systems, will be held **October 6-9, 2019** in Bali, Indonesia. ICENES 2019 is recognized as one of the major international conference on scientific, engineering, and other technical aspects of innovative nuclear reactor design, advanced nuclear technology, etc. In the conference, we are looking at "bold" and "unthinkable" ideas on a sound scientific-technical basis. Papers on strategy, concept, technique and method related to innovative nuclear system are welcome. ICENES has been held in 14 countries as a venue for sharing ideas and research results on emerging nuclear energy technologies and applications. Please see the conference website for more information at <u>http://portal.fmipa.itb.ac.id/icenes2019/</u>.

# TRAINING COURSES



# LANL MCNP6 Class Schedule

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

Dec 3-7, 2018 Los Alamos, NM	Introduction to MCNP6 *** FULL *** Non-US citizens must register by 2018-09-10   Mon 10:00 - Fri 12:00	\$1800 or \$1500* FULL
March 4-8, 2019	Introduction to MCNP6	\$1800 or
Los Alamos, NM	Non-US citizens must register by 2018-12-07   Mon 10:00 - Fri 12:00	\$1500*
March 11-15, 2019	Intermediate MCNP6	\$1800 or
Los Alamos, NM	Non-US citizens must register by 2018-12-14   Mon 10:00 - Fri 12:00	\$1500*
March 18-22, 2019	Criticality Calculations with MCNP6	\$1800 or
Los Alamos, NM	Non-US citizens must register by 2018-12-14   Mon 10:00 - Fri 12:00	\$1500*
March 25-29, 2019	Variance Reduction with MCNP6	\$1800 or
Los Alamos, NM	Non-US citizens must register by 2018-12-14   Mon 10:00 - Fri 12:00	\$1500*
June 3-7, 2019	Introduction to MCNP6	\$1800 or
Los Alamos, NM	Non-US citizens must register by 2019-03-08   Mon 10:00 - Fri 12:00	\$1500*
June 17-21, 2019	Introduction to MCNP6	\$1800 or
Los Alamos, NM	Non-US citizens must register by 2019-03-22   Mon 10:00 - Fri 12:00	\$1500*
June 24-28, 2019	Unstructured Mesh with Attila4MC	\$1500 or
Los Alamos, NM	Non-US citizens must register by 2019-03-29   Tues 12:30 - Fri 4:30	\$1200*
July 23-25, 2019	Using NJOY to Create MCNP ACE Files & Visualize Nuclear Data	\$1200 or
Los Alamos, NM	Non-US citizens must register by 2019-04-29   Tues 10:00 - Thurs 5:00	\$900*
July 29 - Aug 2, 2019 Los Alamos, NM	Introduction to MCNP6 Non-US citizens must register by 2019-05-03   Mon 10:00 - Fri 12:00	\$1800 or \$1500*
Aug 5-9, 2019	Criticality Calculations with MCNP6	\$1800 or
Los Alamos, NM	Non-US citizens must register by 2019-05-10   Mon 10:00 - Fri 12:00	\$1500*

Aug 12-16, 2019	Variance Reduction with MCNP6	\$1800 or
Los Alamos, NM	Non-US citizens must register by 2019-05-17   Mon 10:00 - Fri 12:00	\$1500*
Oct 21-25, 2019	Introduction to MCNP6	\$1800 or
Los Alamos, NM	Non-US citizens must register by 2019-07-26   Mon 10:00 - Fri 12:00	\$1500*
Oct 28 - Nov 1, 2019 Los Alamos, NM	Intermediate MCNP6 Non-US citizens must register by 2019-08-02   Mon 10:00 - Fri 12:00	\$1800 or \$1500*
Nov 4-8, 2019	Unstructured Mesh with Attila4MC	\$1500 or
Los Alamos, NM	Non-US citizens must register by 2019-08-09   Tues 12:30 - Fri 4:30	\$1200*

See the website for more information.

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# MCNP6 Training

For more information, see the website: <u>http://mcnpvised.com/train\_mcnp.html</u>

Current Classes			
Date (Click Date for Info)	Class	Course Content	Location
January 14- 18, 2019	MCNP6 Intermediate Workshop	To see an outline for the course, <u>Click Here</u> .	Las Vegas, NV

# **Beginning/Advanced Visual Editor Training**

For more information, see the website: <u>http://mcnpvised.com/train.html</u>

Date (Click Date for Info)	Workshop (40 Cont. Ed. credits through American Academy of Health Physics. <u>Click here for AAHP</u> <u>Site</u> . Class number is 2008-00-026 for Vised classes and 2011-00-022 for MCNPX Team Workshops)	Level of Difficulty	Workshop Content	Location
<u>December</u> <u>17-21, 2018</u>	Beginning Visual Editor	LEVER 1	Detailed Description	Ulsan, South Korea
<u>January 7-</u> <u>11, 2019</u>	Beginning Visual Editor	LEVEL 1	Detailed Description	Las Vegas, NV
<u>January 28</u> <u>- February</u> <u>1, 2019</u>	Penelope/PenGUIn Workshop	LEVEL 1		Barcelona, Spain
February 4-8, 2019	Advanced Visual Editor with Applications in Mesh Tallies and Variance Reduction	LEVEL 4	Detailed Description	Prague, Czech Republic
August 12-16, 2019	Beginning Visual Editor	LEVEL 1	Detailed Description	Las Vegas, NV
August 19-23, 2019	Advanced Visual Editor with Applications in Mesh Tallies and Variance Reduction	LEVEL 4	Detailed Description	Las Vegas, NV
August 26-30, 2019	Intermediate MCNP6 Using Nucwiz	LEVEL	Detailed Description	Las Vegas, NV

# **NEA Training Courses / Workshops**

https://www.oecd-nea.org/databank/training-courses/

Class size is limited, and workshop may be cancelled if minimum enrollment is not obtained one month prior to the workshop. Workshop fees paid are refundable up to one month before each class.

Please note that all attendees must be registered users.

#### **Upcoming Workshops**

Date	Class	Registration- Payment	Fees	Location
January 28 - February 1, 2019	Electron-Photon Transport Modelling with PENELOPE Course description	Registration form Payment information	1000 EUR	Barcelona, Spain

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



# **SCALE Training Courses – Winter 2019**

Training is provided by developers and expert users from the ORNL 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 for the SCALE training courses must be licensed users of SCALE 6.2, which is available from <u>ORNL/RSICC</u>, the <u>OECD/NEA Data Bank</u> in France, and the <u>RIST/NUCIS</u> in Japan. All attendees for the VERA training course must be licensed users of VERA. All currently scheduled training courses are described below.

Date	Course Name and Description	Location	Cost
January 28 –	Source Terms and Radiation Shielding for Spent Fuel	ORNL	
February 1,	Transportation and Storage Applications	Oak Ridge,	\$2000*
2019	Transportation and Storage Applications	TN USA	
February 4-8, 2019SCALE/Polaris Lattice Physics, Depletion, and Uncertainty Analysis	ORNL		
	Uncertainty Analysis	Oak Ridge,	\$2000*
		TN USA	
February 11- 15, 2019	VERA Workshop and Users' Group Training	ORNL	
		Oak Ridge,	\$2000*
		TN USA	
Esternary 10		ORNL	
22, 2019	SCALE Criticality Safety Calculations	Oak Ridge,	\$2000*
		TN USA	
February 25- March 1, 2019	Nuclear Data Fundamentals and AMPX Libraries	ORNL	
		Oak Ridge,	\$2000*
	Generation Course	TN USA	

\*Full-time university students can register at a reduced rate of \$1000. 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 this class, visit their website at <u>https://www.ornl.gov/scale/scale-training</u>

#### **SYMPOSIA**

#### **2018 CALENDAR**

<u>November</u>

- IEEE Nuclear Science Symposium, November 11-17, 2018, Sydney, Australia. Website: http://www.nssmic.org/2018/.
- **2018** American Nuclear Society (ANS) Winter Meeting, November 11-15, 2018, Orlando, Florida. Website: <u>http://www.ans.org/meetings/c\_1.</u>

#### **2019 CALENDAR**

June

**2019 American Nuclear Society (ANS) Annual Meeting, June 9-13, 2019**, Minneapolis, Minnesota. Website: <u>Electronic Paper Submission and Review</u>

#### <u>August</u>

18<sup>th</sup> International Topical Meeting on Nuclear Reactor Thermal Hydraulics, August 18-22, 2019, Portland, Oregon. Website: <u>http://www.ans.org/meetings/c\_1.</u>

#### <u>October</u>

- 2019 19<sup>th</sup> International Conference on Emerging Nuclear Energy Systems Meeting, October 6-9, 2019, Bali, Indonesia. Website: <u>http://portal.fmipa.itb.ac.id/icenes2019</u>
- 2019 Materials in Nuclear Energy Systems (MiNES), October 6-10, 2019, Baltimore, Maryland. Website: <u>http://mines.ans.org/</u>

#### <u>November</u>

**2019** – ANS Winter Meeting and Nuclear Technology Expo, November 17-21, 2019, Washington D.C. Website: not available yet.

## **2020 CALENDAR**

#### June

2020 American Nuclear Society (ANS) Annual Meeting, June 7-11, 2020, Phoenix, Arizona. Website: not yet available.

#### <u>November</u>

2020 – ANS Winter Meeting and Nuclear Technology Expo, November 15-19, 2020, Chicago, Illinois. Website: not available yet.