Radiation Safety Information Computational Center

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"It is wrong always, everywhere, and for anyone, to believe anything upon insufficient evidence."

– John Adams

TABLE of CONTENTS

CHANGES TO THE RSICC CODE AND DATA COLLECTION

There were two updates to the RSICC catalog for those individuals that may be interested.

CCC-859/STACY

Source Term Analysis Code System (STACY), contributed by International Atomic Energy Agency, through the OECD Nuclear Energy Agency Data Bank, was developed by Institute for Reactor Safety and Reactor Technology RWTH-Aachen, Germany. STACY is a tool to predict the fission product release from spherical fuel elements and the TRISO fuel performance under given normal or accidental conditions. Developed from older codes FRESCO-I, FRESCO-II, PANAMA, and SPATRA, the STACY package was modernized in FORTRAN 95/2003 to enable more detailed analysis, including source term estimation, coated particle failure rate, distinct pebble radius temperature profile, etc. Additional STACY capabilities allow for the simulation of the redistribution of fission products within the primary circuit and the deposition of fission products on graphitic and metallic surfaces. STACY will later become a module within the V/HTR Code Package (HCP).

The package is transmitted digitally as a download link in .zip format. It includes reference material and sample problems. (C859PCX8600). An executable is provided for Windows operating systems. Source code is not provided, and user must extract the package locally using a 7zip compatible unpacker such as 7zip Portable. After unpacking the zip file, double-click on the STACY.exe file provided in the /code folder and follow the command line prompts.

CCC-872/SERPENT 2.2.1

The VTT Technical Research Centre of Finland has contributed a new update to the SERPENT Monte Carlo code.

SERPENT is a three-dimensional, continuous-energy Monte Carlo for performing reactor physics burnup calculations specifically designed for lattice physics applications. The code uses built-in calculation routines for generating homogenized multi-group constants for deterministic reactor simulator calculations. The standard output includes effective and infinite multiplication factors, homogenized reaction cross sections, scattering matrices, diffusion coefficients, assembly discontinuity factors, point-kinetic parameters, effective delayed neutron fractions, and precursor group decay

constants. User-defined tallies can be set up for calculating various integral reaction rates and spectral quantities.

Internal burnup calculation capability allows SERPENT to simulate fuel depletion as a completely stand-alone application. Extensive effort has been put into optimizing the calculation routines, and the code can run detailed assembly burnup calculations like deterministic lattice codes within a reasonable calculation time. The overall running time can be further reduced by parallelization.

SERPENT can be used for various reactor physics calculations at pin, assembly, and core levels. The continuous-energy Monte Carlo method allows the modeling of any critical reactor type, including both thermal and fast neutron systems. The suggested applications of SERPENT include group constant generation, fuel cycle studies, validation of deterministic lattice physics codes, as well as educational, training and demonstration purposes.

A complete description of the project is found at the SERPENT website - https://serpent.vtt.fi/serpent.

SERPENT has been developed under PC Linux and Mac OS X operating systems. A standard C-compiler (gcc) is needed for building the source code. MPI libraries must be installed to run SERPENT in the parallel calculation mode. The code uses the GD open-source graphics library for producing some graphical output. The source code can also be compiled without the MPI and GD functionality.

The package is transmitted digitally as a zip file that includes source code. The package includes SERPENT versions 2.2.0 & 2.2.1.

SINGLE USER MULTI-ORGANIZATION LICENSE AGREEMENT

(*Last updated July 1, 2018*)

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 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 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

(*Last updated November 1, 2022*)

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 codes(s). **Those individuals serving only as system administrators are NOT charged the cost recovery fee for processing their requests.**

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

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) Individuals that have been only granted access to RSICC's secure cloud server **MAY NOT** be 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) The system administrator must ensure that the Licensee's current installation/affiliation 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

(***Last updated September 24, 2021***)

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. Please include the type of calculations that you intend to perform e.g., criticality, reactor physics, shielding, dose, etc. and for what types of applications e.g., reactor shielding design, fusion shield design, nuclear medicine, reactor design, etc.

Students that submit requests to RSICC are strongly encouraged to consult their professor or academic advisor as to what purpose they intend to use the codes for their classes and/or their research. Professors are also encouraged to provide such guidance to their students since the professor is responsible for identifying the activities of the students under their tutelage. Professors are encouraged to write an end use statement for their students that describe both the intended use of the code and the applications for which the code will be applied. Providing this information will help expedite the processing of the request and speed up delivery of the software.

REGISTRATION REQUIREMENTS

(*Last updated July 28, 2020*)

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. RSICC's regulators require us to obtain an address associated with the individual's organization. Due to the COVID situation, we know that many of our customers are working remotely. If you are working remotely, you may include an alternate mailing address as a comment during the registration process. Please note that you cannot provide an alternate mailing address that is in a country different than that for the organization with which you are affiliated. RSICC cannot register a customer for access to software in a country different than that of the organization with which the individual is affiliated as the single user license and export control agreements are specific to the country in which the organization is located.

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. All levels of participants from undergraduates to faculty are encouraged to publish research papers with their mentors. Please browse through the profiles on the different participants and their research experiences on 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

CONFERENCES

17th International Symposium on Reactor Dosimetry

The Seventeenth International Symposium on Reactor Dosimetry will be held 21-26 May 2023 at École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland. The Symposium is being organized by EPFL and is jointly sponsored by the European Working Group on Reactor Dosimetry (EWGRD) and ASTM International Committee E10 on Nuclear Technology and Applications. Those interested can find additional details at: http://isrd17.reactordosimetry.org

International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering (M&C 2023)

The International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering (M&C 2023) will be held 13-17 August 2023 at the Sheraton on the Falls, Niagara Falls, Canada. The Symposium is jointly sponsored by the Canadian Nuclear Society and the American Nuclear Society. Those interested can find additional details at: https://mc2023.com/.

12th International Conference on Nuclear Criticality Safety

The International Conference on Nuclear Criticality Safety will be held 1-6 October 2023 at the Sendai International Center, Miyagi, Japan. The conference is sponsored by the Japan Atomic Energy Agency. Those interested can find additional details at: https://icnc2023.jaea.go.jp/

Best Estimate Plus Uncertainty International Conference

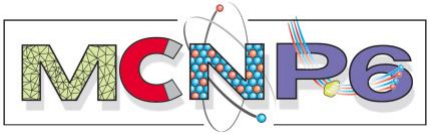
BEPU is a leading international meeting on the use of best estimate and uncertainty analyses methodologies for nuclear reactor safety analyses. The last BEPU meeting was held in May 2018 in Lucca, Italy. The BEPU2018 conference demonstrated that:

- BEPU applications in licensing are limited and their increase is foreseen to be slow;
- there is a need for comprehensive guidelines for use of BEPU technologies, and the availability of mature tools was questioned;
- consistency in all steps of BEPU needs to be ensured, however it was identified that there is a need to reduce shortcuts in BEPU applications and to focus on exploitation of the full BEPU process;
- experimental data is central to the BEPU processes and methodologies; thus the use the available of experimental data in an efficient and consistent way is required; and
- BEPU is at first a methodology that increases the knowledge and understanding of uncertainties and biases embedded in any deterministic safety analysis.

Given the outcomes of the BEPU2018 conference, the community recognized the need to address some of the identified shortcomings and initiated the planning for BEPU2024. The BEPU2024 Conference is planned to be organized in two main Tracks devoted to Industrial Applications and Licensing (Track-1) and to Research and Development (Track-2). Plenary Sessions, Regular Sessions, and Panel Discussions Sessions to promote intensive interactions among all conference participants. Poster and student sessions are also envisioned.

Those interested can find additional details at **www.nineeng.com/bepu2024**.

TRAINING COURSES



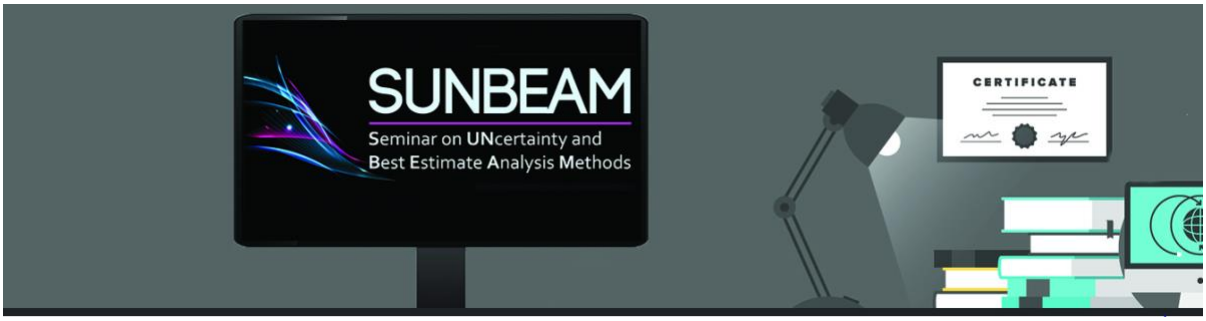
LANL MCNP6 Class Schedule

Individuals interested in attending or that have registered for these classes are encouraged to contact the organizers regarding any delays or cancellations.

Website: https://mcnp.lanl.gov/classes.html

June 5 - 9, 2023 Online	Introduction to MCNP6 (online) Non-US citizens must register by 2023-03-17	$600
June 19 - 23, 2023 Los Alamos, NM	Criticality Calculations with MCNP6 Non-US citizens must register by 2023-03-31	$1,800
Aug 21 - 25, 2023 Los Alamos, NM	Introduction to MCNP6 Non-US citizens must register by 2023-06-02	$1,800
Aug 28 - Sep 3, 2023 Los Alamos, NM	Using NJOY to Create MCNP ACE Files and Visualize Nuclear Data Non-US citizens must register by 2023-06-09	$1,800
Oct 2 - 6, 2023 Los Alamos, NM	Intermediate MCNP6 Non-US citizens must register by 2023-07-14	$1,800
Oct 23 - 27, 2023 Online	Introduction to MCNP6 (online) Non-US citizens must register by 2023-08-04	$600
Dec 4 - 8, 2023 Los Alamos, NM	Variance Reduction with MCNP6 Non-US citizens must register by 2023-09-15	$1,800

See the website for more information.



The **Seminar on UNcertainty and Best Estimate Analysis Methdods** (**SUNBEAM**) course platform will take place from **July 3 to July 14, 2023** at BOKU University in Vienna (Austria).

The seminar course provides a transfer of experience and know-how from recognized experts from different organizations (industrial experts, regulators, researchers and university professors) in the fields of Best-Estimate Plus Uncertainty approach including uncertainty methodologies and application in licensing framework, Scaling Analysis, Validation Process of Evaluation Models, development and applications of Multi-physics & Multi-scale tools.

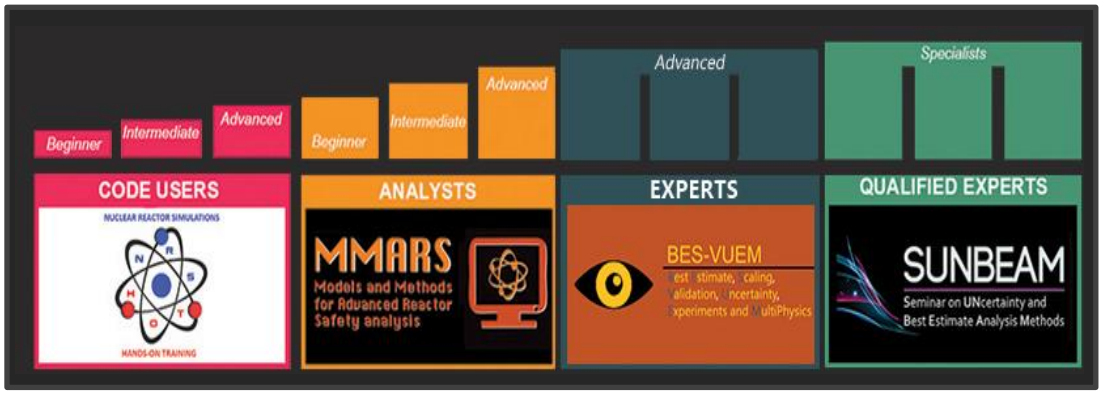
SUNBEAM will address the following subjects for a total of about 70 hours of lecturing:

- Licensing Framework and Best Estimate Plus Uncertainty
- Best Estimate System Thermal-Hydraulic Codes and V&V
- Scaling Issue and Scaling Analysis
- Sensitivity Analysis
- Uncertainty Analysis
- Procedures for a Consistent Application of a BEPU Method in Licensing
- BEPU Applications in Safety Analysis and Licensing Framework
- Reactor Physics and Fuel Performance Experiments and Uncertainty Analysis
- Multi-Physics Multi-Scale Simulations and BEPU

The detailed program of the seminar course and the registration form as well as additional information about the venue, transportation and the hotels can be obtained from the Seminar's home page: https://www.nineeng.com/courses/sunbeam

The **Early Registration Deadline is May 1, 2023** and you can register online at: http://www.nineeng.com/courses/index.php?option=com_chronoforms5&chronoform=SUNBEAM_Registration

Multi-Level Training Program



NINE offers attractive **Multi-Level Training Courses** that meet the needs of stakeholders in the nuclear engineering sector, thanks to cooperation with top level international experts who share expertise and competencies gained from their work-life activity in the industry,

regulatory bodies and academia. Course programs are oriented towards a wide audience, from PhD students, apprentices, jobseekers to young and senior employees of vendors, utilities, regulatory bodies, national laboratories and consulting companies. For More information visit us at: **https://www.nineeng.com/courses/**

SYMPOSIA

2023 CALENDAR

May 2023

2023 Nuclear and Emerging Technologies for Space, May 7 – 11, 2023, Idaho Falls, Idaho, USA. Website: https://www.ans.org/meetings/view-nets2023/

3rd International Conference on Radioanalytical and Nuclear Chemistry, May 7 – 12, 2023, Budapest, Hungary. Website: TBD

2023 International Particle Accelerator Conference, May 7 – 12, 2023, Venice, Italy. Website: https://www.ipac23.org/

50th International Conference on Plasma Science (ICOPS), May 20 – 26, 2023, Santa Fe, New Mexico, USA. Website: http://ece-events.unm.edu/icops2023/index.html

June 2023

2023 ANS Annual Meeting, June 11 – 14, 2023, Indianapolis, Indiana, USA. Website: https://www.ans.org/meetings/view-am2023/

July 2023

Symposium on Fusion Energy (SOFE 2023), July 9 – 13, 2023, Oxford, England, UK. Website: https://sofe2023.co.uk/

13th Nuclear Plant Instrumentation, Control and Human-Machine Interface Technologies (NPIC&HMIT), July 15 – 21, 2023, Knoxville, Tennessee, USA. Website: https://www.ans.org/meetings/npic13psa2023/

August 2023

International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering (M&C 2023), August 13 – 17, 2023, Niagara Falls, Canada. Website: https://mc2023.com/authors.html

20th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-20) August 20 – 25, 2023, Washington, D.C., USA. Website: https://www.ans.org/meetings/view-nureth20/

September2023

International Conference Nuclear Energy for New Europe, September 11 – 14, 2023, Portoroz, Slovenia. Website: https://www.djs.si/nene2023/conference.

October 2023

12th International Conference on Nuclear Criticality Safety (ICNC 2023), Sendai, Miyagi, Japan. Website: https://icnc2023.jaea.go.jp/

November 2023

2023 ANS Winter Meeting, November 5 – 8, 2023, Washington, D.C., USA. Website: https://www.ans.org/meetings/view-315/

December 2023

Materials in Nuclear Energy Systems (MiNES), December 10 – 14, 2023, New Orleans, Louisiana, USA. Website: https://www.ans.org/meetings/view-396/