Radiation Safety Information Computational Center

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No. 673 July 2021

"As always in life, people want a simple answer ….and it's always wrong." – Susan Greenfield

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CHANGES TO THE RSICC CODE AND DATA COLLECTION

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

PSR-614/COBRA-SFS 6.0

Pacific Northwest National Laboratory has contributed an updated version of COBRA-SFS.

COBRA-SFS (Spent Fuel Storage), a code for thermal-hydraulic analysis of multi-assembly spent fuel storage and transportation systems. COBRA-SFS is a computer program that performs thermal-hydraulic analyses of multi-assembly spent-fuel storage and transportation systems. It uses a lumped-parameter, finite-difference approach to predict flow and temperature distributions in spent fuel storage systems and fuel assemblies, under forced and natural convection heat transfer conditions, in both steady-state and transients. Derived from the COBRA family of codes, which have been extensively evaluated against in-pile and out-of-pile data, COBRA-SFS retains all the important features of the COBRA codes for single-phase analysis and extends the range of application to problems with two-dimensional radiative and three-dimensional conductive heat transfer. With these added capabilities, COBRA-SFS has been used to analyze various single- and multi-assembly spent fuel storage systems containing unconsolidated and consolidated fuel, with a variety of fill media.

The finite difference equations for mass continuity, momentum, and energy for the fluid are solved using the RECIRC solution method, adapted from the COBRA-WC code. In this method, the set of equations is solved iteratively to obtain the flow and pressure fields. The primary advantage of the RECIRC method is that it is applicable to reverse and recirculating flows, such as those occurring in storage systems where the geometry allows natural circulation flow paths. RECIRC uses a Newton-Raphson technique like the one developed by Hirt to solve the conservation equations, but it has been made implicit in time, as was done in the SABRE code. The RECIRC flow field solution is divided into two parts: a tentative flow solution and a pressure solution. The tentative flow solution is achieved by iteratively sweeping the subchannel array from inlet to exit. In each sweep, tentative axial flows and crossflows are computed for the channels by evaluating the two linearized momentum equations with current values for pressure and other independent variables. After all tentative flows and crossflows

have been computed at all axial levels, the flows and pressures are adjusted to satisfy continuity by a Newton-Raphson method.

COBRA-SFS 6.0 is distributed as a digital download and includes readme files, source files, documentation, and data files. Fortran; Linux, MacOS (P00614MNYCP02).

CCC-764/MURE v2 - SMURE

MURE v2 – SMURE: Serpent – MCNP Utility for Reactor Evolution was contributed by the Laboratoire de Physique Subatomique et de Cosmologie de Grenoble and the Institut de Physique Nucleaire d'Orsay, France through the OECD NEA Data Bank, Boulogne-Billancourt, France.

The main aim of the MURE package is to perform nuclear reactor time-evolution using successive calls to the widely used particle transport code Monte Carlo N-Particle (MCNP) or Serpent. (S)MURE is an object-oriented package; therefore, users are free to interact with it in their own way or to use the evolution controls already developed. MURE also provides coupling of the neutronics (with or without fuel burn-up) and thermal-hydraulics using a sub-channel 3D code, COBRA-EN. A graphical interface is provided to visualize and post-treat the results, including radiotoxicity calculations, waste heats, and other results. An interface to NJOY to generate cross sections in the MCNP ACE format (endf2ace) is also provided in the MURE package. See http://lpsc.in2p3.fr/MURE/html/MURE/MURE.html for more details.

(S)MURE provides an interface to MCNP or Serpent to build complex geometries using object-oriented programming and/or the ability to calculate nuclear fuel depletion. Moreover, it is very easy to modify a MURE input to switch from MCNP to Serpent, or vice-versa. Neutron transport is performed by MCNP/MCNPX or Serpent2, and depletion is calculated using numerical integration via the Runge-Kutta algorithm. Successive MCNP runs and Bateman equation resolutions are performed until the end of the evolution time. Interactions during the evolution calculation allow the user to impose conditions such as power levels, constant k_{eff}, and others. Users can easily implement their own evolution controls owing to the object-oriented programming and inheritance mechanism. Standard evolutions evaluate one-group constant reaction rates between two MCNP runs for solving the Bateman equations at each step. However, predictor-corrector methods can also be used, as well as quasi-multi group flux, in which reaction rates are calculated outside of MCNP from flux tallies for each cell, with a highly discretized energy binning. Reaction rates in this method are calculated after each MCNP run using the same ACE cross section files that were used in the neutron transport; the advantage of this method is a large CPU time gain in MCNP (by at least a factor 30).

MURE runs on the LINUX operating system and most likely will run on any UNIX computer. The package is transmitted digitally as a download in a "tar" format that contains reference material, documentation, source code and sample problems. Executables are not included in this package. (C00764MNYWS01)

COVID RELATED RECOMMENDATIONS

(*Last updated November 11, 2020*)

Due to the continued situation regarding the COVID, we realize that many of our customers, like the RSICC team, are working from home and are not physically at their institution. However, due to U.S. Federal regulations, RSICC is required to validate the information provided by our customers and the organizations with which our customers are affiliated. Hence, to minimize confusion, we recommend that our customers take the following steps when registering with RSICC and requesting software.

- RSICC's customers must provide an email address associated with their organization. University students should provide an email address associated with their university, and others should provide an email address associated with their organization. Use of a private email address is strongly discouraged as this results in additional delays in processing the registration and/or request.

- RSICC's customers must provide the physical address of the organization with which they are affiliated. This address is required to validate the organization and for screening the organization as required by the U.S. Federal government. If you are not physically located at the organization, you can provide a comment in the registration and/or request providing the location at which you like the software to be delivered. US university students can also add a comment clarifying if they are a remote student at this time. Please note that RSICC cannot license you for the use of software in a country that is different than that of the organization for which you are affiliated. Hence, if you are either studying or working remotely in another country, you should contact our team on how to best proceed.

- Please do not submit multiple requests for software as this only delays the processing of requests. Each customer interaction and communication are required to be saved and multiple requests only add to the work and result in further delays.

- Please include a justification as to why you need the source code when requesting software from RSICC. You do not need to submit a request for both the source and executable versions of a software package but need to provide a justification as to why you need the source code.

- Please limit the number of inquiries to RSICC regarding the status of your request. If you received an acknowledgement from RSICC noting that your request has been received, rest assured that the request is in process. RSICC processes requests on a first-come first-served basis. Inquiries regarding the status of a request have to be filed and addressed that further delays the teams work.

RSICC staff are only permitted to be physically in our offices one day per week. Hence, software that must be sent via DVD or RSA tokens for cloud requests will only be mailed out once per week. By following this guidance, you will have your request processed expeditiously.

SINGLE USER MULTI-ORGANIZATION LICENSE AGREEMENT

(*Last updated July 1, 2018*)

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 codes(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) 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) 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

(*Last updated July 28, 2020*)

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.

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.

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

30th 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 30th International Conference Nuclear Energy for New Europe. The conference will be held in Bled, Slovenia, **September 6 - 9, 2021**.

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.

For more details on this conference, please visit website at https://www.djs.si/nene2021/.

IAEA
International Atomic Energy Agency
Atoms for Peace and Development

Technical Meeting on the Development and Application of Open-Source Modelling and Simulation Tools for Nuclear Science and Technology

The International Atomic Energy Agency aims to support and strengthen its Member States' capabilities in the field of advanced reactors modelling and simulations. Several years of work have been performed by many institutions on the creation of modern open-source* tools for reactor analysis and the trend towards open-source codes and open-access data is evident in the scientific community. Based on this, the IAEA initiated activities to streamline the endeavors and act as pivot for supporting, coordinating, and creating synergies in the development of open-source nuclear codes for reactor analysis. As an outcome of this initiative the IAEA has already established a platform available to all IAEA member states. This platform is attractive for developers across the world, who are seeking new forms of collaboration and impact in the area, as well as for member states exploring

* Software in which the source code is released under a license that grants users the rights to use, change, and distribute the software to anyone and for any purpose.

new nuclear codes for research and development as well as education and training activities. More information on the Open-source Nuclear Codes for Reactor Analysis (ONCORE) at the IAEA can be found at the following site: https://nucleus.iaea.org/sites/oncore/SitePages/Home.aspx

The purpose of the event is to promote and facilitate the exchange of information regarding open-source software, open-access data, and ongoing collaborations in support of research and development, and education and training, in nuclear science and technology. The meeting will be held in Vienna, Austria from October 27th to 29th. More information regarding the technical meeting can be found at the IAEA website: https://conferences.iaea.org/event/247/

17th International Symposium on Reactor Dosimetry 2021

The Seventeenth International Symposium on Reactor Dosimetry will be held 16-20 November 2021 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: www.reactordosimetry.org

7th International Conference on Nuclear and Renewable Energy Resources

The main objective of International Conference series on Nuclear and Renewable Energy Resources (NURER) is to provide an international scientific and technical forum for scientists, engineers, industry leaders, policy makers, decision makers and young scientists/professionals who will shape future energy supply and technology, for a broad review and discussion of various advanced, innovative and non-conventional nuclear energy and renewable energy systems with UNTHINKABLE IDEAS on sound scientific-technical basis. **NURER conferences have gained international importance, because of their unique character of bringing together the nuclear and renewable energy communities in the same forum for mutual understanding.** NURER emphasizes the fact that both are completing energies and not competing.

Earlier conferences were held in Ankara (Türkiye, 2009, 2010), İstanbul (Türkiye, 2012), Antalya (Türkiye, 2014), Hefei (China, 2016) and Jeju (Korea, 2018). For 2020, once more the capital city of modern Türkiye has been selected to host NURER2020 due to its central location. Due to the situation with the Coronavirus NURER2020 will be held in Ankara, Turkey from May 22 – 25, 2022.

For more details on this conference, please visit website at http://nurer2020.org/en.

15th Workshop on Shielding Aspects of Accelerators, Targets and Irradiation Facilities (SATIF)

The Fifteenth Workshop on Shielding Aspects of Accelerators, Targets and Irradiation Facilities (SATIF) will be held 7-9 September 2022 at Michigan State University, East Lansing, Michigan, USA. The SATIF-15 workshop will be hosted by the Facility for Rare Isotope Beams and is an experts'

meeting addressing important aspects related to modeling and design of accelerator shielding. Those interested can find additional details at: https://indico.frib.msu.edu/event/19/.

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 BEPU2020. **BEPU2020 has been postponed**. The conference organizers plan to publish an electronic proceeding of the papers that were submitted and accepted in 2021.

Those interested can find additional details at http://www.nineeng.com/bepu2020/index.php.

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

Aug 16-20, 2021 Online	Introduction to MCNP6 (online) Non-US citizens must register by 2021-06-11 | Mon 9:00 - Fri 12:00	$600
Aug 30 - Sept 1, 2021 Online	Using NJOY to Create MCNP ACE Files & Visualize Nuclear Data (online) Non-US citizens must register by 2021-06-25 | Mon 10:00 - Wed 5:00	$600
Oct 4-8, 2021 Online	Intermediate MCNP6 (online) Non-US citizens must register by 2021-07-30 | Mon 9:00 - Fri 12:00	$600
Nov 15-19, 2021 Online	Introduction to MCNP6 (online) Non-US citizens must register by 2021-09-10 | Mon 9:00 - Fri 12:00	$600
Nov 29 - Dec 1, 2021 Online	Variance Reduction with MCNP6 (online) Non-US citizens must register by 2021-09-24 | Mon 9:00 - Wed 4:30	$600

See the website for more information.

SCALE Training Courses

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 for the SCALE training courses must be licensed users of SCALE 6.2, which is available from ORNL/RSICC, the OECD/NEA Data Bank in France, and the RIST/NUCIS in Japan.

All currently scheduled SCALE training courses are described below.

Date	Course Name and Description	Location
October 11–15, 2021	**SCALE/TRITON Lattice Physics and Depletion**	TBD
October 18–22, 2021	**SCALE/ORIGEN Standalone Fuel Depletion, Activation, and Source Term Analysis**	TBD
October 25–29, 2021	**SCALE Computational Methods for Burnup Credit**	TBD
November 8–12, 2021	**Nuclear Data Fundamentals and AMPX Libraries Generation Course**	TBD

**Full-time university students can register at a reduced rate of $1,000. For each course over one, professional registration fees are discounted $100.*

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 14 days before the start date of the training course they plan to attend.*

For more information regarding these courses, visit the SCALE website at https://www.ornl.gov/scale/training.

5th SCALE Users Group Workshop

We are pleased to announce that the 5th SCALE Users' Group Workshop will be held virtually from Oak Ridge National Laboratory August 4-6, 2021. The workshop will include a mix of short presentations, open discussions, and tutorial sessions. The meeting will be offered free of charge to participants. Registration is limited to a total of 200 participants and each tutorial session is open to a maximum of 25 registrants.

You are invited to participate in the meeting and contribute with presentations and discussions on impactful and innovative applications of SCALE. In addition to other technical sessions and tutorials, we will continue this year the two sessions newly introduced last year. In the "SCALE Open Mic" session participants can present lightning talks and engage the audience in lively Q&As. The "Best SCALE Model Contest" provides an opportunity for all end users to present their most innovative models and compete for special recognition. The models presented last year are showcased in a 2021 SCALE calendar that is available at https://scalemeetings.ornl.gov/scale-meetings-2020/. All are welcome to contribute to the new "SCALE Validation" session with interesting applications and comparisons between calculations and measurements.

Contributions for the SCALE Model Contest session require only a single page showing one or more images of a SCALE model. Participants will have 5–10 minutes during the session to provide background on the model, present additional information as desired, and answer questions. All workshop participants will vote on the 12 best models, which will be used for a SCALE calendar and be displayed on the meeting website. The image(s) can be based on SCALE 6.2 or 6.3 beta rendering. For the SCALE Open Mic session, no formal presentation

is required, but presentation slides are welcome as needed. Each participant will be allocated ~5–10 min to present.

Ten hands-on tutorials will be presented. To be able to participate in these tutorials, registrants must have a user license for SCALE 6.2. To participate in the tutorials that require the use of SCALE 6.3 beta (see detailed tutorials description), licensed users for SCALE 6.2 can find information on how to request the 6.3 beta on https://www.ornl.gov/scale/releases. Before registering for any tutorial, please verify that you have or are eligible to request the SCALE license that is required for that tutorial.

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

2021 CALENDAR

July 2021

2021 Nuclear & Space Radiation Effects, July 19-23, 2021, Ottawa, Canada. Website: http://www.nsrec.com/

66th Annual Meeting of the Health Physics Society, July 25-29, 2021, Phoenix, Arizona. Website: http://hps.org/newsandevents/societynews.html#1737

August 2021

Utility Working Conference and Vendor Expo, August 8-11, 2021, Marco Island, Florida. Website: https://www.ans.org/meetings/view-351/

62nd Annual Meeting of the Institute of Nuclear Materials Management, August 21-26, 2021, Vienna, Austria. Website: https://www.ans.org/meetings/view-351/

2021 International Topical Meeting on Probabilistic Safety Assessment and Analysis (PSA 2021), August 29 – September 3, 2021, Columbus, Ohio. Website: https://www.ans.org/meetings/view-327/

September 2021

14th International Conference on Radiation Shielding (ICRS14) and 21st Topical Meeting on Radiation Protection and Shielding Division (RPSD21), Seattle, Washington. Website: https://www.ans.org/meetings/view-icrs14rpsd21/

European Research Reactor Conference, September 26-30, 2021, Helsinki, Finland. Website: https://www.euronuclear.org/european-research-reactor-conference-2021/

Actinides 2021, September 26 – October 1, 2021, Tallahassee, Florida. Website: https://www.ans.org/meetings/view-356/

October 2021

Mathematics and Computation (M&C) 2021, October 3-7, 2021 Raleigh, North Carolina. Website: https://www.ans.org/meetings/view-365/

2021 International Congress on Advances in Nuclear Power Plants (ICAPP2021), Abu Dhabi, United Arab Emirates. Webiste: https://www.icapp2021.org/

2021 IEEE Nuclear Science Symposium and Medical Imaging Conference, October 16-23, 2021 Yokohama, Japan. Website: https://nssmic.ieee.org/2021/

TopFuel 2021, October 24-28, 2021, Santander, Spain. Website: https://www.euronuclear.org/topfuel2021/

November 2021

Nuclear Education and Training, November 14-18, 2021, Brussels, Belgium Website: https://www.euronuclear.org/nestet2021/

2021 ANS Winter Meeting and Technology Expo, November 30 – December 4, 2021, Washington, D.C. Website: https://www.ans.org/meetings/view-wm2021/

December 2021

23rd IEEE Pulsed Power Conference and 29th IEEE Symposium on Fusion Engineering, December 12-16, 2021, Denver, Colorado. Website: https://uta.engineering/ppcsofe2021/