VLADIMIR SOBES

Oak Ridge National Laboratory ◇ P.O. Box 2008, MS-6170 ◇ Oak Ridge, TN 37831
(857) · 209 · 8287 ◇ sobesv@ornl.gov

EDUCATION

Massachusetts Institute of Technology Feb. 2011 - Sept. 2013
Ph.D. Nuclear Science and Engineering
Thesis: Coupled Differential and Integral Data Analysis for Improved Uncertainty Quantification of the ^{63,65}Cu Cross Section Evaluations
Overall GPA: 4.8/5.0

Massachusetts Institute of Technology Sept. 2007 - Feb. 2011
B.S. Nuclear Science and Engineering
Overall GPA: 5.0/5.0

- Nominated to the National Society of Collegiate Scholars
- Irving Kaplan Award for academic achievement by a junior in Nuclear Science and Engineering
- 5 Letters of Commendation from the Head of Department of Nuclear Science and Engineering for Academic Excellence

TECHNICAL STRENGTHS

Foreign Language Skills	Fluently bilingual in English and Russian Conversational French
Computer Codes	SAMMY, AMPX, NJOY, SCALE, MCNP
Computer Languages	C++, Python, MATLAB, Basic FORTRAN

NATIONAL RECOGNITION

Nuclear Criticality Safety Program Technical Program Review Mar. 14 - 15, 2017
Best Research Paper Award *Washington, DC*

- "FY16 Progress in Resonance Evaluations of Ce and Gd for the NCSP" selected as the best research paper from the US DOE Nuclear Criticality Safety Program for Fiscal Year 2016.

2016 American Nuclear Society Annual Meeting Jun. 12 - 16, 2016
Best Research Paper Award *New Orleans, LA*

- "Benchmarking of the Updated Resolved Resonance Region Evaluations of Copper" selected as the best research paper from the Data, Analysis and Operations in Nuclear Criticality Safety session.

Nuclear Criticality Safety Program Technical Program Review Mar. 15 - 16, 2016
Best Research Paper Award *Albuquerque, NM*

- "Improvements for the ^{63,65}Cu Resonance Evaluations for Criticality Safety Applications" selected as the best research paper from the US DOE Nuclear Criticality Safety Program for Fiscal Year 2015.

Nuclear Criticality Safety Program Technical Program Review Mar. 18 - 19, 2015
Best Research Paper Award *Livermore, CA*

- "Nuclear Data Adjustment with SAMMY Based on Integral Experiments" selected as the best research paper from the US DOE Nuclear Criticality Safety Program for Fiscal Year 2014.

INTERNATIONAL LEADERSHIP

OECD/NEA WPEC Subgroup 44 May 2017 - Present
Founder, Chair *Paris, France*

- Founding member and group coordinator of OECD/NEA Working Party for Evaluation Cooperation (WPEC) Subgroup 44 on "Investigation of Covariance Data in General Purpose Nuclear Data Libraries."
- Leading a group of 50 nuclear data experts from around the globe to provide guidance to the international community on methods for systematic and consistent evaluation of nuclear data uncertainty.

PROFESSIONAL MEMBERSHIPS

OECD/NEA WPEC Subgroup Membership Dec 2015 - Present
Member *Paris, France*

- Active member of WPEC Subgroup 46 on "Efficient and Effective Use of Integral Experiments for Nuclear Data Validation."
- Active member of WPEC Subgroup 45 on "The Validation of Nuclear Data Libraries (VaNDaL) project."
- Active member of WPEC Subgroup 43 on "Code infrastructure to support a modern general nuclear database (GND) structure."
- Past member of WPEC Subgroup 39 on "Methods and approaches to provide feedback from nuclear and covariance data adjustment for improvement of nuclear data files."
- Past member of WPEC Subgroup 38 on "Beyond the ENDF format: A modern nuclear database structure."

American Nuclear Society Sept. 2010 - Present
National Member, Division Committee Vice-Chair

- Technical Program Committee Vice Chair for Nuclear Criticality Safety Division
- Education Committee Member for Nuclear Criticality Safety Division

PROFESSIONAL DEVELOPMENT

World Nuclear University (WNU) Summer Institute (SI) Jun. 27 - Aug. 4, 2017
World Nuclear Association *Uppsala, Sweden*

- The WNU Summer Institute curriculum is designed to provide cutting-edge presentations and workshops on the full range of topics relevant to future leaders of the nuclear industry.
- Global setting, including energy supply and demand, climate change, nuclear technology in sustainable development, new build and key political issues and trends.
- International regimes, nuclear law and 3S, including the international legal framework, safety, security and safeguards, implementation aspects and oversights.
- Nuclear industry and applications, including the nuclear fuel cycle, production of nuclear energy, operational excellence, technology innovations, transport, waste management, economics, and a brief summary of the newest applications of ionizing radiation.
- Leadership, project management, knowledge management, and effective communications.

PROFESSIONAL DEVELOPMENT

Nuclear Criticality Safety Hands-On Training Course Feb. 1 - 12, 2016
Sandia National Laboratory *Albuquerque, NM*

- Experimental hands-on training addressing important characteristics of neutron-multiplying systems.
- Theory and implications for safety of fissionable material operations.
- Understanding of DOE mandates developed specifically for criticality safety professionals regarding application of DOE Orders, Guides, Rules, and ANS standards in performance of criticality safety evaluations.

Modeling Experimentation and Validation (MeV) Summer School Jun. 20 - 30, 2015
Argonne National Laboratory *Lemont, IL*

- Advanced studies in integrated modeling, experimentation, and validation to prepare students for some of the key challenges and demands facing the nuclear energy renaissance.

Criticality Safety Calculations SCALE Training Course Jan. 27 - 31, 2014
Oak Ridge National Laboratory *Oak Ridge, TN*

- Introductory through advanced criticality calculations using KENO V.a and KENO-VI in continuous energy and multi-group formalism using resonance self-shielding techniques.

WORK EXPERIENCE

ORNL Research and Development Staff Oct. 2015 - Present
Nuclear Data and Criticality Safety Group, Reactor and Nuclear Systems Division *Oak Ridge, TN*

- Member of nuclear data team, responsible for the measurement, evaluation and validation of nuclear data for the international nuclear community, methods and code development for data applications, nuclear criticality safety analysis and reactor physics methods development.
- ORNL oversight technical lead for the design and construction of the University of Tennessee, Knoxville (UTK) sub-critical experiment facility.
- ORNL representative for the collaboration on nuclear data research between the Institute for Radiological protection and Nuclear Safety (IRSN), France and the US DOE Nuclear Criticality Safety Program.

ORNL Postdoctoral Research Associate Nov 2013 - Sept. 2015
Nuclear Data Specialist *Oak Ridge, TN*

- Developed a coupling methodology between differential nuclear data analysis and integral benchmark experiments entirely using continuous energy formalism. Implemented under professional Software Quality Assurance (SQA) program; SCALE code system.
- Developed a statistical inference methodology for upper subcritical limit calculations based on correlated experimental data.
- Analyzed the feasibility of direct disposal of spent nuclear fuel in a geologic repository from a criticality safety standpoint.

WORK EXPERIENCE

ORNL Nuclear Engineering Science Laboratory Synthesis (NESLS) May 2013 - Aug. 2013
Summer Intern Researcher *Oak Ridge, TN*

- Developed a methodology for coupling of differential and integral data analysis for neutron resonance region evaluations.
- Coupled the sensitivity/uncertainty analysis codes TSUNAMI/TSURFER with R-Matrix theory code SAMMY using a C++ program.
- Studied double differential nuclear data and its impacts on criticality safety benchmarks.
- Developed a C++ processing code for scattering angular distributions.

ORNL Nuclear Engineering Science Laboratory Synthesis (NESLS) May 2012 - Aug. 2012
Summer Intern Researcher *Oak Ridge, TN*

- Applied R-Matrix theory to evaluate experimental nuclear data and created a new resolved resonance region evaluation for ^{63,65}Cu proposed for submission to the ENDF nuclear data library.

ORNL Nuclear Engineering Science Laboratory Synthesis (NESLS) May 2010 - Aug. 2010
Summer Intern Researcher *Oak Ridge, TN*

- Studied a comparison of processing the new ^{240}Pu resonance and covariance evaluation using the NJOY and AMPX processing codes.
- Tested new evaluations using MCNP and the radiation transport codes.

MIT Reactor Physics Analysis of GNEP Fast Reactor Design Jan. 2010 - May 2010
Undergraduate Researcher *Cambridge, MA*

- Modeled different spent fuel blanket designs and accessed their effectiveness as part of a fuel cycle study.
- Validated a deterministic fast reactor code, ERANOS, by a stochastic neutron transport code, MCNP5.

MIT Reactor Physics Analysis of Pebble Bed Reactors Sept. 2008 - Dec. 2009
Undergraduate Researcher *Cambridge, MA*

- Independently designed, built, and analyzed computational experiments to evaluate the safety of PBMRs, using MCNP5, ORIGEN, and MCODE depletion calculations.
- Performed heat transfer analysis based on neutronics calculations to compute temperature peaking factors.

UPCOMING INVITED TALKS

Nuclear Reaction Theory, Measurement and Applications Jan. 9 - 11, 2018
University of California, Berkeley *Berkeley, CA*

- 3-day course on nuclear reaction theory for graduate and undergraduate students as well as research staff from Lawrence Livermore National Laboratory.
- Sponsored by Nuclear Science and Security Consortium.

INVITED TALKS

The Future of Nuclear Data Feb. 15, 2017
Purdue University *West Lafayette, IN*

· Seminar presentation on the technical outlook at the projected future of evaluation methods for experimental measurements of nuclear reactions.

Nuclear Data Short Course Nov. 1 - 4, 2016
Rensselaer Polytechnic Institute (RPI) *Troy, NY*

· Taught a 3-day course on the theory, measurement and practical applications of nuclear data.
· Course was attended by both graduate students, faculty and research staff of RPI and Knolls Atomic Power Laboratory.

Postdoctoral Experience at a National Laboratory: A Nuclear Engineering Perspective Nov. 12, 2015
ANS Winter Meeting and Technology Expo *Washington, D.C.*

· Discussed the DOE National Laboratory Postdoctoral Research program which offers the opportunity for appointees to perform research in a robust scientific R&D environment, present and publish research, advance knowledge in basic and applied science, and strengthen national scientific and technical capabilities.

CONFERENCE ORGANIZATION

SAMMY Modernization User's Group Meeting Nov. 5, 2016
Rensselaer Polytechnic Institute (RPI) *Troy, NY*

· Organized a meeting amongst several US national research organizations and universities to coordinate the modernization of the SAMMY nuclear data code.

ACADEMIC EXPERIENCE

University of Tennessee, Nuclear Engineering Senior Design Course Sept. 2017 - Present
Project Mentor *Knoxville, TN*

· Leading a team of 4 senior nuclear engineering students through the research and development process of designing a pile oscillator experiment to be constructed and utilized in the proposed fast subcritical assembly at the University of Tennessee to make nuclear reaction rate measurements at elevated temperatures.
· Developing the skills necessary to conduct the project design (computer tools, regulatory background, literature surveys), and the management capabilities to develop a timeline, goals and milestones for completion of the design project.

Doctoral Committee Member Apr. 2017 - Present
Doctoral Student: Jesse Brown (Rensselaer Polytechnic Institute) *Troy, NY*

· Department of Mechanical, Aerospace and Nuclear Engineering
· *Project Tittle:* Transmission and capture measurements in the resolved and unresolved resonance regions of Tantalum.

ACADEMIC EXPERIENCE

Reactor and Nuclear Systems Division (RNSD)
University Relations Advisory Board Oct. 2015 - Present
Chairman *Oak Ridge, TN*

· Charter: to Ensure RNSD's recruiting and university relationship goals are being met by providing integration between the division research groups and the university coordinator.

MIT Nuclear Data Course Jan. 2014 - Jan. 2016 (Annual)
Visiting Lecturer *Cambridge, MA*

· Designed and taught a week-long course on nuclear data at the graduate level.
· 15 hours of lecture, 4 hours of recitation, 4 comprehensive homework sets.
· Attended by over 25 graduate students from Department of Nuclear Science and Engineering and Department of Physics.
· Attended by 6 research staff from US Naval Nuclear Laboratories.

SCALE Training Course Mar. 9, 2016
Guest Lecturer *Oak Ridge, TN*

· Taught a guest lecture in the SCALE Sensitivity/Uncertainty Analysis and Uncertainty Quantification Calculations class at ORNL on the topic of Upper Subcritical Limit calculations.

CNEC Summer Student Mentor Jun. 2016 - Aug. 2016
Summer Student: Pola-Lydia Lagari (Purdue University) *Oak Ridge, TN*

· Mentored a Consortium for Nonproliferation Enabling Capabilities (CNEC) fellow student.
· *Project Tittle:* Nuclear Resonance Characterization for Special Nuclear Material Detection and Identification.
· Submitted to the International Journal of Monitoring and Surveillance Technology Research.

ENEC Summer Student Mentor Jun. 2016 - Aug. 2016
Summer Student: Abdulla Abdulaziz Alhajri (MIT) *Oak Ridge, TN*

· Mentored an Emirates Nuclear Energy Corporation (ENEC) fellow student.
· *Project Tittle:* Resonance Parameter Sensitivities Calculations with SCALE.
· Presented at International Conference on Mathematics & Computational Methods Applied to Nuclear Science & Engineering (M&C2017).

CASL Summer Student Mentor Jun. 2015 - Aug. 2015
Summer Student: Pablo Ducru (MIT) *Oak Ridge, TN*

· Mentored a Consortium for Advanced Simulation of LWRs summer student.
· *Project Tittle:* Multipole Representation; A Cross Section Formalism for High-Fidelity on-the-fly Thermohydraulics-Neutronics Coupling.
· Winner of 1st place in the 2015 Summer Student Research Expo.

UROP Student Mentor Sept. 2011 - Dec. 2012
Undergraduate Researcher: Ekaterina Paramanova (MIT) *Cambridge, MA*

· Mentored an Undergraduate Research Opportunity Project (UROP) student.
· *Project Tittle:* Radiative Capture Cross Section Measurement for Copper in the Thermal Energy Region for Inclusion in the EXFOR Database.
· Presented at 2012 American Nuclear Society Winter Meeting and Nuclear Technology Expo.

ACADEMIC EXPERIENCE

UROP Student Mentor Sept. 2010 - May 2011
Undergraduate Researcher: Ruaridh Macdonald (MIT) *Cambridge, MA*

- Mentored an Undergraduate Research Opportunity Project (UROP) student.
- *Project Tittle:* Total Cross Section Measurement for ^{63,65}Cu in the 0.001 eV - 100 eV Energy Region.
- Presented at 2011 American Nuclear Society Winter Meeting and Nuclear Technology Expo.

JOURNAL PUBLICATIONS

- G. Arbanas, J. Feng, V. Sobes, et al., **Bayesian Generalized Data Optimization Method**, *European Physical Journal (accepted for publication)*, (2018).

- P. Ducru, C. Josey, K. Dibert, V. Sobes, et al., **Kernel reconstruction methods for Doppler broadening cross section temperature interpolation by linear combination of reference temperatures cross sections**, *Journal of Computational Physics*, Jan. (2017).

- V. Sobes, et al., **Application of the SAMINT Methodology to the New Cross-Section Evaluations of Cu-63 and Cu-65**, *European Physical Journal*, **146**, Sept. (2017).

- G. Arbanas, V. Sobes, et al., **Generalized Reich-Moore R-matrix Approximation**, *European Physical Journal*, **146**, Sept. (2017).

- P.L. Lagari, V. Sobes, et al., **Application of Artificial Neural Networks for Reliable Nuclear Data for Nonproliferation Modeling and Simulation**, *Int. Journal of Monitoring and Surveillance Technology Research*, **4**(4), Oct.-Dec. (2016).

- V. Sobes, L. Leal, G. Arbanas, B. Forget, **Resonance Parameter Adjustment Based on Integral Experiments**, *Nuclear Science and Engineering*, **183**(3), Jul. (2016).

- V. Sobes, L. Leal, B. Forget, K. Guber, **New Resolved Resonance Region Evaluations for ^{63}Cu and ^{65}Cu to Support Nuclear Criticality Safety Analyses**, *Nuclear Data Sheets*, **115**, Mar. (2014).

- P. Pereslavtsev, A. Konobeyev, U. Fischer, V. Sobes, L. Leal, **New Evaluation of n+^{63,65}Cu Nuclear Cross Section Data up to 200 MeV Neutron Energy**, *Nuclear Data Sheets*, **115**, Mar. (2014).

- V. Sobes, B. Forget, A. Kadak, **Individual Pebble Temperature Peaking Factor due to Local Pebble Arrangement in a Pebble Bed Reactor Core**, *Nuclear Engineering and Design*, **241**(1), Jan. (2011).

LABORATORY REPORTS

· V. Sobes, L. Leal, **IRSN-ORNL Cooperation on Nuclear Data and Criticality Safety Summary Report**, *IRSN Laboratory Report*, Dec. (2015).

· V. Sobes, J. Scaglione, M. Dunn, **Validation Study for Crediting Chlorine in Criticality Analyses for US Spent Nuclear Fuel Disposition**, Prepared for US DOE Used Fuel Disposition Campaign, *FCRD-UFD-2015-00638*, Dec. (2014).

· Bean, Malcolm K., ... , V. Sobes, et al., **Conceptual Design of Molten Salt Loop Experiment for MIT Research Reactor**, Center for Advanced Nuclear Energy Systems. MIT Reactor Redesign Program, *MIT Press*, (2011).

PEER-REVIEWED CONFERENCE PUBLICATIONS

· V. Sobes, K. Guber, L. Leal, **FY 2016 Progress in Resonance Evaluations of Gadolinium for the NCSP**, *Trans. Am. Nucl. Soc.*, **117**, Nov. (2017).

· V. Sobes, K. Guber, **Status of a New Resonance Evaluation for Cerium to Support Nuclear Criticality Safety Applications**, *Trans. Am. Nucl. Soc.*, **116**, Jun. (2017).

· V. Sobes, L. Leal, M. Falk, **A Study of the Required Fidelity for the Representation of Angular Distributions of Elastic Scatting in the Resolved Resonance Region for Nuclear Criticality Safety Applications**, *Int. Conf. on Math. & Comp. Methods App. to Nucl. Sci. & Eng.*, Apr. (2017).

· A. Alhajri, V. Sobes, C. Perfetti, B. Forget, **Calculating Resonance Parameter Sensitivity Coefficients in SCALE**, *Int. Conf. on Math. & Comp. Methods App. to Nucl. Sci. & Eng.*, Apr. (2017).

· V. Sobes, L. Leal, K. Guber, **Finalizing the Cu-63 and Cu-65 Resonance Evaluations for the ENDF/B-VIII Release**, *Trans. Am. Nucl. Soc.*, **115**, Nov. (2016).

· P. Ducru, C. Josey, K. Dibert, V. Sobes, et al., **Optimal temperature grid for accurate Doppler kernel reconstruction**, *Trans. Am. Nucl. Soc.*, **115**, Nov. (2016).

· V. Sobes, K. Guber, et al., **Calculated Resonance Properties from the New Resolved Resonance Region Evaluations of Copper**, *The 2016 R-Matrix Workshop on Methods and Applications*, Jun. (2016).

· G. Arbanas, V. Sobes, A. Holcomb, et al., **SAMMY: An R-matrix Bayesian Nuclear Data Evaluation Code**, *The 2016 R-Matrix Workshop on Methods and Applications*, Jun. (2016).

· V. Sobes, L. Leal, **Benchmarking of the Updated Resolved Resonance Region Evaluations of Copper**, *Trans. Am. Nucl. Soc.*, **114**, Jun. (2016).

· P. Ducru, V. Sobes, B. Forget, K. Smith, **On Methods for Conversion of R-Matrix Resonance Parameters to Multi-pole Formalism - Numerics of Algebraic Conversion**, *PHYSOR 2016*,

May (2016).

PEER-REVIEWED CONFERENCE PUBLICATIONS

· V. Sobes, et al., **SAMINT: A New Evaluation Tool to Perform Resonance Parameter Data Adjustments based on Integral Experiment Data**, *Trans. Am. Nucl. Soc.*, **113**, Nov. (2015).

· P. Ducru, C. Josey, V. Sobes, et al., **Doppler Broadening by Linear Combination of Reference Temperature Cross Sections**, *Trans. Am. Nucl. Soc.*, **113**, Nov. (2015).

· V. Sobes, B. Rearden, et al., **Upper Subcritical Calculations Based on Correlated Data**, *Trans. of Int. Conf. on Nucl. Crit. Safety*, Sept. (2015).

· V. Sobes, L. Leal, G. Arbanas, **Nuclear Data Adjustment with SAMMY Based on Integral Experiments**, *Trans. Am. Nucl. Soc.*, **111**, Nov. (2014).

· L. Leal, V. Sobes, et al., **ORNL Nuclear Data Evaluation Accomplishments for FY2013**, *Trans. Am. Nucl. Soc.*, **111**, Nov. (2014).

· V. Sobes, L. Leal, **Results for the Intermediate-Spectrum Zeus Benchmark Obtained with New ^{63,65}Cu Cross-Section Evaluations**, *Trans. Am. Nucl. Soc.*, **110**, Jun. (2014).

· V. Sobes, L. Leal, B. Forget, **Coupled Differential and Integral Data Analysis for Improved Uncertainty Quantification**, *Trans. Am. Nucl. Soc.*, **109**, Nov. (2013).

· E. Paramanova, V. Sobes, B. Forget, G. Kohse, **Radiative Capture Cross Section Measurement of Copper for EXFOR Database**, *Trans. Am. Nucl. Soc.*, **107**, Nov. (2012).

· V. Sobes, L. Leal, K. Guber, B. Forget, **Preliminary Resolved Resonance Region Evaluation of Copper-63 from 0 to 300 keV**, *PHYSOR 2012*, Apr. (2012).

· V. Sobes, R. Macdonald, L. Leal, B. Forget, K. Guber, G. Kohse, **Thermal Total Cross Section Measurement for ^{63}Cu and ^{65}Cu at the MIT Reactor**, *Trans. Am. Nucl. Soc.*, **106**, Nov. (2011).

· V. Sobes, L. Leal, H. Derrien, D. Wiarda, D. Muller, B. Forget, **Processing and Testing New ^{240}Pu Resolved Resonance and Covariance Evaluation**, *Trans. Am. Nucl. Soc.*, **105**, Jun. (2011).