CURRICULUM VITAE

University of Idaho

NAME: Robert Angelo Borrelli

RANK OR TITLE: Associate Professor

DEPARTMENT: Nuclear Engineering & Industrial Management

OFFICE LOCATION AND CAMPUS ZIP: CAES 83401

DATE: 2025.12.29

EMAIL: rborrelli@uidaho.edu

WEB: @TheDoctorRAB

DATE OF FIRST EMPLOYMENT AT UI: 2015.07.13

DATE OF TENURE: 2021.05.20

DATE OF PRESENT RANK OR TITLE: 2021.05.20

EDUCATION BEYOND HIGH SCHOOL

Degrees

Doctor of Philosophy – Nuclear Engineering *2006*
University of California – Berkeley
Radionuclide transport modeling with bentonite extrusion

Master of Science – Civil & Environmental Engineering *1999*
Worcester Polytechnic Institute
Characterization of background radiation in the environment

Bachelor of Science, Mechanical Engineering with high distinction *1996*
Worcester Polytechnic Institute
Capstone – Real time PLC-based reactivity modeling by inverse point kinetics

EXPERIENCE

Teaching, Extension, and Research Appointments

University of Idaho · Idaho Falls Center for Higher Education *2015–*
Associate Professor · Nuclear Engineering & Industrial Management *2021–*
Assistant Professor · Nuclear Engineering & Industrial Management *2015–21*
Affiliate Faculty – Electrical & Computer Engineering · University of Idaho *2025–*
Coordinator – Nuclear Technology Management Certificate *2023–*
Affiliate – Energy Policy Institute Boise State University *2019–*
Coordinator – Nuclear Decommissioning & Used Fuel Management Certificate *2019–*
State of Idaho Professional Engineer – Faculty Restricted *2019–*
Coordinator – Nuclear Criticality Safety Certificate *2015–*

Postdoctorate Researcher *2009-12*
University of California-Berkeley · Nuclear Engineering
Safeguardability methodology for remotely-handled nuclear materials facilities

Research Associate *2007–09*
University of Tokyo · Nuclear Engineering & Management

Mathematical modeling for mass transport in the engineered barrier system of a high-level nuclear waste repository

Postdoctorate Researcher *2007*
University of California-Berkeley · Nuclear Engineering
Mathematical modeling for mass transport in the engineered barrier system of a high-level nuclear waste repository

Doctoral Candidate *2005-06*
University of California-Berkeley · Nuclear Engineering
Derived a two-phase, mass transport model for radionuclides in a porous medium with bentonite extrusion model in a planar fracture to assess the potential to confine radionuclides.

Intern, Earth Sciences Division *2001–02*
Lawrence Berkeley National Laboratory
Data analysis for chaotic modeling of water flow in the unsaturated zone

EXPERIENCE

Non-Academic Employment including Armed Forces
Assistant Radiation Safety Officer *1996-99*
Leslie C. Wilbur Nuclear Reactor Facility
Worcester Polytechnic Institute
Emergency response for incidents involving radioactive material; Records maintenance of radiation exposures to campus personnel, etc.

Senior Nuclear Reactor Operator #70145 *1994-99*
Leslie C. Wilbur Nuclear Reactor Facility
Worcester Polytechnic Institute
Emergency response for incidents involving radioactive material; Records maintenance of radiation exposures to campus personnel, etc.

Major Qualifying Project *1995–96*
Leslie C. Wilbur Nuclear Reactor Facility
Worcester Polytechnic Institute
The Major Qualifying Project synthesizes previous undergraduate studies to solve problems in the major field and communicate results. For this project, a logic algorithm was developed for reactivity derived from point kinetics equations and a Programmable Logic Controller was modified for real time data collection during nuclear reactor operation for use with experimental coursework and maintenance procedures.

TEACHING ACCOMPLISHMENTS

Areas of Specialization Neutronics, risk assessment, pyroprocessing, nuclear fuel cycle analysis, safeguards, security, nuclear cybersecurity, nuclear integrated hybrid energy systems, regulatory analysis, energy policy

University of Idaho · Idaho Falls Center for Higher Education
Nuclear Engineering & Industrial Management
Used Fuel Management & Nuclear Power Plant Decommissioning Certificate *Offered variably as needed*
NE514: Nuclear Safety
The focus of this course is on the approach to nuclear safety for the commercial nuclear industry. Historical events serve as a basis for learning to investigate how nuclear energy policy has affected approaches to safety developed in the United States. Additionally, how safety approaches affect the nuclear industry will be covered. Several different classes of nuclear facilities will be studied. Relevant current events will be highlighted.

NE516: Nuclear Rules & Regulations
The focus of this course is on the rules and regulations that govern the commercial nuclear industry. Historical events serve as a basis for learning to investigate how nuclear energy policy has developed in the United States. This includes not only current regulations but important development that led to major policy changes. Additionally, how current regulations affect the nuclear industry will be covered. Facilities studied will include research, commercial, and government. Relevant current events will be highlighted.

NE527: Nuclear Materials, Transportation, Storage *in development*
The focus of this course is on the scope and sequencing of activities necessary to comply with the rules and regulations that govern storage, transport, and disposal of nuclear materials. The course is mainly focused on spent nuclear fuel management, Department of Energy high-level waste management, and NRC regulated activities. The course is based on United States nuclear facilities and nuclear power plants.

NE587: Nuclear Facility Decommissioning
The focus of this course is on the scope and sequencing of activities necessary to comply with the rules and regulations that govern decommissioning of nuclear facilities. The course is mainly focused on the NRC regulated activities, as these are both stricter and more regimented when compared to the DOE/DOD regulated activities. However, most of the rules apply to both. The course is based on D&D experience in the US, both for facilities which have successfully completed the process and for facilities currently in the process.

Courses Taught
University of Idaho · Idaho Falls Center for Higher Education
Nuclear Engineering & Industrial Management
NE587: Nuclear Facility Decommissioning *Fall 2025*
supervising instructor
The focus of this course is on the scope and sequencing of activities necessary to comply with the rules and regulations that govern decommissioning of nuclear facilities. The course is mainly focused on the NRC regulated activities, as these are both stricter and more regimented when compared to the DOE/DOD regulated activities. However, most of the rules apply to both. The course is based on D&D experience in the US, both for facilities which have successfully completed the process and for facilities currently in the process.

NE585: Nuclear Fuel Cycle Analysis *Fall 2023–; 2017*
This course presents the nuclear fuel cycle can as an holistic system with components related in many complex ways. This course focuses on systems analysis of components that comprise the nuclear fuel cycle to understand the contemporary challenges facing nuclear energy. Topics include reactor design, critical size, reactor statics and dynamics, advanced reactor design, and back-end management; siting, fuel management, interim storage, repository design. Students will also gain facility with MCNP.

NE529: Risk Assessment *Spring 2021–; 2016–19*
This course is designed to provide students with an understanding of how to perform a comprehensive risk assessment applicable to a wide variety of engineering problems in many different disciplines. The course will focus on failure mode and effect analysis, fault tree analysis, probabilistic risk analysis, and human reliability analysis. The course will also cover fundamental probability and statistics content.

NE544: Reactor Analysis – Statics and Kinetics *Spring 2022 –*
supervising instructor
The purpose of this course is to study nuclear theory in the context of nuclear reactor engineering; concepts relating to the design and operation of nuclear reactors will be discussed. Content includes development of mathematical expressions describing the relevant nuclear processes as well as their physical implications. This course will involve the application of several common analytical tools used for the design and evaluation of nuclear systems.

NE450: Principles of Nuclear Engineering *Fall 2015–22*

In this course, an overview of fundamental nuclear engineering principles and how these are practically applied to contemporary, nuclear engineering problems will be presented. The topics covered in this course include: nuclear physics and reactions, materials science, radiation protection, energy production, fuel cycle analysis, advanced reactor design, fusion, nonproliferation, back-end management, and risk assessment and safety. Throughout the course, the ethical considerations with regards to engineering problems within these fields will also be discussed.

NE502: Python MCNP Development for Molten Fuel Salt Handling *Spring 2025*
In this course, a series of Python Scripts are developed to construct MCNP input decks that will be applied to establish criticality safety fuel handling controls for molten fuel salt.

NE502: Nuclear Power Plant Decommissioning Education *Fall 2023*
As variable energy sources increasingly penetrate the United States energy market, the economics of nuclear energy has weakened. This has led to planned plant closures. Under NRC regulations, these plants must be decommissioned; i.e., safe removal from service and reduction of radioactivity to permissible levels in order to release the property. These activities will require specialized training. The market for decommissioning in North America was valued at $1.92B in 2019, and it is projected to increase to $3.35B in 2027. A significant, skilled, and technically proficient workforce will be needed to complete these activities safely and within regulations. Currently, there are no programs in the US specifically focused on decommissioning workforce training. This course will develop a nuclear power plant decommissioning asynchronous, online graduate course as part of the University of Idaho Nuclear Power Plant Decommissioning Graduate Certificate.

NE502: Computation and modeling of nuclear systems *Fall 2020*
Using published nuclear computational modeling references, this course will examine prior efforts to simplify the neutron transport and depletion calculations for advanced reactor designs, such as high-temperature pebble-bed reactors. These include efforts to model heterogeneous stochastic media, such as TRISO fuel particles dispersed in a graphite matrix. Deterministic neutron transport in stochastic media has resulted in several new methods developed in order to address the challenges associated with modeling them, however, comparison of the proposed and implemented methods has been largely absent. Other challenges facing the modeling of pebble-bed reactors include the depletion calculations for individual pebbles. Because of the flow of pebbles through the core, and the recirculation of said pebbles in most modern designs, the depletion of individual pebbles can affect the criticality of the system as well as the temperature profile of individual pebbles, which was demonstrated to have significant safety implications based on the operation of the German AVR pebble-bed system. To these ends, this course will identify relevant literature regarding these topics and the feasibility of implementing these methods in modern nuclear modeling tools, such as the Griffin tool in development at Idaho National Laboratory.

NE502: Heterogeneity comparisons of intermediate enrichment uranium in critical systems *Fall 2020*
The ICSBEP handbook contains descriptions and evaluations of critical experiments conducted in facilties throughout the world. The reach of the handbook stretches to the beginning of the history of nuclear engineering. As part of that history, a number of critical experiments have been conducted using arrays of fissile material in the intermediate enrichment range, which is defined for the purposes of this course as ten to forty percent (10%-40%). In those evaluations, a variety of methods have been discussed and described which convert a system of known or unknown degree of heterogeneity into a simplified homogeneous model, which is a traditional method for examining the critical characteristics of multiplying systems. The specific methodology for this conversion varies between evaluations and is explained in some cases, where other cases are less descriptive. It is of interest to the field of nuclear criticality safety to improve the understanding of the effect of heterogeneity on the critical characteristics of multiplying fissile systems, particularly in the range of intermediate enrichment. It is of further interest to the field that a methodology be established which can be used to evaluate these types of systems for practical nuclear criticality safety applications, especially the development of nuclear criticality safety limits.

NE502: Computation of spherical critical volume for nuclear criticality safety applications *Fall 2020*
The nuclear safety guide, Critical Dimensions of Systems Containing U-235, Pu-239, and U-233 contains a graph of minimum critical volumes as a function of U-235 enrichment in homogeneous and heterogeneous hydrogen-moderated systems. This graph includes a wide extrapolation between the data for ten percent enrichment and

ninety-three percent enrichment. A similar graph appears in Anomalies of Nuclear Criticality without the extrapolation. This graph shows a clear transition at approximately thirty-five percent enrichment between two different types of systems. It is clear that there is a difference between the extrapolated minimum spherical critical volumes and the calculated critical volumes. As part of the development of nuclear criticality safety methodology for intermediate-enrichment uranium systems, it is necessary to more fully evaluate and explain the nature of the transition point. This work will attempt to re-create and expand on the data used to produce this graph and more fully evaluate the nature of the minimum critical volume for intermediate-enrichment systems. The secondary objective will be the proposal of nuclear criticality safety rules which could be applied to these data to ensure that fissionable material operations in this range of enrichment can be conducted safely.

NE502: Subcritical multiplication *Fall 2020*
Using published fundamental nuclear data for thermal neutrons, this course will examine the relationship between processes of fission and capture and develop models for reactivity worth as a function of thermal fission and capture cross-sections and local thermal flux. This course will include evaluation of tests in zero-power reactors. The Advanced Test Reactor (ATR) physics analyses rely heavily on measurement results from the Advanced Test Reactor Critical Facility (ATRC). These results are easily delivered in terms of reactivity worth, but the results are almost never directly applicable to ATR due to differences in thermal neutron flux. Reactivity worth is not a fundamental property of a material and indeed is not a characteristic property of a given piece of reactor hardware if the hardware is to be irradiated in a new neutron environment. However, translating reactivity worth of a piece of hardware in ATRC to a pair of macroscopic cross-sections essentially characterizes the hardware with constants that will be applicable in any subsequent location in ATR or ATRC. Therefore, reactivity worth in a new irradiation position can be predicted by calculation.

NE502: Historical examinations of heterogeneity in nuclear criticality safety *Spring 2020*
Using published nuclear criticality safety references, this course will conduct an examination of the effect of heterogeneity with respect to nuclear criticality safety. As part of the history of nuclear criticality safety, a number of critical experiments have been conducted using arrays of fissile material in an attempt to quantify the effect of heterogeneity in the determination of safe handling limits. In these attempts, a number of low-enriched experiments were examined and converted in their critical dimensions to establish a useful baseline from which other limits could be extrapolated. It is of interest to the field of nuclear criticality safety to improve the understanding of the effect of heterogeneity on the critical characteristics of multiplying fissile systems, particularly in the range of intermediate enrichment. It is of further interest to the field that a methodology be established which can be used to evaluate these types of systems for practical nuclear criticality safety applications, especially the development of nuclear criticality safety limits. To that end, this course will identify relevant data in the literature used to generate historical experiments and apply MCNP to model these experiments in order to understand and evaluate assumptions and restrictions raised in the experiments.

NE502: Heterogeneity comparisons of intermediate enrichment uranium in critical systems *Spring 2020*
Using the International Criticality Safety Benchmark Evaluation Project (ICSBEP) handbook of evaluated critical experiments, conduct an examination of the effect of heterogeneity in intermediate-enrichment uranium systems. The ICSBEP handbook contains descriptions and evaluations of critical experiments conducted in facilities throughout the world. The reach of the handbook stretches to the beginning of the history of nuclear engineering. In those evaluations, a variety of methods have been discussed and described which convert a system of known or unknown degree of heterogeneity into a simplified homogeneous model, which is a traditional method for examining the critical characteristics of multiplying systems. The specific methodology for this conversion varies between evaluations and is explained in some cases, where other cases are less descriptive. It is of interest to the field of nuclear criticality safety to improve the understanding of the effect of heterogeneity on the critical characteristics of multiplying fissile systems, particularly in the range of intermediate enrichment. It is of further interest to the field that a methodology be established which can be used to evaluate these types of systems for practical nuclear criticality safety applications, especially the development of nuclear criticality safety limits. This course will identify and evaluate relevant benchmark experiments for heterogeneity effects using MCNP to establish new baseline models from the benchmark handbook.

NE502: Nuclear integrated energy systems *Spring 2020*

Nuclear renewable hybrid energy systems enable a nuclear reactor to load follow with a renewable energy source. These must be designed to distribute energy dynamically by supplying electricity to the grid while using either thermal or electrical energy for industrial applications. This takes advantage of the flexible distribution of electricity or heat to maximize profit. The industrial process serves as a load sink for the excess heat or electricity produced by the nuclear reactor. Economic challenges to the current United States nuclear light water reactor (LWR) fleet have led to early plant closures. While LWRs primarily deliver baseload electricity, there is no reason why nuclear energy produced by these reactors cannot be used to provide energy to a range of industrial applications. This directed study course will identify feasible systems, products, and commodities that could be produced by existing nuclear plants. As part of this, cost and potential profitability will be analyzed within the context of market structures and grid reliability.

NE527: Nuclear material storage, transport, disposal *Spring 2020*
There is a wide range of nuclear materials that are stored, transported and disposed of each day. The materials include medical radioisotopes, new fuel pellets, used fuel, and industrial radioisotopes. This course will cover the regulations that govern nuclear material storage, transportation and disposal, as well as the engineering requirements and practical aspects of handling these materials.

NE535: Nuclear Criticality Safety I *Spring 2022; 2020*
This course applies uses the foundation of applied nuclear physics to develop and explain the international and domestic rules and practices that are used to prevent inadvertent criticality in fuel cycle applications such as used fuel storage and processing.

Diablo Valley College
Architecture and Engineering
Adjunct Professor
ENGIN110: Introduction to Engineering *2013–15*
This course introduces students to fundamental engineering principles. Students learn how these are applied to contemporary engineering problems through laboratory exercises, homework assignments, design projects, interviews with professional engineers, and field trips to engineering companies. Topics include: materials science, risk assessment and safety, critical problem-solving, engineering analysis, engineering design processes, project development, engineering software, and presentation tools. The role of the engineer in society, professionalism, and engineering ethics are major themes. The emphasis is on creative problem-solving, teamwork, and effective communication, both in presentation and writing.

University of California –Berkeley
Nuclear Engineering
Instructor
NE375: Teaching Techniques in Nuclear Engineering *2006; 2010–11*
This course acquaints Graduate Student Instructors (GSIs) with teaching techniques for courses in the Department of Nuclear Engineering. The GSI will have several duties far beyond grading assignments and/or examinations: conducting discussion sessions, review lectures, or laboratory experiments. The GSI, therefore, needs to develop the appropriate tools to use when facing these pedagogical challenges. Three students from the 2010 course received the Outstanding Graduate Student Instructor Award given by the UC-Berkeley Graduate Student Instructor Teaching & Resource Center.

Graduate Student Instructor
E124: Ethics and the Impact of Technology on Society *2004–06*
Conducted multiple discussion sections on a weekly basis and review lectures
Supervised research projects based on current, ethical and scientific issues
Assessed individual student presentations, projects, and overall course grading

IDS110: Introduction to Computing *2004*
Conducted multiple laboratory sessions on a weekly basis

Supervised undergraduate research projects focused on web based education
Assessed laboratory assignments and project grading

NE92: Issues in Nuclear Science and Engineering *2000; 2002*
Conducted multiple laboratory sessions on a weekly basis
Supervised undergraduate research projects focused on web based education
Assessed laboratory assignments and project grading

NE275: Principles and Methods of Risk Analysis *2001*
This graduate course requires a deeper understanding of the subject matter, due to the student body. The course was one of three in the curriculum with the highest credit load. The main responsibility in this was to advise and grade semester projects and presentations based on risk assessments of engineering systems.

Reader
NE150: Introduction to Nuclear Reactor Theory *2003*
NE104: Radiation Detection and Nuclear Instrumentation Laboratory *2002*
NE107: Introduction to Imaging *2001*
NE120: Nuclear Materials *2000*
Supervised laboratory sessions
Assessed examinations, homework assignments, laboratory reports, final grades
Conducted review lectures

University of Tokyo
Nuclear Engineering & Management
Part Time Lecturer
Technical English for Scientists *2007–08*
This course provided the opportunity for non-native English speaking students to develop technical communication skills; i.e., presenting scientific and technical material to an informed audience at an international conference. In this course, the 'assertion evidence design' concept for technical presentation of scientific topics was applied to student research interests. Transmutable skills focused on the professional communication of scientific research in various public speaking formats and a comfortable familiarity with the English language to establish a stronger foundation for technical writing.

STUDENTS ADVISED

University of Idaho *Affiliation is of where majority degree research was conducted*
Major Professor
Current

Dylan Ohrt	Idaho National Laboratory	Nuclear materials safeguards	Ph.D.
J. Seth Dustin	Oklo	Waste processing	Ph.D.
Nathan Manwaring	Idaho National Laboratory	Criticality safety	Ph.D.
Trevin Lasley	Naval Reactors Facility	Criticality safety	Ph.D.
David Haar	Self-employed	Decontamination & Decommissioning	Ph.D.
Kevin Haar	Waste Isolation Pilot Plant		MS
Ethan Bauer	Idaho National Laboratory	Detector design	MS

Graduates

Olin Calvin	University of Idaho	Depletion chain simplification with pseudo-nuclides to model decay effects	Ph.D.	*2023*
Joseph Christensen	TerraPower	Advancements in the Evaluation of Heterogeneity for Nuclear Criticality Safety in High-Assay Low-Enriched Uranium Systems	Ph.D.	*2023*
Teyen Widdicombe	University of Idaho	Investigation of Interactions Between Radiations from Dragonfly's MMRTG and Titan's Environment	Ph.D.	*2022*
Kelley M. Verner	University of Idaho	Irradiation induced phase change in low enriched uranium-molybdenum fuel as it relates to microstructure	Ph.D.	*2021*
J. Seth Dustin	University of Idaho	High level examination of Am-241 as an alternative Fuel Source in radioisotope thermoelectric generators	MS	*2020*
John Peterson	University of Idaho	Molten salt reactor neutronics design	MS	*2019*
Jieun Lee	University of Idaho	Risk-informed safeguards of pyroprocessing for advanced nuclear fuel concepts	MS	*2018*
Emma Redfoot	University of Idaho	Allocating heat and electricity in a nuclear renewable hybrid energy system coupled with a water purification system	MS	*2018*
Malachi Tolman	University of Idaho	INL BISON code documentation	MS	*2017*
Jonathon Wheelwright	Idaho National Laboratory	Microreactor transport	MEng	*2023*
Trevor MacLean	Idaho National Laboratory	Cybersecurity modeling of non-critical nuclear power plant instrumentation	MEng	*2018*

University of Idaho

Committee Member

Graduates

Jonathan Tacke	University of Idaho	Frequency Regulation by Way of a Variable Moment of Inertia	Ph.D.	*2024*
Ryan C. Hruska	Idaho National Laboratory	A Functional All-Hazard Approach to Critical Infrastructure Dependency Analysis	Ph.D.	*2023*
David Kamerman	Idaho National Laboratory	On the Role of Bulk Hydrides and Hydride Rims in Causing Low Temperature Ruptures of Zircaloy-4 Cladding Tubes in Transient Reactor Tests	Ph.D.	*2023*
James Richards	Ultra Safe Nuclear Corp.	Techno-Economic Analysis of Nuclear Integrated Energy Systems for Water Desalination and Hydrogen Production	Ph.D.	*2023*
John Carter	Idaho National Laboratory	Core design of molten salt nuclear battery	Ph.D.	*2022*
Jacob Benjamin	Dragos, Inc.	Bounding cyber in design basis threat	Ph.D.	*2020*

Gabriel Lewis	University of Idaho	Redox measurement and Corrosion testing in molten FLiNaK salts	MS	*2025*
Sam J. Root	University of Idaho	Dynamic System Modeling & PID Controller Design for a Molten Salt Microreactor	MS	*2024*
Stefan Abbot	University of Idaho	Electrochemical Analysis of Molybdenum, TZM, and Molybdenum-Lanthanum ODS in Aqueous Solution	MS	*2024*
Kendall Bean	University of Idaho	Using static VAR Compensators to Simultaneously Regulate Power System Voltage and Frequency	MS	*2022*
Trevin Lasley	University of Idaho	Criticality safety on the molten salt nuclear battery	MS	*2021*
Joshua Young	University of Idaho	Analysis of a Dump Heat Exchanger For The Versatile Test Reactor's Secondary Loop	MS	*2021*
Jonathan Tacke	University of Idaho	Design of an automatic voltage regulator with limited plant information	MS	*2020*
John Bell	University of Idaho	Hierarchical inference and spoofing alarm in HVDC control systems	MS	*2020*
Winfred Sowah	University of Idaho	Thermal behavior of cold plated storage cask for used light water reactor nuclear fuels	MS	*2019*
D. Devin Imholte	Idaho National Laboratory	Conceptual design of the Advanced Test Reactor non-destructive examination system	MS	*2019*
John Biersdorf	University of Idaho	Precipitation changes to Idaho National Laboratory over time	MEng	*2018*

Idaho State University

Committee Member

Graduates

Pedro Mena	Idaho State University	Reactor transient classification using machine learning	Ph.D.	*2012*
Pedro Mena	Idaho State University	Auto Machine Learning Applications for Nuclear Reactors: Transient Identification, Model Redundancy and Security	MS	*2019*

MATERIALS DEVELOPED

Open Educational Resources

Open source educational materials were compiled in order to produce an online textbook as a supplement to existing commercial textbooks. An online textbook allows flexibility to augment course content without requiring multiple textbooks. It also allows the educational content of a course to be more closely aligned with the desired learning outcomes. Two online texts have been developed – Principles of Nuclear Engineering and Risk Assessment.

Courses

NE450: Principles of Nuclear Engineering
NE514: Nuclear Safety – (adapted, with about 40% new material)
NE516: Nuclear Rules & Regulations – (adapted, with about 40% new material)
NE527: Nuclear Materials Storage, Disposal, Transport – (under development)

NE529: Risk Assessment
NE535: Criticality Safety I
NE585: Nuclear Fuel Cycles
NE587: Nuclear Facility Decommissioning – (collaboration with David Haar)
CORS234: The Science of Engineering and Technology in the Modern World – (Nuclear physics module)

SCHOLARSHIP ACCOMPLISHMENTS

Publications, Exhibitions, Performances, Recitals *[+]Students*
Refereed/Peer Reviewed Journal Publications

(1) [+]Tollan Berhanu, [+]Hunter Squires, [+]Braxton Marlatt, [+]Scott Anderson, [+]Benton Wilson, R. A. Borrelli, Constantinos Kolias (2025). AE^{3}GIS -– An Agile Emulated Educational Environment for Guided Industrial Security Training. Future Internet, 10.3390/fi1010000 [*under review*].

(2) [+]Ethan Bauer, Tommy Holschuh, R. A. Borrelli (2025). Evaluation of Simulated HPGe Detector Efficiencies in OpenMC Compared to MCNP. Nuclear Engineering and Technology, [*in revision*].

(3) [+]Koffi Anderson Koffi, [+]Kyle Lucke, [+]Elijah Danquah Darko, [+]Tollan Berhanu, R. A. Borrelli, Constantinos Kolias (2025). AgentRed: Towards an Agent-Based Approach to Network Red Team Assessment Automation. Algorithms Artificial Intelligence in Modern Cybersecurity: Changes, Applications and Challenges, 4013356.

(4) [+]Nathan Manwaring, Matt Johnson, R. A. Borrelli (2024). At-power Subcritical Multiplication in the Advanced Test Reactor during Nuclear Requalification Testing. Nuclear Engineering and Design 426, 113399.

(5) [+]Olin Calvin, Barry D. Ganapol, R. A. Borrelli (2023). Introduction of the adding and doubling method for solving Bateman equations for nuclear fuel depletion. Nuclear Science and Engineering 197, 558.

(6) [+]Pedro Mena, R. A. Borrelli, Leslie Kerby (2023). Detecting Anomalies in Simulated Nuclear Data using Autoencoders. Nuclear Technology 210, 112.

(7) [+]Sam J. Root, [+]Porter Throckmorton, [+]Jonathan Tacke, Jacob Benjamin, Michael Haney, R. A. Borrelli (2023). Cyber Hardening of Nuclear Power Plants with Real-time Nuclear Reactor Operation — 1. Preliminary Operational Testing. Progress in Nuclear Energy 162, 104742.

(8) [+]Sam J. Root, Haiyan Zhao, R. A. Borrelli, Michael G. McKellar (2023). Thermodynamic Analysis on Xenon Stripping to Shorten Restart Time in Molten Salt Microreactors. Nuclear Engineering and Design 414, 112606.

(9) Haruko Wainwright, Brian Powell, [+]Megan Hoover, Dinara Ermakova, R. A. Borrelli, Christina Leggett, Milos Atz, Carol Eddy-Dilek, William Roy, Emily Stein, Kathryn Higley, Sheldon Landsberger, Rod Ewing (2023). Nuclear Waste Educator's Workshop: What and How Do We Teach About Nuclear Waste? Journal of Environmental Radioactivity 270, 107288.

(10) [+]Teyen Widdicombe, R. A. Borrelli (2023). Experimental Determination of Interaction Between the Radiation Fields of Dragonfly's MMRTG and Titan's Environment II: Gamma Induced Atmospheric Conductivity. Acta Astronautica 208, 91.

(11) [+]Joseph Christensen, R. A. Borrelli (2022). Evaluations of the effect of heterogeneity in HALEU systems using modified critical benchmarks. Nuclear Science and Engineering 196, 1333.

(12) [+]Nathan Manwaring, R. A. Borrelli (2022). At-power subcritical multiplication in the Advanced Test Reactor. Nuclear Engineering and Design 401, 112040.

(13) [+]Pedro Mena, R. A. Borrelli, Leslie Kerby (2022). Survey of markets for nuclear power in Western North America. International Journal of Energy, Environment, and Economics 29, 17.

(14) [+]Pedro Mena, R. A. Borrelli, Leslie Kerby (2022). Expanded Analysis of Machine Learning Models for Nuclear Transient Identification Using TPOT. Nuclear Engineering and Design 390, 111694.

(15) [+]Emma K. Redfoot, [+]Kelley M. Verner, R. A. Borrelli (2022). Applying analytic hierarchy process to

industrial process design in a nuclear renewable hybrid energy system. Progress in Nuclear Energy 145, 104083.

(16) +Emma K. Redfoot, Michael G. McKellar, R. A. Borrelli (2022). Allocating heat and electricity in an integrated energy system coupled with a water purification system. Nuclear Engineering and Design 397, 111902.

(17) +Teyen Widdicombe, R. A. Borrelli (2022). Experimental Determination of Interaction Between the Radiation Fields of Dragonfly's MMRTG and Titan's Environment I: Neutron results. Acta Astronautica, 10.1016/j.actaastro.2022.08.048.

(18) +J. Seth Dustin, R. A. Borrelli (2021). Assessment of alternative radionuclides for use in a radioisotope thermoelectric generator. Nuclear Engineering and Design 385, 111475.

(19) +J. Seth Dustin, R. A. Borrelli (2021). Modeling of Am-241 as an alternative fuel source in a radioisotope thermoelectric generator. Nuclear Engineering and Design 385, 111495.

(20) +Pedro Mena, R. A. Borrelli, Leslie Kerby (2021). Nuclear reactor transient diagnostics using classification and AutoML. Nuclear Technology 208, 232.

(21) +Jonathan Tacke, R. A. Borrelli, Dakota Roberson (2021). Advanced frequency-domain compensator design for subsystems within a nuclear generating station. Progress in Nuclear Energy 140, 103914.

(22) +Teyen Widdicombe, R. A. Borrelli (2021). MCNP modelling of radiation effects of the Dragonfly mission's RTG on Titan II: Atmospheric ionization effects. Acta Astronautica 186, 517.

(23) +Teyen Widdicombe, R. A. Borrelli (2021). MCNP modelling of radiation effects of the Dragonfly mission's RTG on Titan. Acta Astronautica 183, 363.

(24) R. A. Borrelli, Mark S. Delligatti, Brenden J. Heidrich (2020). Borated aluminum cask design for onsite intermediate storage - neutronics design and certification analysis. Nuclear Engineering and Design 363, 110666.

(25) +John P. Carter, R. A. Borrelli (2020). Integral molten salt reactor neutron physics study using Monte Carlo N-particle code. Nuclear Engineering and Design 365, 110718.

(26) +John P. Carter, R. A. Borrelli (2020). Integral molten salt reactor temperature sensitivities using Serpent target motion sampling. Nuclear Engineering and Design 369, 110863.

(27) +Joseph Christensen, R. A. Borrelli (2020). Nuclear criticality safety aspects for the future of HALEU: Evaluating heterogeneity in intermediate-enrichment uranium using critical benchmark experiments. Nuclear Science and Engineering, 10.1080/00295639.2020.1819143.

(28) +Joseph Christensen, R. A. Borrelli (2020). Parametric study of minimum critical volume for high-assay low-enriched uranium (20%) in spherical geometry against particle size. Nuclear Science and Engineering 196, 98.

(29) +Kaelee A. Novich, +Samuel V. Pedersen, R. A. Borrelli, Richard N. Christensen, Brian J. Jaques (2020). Synthesis of boron carbide reinforced aluminum castings through mechanical stir casting. Journal of Composite Materials 55, 10.1177/0021998320987597.

(30) +Jieun Lee, R. A. Borrelli (2019). Sensitivity analysis and application of advanced nuclear accounting methodologies on the high reliability safeguards model: Use of discrete event simulation for material throughput. Nuclear Engineering and Design 345, 183.

(31) +Jieun Lee, +Amey Shigrekar, R. A. Borrelli (2019). Hazard and operability analysis of a pyroprocessing facility. Nuclear Engineering and Design 348, 131.

(32) +John Peterson, Michael Haney, R. A. Borrelli (2019). An overview of methodologies for cybersecurity vulnerability assessment conducted in nuclear power plants. Nuclear Engineering and Design 346, 75.

(33) +Emma K. Redfoot, R. A. Borrelli (2018). Analysis of nuclear renewable hybrid energy systems modeling and nuclear fuel cycle simulators. Nuclear Technology 204, 249.

(34) R. A. Borrelli, Joonhong Ahn, Yongsoo Hwang (2017). Approaches to a practical systems assessment for safeguardability of the advanced nuclear fuel cycle. Nuclear Technology 197, 248.

(35) [+]Jieun Lee, [+]Malachi Tolman, R. A. Borrelli (2017). High reliability safeguards approach to remotely handled nuclear processing facilities: Use of discrete event simulation for material throughput for fuel fabrication. Nuclear Engineering and Design 324, 54.

(36) R. A. Borrelli (2016). Functional components for a design strategy: Hot cell shielding in the high reliability safeguards methodology. Nuclear Engineering and Design 305, 18.

(37) R. A. Borrelli (2014). A high reliability safeguards approach for safeguardability of remotely-handled nuclear facilities: 1. Functional components to system design. Journal of Nuclear Materials Management XLII, 4.

(38) R. A. Borrelli (2014). A high reliability safeguards approach for safeguardability of remotely-handled nuclear facilities: 2. A risk-informed approach for safeguards. Journal of Nuclear Materials Management XLII, 27.

(39) R. A. Borrelli (2014). Use of curium neutron flux from head-end pyroprocessing subsystems for the high reliability safeguards methodology. Nuclear Engineering Design 277, 166.

(40) R. A. Borrelli (2013). Use of curium spontaneous fission neutrons for safeguardability of remotely-handled nuclear facilities: Fuel fabrication in pyroprocessing. Nuclear Engineering and Design 260, 64.

(41) R. A. Borrelli, Olivier Thivent, Joonhong Ahn (2013). Parametric studies on confinement of radionuclides in the excavated damaged zone due to bentonite type and temperature change. Physics and Chemistry of the Earth 65, 32.

(42) R. A. Borrelli, Olivier Thivent, Joonhong Ahn (2011). Impacts of elevated temperatures on bentonite extrusion and radionuclide transport in the excavated damaged zone. Nuclear Technology 174, 94.

(43) R. A. Borrelli, Joonhong Ahn (2008). Radionuclide transport in a water-saturated planar fracture with bentonite extrusion. Nuclear Technology 164, 442.

(44) R. A. Borrelli, Joonhong Ahn (2008). Numerical modeling of bentonite extrusion and radionuclide migration in a saturated planar fracture. Physics and Chemistry of the Earth 33, S131.

Refereed/Peer Reviewed Conference Proceedings

(1) Cassie Koerner, R. A. Borrelli (2025). A Collaborative-Based Siting case study Yucca Mountain siting: The Willrich report predictions. Washington, D. C.: Proc., American Nuclear Society Winter Meeting.

(2) Eugene Balsmeier, R. A. Borrelli, Craig L. Porter (2025). Radiological Assessment for Sub-seabed Repositories. Phoenix, Arizona: Proc., Waste Management Symposia.

(3) R. A. Borrelli, Kathleen Araújo, Cassie Koerner, Denia Djokić (2024). Consent based siting for Spent Nuclear Fuel – The Common Ground Consortium Focus on Research and Public Conversations. Las Vegas, Nevada: Proc., American Nuclear Society Annual Meeting.

(4) Haruko Wainwright, Brian Powell, [+]Megan Hoover, R. A. Borrelli, Carol Eddy-Dilek, Sheldon Landsberger, Rod Ewing (2023). Nuclear Waste Educator's Workshop: What and How Do We Teach About Nuclear Waste? Indianapolis, Indiana: Proc., American Nuclear Society Annual Meeting.

(5) [+]Jonathon Wheelwright, R. A. Borrelli (2023). A Regulatory Approach to Nuclear Reactor Transportation. Washington, D. C.: Proc., American Nuclear Society Annual Meeting.

(6) [+]Sam J. Root, [+]Porter Throckmorton, Michael Haney, R. A. Borrelli (2022). Simulated boron shimming cyber-attack on pressurized water reactor. Phoenix, Arizona: Proc., American Nuclear Society Winter Meeting.

(7) Michael Haney, Jacob Benjamin, R. A. Borrelli (2021). Cyberweapon nonproliferation controls for the virtual battlefield - Applying the nuclear nonproliferation regime to an unseen enemy. Washington, D. C.: Proc., American Nuclear Society Winter Meeting.

(8) [+]James Richards, R. A. Borrelli (2020). Development of a tool for evaluating nuclear integrated energy systems profitability for existing reactors. [*virtual*]: Proc., American Nuclear Society Virtual Winter Meeting.

(9) R. A. Borrelli (2019). Updates on borated aluminum cask design for onsite used fuel storage. Minneapolis, Minnesota: Proc., American Nuclear Society Annual Meeting.

(10) +Joseph Christensen, R. A. Borrelli, Charles S. Henkel, Brian Matthews (2019). Minimum accident of concern for uranyl sulfate solutions. Minneapolis, Minnesota: Proc., American Nuclear Society Annual Meeting.

(11) Constantinos Kolias, R. A. Borrelli, Daniel Barbara, Angelos Stavrou (2019). Malware detection in critical infrastructures by using the electromagnetic emissions of plcs. Washington, D. C.: Proc., American Nuclear Society Winter Meeting.

(12) +Trevor MacLean, Michael Haney, R. A. Borrelli (2019). Cybersecurity modeling of non-critical nuclear power plant instrumentation. Arlington, Virginia: Proc., Thirteenth Annual IFIP WG 11.10 International Conference on Critical Infrastructure Protection.

(13) +John Peterson, Michael Haney, R. A. Borrelli (2019). An overview of methodologies for cybersecurity vulnerability assessments conducted at nuclear power plants. Washington, D. C.: Proc., American Nuclear Society Winter Meeting.

(14) R. A. Borrelli, +J. Seth Dustin, +Samuel V. Pedersen, Brian J. Jaques (2018). Design of a borated aluminum cask design for onsite used fuel storage. Philadelphia, Pennsylvania: Proc., American Nuclear Society Annual Meeting.

(15) R. A. Borrelli, Mark S. Delligatti (2018). Regulatory licensing pathway for a borated aluminum cask design for onsite used fuel storage. Philadelphia, Pennsylvania: Proc., American Nuclear Society Annual Meeting.

(16) +J. Seth Dustin, R. A. Borrelli (2018). Preliminary performance assessment of americium-241 as fuel in radioisotope thermoelectric generators for deep space exploration. Las Vegas, Nevada: Proc., ANS NETS 2018 - Nuclear and Emerging Technologies for Space.

(17) +Jieun Lee, R. A. Borrelli (2018). Upgrades on high reliability safeguards model for material throughput in fuel fabrication. Philadelphia, Pennsylvania: Proc., American Nuclear Society Annual Meeting.

(18) R. A. Borrelli, +Malachi Tolman, +Jieun Lee (2017). Preliminary analysis of facility design for pyroprocessing safeguardability. San Francisco, California: Proc., American Nuclear Society Annual Meeting.

(19) +Jieun Lee, R. A. Borrelli (2017). Hazard and operability analysis of a pyroprocessing facility. Washington, D. C.: Proc., American Nuclear Society Winter Meeting.

(20) +John Peterson, Michael A. Haney, R. A. Borrelli (2017). Cybersecurity vulnerability assessment methodologies for nuclear power plants. San Francisco, California: Proc., American Nuclear Society Annual Meeting.

(21) +Emma K. Redfoot, +Kelley M. Verner, R. A. Borrelli (2017). Applying preliminary hazard analysis and analytic hierarchy process to a nuclear renewable hybrid energy system. Washington, D. C.: Proc., American Nuclear Society Winter Meeting.

(22) +Emma K. Redfoot, R. A. Borrelli (2017). Nuclear fuel cycle simulator as a means to model a nuclear hybrid energy system. San Francisco, California: Proc., American Nuclear Society Annual Meeting.

(23) R. A. Borrelli, +Malachi Tolman (2016). Development of a discrete event simulation model for pyroprocessing safeguardability. Las Vegas, Nevada: Proc., American Nuclear Society Winter Meeting.

(24) R. A. Borrelli (2013). Summary of modeling studies in the high reliability safeguards approach. Washington, D. C.: Proc., American Nuclear Society Winter Meeting.

(25) R. A. Borrelli (2013). Applying curium spontaneous fission neutrons in the high reliability safeguards approach for remotely-handled nuclear facilities. Salt Lake City, Utah: Proc., Global 2013 - International Nuclear Fuel Cycle Conference.

(26) R. A. Borrelli (2012). Applying curium spontaneous fission neutrons in the high reliability safeguards approach for remotely-handled nuclear facilities. Savannah, Georgia: Proc., 9th International

Conference on Facility Operations-Safeguards Interface.

(27) R. A. Borrelli (2011). Role of neutron detection in the high reliability safeguards approach. Albuquerque, New Mexico: Proc., International Conf., High-Level Radioactive Waste Management.

(28) R. A. Borrelli, Lance Kim, Edward D. Blandford, Yongsoo Hwang, Eung Ho Kim, Per F. Peterson (2010). High reliability safeguards for remote-handled nuclear materials. San Diego, California: Proc., 2010 International Congress on Advances in Nuclear Power Plants (ICAPP '2010).

(29) R. A. Borrelli, Joonhong Ahn (2010). Parametric studies on confinement of radionuclides in the excavated damaged zone due to bentonite type and temperature change. Nantes, France: Proc., Clays in Natural & Engineered Barriers for Radioactive Waste Confinement, 4th International Meeting.

(30) R. A. Borrelli, Olivier Thivent, Joonhong Ahn (2009). Effect of temperature change on bentonite extrusion and radionuclide migration in the excavated damaged zone. Luxembourg: Proc., Impact of Thermo-Hydro-Mechanical-Chemical Processes on the Safety of Underground Repositories Conference.

(31) R. A. Borrelli, Olivier Thivent, Joonhong Ahn (2009). Parametric studies for temperature changes of bentonite extrusion and impacts on radionuclide migration in the excavated damaged zone. Kennewick, Washington: Proc., 12th International Conference on the Chemistry and Migration Behaviour of Actinides and Fission Products in the Geosphere.

(32) R. A. Borrelli, Joonhong Ahn (2008). Impact of bentonite extrusion on radionuclide migration in a saturated planar fracture. Osaka, Japan: Proc., 2008 Annual Meeting of the Atomic Energy Society of Japan.

(33) R. A. Borrelli, Joonhong Ahn (2007). Impact of bentonite extrusion on radionuclide in a saturated planar fracture. Lille, France: Proc., Clays in Natural & Engineered Barriers for Radioactive Waste Confinement, 3rd International Meeting.

(34) R. A. Borrelli, Joonhong Ahn (2007). Radionuclide transport in a water-saturated planar fracture with bentonite extrusion. J. Grunlan, D. Bhattacharyya, E. Marand, O. Regev, A. Balazs (eds.), 1006E. San Francisco, California: Proc., Transport Behavior in Heterogeneous Polymeric Materials and Composites, Mater. Res. Soc. Symp.

(35) R. A. Borrelli, Joonhong Ahn (2006). Bentonite extrusion in planar fracture based on net water flow. Las Vegas, Nevada: Proc., International Conf., High-Level Radioactive Waste Management.

(36) Leo M. Bobek, R. A. Borrelli (1996). Plc-based reactivity measurements using inverse point kinetics. Reno, Nevada: Proc., American Nuclear Society Annual Meeting.

Book contributions

(1) [+]Trevor MacLean, R. A. Borrelli, Michael Haney (2019). Cybersecurity modeling of non-critical nuclear power plant digital instrumentation. In: Jason Staggs, Sujeet Shenoi, eds., Critical Infrastructure Protection XIII, chap. 15. Springer, p. 277.

(2) R. A. Borrelli (2015). Reflections on developing an identity for the third generation nuclear engineer in the post-Fukushima society. In: Joonhong Ahn, Cathryn Carson, Mikael Jensen, Kohta Juraku, Shinya Nagasaki, Satoru Tanaka, eds., Reflections on the Fukushima Daiichi nuclear accident: Toward social scientific literacy and engineering resilience. Springer Cham. ISBN 978-3-319-12089-8, p. 353.

Non-Refereed Technical Reports

(1) Haruko Wainwright, Brian Powell, Megan Hoover, Dinara Ermakova, R. A. Borrelli, Christina Leggett, Milos Atz, Carol Eddy-Dilek, William Roy, Emily Stein, Kathryn Higley, Sheldon Landsberger, Rod Ewing (2023). Nuclear Waste Educator's Workshop: What and How Do We Teach About Nuclear Waste? Nuclear Waste Educator's Working Group.

(2) Kathleen Araújo, Brittany Brand, R. A. Borrelli, Vince Bowen, Lan Li, Libby Lunstrum, Bruce Savage (2021). Advancing resilience science for complex decision-making and governance of energy

and water within natural-human-built systems. National Science Foundation Established Program to Stimulate Competitive Research (EPSCoR) Research Infrastructure Improvement (RII) Track-1 - Phase 2 Developmental Concept Report.

(3) J. Seth Dustin, R. A. Borrelli (2020). High level examination of Am-241 as an alternative fuel source in radioisotope thermoelectric generators. LA-UR-20-20574.

(4) R. A. Borrelli, Richard N. Christensen, Brian J. Jaques, Samuel V. Pedersen, Winfred Sowah (2019). Modeling and design of borated aluminum cask for used fuel cooling. APP-002714.

(5) R. A. Borrelli, Richard N. Christensen, Brian J. Jaques, Samuel V. Pedersen, Winfred Sowah (2019). Modeling and design of borated aluminum cask for used fuel cooling. APP-002714.

(6) Joonhong Ahn, R. A. Borrelli, Esra Orucoglu, Bret P. van den Akker, Seung Min Woo, Jihae Yoon (2015). Systems assessment for advanced nuclear fuel cycle: Final report for UCBNE-KAERI collaboration. UCBNE-5150.

(7) Joonhong Ahn, R. A. Borrelli, Jihae Yoon (2012). Systems assessment for advanced nuclear fuel cycle: Fourth year report for UCBNE-KAERI collaboration. UCBNE-5137.

(8) Siegfried S. Hecker, Edward D. Blandford, Alan S. Hanson, Thomas Isaacs, Niko Milonopoulos, Joonhong Ahn, R. A. Borrelli, Jorshan Choi, Lance K. Kim, Per F. Peterson, Jihae Yoon (2012). Scientific and institutional aspects of advanced systems for spent nuclear fuels in emerging nuclear countries: Final report. UCBNE-5135.

(9) Joonhong Ahn, R. A. Borrelli, Lance K. Kim, Per F. Peterson, Jihae Yoon, Jorshan Choi (2011). Systems assessment for advanced nuclear fuel cycle: Third year report for UCBNE-KAERI collaboration. UCBNE-5134.

(10) Joonhong Ahn, R. A. Borrelli, Lance K. Kim, Per F. Peterson, Jasmina L. Vujic, Jihae Yoon, Jorshan Choi, Yongsoo Hwang (2010). Systems assessment for advanced nuclear fuel cycle: Second year report for UCBNE-KAERI collaboration. UCBNE-5133.

(11) Joonhong Ahn, Per F. Peterson, R. A. Borrelli, Lance K. Kim, Jihae Yoon (2010). Scientific and institutional aspects of advanced systems for spent nuclear fuels in emerging nuclear countries: Interim report. UCBNE-5130.

(12) R. A. Borrelli, Olivier Thivent, Joonhong Ahn (2010). Numerical simulation of radionuclide transport in the near field region. UCBNE-5128.

(13) Joonhong Ahn, Edward D. Blandford, R. A. Borrelli, Eung Ho Kim, Lance K. Kim, Per F. Peterson, Jasmina L. Vujic, Jihae Yoon, Jorshan Choi, Yongsoo Hwang (2009). Systems assessment for advanced nuclear fuel cycle: First year report for UCBNE-KAERI collaboration. UCBNE-5126.

(14) R. A. Borrelli, Joonhong Ahn (2007). Radionuclide transport coupled with bentonite extrusion in a saturated planar fracture: TRIBEX manual. UCBNE-5111.

(15) R. A. Borrelli, Joonhong Ahn (2007). Modeling and simulation of bentonite extrusion in a saturated planar fracture. UBCNE-5110.

(16) R. A. Borrelli, Joonhong Ahn (2007). Modeling and simulation of radionuclide transport in a saturated planar fracture with bentonite extrusion. UCBNE-5109.

(17) Joonhong Ahn, Paul L. Chambre, Daisuke Kawasaki, R. A. Borrelli (2006). Development of integrated repository performance assessment models. UCBNE-5103.

Conference Presentations

(1) Cassie Koerner, *R. A. Borrelli (2025). A Collaborative-Based Siting case study Yucca Mountain siting: The Willrich report predictions. Washington, D. C.: Proc., American Nuclear Society Winter Meeting.

(2) Eugene Balsmeier, R. A. Borrelli, *Craig L. Porter (2025). Radiological Assessment for Sub-seabed Repositories. Phoenix, Arizona: Proc., Waste Management Symposia.

(3) R. A. Borrelli, *Kathleen Araújo, Cassie Koerner, Denia Djokić (2024). Consent based siting for

Spent Nuclear Fuel – The Common Ground Consortium Focus on Research and Public Conversations. Las Vegas, Nevada: Proc., American Nuclear Society Annual Meeting.

(4) *Haruko Wainwright, Brian Powell, Megan Hoover, R. A. Borrelli, Carol Eddy-Dilek, Sheldon Landsberger, Rod Ewing (2023). Nuclear Waste Educator's Workshop: What and How Do We Teach About Nuclear Waste? Indianapolis, Indiana: Proc., American Nuclear Society Annual Meeting.

(5) *Jonathon Wheelwright, R. A. Borrelli (2023). A Regulatory Approach to Nuclear Reactor Transportation. Washington, D. C.: Proc., American Nuclear Society Annual Meeting.

(6) *Sam J. Root, Porter Throckmorton, Michael Haney, R. A. Borrelli (2022). Simulated boron shimming cyber-attack on pressurized water reactor. Phoenix, Arizona: Proc., American Nuclear Society Winter Meeting.

(7) *Sam J. Root, Porter Throckmorton, Michael Haney, R. A. Borrelli (2022). Simulated boron shimming cyber-attack on pressurized water reactor. [*virtual*]: 2022 3KEYMASTER Consortium Meeting.

(8) *Michael Haney, Jacob Benjamin, R. A. Borrelli (2021). Cyberweapon Nonproliferation Controls for the Virtual Battlefield - Applying the Nuclear Nonproliferation Regime to an Unseen Enemy. Washington, D. C.: Proc., American Nuclear Society Winter Meeting.

(9) *Samuel Cutler, Allysa Bateman, Brenden Heidrich, R. A. Borrelli, James Simpson, Brian J. Jaques (2020). Modeling shielding designs for the safe operation of neutron generators. Boise, Idaho: Idaho Conference on Undergraduate Research [*poster*].

(10) *James Richards, R. A. Borrelli (2020). Development of a tool for evaluating nuclear integrated energy systems profitability for existing reactors. [*virtual*]: American Nuclear Society Virtual Winter Meeting.

(11) *R. A. Borrelli (2019). Updates on borated aluminum cask design for onsite used fuel storage. Minneapolis, Minnesota: American Nuclear Society Annual Meeting.

(12) *Joseph Christensen, R. A. Borrelli, Charles S. Henkel, Brian Matthews (2019). Minimum accident of concern for uranyl sulfate solutions. Minneapolis, Minnesota: American Nuclear Society Annual Meeting.

(13) *Constantinos Kolias, R. A. Borrelli, Daniel Barbara, Angelos Stavrou (2019). Malware detection in critical infrastructures by using the electromagnetic emissions of plcs. Washington, D. C.: American Nuclear Society Winter Meeting.

(14) Trevor MacLean, *Michael Haney, R. A. Borrelli (2019). Cybersecurity modeling of non-critical nuclear power plant instrumentation. Arlington, Virginia: Thirteenth Annual IFIP WG 11.10 International Conference on Critical Infrastructure Protection.

(15) *John Peterson, Michael Haney, R. A. Borrelli (2019). An overview of methodologies for cybersecurity vulnerability assessments conducted at nuclear power plants. Washington, D. C.: American Nuclear Society Winter Meeting.

(16) *John Peterson, R. A. Borrelli, Dakota Roberson (2019). Informing electrical grid policy with a nuclear power plant simulator. Boise, Idaho: Energy Policy Research Conference [*poster*].

(17) *R. A. Borrelli, J. Seth Dustin, Samuel V. Pedersen, Brian J. Jaques (2018). Design of a borated aluminum cask design for onsite used fuel storage. Philadelphia, Pennsylvania: American Nuclear Society Annual Meeting.

(18) *R. A. Borrelli, Mark S. Delligatti (2018). Regulatory licensing pathway for a borated aluminum cask design for onsite used fuel storage. Philadelphia, Pennsylvania: American Nuclear Society Annual Meeting.

(19) *J. Seth Dustin, R. A. Borrelli (2018). Preliminary performance assessment of americium-241 as fuel in radioisotope thermoelectric generators for deep space exploration. Las Vegas, Nevada: ANS NETS 2018 - Nuclear and Emerging Technologies for Space.

(20) *Kathryn D. Huff, Neal Davis, Paul Wilson, R. A. Borrelli, Skutnik Steven E., Anthony Scopatz, Jenny Amos (2018). Open-source curriculum development. Urbana, Illinois: Academy for Ex-

cellence in Engineering Education Strategic Instructional Innovation Program at the University of Illinois [*poster*].

(21) *Jieun Lee, R. A. Borrelli (2018). Upgrades on high reliability safeguards model for material throughput in fuel fabrication. Philadelphia, Pennsylvania: American Nuclear Society Annual Meeting.

(22) R. A. Borrelli, Malachi Tolman, *Jieun Lee (2017). Preliminary analysis of facility design for pyroprocessing safeguardability. San Francisco, California: American Nuclear Society Annual Meeting.

(23) *Jieun Lee, R. A. Borrelli (2017). Hazard and operability analysis of a pyroprocessing facility. Washington, D. C.: American Nuclear Society Winter Meeting.

(24) *John Peterson, Michael A. Haney, R. A. Borrelli (2017). Cybersecurity vulnerability assessment methodologies for nuclear power plants. San Francisco, California: American Nuclear Society Annual Meeting.

(25) *Emma K. Redfoot, Kelley M. Verner, R. A. Borrelli (2017). Applying preliminary hazard analysis and analytic hierarchy process to a nuclear renewable hybrid energy system. Washington, D. C.: American Nuclear Society Winter Meeting.

(26) *Emma K. Redfoot, R. A. Borrelli (2017). Nuclear fuel cycle simulator as a means to model a nuclear hybrid energy system. San Francisco, California: American Nuclear Society Annual Meeting.

(27) R. A. Borrelli, *Malachi Tolman (2016). Development of a discrete event simulation model for pyroprocessing safeguardability. Las Vegas, Nevada: American Nuclear Society Winter Meeting.

(28) *R. A. Borrelli (2013). Summary of modeling studies in the high reliability safeguards approach. Washington, D. C.: American Nuclear Society Winter Meeting.

(29) *R. A. Borrelli (2013). Applying curium spontaneous fission neutrons in the high reliability safeguards approach for remotely-handled nuclear facilities. Salt Lake City, Utah: Global 2013 - International Nuclear Fuel Cycle Conference.

(30) *R. A. Borrelli (2012). Applying curium spontaneous fission neutrons in the high reliability safeguards approach for remotely-handled nuclear facilities. Savannah, Georgia: 9th International Conference on Facility Operations-Safeguards Interface.

(31) *R. A. Borrelli (2011). Role of neutron detection in the high reliability safeguards approach. Albuquerque, New Mexico: International Conf., High-Level Radioactive Waste Management.

(32) *R. A. Borrelli, Lance Kim, Edward D. Blandford, Yongsoo Hwang, Eung Ho Kim, Per F. Peterson (2010). High reliability safeguards for remote-handled nuclear materials. San Diego, California: 2010 International Congress on Advances in Nuclear Power Plants (ICAPP '2010).

(33) *R. A. Borrelli, Joonhong Ahn (2010). Parametric studies on confinement of radionuclides in the excavated damaged zone due to bentonite type and temperature change. Nantes, France: Clays in Natural & Engineered Barriers for Radioactive Waste Confinement, 4th International Meeting [*poster*].

(34) R. A. Borrelli, *Olivier Thivent, Joonhong Ahn (2009). Effect of temperature change on bentonite extrusion and radionuclide migration in the excavated damaged zone. Luxembourg: Impact of Thermo-Hydro-Mechanical-Chemical Processes on the Safety of Underground Repositories Conference.

(35) *R. A. Borrelli, Olivier Thivent, Joonhong Ahn (2009). Parametric studies for temperature changes of bentonite extrusion and impacts on radionuclide migration in the excavated damaged zone. Kennewick, Washington: 12th International Conference on the Chemistry and Migration Behaviour of Actinides and Fission Products in the Geosphere [*poster*].

(36) *R. A. Borrelli, Joonhong Ahn (2008). Impact of bentonite extrusion on radionuclide migration in a saturated planar fracture. Osaka, Japan: 2008 Annual Meeting of the Atomic Energy Society of Japan.

(37) *R. A. Borrelli, Joonhong Ahn (2007). Impact of bentonite extrusion on radionuclide in a saturated planar fracture. Lille, France: Clays in Natural & Engineered Barriers for Radioactive Waste Confinement, 3rd International Meeting.

(38) *R. A. Borrelli, Joonhong Ahn (2007). Radionuclide transport in a water-saturated planar fracture with bentonite extrusion. San Francisco, California: Transport Behavior in Heterogeneous Polymeric Materials and Composites, Mater. Res. Soc. Symp. [*poster*].

(39) *R. A. Borrelli, Joonhong Ahn (2006). Bentonite extrusion in planar fracture based on net water flow. Las Vegas, Nevada: International Conf., High-Level Radioactive Waste Management.

Invited talks

International Atomic Energy Agency
Knowledge Management Assist Visits for Education and Training Providers *2021 virtual*

University of Idaho · Idaho Falls Center for Higher Education
Strategies and success for ethical research *2018–19; 2022*
Vandal Advantage Graduate Student Orientation *2017–19*
P3/TRIO Upward Bound STEM Day Presentation *2015*

Stanford University
Pre-Collegiate Summer Institutes *2014*

Seminars
University of Tennessee–Knoxville Nuclear Engineering Department *2019*

Lightning Talks
Future of Nuclear Waste Education – Massachutsetts Institute of Technology *2022*
Idaho National Laboratory Nuclear Science and Technology Collaborative Planning Meeting *2018*
Idaho National Laboratory National and Homeland Security Collaborative Planning Meeting *2018*
Idaho National Laboratory Energy & Environment Collaborative Planning Meeting *2017*

GRANTS AND CONTRACTS AWARDED

(1) Sean McBride (PI) - Idaho State University, Dakota Roberson (co-PI), R. A. Borrelli (co-PI), Constantinos Kolias (co-PI) - University of Idaho. Industrial Cyber Security Research and Training Laboratory. National Institute of Standards and Technology. **$2,875,000**. 2024.08.01 - 2026.07.31. [*non-competitive*]

(2) Michael Haney (PI), R. A. Borrelli (co-PI), Dakota Roberson (co-PI), Constantinos Kolias (co-PI) - University of Idaho, Ben Lampe (co-PI), Sean McBride (co-PI) - Idaho State University. Secure Cyberspace and Resilient Industrial Systems Workforce Development. Idaho Global Entrepreneurial Mission Initiative · Higher Education Research Council. **$700,000.** 2024.07.01 - 2025.06.30. [*Borrelli PI 2024.07.01*]

(3) Kathleen Araújo (PI), Cassie Koerner (co-PI) - Boise State University, Stephanie Malin (co-PI) - Colorado State University, Daniel Cardenas (co-PI) - National Tribal Energy Association, R. A. Borrelli (co-PI) - University of Idaho, Weston Eaton (co-PI), Temple Stoellinger (Senior Personnel), Steven Smutko (Senior Personnel), Rachael Budowle (Senior Personnel) - University of Wyoming, Majia Nadesan (co-PI) - Arizona State University, Julia Haggerty (co-PI), Lee Spangler (Senior Personnel) - Montana State University, Denia Djokić (co-PI) University of Michigan, Sarah Robey (co-PI) - Idaho State University. Common ground: Legitimacy in consent-based siting for interim nuclear waste storage. United States Department of Energy Consent-Based Siting for Interim Storage Program - Community Engagement Opportunities. **$2,000,000.** 2023.08.01 - 2025.07.31.

(4) Andrew Kliskey (PI) - Idaho EPSCoR Director, Karla Eitel (co-PI), Alistair Smith (co-PI) - University of Idaho, Donna Lybecker (co-PI) - Idaho State University, Kathleen Araújo (co-PI) Boise State University. RII Track-1: Idaho Community-engaged Resilience for Energy-Water Systems (I-

CREWS). National Science Foundation EPSCoR. **$24,000,000.** 2023.09.01 - 2028.08.31.[1,2] [*Borrelli Modeling Group Lead 2025.09.01*]

(5) Michael Haney (PI), R. A. Borrelli (co-PI), Dakota Roberson (co-PI), Constantinos Kolias (co-PI) - University of Idaho, Ben Lampe (co-PI), Sean McBride (co-PI) - Idaho State University. Secure Cyberspace and Resilient Industrial Systems Workforce Development. Idaho Global Entrepreneurial Mission (IGEM) – Higher Education Research Council **$700,000.** 2023.07.01 - 2024.06.30.

(6) Michael Haney (PI), R. A. Borrelli (co-PI), Dakota Roberson (co-PI), Constantinos Kolias (co-PI) - University of Idaho, Ben Lampe (co-PI), Sean McBride (co-PI) - Idaho State University. Secure Cyberspace and Resilient Industrial Systems Workforce Development. Idaho Global Entrepreneurial Mission (IGEM) – Higher Education Research Council **$693,000.** 2022.07.01 - 2023.06.30.

(7) R. A. Borrelli (PI), Michael Haney (co-PI) - University of Idaho. Cyber-informed design, education, and training for cyberthreat resiliency with real-time nuclear reactor simulation. University of Idaho. Operation: Resubmission Support. **$34,122.** 2022.04.30 - 2022.09.30.

(8) Thomas A. Ulrich (PI) - Idaho National Laboratory, R. A. Borrelli (co-PI) - University of Idaho. User evaluation of the NuScale simulator at the Center for Advanced Energy Studies. CAES programmatic funding. **$50,000.** 2022.03.01 - 2022.09.30.

(9) R. A. Borrelli (PI) - University of Idaho, Dennis D. Keiser, Jr., (co-PI) - Idaho National Laboratory. Graduate Research Assistantship: Connecting U-Mo Fuel Processing, Microstructure, and Irradiation Performance. **$23,823.** 2021.06.01-2022.01.31.

(10) R. A. Borrelli (PI), Jason Barnes (Senior Adviser) - University of Idaho. Experimental determination of interactions between the radiation fields of Dragonfly's MMRTG and Titan's environment. Idaho NASA EPSCoR Research Initiation Grant. **$82,962**. 2021.05.01 - 2022.04.30.

(11) R. A. Borrelli (PI) - University of Idaho. Online educational resources for nuclear engineering courses. University of Idaho Think Open Fellowship. **$1200**. 2021.01.01 - 2021.05.31.

(12) Lee Ostrom (PI), Richard N. Christensen, R. A. Borrelli, Haiyan Zhao (co-PIs) - University of Idaho. ORED Fall 2019 EIS: Portable XFR for use in supporting material research. ORED Equipment and Infrastructure Support. **$40,000.** 2019.12.01 - 2020.11.30

(13) R. A. Borrelli (PI) - University of Idaho, Mark. D. DeHart (co-PI) - Idaho National Laboratory. Application and enhancement of MAMMOTH depletion capabilities. **$33,521.** 2020.01.13 - 2020.12.31.

(14) Richard N. Christensen (PI), R. A. Borrelli, Michael G. McKellar, Michael Haney, David Arcilesi (co-PIs) - University of Idaho, Richard Jacobson (co-PI) Idaho State University. NuScale Simulator at the Center for Advanced Energy Studies. United States Department of Energy Scientific Infrastructure Support for Consolidated Innovative Nuclear Research. **$321,525.** 2019.10.01 - 2022.09.30. [*PI - NuScale Simulator Laboratory - 2022.01.07*]

(15) R. A. Borrelli (PI) - University of Idaho, Dennis D. Keiser, Jr., (co-PI) - Idaho National Laboratory. Graduate Research Assistantship: Connecting U-Mo Fuel Processing, Microstructure, and Irradiation Performance. **$127,866.** 2018.10.01-2021.05.31.

(16) R. A. Borrelli (PI), Richard N. Christensen (co-PI) - University of Idaho, Brian J. Jaques (co-PI) - Boise State University, Piyush Sabharwall (co-PI) - Idaho National Laboratory, Mark Delligatti (co-PI) - Table Rock, LLC, Sakae Casting USA, LLC (co-PI). Modeling and design of borated aluminium cask for used fuel cooling. Idaho Global Entrepreneurial Mission (IGEM) - Idaho Commerce. **$237,898.** 2018.01.01-2019.05.31.

(17) R. A. Borrelli (PI) - University of Idaho, Dennis D. Keiser, Jr., (co-PI) - Idaho National Laboratory. Graduate Research Assistantship: Connecting U-Mo Fuel Processing, Microstructure, and Irradiation Performance. **$36,180.** 2017.11.01-2018.05.31.

(18) R. A. Borrelli (PI), Lee Ostrom (Senior Advisor) - University of Idaho, Stephen G. Johnson (Senior Advisor) - Idaho National Laboratory. Performance assessment of americium as fuel in radioisotope

[1]Technical Proposal Writing Team.
[2]University of Idaho Research Team.

thermoelectric generators for deep space exploration. Idaho NASA EPSCoR Research Initiation Grant. **$55,000.** 2017.08.01-2018.04.30.

(19) Kelley M. Verner (PI), R. A. Borrelli, Marc T. Skinner, Emma K. Redfoot, Jieun Lee, Seth Dustin, John Peterson (co-PIs) - University of Idaho. Increasing the Go-on Rate in Southeast Idaho Through the Nexus of Food, Energy, and Water. University of Idaho Vandals Big Ideas Project. **$23,984.** 2017.07.01-2018.06.30.

(20) R. A. Borrelli (PI) - University of Idaho, Jason Hales (co-PI) - Idaho National Laboratory. Graduate Research Assistantship: Idaho National Laboratory Code Documentation. **$35,435.** 2016.10.01-2017.06.30.

(21) Vivek Utgikar (PI), Fatih Aydogan, Krishnan Raja, Raghunath Kanakala, R. A. Borrelli, Haiyan Zhao, Matthew Swenson (co-PIs) - University of Idaho. University of Idaho Nuclear Engineering Faculty Development Program. United States Regulatory Commission Faculty Development Grant. **$434,048.** 2015.09.29 - 2019.09.30.

Major Equipment Acquisitions
Western Services Corporation Pressurized Water Reactor Nuclear Power Plant Simulator.

HONORS AND AWARDS

University of Idaho American Nuclear Society Student Section
Samuel Glasstone Award for Public Service – Second Place *2019*
Certificate of Distinction *2019–*

University of California –Berkeley
Nuclear Engineering Department Block Grant Fellowship *2005*
Outstanding Graduate Student Instructor Award *2003*
Katherina S. DeSharton Fellowship *1999*
Hamilton Family Memorial Fellowship *1999*

United States Department of Energy · Office of Civilian Radioactive Waste Management
Civilian Radioactive Waste Management Fellowship *2000–04*

Nuclear Energy Institute
National Academy for Nuclear Training Fellowship *1999*

SERVICE

Major Committee Assignments
University of Idaho
Chair
Faculty Affairs Committee *2025–26*
Promotion & Tenure – Nuclear Engineering & Industrial Management *2023*
Third Year Promotion & Tenure – Nuclear Engineering & Industrial Management *2021*
Member
University Level Promotions and Tenure Silver Committee *2026*
University Level Promotions and Tenure Gold Committee *2025*
Center for Excellence in Teaching and Learning Accessibility Advisory Committee *2025–6*
Faculty Compensation Committee *2025–6*
Promotion – Chemical & Biological Engineering 2025
Strategic Planning Focus Group *2025*
Faculty Senate – College of Engineering *2024–27*
Scientific Misconduct Committee *2025–26*
Faculty Affairs Committee *2024–26*

Faculty Appeals Hearing Board Committee *2024–25*
Promotion & Tenure, College of Engineering *2020–23*
Nuclear Regulatory Commission Student Fellowship Oversight Committee
Nuclear Engineering & Industrial Management Bylaws Committee
Graduate Faculty
Nuclear Engineering & Industrial Management Admissions Committee
Commencement Speaker Committee – Idaho Falls Center for Higher Education
Organizer
American Nuclear Society Graduate School Fair *2020 – 22*
NNSA Fellowship Information Symposia for Idaho Universities *2017 –*

Faculty Search Committees
Chair
Nuclear Engineering & Industrial Management *2024*
Member
Grants & Contracts Specialist II *2024*
Nuclear Engineering & Industrial Management *2023*
Nuclear Engineering *2022*
Mechanical/Nuclear Engineering *2017*

Idaho State University
Faculty Search Committees
Nuclear Engineering *2018*

Professional and Scholarly Organizations
National
American Nuclear Society
National Program Screening Subcommittee *2022–*
Local Sections Committee
  Member-at-Large *2025–28*
Fuel Cycle & Waste Management Division *2015–*
  Executive Committee *2018–21*
  Student Support Subcommittee *2025*
Nonproliferation Policy Division *2015–*
  Executive Committee *2019–22*
Student Sections Committee *2015–*
  Executive Committee *2018–21; 2024–27*

Tau Beta Pi Engineering Society *1996*

Regional
Idaho Section of the American Nuclear Society
Treasurer *2022–*
Board of Directors *2018; 2020*
Nuclear Science Week Planning Committee *2017*
Community Service Committee *2015–*

University of Idaho
Faculty Advisor – American Nuclear Society Student Section *2015–*

Peer Reviewer
American Nuclear Society

Advances in Nuclear Nonproliferation Technology and Policy
Annual & Winter Meetings
Fuel Cycle and Waste Management Division John Randall Scholarship
Chair *2022 – 23*
Instrumentation, Control & Human-Machine Interface Technologies
International High-Level Radioactive Waste Management Conference
Student Conferences

Journals
Advances in Engineering Software
Annals of Nuclear Energy
Energy Science & Engineering
IEEE Transactions on Nuclear Science
International Journal of Nuclear Energy
Nuclear Engineering and Design
Nuclear Engineering and Technology
Progress in Nuclear Energy

Government
Nuclear Science User Facilities
DOE Advanced Research Projects Agency-Energy Concept Papers
DOE Advanced Research Projects Agency-Energy Review Panel
DOE Office of Nuclear Energy, Consolidated Innovative Nuclear Research
DOE SBIR/STTR Phase I Release 2
DOE SBIR/STTR Phase II Release 1
DOE SBIR/STTR Phase II Release 2

Other
Louisiana Board of Regents Support Fund R & D Grants Programs
Clays in Natural & Engineered Barriers for Radioactive Waste Confinement
Bonneville Power Administration, Office of Technology Innovation
John Wiley & Sons, Inc.
Khalifa University of Science and Technology

Professional Activities

Conference Committees

American Nuclear Society
Technical Program Committee, International High Level Radioactive Waste Management, Washington, D.C.*2025*
Technical Program, Advances in Nuclear Nonproliferation Technology and Policy, Orlando, Florida *2016; 2018*
Co-Chair *2018*

Technical Session Organizer

American Nuclear Society
Cybersecurity for Nuclear Installations, Washington, D. C. *2019; 2021*
co-Organizer with Prof. Jamie B. Coble, University of Tennessee–Knoxville

Technical Session Chair

American Nuclear Society
Program Development, Strategy, and Policy: II, International High Level Radioactive Waste Management, Washington, D. C. *2025*
Cybersecurity for Nuclear Installations, Anaheim, California *2022*
Technology and Policy Advancements in Nuclear Nonproliferation Anaheim, California *2022*

Cybersecurity for Nuclear Installations, Washington, D. C. *2019; 2021*
Spent Fuel Storage and Transportation, Washington, D. C. *2019*
Data Synthesis for Pyroprocessing Safeguards, Advances in Nuclear Nonproliferation Technology and Policy, Orlando Florida *2018*
Prof. Joonhong Ahn Memorial Session, International High-Level Radioactive Waste Management, Charlotte, North Carolina *2017*
Nonproliferation Policy, Concepts, and Approaches: Treaty verification regimes, State-level Concepts, and Fuel Cycle Analysis, Advances in Nuclear Nonproliferation Technology and Policy, Santa Fe, New Mexico *2016*
Security, Safeguards, and Non-proliferation, International High-Level Radioactive Waste Management, Albuquerque, New Mexico *2011*
Used Fuel Recycling Technologies–I, International Congress on Advances in Nuclear Power Plants, San Diego, California *2010*
Engineered Systems and Transport Processes, International High-Level Radioactive Waste Management, Las Vegas, Nevada *2008*
Boise State University Energy Policy Institute
Diverse Approaches to Addressing Decarbonization, Energy Policy *2021 virtual*
University of Tokyko
Challenges in Nuclear Waste Disposal: Sociological Aspects and Technical Approaches, Global Center of Excellence *2007*

Panels
Moderator
American Nuclear Society
Future of Cybersecurity in Nuclear Installations *2021*
Panelist
American Nuclear Society
Future of Cybersecurity in Nuclear Installations *2021*
Taking Care of You: Student-Mentor Relationships *2021*
A great mentoring situation can pave the way for success out of undergraduate or graduate school. Likewise, a poor or unhealthy mentoring relationship can cause lasting negative consequences on the students. Many times these interactions go undiscussed, and one goal of this workshop is to empower students to talk about and take charge of unhealthy mentoring relationships.
University of Idaho
Idaho Open Education Week Think Open Fellowship *2021*
Think Open Fellows an incubator program that awards 6 fellowships each year to support faculty and graduate students in transitioning a course from a standard text to open or extremely low cost course materials.
Boise State University Energy Policy Institute Power Talks
Economic Opportunities and Challenges for Idaho with Low Carbon Energy *2022*

Workshops
Idaho Community-Engaged Resilience for Energy-Water Systems
Machine Learning, Computational Modeling, Risk Assessment *2024*
Presenter [*virtual*]
The workshop is designed to provide an introductory overview of machine learning, including what machine learning is, different types of learning, and machine learning in practice. The workshop will provide machine learning examples used in water and energy research, followed by discussion. Additionally, the workshop will feature discussions on energy modeling with a focus on timescales, and an exploration of risk, including its dynamic nature and examples from the literature. The objective of the workshops are to provide an opportunity to enhance participant understanding of machine learning, fostering collaboration and knowledge exchange within the I-CREWS community.

Future of Nuclear Waste Education
Clemson University *2023*
Presenter

Understanding and managing nuclear waste requires a broad knowledge from nuclear engineering to civil and environmental engineering. In parallel, broader system-level analyses as well as societal/regulatory contexts are necessary to inform energy policies from the nuclear waste and environmental perspectives. Energy system or nuclear fuel cycle analysis quantifies waste generation per unit energy output, and their economical and environmental impacts throughout the life cycles of nuclear energy. Historical and regulatory contexts are also important to understanding nuclear waste in the contexts of general hazardous waste management. A challenge is posed by the extreme interdisciplinary nature of the subject of nuclear waste management— which makes it difficult to cover all the important topics in one, single institution. Such a knowledge gap is a major bottleneck when transformational changes are needed to prepare for new types of wastes from advanced reactors as well as to develop new waste processing technologies such as pyroprocessing. Although each individual institution can have its strengths and characteristics, it is critical to create community efforts such that the next generation workforce – interacting with the public and policy makers – has current and comprehensive knowledge about nuclear waste and its environmental impacts. This workshop will develop the blueprint of educating next generation engineers/scientists in nuclear waste as well as broader nuclear and environmental engineers. Although one student may not need to have all the knowledge, there is a minimum set of knowledge that one should have as a future scientist or engineer involved in nuclear waste and nuclear energy.

Nuclear Advocacy and Communications Training
Generation Atomic
Idaho Falls *2018*
Facilitator
Opposition groups claim nuclear power plants are unsafe. Recently, the U.S. nuclear power industry has been characterized as too expensive and dangerous when compared to other energy sources. As members of the nuclear community, we know that the success of nuclear energy has never been more important to ensuring a positive future for the world – but what can we do to make a difference? This workshop will leave participants energized to tell today's nuclear power story and be well-equipped with the tools to do so. Convincing others about the benefits of nuclear involves more than just laying out the facts. Thoughtful and personal storytelling bridges gaps when speaking those who are unfamiliar with the technology by explaining the personal and moral reasons that we work in this field. Telling our personal stories and motivations for working in nuclear creates common ground from which we can better explain nuclear's benefits: whether it's as a mother talking to a father, a surfer talking to a skier, or a cook talking to a conservationist, the human stories that nuclear makes possible are our strongest tools when speaking to the public. The most effective nuclear advocacy takes place at the interpersonal level when we strike up conversations with peers and even better, strangers. Because you can never know who it might be sitting across from you at that dinner party or next to you on the airplane, it's important to practice having open, considerate conversations with people of all backgrounds.

Modeling, Experimentation, Validation Summer School
Idaho National Laboratory *2017*
Mentor
The MeV Summer School provides enhanced training for engineers and applied scientists involved in design, licensing, and operation of current and advanced nuclear reactor systems through a multi-faceted learning approach of lectures, tours, and hands-on activities. The school is being organized through the cooperation of national laboratories, industry, government agencies, and universities that share the goal of building a strong workforce to support global nuclear expansion. The faculty will be drawn from the top experts in academia, industry, and government. The general organization and conduct of the school will be overseen by an international board of senior experts. A local secretariat will provide technical, logistical and administrative support to students and faculty. It is the aim of the school to foster the development of a next-generation network of scientists and engineers capable of advancing nuclear energy in the 21st century through integrated modeling and experimentation.

Symposia
Organizer
Center for Advanced Energy Studies
Nuclear cybersecurity research initiatives *2017*
Nuclear cybersecurity research focus areas *2016*

Stanford University
Center for International Security and Cooperation
Technical implications of nuclear energy system options *2011*

OUTREACH

University of Idaho
University of Idaho, Utah State University, Boise State University American Nuclear Society Student Social *2022*
American Nuclear Society Diversity and Inclusion Committee Sponsorship *2020–*
Utah State University Graduate School Fair *2019*
Montana Tech Career Fair *2018–22*
University of Idaho Moscow Campus Recruiting *2017–*
Live After 5 Idaho Falls *2017*
United States Department of Energy consent based siting meeting – Boise *2016*
PHYSOR University of Idaho Idaho Sponsorship *2016*
Boise State University Nuclear Research Summit *2016*
University of Idaho & Brigham Young University American Nuclear Society Student Social *2016; 2018*
Brigham Young University–Idaho Career Fair *2015*

Regional
Idaho Section of the American Nuclear Society
Highway Cleanup *2016–*
Garbage cleanup of Miles 122-124 on Interstate 15 biannually
Smoke Detector Donation Program
Since 2008, we have worked with more than 75 fire departments to donate more than 6200 smoke detectors to Idaho residents. From 2016, we donated over 2300 smoke detectors to Arimo, Ashton, Bancroft, Bear Lake, Clear Creek, Declo, Downey, Driggs, Grace, Hamer, Lava Hot Springs, Roberts, Shelley, and Soda Springs, across southeastern Idaho; Centerville, Clear Creek, Gem County, Horseshoe Bend, Idaho City, Lowman, Placerville and Valley of the Pines in Boise County; and north to the panhandle in Coeur D'Alene, Mullan, Shoshone, North Side, and West Pend, as well as nonprofits such as Habitat for Humanity and Club Inc. In 2022, we were pleased to be able to expand into Western Wyoming to Teton County.

College of Eastern Idaho Machine Tool Technology Advisory Board *2018*

PROFESSIONAL DEVELOPMENT

In Person
Future of Nuclear Waste Education Workshop
Vanderbilt University *2024*
Clemson University *2023*
Massachusetts Institute of Technology *2024*
Understanding and managing nuclear waste requires a broad knowledge from nuclear engineering to civil and environmental engineering. In parallel, broader system-level analyses as well as societal/regulatory contexts are necessary to inform energy policies from the nuclear waste and environmental perspectives. Energy system or nuclear fuel cycle analysis quantifies waste generation per unit energy output, and their economical and environmental impacts throughout the life cycles of nuclear energy. Historical and regulatory contexts are also important to understanding nuclear waste in the contexts of general hazardous waste management. A challenge is posed by the extreme interdisciplinary nature of the subject of nuclear waste management— which makes it difficult to cover all the important topics in one, single institution. Such a knowledge gap is a major bottleneck when transformational changes are needed to prepare for new types of wastes from advanced reactors as well as to develop new waste processing technologies such as pyroprocessing. Although each individual institution can have its strengths and characteristics, it is critical to create community efforts such that the next generation workforce – interacting with the public and policy makers – has current and comprehensive knowledge about nuclear waste and its environmental impacts. This workshop will develop the blueprint of educating next generation engineers/scientists

in nuclear waste as well as broader nuclear and environmental engineers. Although one student may not need to have all the knowledge, there is a minimum set of knowledge that one should have as a future scientist or engineer involved in nuclear waste and nuclear energy.

International Workshop on Siting of Radioactive Waste Facilities
Nuclear Waste Technical Review Board
Idaho Falls *2023*
The mission of the U.S. Nuclear Waste Technical Review Board is to perform unbiased and ongoing technical and scientific peer review of United States Department of Energy nuclear waste management activities. The NWTRB makes an essential contribution to increasing confidence in the scientific process and to informing, from a technical and scientific perspective, decisions on nuclear waste management. The NWTRB provides objective technical information to Congress, the Administration, DOE, government and non-government organizations, and the public on a wide-range of issues related to spent nuclear fuel and high-level waste management and disposition.

National Science Foundation Grant Development Conference
Los Angeles *2019*
Portland *2016*
Key officials representing program directorates, administrative offices, Office of General Counsel, and Office of the Inspector General will participate in this two-day conference. The conference is considered a must, particularly for new faculty, researchers, educators and administrators who want to gain insight into a wide range of important and timely issues including: the state of current funding; the proposal and award process; and current and recently updated policies.

Collaborative Open Source Curriculum Development Workshop
University of Illinois Urbana – Champaign *2017; 2018*
This workshop concluded a year of faculty interaction at six universities to develop curricula for courses common across the same disciplines at multiple universities in order to reduce the amount of time that any individual professor spends on creating what is essentially duplicate materials. The method proposed in this workshop is based on open source software development, where code is shared in online repositories, reviewed by peers, and contributed to the main project.

PyNE Summit
University of Illinois Urbana – Champaign *2017*
PyNE is a suite of tools to aid in computational nuclear science and engineering. PyNE seeks to provide native implementations of common nuclear algorithms, as well as Python bindings and I/O support for other industry standard nuclear codes.

Cyber Security Course for Safeguards Practitioners
Pacific Northwest National Laboratory *2018*
The course is designed for early to mid-career safeguards practitioners (technical instrument developers, instrument users, policy advisors, etc.) who will benefit from a greater understanding of cyber security threats and how to reduce risks to safeguards systems and processes. This 3.5 day course is designed to teach safeguards and cybersecurity experts how to recognize and mitigate potential cybersecurity vulnerabilities in emerging safeguards instrumentation, information systems, and conduct of operations. This training features classroom style learning opportunities through hands-on exercises and provides plenty of time for questions and discussion. Participants will learn new cyber security skills, use cyber security tools, and collaborate with one another and cyber experts to resolve challenges. They will gain an understanding of cyber security principles and a better awareness of cyber risks associated with safeguards systems. Exercises will include puzzles, exploits of attended and unattended monitoring systems, blended physical and cyber attacks on fictional nuclear facilities, and network defense.

Safeguards Laboratory Day
Pacific Northwest National Laboratory *2017–19*
Students and faculty from the University of Idaho invited to Pacific Northwest National Laboratory to learn about the research activities at the laboratory. The day also included hands-on safeguards and security experiments

conducted at laboratory facilities, such as materials accounting and vehicle searches.

Next Generation Safeguards Initiative Summer Course
Pacific Northwest National Laboratory *2016*
This course, offered through the DOE/NNSA Next Generation Safeguards Initiative, covers major international safeguards procedures currently in use in IAEA member nations. Daily lectures were supplemented with hands-on safeguards activities conducted by IAEA safeguards inspectors and researchers. Participants included faculty, postdoctorate researchers, and graduate students.

Collaborative Research Planning Meeting
Idaho National Laboratory *2017; 2018*
The Center for Advanced Energy Studiesis a catalyst for collaborative projects focused on energy research, achieved via connections between the CAES entities -– Idaho National Laboratory, Boise State University, Idaho State University, and the University of Idaho. Through a series of strategic planning meetings, CAES leadership aims to develop a set of focused research directions. The meeting is intended to establish new collaboration, along with a list of prioritized goals and actions items that will steer internal research investments with the intent of growing sustainable, externally-funded programs. The planning meeting will focus on a strategic area tied to one or more Idaho National Laboratory directorates and will bring together the appropriate Idaho National Laboratory and university leadership and researchers.

Intermountain Energy Summit
Idaho Falls Post Register *2015–17*
This summit is held annually and covers energy issues unique to the intermountain region. Participants include faculty from local universities, researchers from national laboratories, energy companies, and politicians. This year, the theme is energy security with a focus on nuclear, renewable, and alternative energy sources and continued advancements in grid and cybersecurity.

United States Department of Energy Collaborative-Based Siting Public Meeting
Boise *2016*
The United States Department of Energy is in the initial phase of developing a consent-based process for siting the facilities needed to store and dispose of the nation's spent nuclear fuel and high-level radioactive waste. A consent-based approach to siting relies on understanding the views of the public, stakeholders, and governments at the local, state, and tribal levels. In this first phase, DOE is engaging with interested groups and individuals to learn about what elements are important to consider in designing an enduring approach to siting. This session is an opportunity for the public to share thoughts and perspectives through a facilitated discussion.

Trilateral Nuclear Energy Dialogue: Korea, Japan, United States
Global American Business Institute
Boise *2016*
A high-level private workshop among preeminent Korean, Japanese, and American experts in nuclear energy and nuclear policy issues, with the intention of fostering relationships, confidence building, and seeking potential areas for trilateral cooperation. In keeping with the overarching theme of previous discussions—the back-end fuel cycle—this meeting seeks to underscore the role of advanced nuclear energy and fuel cycle technologies. Although the obstacles impeding permanent solutions to spent fuel and radioactive waste are largely political, this dialogue aims to highlight the potential of cutting-edge technologies in addressing the policy, environmental, and public acceptance challenges facing management of the nuclear fuel cycle, in addition to opportunities for international collaboration in the research, development, demonstration, and deployment of such technologies.

Idaho's Role in Nuclear: Clean Energy Powered by the Next Generation
Boise State University *2016*
Boise State University invited globally recognized leaders in nuclear energy to address the benefits and challenges associated with nuclear energy production and its role in supplying clean energy for a growing world. The summit will also include a panel discussion with John Kotek, Assistant Director of Nuclear Energy, U.S. United States

Department of Energy; Dr. Mark Peters, Laboratory Director for the Idaho National Laboratory; Mark Rudin, Vice President for Research at Boise State University; Mike McGough, Chief Commercial Officer at NuScale Power, and Dr. Harold Blackman, Associate Vice President for Research and Economic Development at Boise State University. The panel will address questions about the benefits of and concerns around nuclear power.

Proliferation Resistance & Physical Protection Working Group Workshop
University of California – Berkeley *2015*
The PR&PP methodology was developed within the Generation IV International Forum to provide a structured framework to assess the proliferation resistance and physical protection robustness of advanced nuclear energy systems, and to guide designers to further improve their systems. This workshop is intended to familiarize non-experts in this field with the broad aspects of the methodology and its applications. The PR&PP Working Group will present an overview of the methodology to an audience of students, academics, and members of the community who wish to become more familiar with the methodology. To illustrate the methodology, its application to a hypothetical nuclear energy system will be examined. Workshop participants will be divided into subgroups that will consider different proliferation and security threats, and will identify important design features and approaches that contribute to the system's resilience to these threats. Following these subgroup sessions, workshop participants will reconvene to review insights from the subgroups. Finally, an open discussion will be held to obtain feedback from the participants on the approach to PR&PP with the objective of refining the methodology and its presentation to the wider community.

Open Education Resources Development
State of Idaho Board of Education
Boise *2015*
This workshop focused on the use of open source educational materials in order to produce an online textbook as a supplement to existing commercial textbooks. An online textbook allows flexibility for faculty to augment content without requiring multiple textbooks for a course. An online textbook allows the educational content of a course to be more closely aligned with the desired learning outcomes. Two online texts have been developed – Principles of Nuclear Engineering and Risk Assessment.

Advanced Summer School of Radioactive Waste Disposal with Social-Scientific Literacy
University of California – Berkeley *2009; 2011*
Hawai'i Tokai International College *2010*
This advanced summer school was established in conjunction with the Department of Nuclear Engineering & Management at the University of Tokyo and the Department of Nuclear Engineering at the University of California–Berkeley to provide Ph.D. students and early-career nuclear engineers with education in social sciences and engineering. The goal was to foster a next generation of engineers capable of understanding the public and societal needs, contributing to the societal decision making, and taking a responsible role as engineering experts in society. The discussant leads student group activities by stimulating questions from students and corroborating with the chair to develop a summary of lectures.

Minner Fellows Program
University of California – Berkeley *2011*
The objective of this NSF funded program was to develop a framework for making ethical judgments in engineering. Because engineering faculty and graduate students play a leadership role in the development of these technologies, it is essential that they become aware the ethical, legal and social ramifications of them. The course focused on context, or the embodiment of moral maturity and ethical expertise, in the same way that faculty and graduate students embody engineering and technical expertise.

Summer Institute for Preparing Future Faculty
University of California – Berkeley *2005*
This unique program is for Doctoral Candidates with an interest in an academic career. Many aspects of teaching are covered: course design, syllabus development, teaching and learning assessment, teaching and learning strategies, and the creation of a teaching portfolio. The program exposes candidates to faculty in several disciplines

both within and outside the university; thus allowing for the dissemination of the full scope of teaching methods and skills, as well as broadening of perspectives with regards to the entire teaching profession.

Webinars & Virtual

American Nuclear Society

Equitable Outreach: Now Comes the Hard Part *2025*
Next Generation Workforce Development for Nuclear Waste Disposal *2024*
Spending Time on Spent Nuclear Fuel with the United States Department of Energy *2024*

Idaho Section of the American Nuclear Society

Allies for Career Success *2024*

Boise State University Energy Policy Institute Power Talks

Views from Former Nuclear Regulatory Commission Chairs on Siting for Used Nuclear Fuel Storage 2024
Decision-making and Engagement for Used Nuclear Fuel & Nuclear Waste 2024
Energy Storage 2023
Wildfire-Grid 2.0 2023
Tribal Energy Decisionmaking 2023
Consent-based Siting in Nuclear Energy 2022
Economic Opportunities and Challenges for Idaho with Low Carbon Energy 2022

Western Services Corporation

Western Services Corporation Generation III Generic Pressurized Water Reactor Simulator Workshop *2022*

Nuclear Energy Institute

NEI Advanced Reactors Safeguards & Security Workshop *2021*

University of Idaho

Best Practices for Working with the DOD *2021; 2023*
Defense Established Program to Stimulate Competitive Research *2021*
NSF Broader Impacts 101 Workshop *2021*