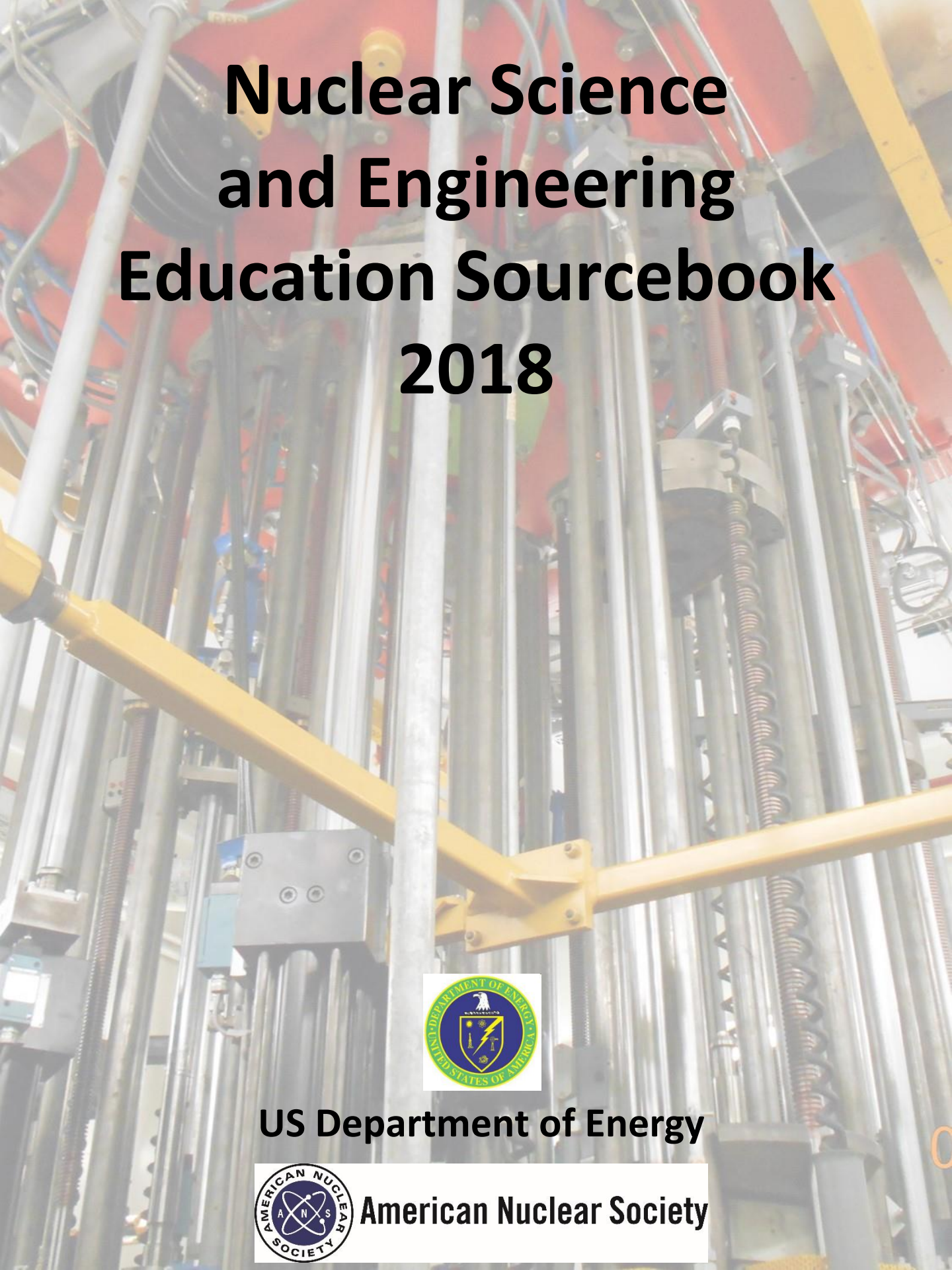
Nuclear Science and Engineering Education Sourcebook 2018



US Department of Energy

American Nuclear Society

Nuclear Science & Engineering Education Sourcebook 2018

North American Edition

American Nuclear Society
Education, Training, and Workforce Division

US Department of Energy
Office of Nuclear Energy

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Version 5.18

Front Cover Photo – TREAT Control Rod Drive Mechanism

Welcome to the 2018 Edition of the Nuclear Science and Engineering Education (NS&EE) Sourcebook. We keep evolving and improving! The core mission of the Sourcebook has not changed, however. Our purpose is to facilitate interaction among faculty, students, industry, and government agencies to accomplish nuclear research, teaching and service activities. Since 1986 we have compiled critical information on nuclear engineering enrollments, degrees, and faculty expertise in printed and electronic formats.

There has been much growth and change in the nuclear community in recent years and is evidenced in the 2018 NS & EE Sourcebook.

We currently use a web based input format that allows quick changes to the Sourcebook and the capability to do ranking and sort manipulations in a spreadsheet environment as the data is displayed. We will publish a PDF version of the Sourcebook. This year we will also include programs that are new and growing, which might include undergraduate curricula with a nuclear energy minor or graduate programs that offer a track or certificate option. We will list only faculty involved in the nuclear options in all of these cases. In general we list faculty that have at least a budgeted 25% appointment in nuclear activities.

Other nuclear energy or related programs can be found under the listings for the ANS Student Branches and University Reactors. The Sourcebook data will be placed on the web at the Nuclear Energy University Programs (NEUP) site and on the DOE-NE website. Copies of the Sourcebook will be distributed to academic Department Heads, and libraries, as well as key industry, society and government officials. A limited number of extra printed copies can be requested in cases where web access is limited or inconvenient.

The Sourcebook is a publication by the Education, Training and Workforce Division of the American Nuclear Society with the support of the Department of Energy, Office of Nuclear Energy. Appreciation is expressed to the Executive Committee of the ETWD of the ANS for their encouragement for this project. Special thanks go to the US DOE Office of Nuclear Energy and the NEUP Integration Office at the Idaho National Lab for providing support and a web site home for the NS&EE Sourcebook. We would also like to acknowledge the diligent work of Ms. Sherry Bailey for accumulating the Sourcebook information and for maintenance of the Sourcebook website.

We are excited to present the 2018 Edition of the NS&EE Sourcebook (Version 5.18) available in PDF file format and on the web at www.neup.gov > Documents > Nuclear Science and Engineering Sourcebook.

To update information, please contact Assistant Editor Ms. Sherry Bailey (sbbailey@ncsu.edu or 919-515-1897).

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
B.S.	9	15	21	8	9
Masters	10	7	16	14	8
PhD	10	15	6	9	17

Graduate Student Enrollment: 20 Masters/75 Ph.D.
ABET Accreditation: BS degree in Nuclear Engineering

Nuclear Science and Engineering Faculty

Karl A. van Bibber, Professor and Chair (510-642-3477) [karl.van.bibber@nuc.berkeley.edu] Ph.D., Massachusetts Institute of Technology, 1976. Nuclear Physics; Particle Physics; Particle Astrophysics; Nuclear Instrumentation; Accelerator Science & Technology.
Website: http://www.nuc.berkeley.edu/people/karl-van-bibber

Rebecca Abergel, Assistant Professor [rjabergel@lbl.gov] Ph.D., University of California, Berkeley, 2006. Nuclear, Radio, Inorganic, Coordination, and Biological Chemistry; Medical Countermeasures and Radiopharmaceuticals Development; Nuclear/Radiological Emergency Preparedness; Nuclear Fuel Related Element and Isotope Solution Thermodynamics and Separation.

Massimilliano Fratoni, Assistant Professor (510-664-9079) [maxfratoni@berkeley.edu] Ph.D., University of California, Berkeley, 2008. Advanced reactor design; computational methods; and nuclear fuel cycle. Current projects focus on accident tolerant fuels for light water reactors; molten salt reactors for used fuel transmutation; and thermal analysis of generic repository.
Website: http://www.nuc.berkeley.edu/people/massimilliano-fratoni

Peter Hosemann, Associate Professor (510-717-5752) [peterh@berkeley.edu] Dr**.,** Montanuniversitaet Leoben, Austria**,** 2008. Small scale materials testing on irradiated and unirradiated structural materials for nuclear applications; Investigating new advanced structural materials concepts (e.g. oxide dispersion strengthened steels) for nuclear applications using accelerated materials testing via ion beam irradiations; Liquid metal corrosion of structural materials for nuclear applications.
Website: http://www.nuc.berkeley.edu/people/peter-hosemann

Edward C. Morse, Professor (510-642-7275) [morse@nuc.berkeley.edu] Ph.D., University of Illinois, Urbana-Champaign, 1979. Fusion reactor design and applied plasma physics, experimental investigation of RF plasma heating; rotating target neutron source at UC Berkeley; experimental studies of compact toroids; a spectral method for magnetohydrodynamic stability.
Website: http://www.nuc.berkeley.edu/people/edward-morse

Per F. Peterson, Professor**,** William and Jean McCallum Floyd Endowed Chair (510-643-7749) [peterson@nuc.berkeley.edu] Ph.D., UC Berkeley, 1988. High-temperature fission and fusion energy systems; topics related to the safety and security of nuclear materials and waste management: heat transfer; fluid mechanics; regulation and licensing for high temperature reactors, principally designs that use liquid fluoride salts as coolants. Website: http://www.nuc.berkeley.edu/people/per-peterson

Rachel Slaybaugh, Assistant Professor (570-850-3385) [slaybaugh@berkeley.edu] Ph.D., University of Wisconsin, 2011. Research is based in numerical methods for neutron transport with an emphasis on supercomputing. Prof. Slaybaugh applies these methods to reactor design, shielding, and nuclear security and nonproliferation. Website: http://www.nuc.berkeley.edu/people/rachel-slaybaugh

Kai Vetter, Professor in Residence (510-642-7071) [kvetter@nuc.berkeley.edu] Ph.D., J. W. Goethe-University, Frankfurt**,** 1995. Development and demonstration of new and/or improved gamma-ray (and neutron) imaging concepts for applications ranging from homeland security and nuclear non-proliferation tobiomedicalimaging; search for neutrino-less double-beta decay in 76Ge to obtain better understanding on fundamental properties of neutrinos to answer fundamental questions; developing and demonstrating new and improved concepts in Ge detector technologies to provide unprecedented capabilities in observing rare decays or rare interactions; basic nuclear physics experiments and associated instrumentation to better understand the basic structure of nuclei.
Website: http://www.nuc.berkeley.edu/people/kai-vetter

Jasmina L. Vujic, Professor (510-643-8085) [vujic@nuc.berkeley.edu] Ph.D., University of Michigan, 1990. Numerical methods in reactor physics, neutron and photon transport, reactor core design and analysis, shielding and radiation protection, biomedical application of radiation, optimization techniques for vector and parallel computers: neutronics analysis of fissile material behavior in geologic repositories; computer modeling for radiation diagnostic and cancer therapy; development of multiprocessor multiassembly neutron transport theory code; development and validation of the GT-SCALE code package for advanced reactor core designs; development of a unified multidimensional computational method for neutral particles in complex non-uniform domains. Website: http://www.nuc.berkeley.edu/people/jasmina-vujic

Other Faculty

Lee Bernstein, Adjunct Professor (510-642-4077)[labernstein@berkeley.edu] Ph.D., Rutgers University, 1994. Statistical properties of nuclear matter; Nuclear physics in high energy density plasmas; Neutron-induced reaction cross section measurements; Surrogate nuclear reactions.

Ehud Greenspan, Professor of the Graduate School (510-643-9983) [gehud@nuc.berkeley.edu] Ph.D., Cornell University, 1966. Generation IV reactors - conception and analysis of advanced nuclear reactors; Transmutation - minimization of nuclear waste as well as the disposition of nuclear waste and the closing of the nuclear fuel cycle; Advanced fuel cycles for improving proliferation resistance and nuclear fuel utilization; as well as development of automated nuclear design optimization methods and their application in the areas of criticality safety, boron neutron capture therapy, radiation shields, and fusion energy systems. Website: http://www.nuc.berkeley.edu/people/ehud-greenspan

Daniel M. Kammen, Professor (510-643-2243) [kammen@socrates.berkeley.edu] Ph.D., Princeton University, 1988. Science and technology policy focused on energy, development and environmental management; Technology and policy questions in developing nations, particularly involving: the linkages between energy, health, and the environment; technology transfer and diffusion; household energy management; renewable energy; women; minority groups; Global environmental change including deep cuts in greenhouse gas emissions and resource consumption; Environmental and technological risk; Management of innovation and energy R&D policy. Geographic expertise: Africa; Latin America. Website: http://www.nuc.berkeley.edu/people/daniel-kammen

William E. Kastenberg, Professor Emeritus [kastenbe@nuc.berkeley.edu] Ph.D., UC Berkeley, 1966. Ethical issues in emerging technologies, risk assessment and risk management for technological and natural complex systems, nuclear reactor safety, environmental risk analysis, environmental conflict resolution. Website: http://www.nuc.berkeley.edu/people/bill_kastenberg

Ka-Ngo Leung, Professor of the Graduate School (510-486-7918) [knleung@lbl.gov] Ph.D., UCLA, 1975. Plasma and Ion Beam technology in microfabrication processes: maskless ion beam lithography technology as candidates for next generation lithography (NGL) that will be used to produce feature sizes of 100 nm and below; focused ion beam (FIB) systems equipped with plasma ion sources; compact neutron tube with rf plasma ion source. Website: http://www.nuc.berkeley.edu/people/ka-ngo-leung

Eric B. Norman, Professor of the Graduate School (510-643-9984) [ebnorman@lbl.gov] Ph.D.**,** University of Chicago**,** 1978**.** Developing active neutron-based interrogation system to screen sea-going cargo containers for fissionable material; Cryogenic Underground Observatory for Rare Events (CUORE) – a planned large-scale bolometric detector designed to search for the neutrinoless double beta decay of 130Te; Measurements of neutron and charged-particle induced reaction cross sections for homeland security, nuclear astrophysics, and neutrino physics. Website: http://www.nuc.berkeley.edu/people/eric-norman

Donald R. Olander, Professor Emeritus (510-642-7055) [fuelpr@nuc.berkeley.edu] Sc.D.**,** MIT**,** 1958. High-temperature kinetic and thermodynamic behavior of nuclear reactor fuels; performance of degraded nuclear fuels. Website: http://www.nuc.berkeley.edu/people/donald-olande

Nuclear Science and Engineering Research Centers

Nuclear Science and Security Consortium (NSSC): The NSSC is a consortium of seven major research universities and five DOE national laboratories, of which UC Berkeley is the lead institution. Funded by the DOE Office of Non-Proliferation ($25M/5 years), the purpose of the NSSC is to reinvigorate the pipeline of

scientific, engineering and policy talent into the national laboratories and federal service in national security. Primarily the Consortium is intended to fund undergraduate, graduate student and postdoctoral research, introducing and connecting this talent with participating DOE labs. The NSSC supports research across the entire spectrum of relevant disciplines, including nuclear and particle physics, nuclear instrumentation and radiation detection, nuclear- and radiochemistry, nuclear engineering, and nuclear security international policy and programs. Additionally, NA-22 has expanded and augmented the program to include solicitations for research grants and internships to Minority Serving Institutions (MSI) as well.

Applied Nuclear Physics Laboratories: These labs are concerned with the low-energy nuclear physics and interaction of radiation with matter important to nuclear chemistry, nuclear technology and applications. Research programs include fundamental nuclear physics measurements for applied purposes and the development of advanced detectors and methodologies, in addition to the application of nuclear techniques in a wide range of studies. Current emphasis is on experimental and modeling studies in support of neutrino mass measurements, the design of methodologies and systems to counter the possible transport of clandestine nuclear materials and applications in the biomedical and radiological sciences.

Detection Laboratory - Kelp Watch (http://kelpwatch.berkeley.edu/) and Rad Watch. Additional Research Areas: Computational Methods, Nonproliferation, Risk, Safety, and Large-Scale Systems Analysis, Ethics and the Impact of Technology on Society, Energy Systems and the Environment, Bionuclear and Radiological Physics, Laser, Particle Beam, and Plasma Technologies Plasma and Fusion Science and Technology

Nuclear Materials Laboratory: This lab uses thermogravimetric techniques with microbalances to investigate the hydriding and oxidation of nuclear reactor core materials and positron annihilation spectroscopy to characterize the microstructural changes in irradiated structural steels. In addition to understanding the performance of nuclear fuels and materials in current nuclear fission plants, the materials aspects of new fuel element designs and advanced nuclear fuels and structural material systems are investigated. The lab is devoted to understanding the many causes of materials degradation and failure in nuclear technology. Specific emphasis is on the behavior of nuclear fuels, cladding and structural materials in nuclear fission and fusion environments where radiation damage and corrosion are the overarching concerns. This research combines computational, experimental and theoretical techniques to investigate the dynamic response of nuclear materials.

Nuclear Waste and Fuel Cycle Laboratory: The lab focuses on performance assessment of nuclear and radioactive waste management. Research topics include (1) mass-flow analyses in the nuclear fuel cycle to quantify compositions and quantities of wastes from various concepts of fuel cycles, ranging from reactors, separation processes, and waste stabilization processes, (2) performance assessment of geological disposal for various different waste forms and repository concepts and designs, ranging from shallow-land burial for low and intermediate level wastes, mined repository for spent nuclear fuels and high-level wastes, and most recently deep borehole disposal for separated long-lived iodine, and (3) development of integrated performance assessment systems covering both the fuel cycle and the

geological disposal. After the Fukushima accident, the criticality safety for geological disposal of molten corium and accumulated plutonium has emerged as an important topic.

Renewable and Appropriate Energy Laboratory (RAEL): RAEL is a unique new research, development, project implementation, and community outreach facility that focuses on designing, testing, and disseminating renewable and appropriate energy systems. The laboratory's mission is to help these technologies realize their full potential to contribute to environmentally sustainable development in both industrialized and developing nations while also addressing the cultural context and range of potential social impacts of any new technology or resource management system. The work in RAEL is guided by the principles of use-inspired basic research, interdisciplinary approaches to the needs that energy services can provide, and a dedication to understanding and addressing the opportunities and risks in the implementation of novel energy generation and management programs. At one level, the goal for RAEL is to update, integrate and nurture a collaborative synthesis of E. F. Schumacher's Small is Beautiful appropriate technology and development philosophy with the energy industry as it exists today. On another level, it is to promote sustainable development that includes deep cuts in greenhouse gas emissions and resource consumption. RAEL studies how to evolve the current energy infrastructure through analysis of coal, oil, and integrated fossil-fuel/fuel cells systems, biomass energy, and combinations of energy-efficiency and renewables, as well as entirely new long-term energy options for industrialized, decentralized, and rural energy needs.

Thermal Hydraulics Laboratory: The UCB Thermal Hydraulics Laboratory studies heat transfer and fluid mechanics phenomena that are relevant to fission and fusion energy systems. A principal focus of the laboratory is on the development of and experimental validation of models for passive safety systems. Experimental work in the laboratory has investigated effects of noncondensables on condensation in passive light water reactor containments, large-scale mixing processes in reactor containments and high level waste tanks, coolant fluid mechanics for inertial fusion energy chambers, convective heat transport for high Prandtl number fluids simulating the behavior of fluoride salts, pebble bed granular flows, and other phenomena. The laboratory has extensive capabilities for quality assurance, instrumentation and data acquisition, and modeling and simulation.

COLORADO SCHOOL OF MINES

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
Masters	15	10	7	6	4
PhD	1	2	1	3	2

Graduate Student Enrollment: 13 Masters/ 14 Ph.D.

Nuclear Science and Engineering Faculty

Mark Jensen, Professor, Program Director and Grandey University Chair in Nuclear Science and Engineering (303-273-3785) [mjensen@mines.edu] Ph.D., Florida State University. Nuclear fuel cycle, chemical separations e biochemistry and environmental chemistry of the transuranium elements. Website: https://chemistry.mines.edu/project/mark-jensen/

Jennifer C. Braley, Assistant Professor (303-273-3996) [jbraley@mines.edu] Ph. D., Washington State University, 2010. Actinide separations; medical radioisotope production; environmental chemistry; nuclear forensics. Website: https://chemistry.mines.edu/project/jenifer-shafer/

Mark Deinert, Associate Professor (303-384-2387) [mdeinert@mines.edu] Ph.D., Cornell University. Understanding the broader impacts of Advanced Nuclear Fuel Cycles.

Uwe Greife, Professor (303-273-3618) [ugreife@mines.edu] Dr. rer. nat.**,** Ruhruniversitaet Bochum**,** 1994. Nuclear astrophysics; applied nuclear physics; nuclear fission and fusion; radiation detector development. Website: https://physics.mines.edu/project/uwe-greife/

Jeffrey C. King, Associate Professor and Director, Nuclear Science and Engineering Center (303-384-2133) [kingjc@mines.edu] Ph.D., Nuclear Engineering**,** University of New Mexico**,** 2006. Reactor physics and design; neutron imaging; nuclear materials**.** Website: http://www.mines.edu/~kingjc

Andrew G. Osborne, Assistant Professor (303-273-3650) [osbornea@mines.edu] Ph.D, University of Glasgow, 2006. Nuclear reactor theory; nuclear fuel cycles; reactor optimization; numerical methods; energy systems analysis.

Other Faculty

Linda Figueroa, Associate Professor (303-273-3491) [lfiguero@mines.edu] Ph.D.**,** University of Colorado at Boulder**,** 1989**.** Bioremediation of radionuclides and metals. Professional Engineer.
Website: http://inside.mines.edu/Figueroa

Zeev Shayer, Research Professor (303-273-3037) [zshayer@mines.edu] Ph.D.,
Tel-Aviv University, Israel, 1985. Advanced fuel cycle and new reactor concept design; thermal hydraulics; radiation physics; dose rate and material degradation assessments; criticality safety analysis; probability risk assessment and reliability analysis; nuclear waste transmutation and compaction; low energy nuclear physics; computational methods in engineering and science. Professional Engineer.
Website: https://physics.mines.edu/project/zeev-shayer/

Nuclear Science and Engineering Research Centers

Nuclear Science and Engineering Center (NuSEC) - Coordinates nuclear science and engineering research across campus and maintains the CSM nuclear science and engineering laboratory facilities located adjacent to the GSTR.

Geological Survey TRIGA Reactor (GSTR) - 1 MW thermal TRIGA reactor used for teaching and research located on the Denver Federal Center, approximately 10 minutes from campus.

Active Materials Characterization Laboratory (ActMCL) - Provides materials synthesis and characterization capabilities for radioactive materials. Located adjacent to the GSTR. Capabilities include scanning electron microscopy, transmission electron microscopy, optical microscopy, x-ray diffraction, and x-ray nano-computed tomography.

Mines Neutron Radiography (MINER) - Provides neutron radiography capabilities at the GSTR. Capabilities include direct and indirect foil imaging capabilities. The facility can provide a beam flux of $2.2X10^6$ n/cm^2 – s with an effective L/D of approximately 200.

Laboratory for Applied & Environmental Radiochemistry (LAER) – Located on the Mines Campus, the Laboratory for Applied & Environmental Radiochemistry (LAER) is a multi-user facility well equipped for use and analysis of radioactive materials, especially tranuranic elements. Our emphasis is on understanding the behavior of radionuclides relevant to nuclear energy.. Capabilities include all forms of radioactive counting, alpha and gamma spectroscopy, UV-visible spectroscopy calorimetry, biochemistry, chemical synthesis, and all types of chemical separations.

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
B.S.	26	25	32	20	24
Masters	6	6	7	9	16
PhD	0	1	1	2	6

Graduate Student Enrollment: 19 Masters/24 Ph.D.
ABET Accreditation: Nuclear Engineering (BS)

Nuclear Science and Engineering Faculty

James Baciak, Program Director and Associate Professor (352-273-2131) [jebaciak@mse.ufl.edu] Ph.D., University of Michigan, 2004**.** Radiation measurements; radiation detector development; new radiation detector materials; detector testing and characterization for gamma-ray spectroscopy; environmental monitoring; non-proliferation and treaty verification; nuclear security.

Assel Aikaliyeva, Assistant Professor (352-846-3778) [aitkaliyeva@ufl.edu] Ph.D., Texas A&M, 2012. Nuclear Fuels and Materials, with emphasis on characterization and property evaluation; Mechanical and Thermal properties of materials; Reactor Irradiation; Radiation damage in materials; Ion Implantation; Kinetics; Composites; Nanostructured materials; Multi-Scale simulation of nuclear fuel.
Website: http://manatee.mse.ufl.edu

Andreas Enqvist, Assistant Professor (352-294-2177) [enqvist@mse.ufl.edu] Ph.D., Chalmers University of Technology, Sweden, 2010. Nuclear safeguards; detection statistics of radiation from fissile materials and the physics behind particle-detector interactions; neutron physics & detectors; neutron noise signals; radiation signal analysis.

Sedat Goluoglu, Professor (352-294-1690) [goluoglu@mse.ufl.edu] Ph. D., University of Tennessee, 1997. Advanced modeling and simulation; criticality safety; neutron and photon cross section processing methods and tools; reactor physics applications and methods development; nuclear materials safeguards and security.

DuWayne Schubring, Assistant Professor (352-392-1401x314) [dlschubring@ufl.edu] Ph.D., University of Wisconsin-Madison, 2009. Two-phase flow; nuclear reactor thermal hydraulics; quantitative visualization; nuclear reactor safety; computational and numerical methods including coupled codes; advanced nuclear power systems.

Yong Yang Assistant Professor **(**352-392-1401) [yongyang@ufl.edu] Ph.D.**,** University of Wisconsin-Madison**,** 2005**.** Structural, fuel cladding and fuel materials for innovative nuclear systems and light water reactors; all material related issues including radiation damage, evaluation of life extension of existing reactors and material selection for advanced nuclear reactor designs.

Other Faculty

Wesley E. Bolch, Professor of Biomedical Engineering (352-273-0303) [wbolch@ufl.edu] Ph.D., University of Florida, 1988. Dosimetry; computational medical physics; dose assessment.

Edward Dugan, Adjunct Associate Professor Emeritus (352-273-2129) [edugan@mse.ufl.edu] Ph.D., University of Florida, 1976. Backscatter x-ray imaging; reactor analysis; nuclear power plant dynamics and control; space nuclear power and propulsion; radiation transport and Monte Carlo simulations.

David Gilland, Associate Professor of Biomedical Engineering (352-273-0302) [gilland@ufl.edu] Ph.D., University of North Carolina at Chapel Hill, 1989. Molecular imaging, instrumentation and algorithm development using PET and SPECT.

Katherin Goluoglu, Lecturer (352-273-2180) [klgoluoglu@mse.ufl.edu] M.S., University of Tennessee, 2004, Nuclear criticality safety, facility safety, safeguards and security.

David Hintenlang, Associate Professor of Biomedical Engineering (352-273-0301) [dhinten@ufl.edu] Ph.D., Brown University, 1985. Real-time characterization and optimization of radiation dosimetry for therapy and imaging.

Juan C. Nino, Professor of Materials Science and Engineering (352-846-3787) [jnino@mse.ufl.edu] Ph.D., The Pennsylvania State University, 2002. Multifunctional ceramics; energy materials; dielectrics and ionic conductors in bulk and thin film; single crystal growth; nuclear materials and detectors; bioceramics.

Simon Phillpot, Professor and Chair of Materials Science and Engineering (352-846-3782) [sphil@mse.ufl.edu] Ph.D., University of Florida, 1985. Computational materials science; heat transport; nuclear materials; ferroelectrics and dielectrics.

James S. Tulenko, Professor Emeritus (352-392-1427) [tulenko@ufl.edu] M.S., Massachusetts Institute of Technology, 1963. Nuclear fuel cycle; processing, fabrication and in-core and ex-core performance of nuclear fuel; multi-scale simulation of nuclear fuel; economic and environmental evaluation of all forms of electrical energy generation.

William Vernetson, Adjunct Faculty (retired) (352-392-1401x309) [vernet@ufl.edu] Ph.D., University of Florida, 1978. Reactor safety; reactor operations and training; systems design; probabilistic risk assessment; criticality analysis; neutron activation analysis.

Nuclear Science and Engineering Research Centers

Advanced Laboratory for Radiation Dosimetry Studies (ALRADS),: Dr. Wesley Bolch, Director. Performs high performance computing and Monte Carlo simulation for external and internal radiation dosimetry, computational medical physics, utilizing patient-specific anatomic models for organ dose assessment.

Backscatter Radiography by Selective Detection (RSD) Lab: Dr. James Baciak. X-ray backscatter imaging for a wide variety of imaging applications focused on non-destructive testing in aerospace, nuclear facility, roadway/railway infrastructure, and medical applications.

Laboratory for Development of Advanced Nuclear Fuel and Materials (LDANF): Professor James Tulenko. Empirical base evaluation and development of advanced nuclear fuels and related materials.

Progress Energy Advanced Radiation Detection (PE-ARDAD) Lab: Dr. James Baciak. Provides an opportunity for undergraduate and graduate students in the department to learn about and operate various radiation detectors, detector systems, and their associated electronics. Laboratory space and equipment is also provided for advanced research in radiation detector development. Other non-destructive testing systems are also available for investigative/educational purposes.

Visualization, Imaging, and Computation for the Thermohydraulics of Reactors (VICTR): Dr. Duwayne Schubring. Advanced visualizations of annular two-phase flow with planar laser-induced fluorescence (PLIF) and high-speed video and coupled neutronics/TH with 3D neutron transport and 3D computational fluid dynamics.

University of Florida Training Reactor (UFTR): A 100 kW reactor used for training and demonstration, including the design licensing and construction of a fully digital control and safety system.

GEORGIA INSTITUTE OF TECHNOLOGY

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
B.S.	38	55	32	23	21
Masters	25	25	24	29	8
PhD	5	7	6	11	9

Graduate Student Enrollment: 37 Masters/36 Ph.D.
ABET Accreditation: B.S.N.R.E.
CAMPEP Accreditation: M.S.M.P. and Ph.D. NRE – MP option

Distance Education Program
Offers Nuclear Engineering Courses Online
www.dlpe.gatech.edu

Nuclear Science and Engineering Faculty

Steven R. Biegalski, Professor and Chair (404-385-5973) [steven.biegalski@me.gatech.edu] Ph.D. University of Illinois at Urbana-Champaign, 1996. Nuclear analytical methods; nuclear forensics; nuclear instrumentation; nuclear reactor design; neutron radiography; analysis of environmental media with nuclear methods; modeling of environmental pathways; reactor operations and reactor safety analysis. Professional Engineer.

Said I. Abdel-Khalik, Southern Nuclear Distinguished Professor (404-894-3719) [said.abdelkhalik@me.gatech.edu] Ph.D., University of Wisconsin-Madison, 1973. Reactor thermal-hydraulics; reactor operations; reactor safety; fusion technology.

Chaitanya S. Deo, Associate Professor (404-385-4928) [chaitanya.deo@nre.gatech.edu] Ph.D., University of Michigan, 2003. Structure property relationships in nuclear materials: theory and simulations across electronic; atomic, mesoscopic and continuum scales. Radiation effects in materials for nuclear energy including structural materials and nuclear fuels identifying atomic mechanisms in defect mobility and interaction in crystalline solids and modeling the collective evolution of defects.

Anna Erickson, Assistant Professor (404-894-3731) [anna.erickson@nre.gatech.edu] Ph.D., Massachusetts Institute of Technology, 2011. Advanced reactor design; nuclear safety and safeguards; radiation detection systems.

Dan Kotlyar, Assistant Professor [dan.kotlyar@me.gatech.edu] Ph.D., Ben-Gurion University of the Negev, 2013, Development of advanced numerical methods and algorithms for fuel depletion and thermal hydraulic coupled Monte Carlo codes.

Nolan E. Hertel, Professor (404-894-3601) [nolan.hertel@nre.gatech.edu] Ph.D., University of Illinois at Urbana-Champaign, 1979. Radiation spectrometry; transport; dosimetry and shielding; radiation detector simulations and design; neutron measurements and applications; computational dosimetry; radiation protection. Professional Engineer.

Bojan Petrovic, Professor (404-894-8173) [bojan.petrovic@gatech.edu] Ph.D., The Pennsylvania State University, 1995. Reactor physics; transport theory; shielding; Monte Carlo methods; advanced reactor design; nuclear fuel cycle; numerical simulations of nuclear systems.

Farzad Rahnema, Georgia Power Company Distinguished Professor (404-894-3731) [farzad@gatech.edu] Ph.D.**,** University of California, Los Angeles**,** 1981. Radiation transport theory; reactor physics; computational medical physics; perturbation and variational methods.

Weston M. Stacey, Jr., Regents' and Callaway Professor (404-894-3714) [weston.stacey@nre.gatech.edu] Ph.D.**,** Massachusetts Institute of Technology 1966. Fusion plasma physics; reactor physics and conceptual design for fusion and fission reactors.

C-K Chris Wang, Professor (404-894-3727) [chris.wang@nre.gatech.edu] Ph.D., The Ohio State University**,** 1989. Radiation physics; detection; protection and dosimetry; micro- and nano-dosimetry; radiobiological modeling; radiation biology; and radiotherapy modalities using neutrons**.** Professional Engineer.

Shannon Yee, Assistant Professor [shannon.yee@me.gatech.edu] Ph.D., University of California Berkeley, 2013, heat transfer, energy systems, direct energy conversion, thermoelectrics, and thermal energy conversion.

Other Faculty

Armin Ansari, Adjunct Associate Professor; Health Physicist, Radiation Studies Branch, Centers for Disease Control and Prevention (770-488-3654) [AAnsari@cdc.gov] Ph.D., University of Kansas, 1989; radiation emergency preparedness and response; radiation biology; internal dosimetry.

Seung-Kyum Choi, Associate Professor (912-966-6771) [seungkyum.choi@me.gatech.edu]**;** Ph.D., Wright State University, 2006. Probabilistic risk assessment; reliability-based design; multidisciplinary design optimization; and decision support method.

Anees Dhabaan, Assistant Professor of Radiation Oncology and Director of Medical Physics Residency Program, Emory University School of Medicine; Adjunct Assistant Professor at Georgia Tech (404-778-3535) [anees.dhabaan@emory.edu] Ph.D., University of Birmingham, England, United Kingdom, 1994. Diplomate, American Board of Radiology 2003; Head physicist for the stereotactic radiosurgery program at Emory University; neutron and photon transport and the use of Monte Carlo method in dense media; clinical services including implementing new technologies.

Eric S. Elder, Associate Professor of Radiation Oncology and Director of Clinical Medical Physics, Emory University School of Medicine, Adjunct Assistant Professor at Georgia Tech (404-778-2304) [eric@radonc.emory.org] Ph.D., Georgia Institute of Technology, 1997. Certified by the American Board of Radiology – Therapeutic Radiologic Physics 1997; image-guided radiation therapy (IGRT) methods; endovascular brachytherapy.

Timothy Fox, Vice President, Varian Medical Systems, Adjunct Assistant Professor at Georgia Tech (770-372-1410) [tim.fox@varian.com] Ph.D., Georgia Institute of Technology, 1994. Medical imaging; radiation treatment planning; oncology data analytics.

Srinivas Garimella, Professor (404-894-7479) [srinivas.garimella@me.gatech.edu] Ph.D., The Ohio State University, 1990. Heat transfer; thermal-hydraulics; microchannel phase change.

S. Mostafa Ghiaasiaan, Professor (404-894-3246) [mghiaasiaan@gatech.edu] Ph.D**.,** University of California, Los Angeles**,** 1983. Heat transfer; two-phase flow; nuclear reactor engineering. Professional Engineer.

Jarrod Hayes, Associate Professor (404.894.0289) [jarrod.hayes@gatech.edu] Ph.D., University of Southern California, 2009. Nuclear proliferation; nuclear strategy and arms control; South and East Asia; Europe.

Tom C.-C. Hu, Project Officer, The Biomedical Advanced Research and Development Authority (BARDA), within the Office of the Assistant Secretary for Preparedness and Response (ASPR) in the U.S. Department of Health and Human Services (HHS) [tom.hu@hhs.gov] Part-Time Assistant Professor of Radiology and Founding Director of Small Animal Imaging Program, Medical College of Georgia; [thu@mail.mcg.edu]; Adjunct Assistant Professor at Georgia Tech; Ph.D**.,** Carnegie Mellon University**,** 2001; MBA, Villanova University, 2005. Non-invasive magnetic resonance imaging (MRI) in small animals.

Laurence J. Jacobs, Professor (404 -894-2344) [laurence.jacobs@coe.gatech.edu] Ph. D, Columbia University, 1987. Development of measurement techniques for the quantitative nondestructive evaluation of structural materials; nonlinear acoustics for damage characterization and life prediction of structural materials.

Sheldon M. Jeter, Associate Professor (404-894-3211) [sheldon.jeter@me.gatech.edu] Ph.D., Georgia Institute of Technology**,** 1979. Heat transfer; thermal hydraulics. Professional Engineer.

Bernd Kahn, Professor Emeritus (404-407-6776) [bernd.kahn@me.gatech.edu] Ph.D.**,** Massachusetts Institute of Technology**,** 1960. Radiochemistry; radiochemical analysis; radiological monitoring.

Ratib Karam, Professor Emeritus (404-894-3620) [ratib.karam@nnrc.gatech.edu] Ph.D.**,** University of Florida**,** 1963. Reactor physics; transport theory.

Benjamin Klein, Associate Professor (912-966-7945) [bklein@gatech.edu] Ph.D.**,** University of Illinois at Urbana-Champaign, 2000. Reactor physics; transport theory; optical; optoelectronic; and electronic device simulation and design; wide-bandgap semiconductors; nanowire FETs and LEDs; scintillator characterization and design; photonic crystal devices.

Margaret E. Kosal, Associate Professor (404-894-9664) [margaret.kosal@inta.gatech.edu] Ph.D., University of Illinois at Urbana-Champaign, 2001. Nuclear, chemical, and biological nonproliferation; counterproliferation; counterterrorism; and consequence management; CBRN defensive countermeasures and policy; deterrence; emerging technologies (nanotechnology, including metamaterials; biotechnology, including synthetic genomics; neuro- and cognitive sciences) and international security.

Henry La Pierre, Assistant Professor [la_pierre@chemistry.gatech.edu] Ph.D., University of California, Berkeley, magnetism, electronic structure, and reactivity of f-element complexes and materials, lanthanide/actinide separations, transuranic coordination chemistry and X-ray absorption spectroscopy.

Jolinta Lin, Assistant Professor in Department of Radiation Oncology at Emory University, Adjunct Assistant Professor at Georgia Institute of Technology, M.D., University of Maryland School of Medicine, understanding mechanisms of toxicity from radiation therapy, identifying potential pathways to decrease side effects, and improving patients' quality-of-life issues.

David L. McDowell, Carter N. Paden Jr. Distinguished Chair in Metals Processing and Regents' Professor (404-894-5128) [david.mcdowell@me.gatech.edu] Ph.D., University of Illinois at Urbana-Champaign**,** 1983. Effects of radiation on metals. multiscale modeling and materials design.

Jonathon A. Nye, Assistant Professor of Radiology, Emory University School of Medicine (404-778-4227) [jnye@emory.edu] Ph.D., University of Wisconsin – Madison, 2005. Nuclear Medical Physics; Radioisotope production; Positron emission tomography; Kinetic Modeling.

Pretash Patel, Assistant Professor of Radiation Oncology, Emory University School of Medicine; Adjunct Assistant Professor at Georgia Tech (404-778-3473) [pretesh.patel@emory.edu] M.D., Duke University, 2008. HDR brachytherapy in gynecological and genitourinary malignancies; advancements in clinical and technical aspects of SBRT; use of information technology to improve quality and safety in oncology clinical practice.

Devesh Ranjan, Associate Professor [devesh.ranjan@me.gatech.edu] Ph.D., University of Wisconsin-Madison, 2007, fluid mechanics, turbulent mixing process in the complex flow environment, design of more efficient fuel pellets for inertial confinement fusion, Use of Brayton cycle for any high-temperature

heat sources including the very High Temperature Reactor, the Sodium Fast Reactor and the Fluoride High temperature reactor.

Justin Roper, Medical Physicist, Hospital Corporation of America, Adjunct Assistant Professor at Georgia Tech (404-894-1044) [justin.roper@emory.edu] Ph.D., Duke University, 2010. Certified by the American Board of Radiology - Therapeutic Medical Physics 2013; image guided radiation therapy, functional and molecular imaging as a means to design treatments based on the biology of cancer and normal tissue.

Lawrence P. Rubin, Assistant Professor (404-385-4081) (lawrence.rubin@inta.gatech.edu) Ph.D., University of California, Los Angeles, 2009. Nuclear nonproliferation; terrorism; energy security; and Middle East politics and security.

Michael P. Shannon, Adjunct Principal Research Engineer, [michael.shannon@gtri.gatech.edu] Ph.D., Georgia Institute of Technology, 2009, radiation transport, radiation detection and measurement, Monte-Carlo methods, and radiation dosimetry.

Joseph Shelton, Assistant Professor Department of Radiation Oncology at Emory University, Adjunct Assistant Professor at Georgia Institute of Technology, M.D., University of North Carolina. The treatment and outcomes of patients with gynecologic and genitourinary malignancies. Current work focuses on development of new treatment strategies combining modern radiotherapy and chemotherapy in post-cystectomy bladder cancer patients. Other work involves investigating strategies for adapting brachytherapy and external beam radiation treatments to improving outcomes in cervical cancer patients.

Adam N. Stulberg, Associate Professor and Co-Director of the Center for International Strategy, Technology, and Policy (404-385-0090) [adam.stulberg@inta.gatech.edu] Ph.D., University of California, Los Angeles, 1996. Nuclear strategy; arms control; and nonproliferation; internationalization of the fuel cycle; illicit nuclear trafficking; nanotechnology and international security.

Christopher J. Summers, Professor Emeritus (404-385-0697) [chris.summers@mse.gatech.edu] Ph.D., Physics, University of Reading, England, 1966. Phosphors and luminescent materials for displays; solid-state lighting and scintillators; synthesis of nanophosphors and quantum dots; photonic crystals; optical and electrical properties of semiconductors; semiconductor growth; particularly the development of new atomic layer deposition techniques and processes for optimizing photonic crystals and metamaterials.

James J. Wall, Adjunct Assistant Professor, Ph.D., University of Tennessee, 2007, nondestructive evaluation, characterization of structural materials for nuclear applications, materials aging, structure-property relationships, neutron and high energy x-ray scattering.

William J. Wepfer, Eugene C. Gwaltney, Jr. Chair of the Woodruff School and Professor (404-894-3200) [bill.wepfer@me.gatech.edu] Ph.D., University of Wisconsin-Madison, 1979. Heat transfer; energy systems; and fuel cells.

Rachel Whitlark, Assistant Professor, [rachel.whitlark@inta.gatech.edu] Ph.D. George Washington University 2014, International security, international relations, foreign-policy decision-making, nuclear

weapons and proliferation, military intervention, U.S. foreign and national security policy, grand strategy, defense policy, qualitative methods.

Xiaofeng Yang, Assistant Professor in Department fo Radiation Oncology at Emory University, Director of Medical Physics Residency Program, Adjunct Assistant Professor at Georgia Institute of Technology, Ph.D. Xi'an Jiaotong University , 2006, medical imaging, image-guided radiotherpy, machine learning, medical image analysis, and prostate cancer,

Ting Zhu, Professor (404-894-6597) [ting.zhu@me.gatech.edu] Ph.D., Massachusetts Institute of Technology**,** 2004. Mechanical behavior of solids and thin films; nanomechanics of defect in crystals; coupled mechano-chemical phenomena; multiscale and nuclear energy related materials modeling.

Nuclear Science and Engineering Research Centers

Fusion Research Center: [www.frc.gatech.edu], Director, Weston Stacey (NRE), [weston.stacey@nre.gatech.edu] (404-894-3714). Plasma edge physics, plasma and neutral particle transport, fusion neutron source applications, next-step tokamak design analysis, transmutation of spent nuclear fuel.

Radiological Science and Engineering Laboratory: [www.rsel.gatech.edu] (404-894-3606) The RSEL provide a wide variety of nuclear and accelerator-driven research and irradiation services to the needs of faculty, staff and external customers. Facilities in the RSEL include: Varian Clinical Linear Accelerator (VCLA) laboratory, A Neutron Reference Field Laboratory, A Neutron Generator Irradiation Facility, A Gamma Calibration Laboratory, and Sub-critical Graphite and Natural Uranium Pile, as well as various radiological support instruments.

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
Masters	16	13	9	5	6
PhD	6	3	4	5	0

Graduate Student Enrollment: 26 Masters/18 Ph.D.

Nuclear Science and Engineering Faculty

Richard Christensen, Professor, Director of Nuclear Engineering (208-533-8201) [rchristensen@uidaho.edu] Ph.D., Stanford University, 1974. Design, fabrication and testing of heat exchangers for advanced reactors; single and two phase fluid flow; heat transfer.

Fatih Aydogan, Assistant Professor (208-533-8107) [fatih@uidaho.edu] Ph.D., Pennsylvania State University, 2008. Small modular and advanced reactors, system design and analysis, nuclear safety, computational and experimental thermal hydraulics.

Robert Borrrelli, Assistant Professor (208-533-8122) [rborrelli@uidaho.edu] Ph.D., University of California Berkeley. Safeguards-by-design, nuclear cybersecurity, fuel cycle analysis, modeling and scientific computing.

Indrajit Charit, Associate Professor (208-885-5964) [icharit@uidaho.edu] Ph.D., University of Missouri-Rolla, 2004. Nuclear materials; structure-propoerty relationship in materiasl; multi-scale modeling of materials.

Samrat Choudhury, Assistant Professor (208-885-7572) [samrat@uidaho.edu] Ph.D., Pennsylvania State University, 2008. Nuclear and nanocrystalline materials; microstructure-property correlations; adv processing techniques; light metals.

John Crepeau, Professor (208-885-8123) [crepeau@uidaho.edu] Ph.D., University of Utah. Transition to turbulence in fluid flow and fluid stability, flow visualization, experimental and theoretical studies of drying and drying processes, solidification of materials with internal heat generation.

Michael Haney, Assistant Professor (208-533-8209) [mhaney@uidaho.edu] Ph.D., University of Tulsa, 2015. Computer and network security; critical infrastructure protection including SCADA and industrial control systems protocols for nuclear, power and water systems.

Robert Hiromoto, Professor (208-533-8119) [hiromoto@uidaho.edu] Ph.D., California State University-Long Beach, 1978. Parallel algorithms; communication protocols for UAV's; secure wireless networks.

Raghunath Kanakala, Assistant Professor (208-282-7828) [kanakala@uidaho.edu] Ph.D., University of Nevada-Reno. Nanocrystalline materials processing; in situ processing of nano particle composites; coatings; high temperature materials; structural and functional characterization of materials.

Krishnan Raja, Associate Professor (208-201-2949) [ksraja@uidaho.edu] Ph.D., Indian Institute of Technology, 1993. Degradation of nuclear structural materials; non-destructive materials evaluation; electrochemistry of molten salt reprocessing.

Dakota Roberson, Assistant Professor (208-533-8120)[dakotar@uidaho.edu] Ph.D., University of Wyoming. Renewable energy integration; power system control.

Vivek Utgikar, Associate Dean (208-885-6970) [vutgikar@uidaho.edu] Ph.D., University of Cincinnati, 1993. Hydrogen and energy systems; advanced fuel cycles; energy storage.

Tom Wood, Associate Professor (208-533-8164) [twood@uidaho.edu] Ph.D., University of Idaho, 2005. Hydrogeology of fractures rock systems; geothermal energy; nuclear waste geological storage/disposal; hydrofracking.

Haiyan Zhao, Assistant Professor (208-533-8123) [haiyanz@uidaho.edu] Ph.D., Virginia Polytechnic University, 2009. Nuclear waste treatment; advanced characterization techniques; catalysis in petroleum; biofuels; nature gas and environmental.

Other Faculty

Fred Gunnerson, Emeritus Faculty (208-282-7979), Ph.D., University of New Mexico. Thermo-fluids, high temperature heat transfer, nuclear science.

Steven Howe, Director of Center for Space Nuclear Research (208-526-6103)[showe@usra.edu] Ph.D., Kansas State University. Nuclear power and propulsion.

Majid Khalaf, Instructor [mkhalaf@uidaho.edu] Ph.D., Idaho State University. Nuclear criticality safety.

Donald McEligot, Distinguished Adjunct Faculty (208-533-8120) [donaldm@uidaho.edu] Ph.D., Stanford University, 1963. Heat transfer; fluid mechanics; experiments.

Michael McKellar, Research Faculty (208-757-5431) [mmckellar@uidaho.edu] Ph.D., Purdue University. Nuclear hybrid energy; heat exchangers; process modeling.

Lee Ostrom, Professor, Associate Dean (208-757-5427) [ostrom@uidaho.edu] Ph.D., Texas Technology University, 1988. Risk assessment; nuclear safety; project management.

You Qiang, Professor (208-885-7558) [youqiang@uidaho.edu] Ph.D. Nanomaterials and nanotechnology for nuclear energy; magnetics separation nanotechnology for spent nuclear fuel recycling; radiation detection and shielding nanotechnology.

Chien Wai, Professor (208-885-6552) [cwai@uidaho.edu] Ph.D., University of California-Irvine. Supercritical fluids reactions and extraction of metals and radionuclides, nuclear waste management and nanomaterials.

Nuclear Science and Engineering Research Centers

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
B.S.	14	14	*	16	8
Masters	19	19	*	13	13
PhD	2	4	*	3	2

Graduate Student Enrollment: 31 Masters/23 Ph.D.
ABET Accreditation: B.S. in Nuclear Engineering, B.S. in Health Physics, & MS in Health Physics

Nuclear Science and Engineering Faculty

Mary Lou Dunzik-Gougar, Associate Professor and Associate Chair (208-533-8111) [mldg@isu.edu] PhD, Pennsylvania State University**,** 2003. Nuclear fuel cycle; radioactive waste management; waste form development; irradiated nuclear graphite.

Richard Brey, Professor and Dean of College of Science and Engineering (208-282-2667) [breyrich@isu.edu] Ph.D., Purdue University. 1994. Health physics, internal dosimetry, radiation instrumentation, environmental radioactivity. Certified Health Physicist.

Eric A. Burgett, Associate Professor and Director of RISE (208-282-2220) [burgeric@isu.edu] Ph.D.**,** Georgia Institute of Technology**,** 2010. Radiation detector development; scintillator detectors; semiconductor detectors; novel detector materials; nanophotonics; homeland security; nuclear nonproliferation; nuclear fuels; nuclear materials; detector calibrations; neutron spectroscopy; health physics.

George R. Imel, Professor (208-705-2344) [gimel@isu.edu] Ph. D.**,** Pennsylvania State University**,** 1971. Experimental reactor physics, fast reactor physics.

Chad Pope, Associate Professor (208-282-2875) [popechad@isu.edu]; Ph.D., Idaho State University, 2011. Experimental reactor physics, reactor engineering, fast reactor physics, nuclear safety, project management, regulations. Professional Engineer.

Other Faculty

Steve Aumeier, Adjunct Faculty and Director of CAES, (208-522-7479) [steven.aumeier@inl.gov] Ph.D., Univ. Of Michigan. Idaho National Laboratory. Reactor engineering, fast reactor physics.

Bob Boston, (208-533-4250) **[**bostonrd@id.doe.gov] MS, Idaho State University. U.S. Department of Energy. Reactor safety and regulations. Professional Engineer

Kevin Claver, EAL Supervisor (208-282-4066) [clavkevi@isu.edu] BS in Health Physics, Idaho State University, 1995. Environmental radiation and radionuclide metrology.

Roy Dunker, EML Supervisor **(**208-282-4368) **[**dunkroy@isu.edu] MS in Health Physics**,** Idaho State University**,** 1998**.** Radionuclide metrology and low-level radionuclide measurements of the environment

Todd C Gansauge, Instructor **(**208-282-2968) **[**ganstodd@isu.edu] Masters of Science Mechanical Engineering**,** University of Utah**,** 1990. Reactor physics; radiation detection. Professional Engineer.

Thomas Gesell, Emeritus Professor (208-282-3669) [gessthom@isu.edu] Ph.D. Health physics, environmental radioactivity.

Hans Gougar, Adjunct Faculty (208-526-1314) [hans.gougar@inl.gov] Ph.D. Idaho National Laboratory. Reactor engineering and reactor physics.

J. Stephen Herring, Adjunct Faculty **(**208-526-9497) [j.herring@inl.gov] Ph.D. MIT. Idaho National Laboratory. Reactor engineering and reactor physics, fuel cells and high temperature electrolysis.

Richard T. Jacobsen, Professor, at large. (208-313-3999) [jacorich@isu.edu] Ph.D. (Engineering Science), Washington State University, 1972. Thermo-physical properties of fluids, of fluid mixtures, of hydrogen; and natural gas; energy system design and analysis; Professional Engineer

Jay F. Kunze, Emeritus and Reactor Administrator (208-282-4147) [kunzejay@isu.edu] Ph.D.**,** Carnegie-Mellon**,** 1959. Reactor engineering, reactor physics, health physics, medical physics. Professional Engineer.

Maria A. Okuniewski, Adjunct Faculty (208-533-7187) [Maria.Okuniewski@inl.gov] Ph.D. in Nuclear Engineering, University of Illinois, Urbana**,** 2008. Idaho National Laboratory. Nuclear fuels, radiation damage in materials, PAS, modeling.

Abderrafi M Ougouag, Adjunct Professor (208-526-7659) [Abderrafi.Ougouag@inl.gov] Ph.D., University of Illinois, Urbana**,** 1984. Computational methods development in reactor physics; theoretical and applied neutron physics; high temperature gas-cooled reactor physics.

Richard Schultz, Adjunct Research Professor (208-521-5605) [srr@srv.net] Ph.D. Idaho State University, 2010. Idaho National Laboratory Thermal hydraulics experimentation, instrumentation, and analysis. Reactor safety analysis. Professional Engineer.

Curtis Smith, Adjunct Professor (208-526-9804) [curtis.smith@inl.gov] Ph.D. MIT, 2002. Idaho National Laboratory. Probabilistic risk assessment, reactor safety analysis.

Sebastian Teysseyre, Adjunct Faculty (208-526-8263) [Sebastien.Teysseyre@inl.gov] Ph.D. in Material Science, Ecole Nationale Superieure des Mines de Saint Etienne, France**,** 2001. Idaho National Laboratory. Material behavior in nuclear reactors, radiation damage.

Nuclear Science and Engineering Research Centers

AGN-201M, 0.005 kW Reactor Laboratory: Administrator: Jay Kunze, PhD, (208 -282-4147/FAX: 208- 282-4538) [kunzejay@isu.edu] Adam Mallicoat, Reactor Supervisor, (208-282-4237] [mallaem@isu.edu] Lillibridge Engineering Laboratory, Pocatello, ID 83209-8060. Used for training and research.

Environmental Assessment and Monitoring Laboratory: Director, Richard Brey, Ph.D. (208-282-4539) [breyfich@isu.edu] Low level radiation monitoring, instrument calibration, trace element analysis. High range dosimetry support for the Idaho Accelerator Center. Annual Research Expenditures: $500,000.

Environmental Monitoring Laboratory: Director: Jason Harris, Ph.D. (208-282-3669) [gesethom@isu.edu] Low level radiation monitoring, radio analytical analysis, instrument calibration, trace element analysis. Research Expenditures: $300,000/year.

RISE (Research Innovation in Science and Engineering), Director, Eric Burgett, PhD. 200,000 square foot facility, with primary mission being nuclear materials research and development, nano research, homeland security. Annual research expenditures ~$3 million.

CAES (Center for Advanced Energy Studies) Director, Dr. Stephen Aumeier (INL), Associate Director, Dr. Jason Harris (ISU) [harrjaso@isu.edu]. Built by Idaho State University for joint research with Idaho National Laboratory, Boise State University, and University of Idaho. Annual expenditures for research ~ $6 million

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B.S.	50	51	30	36	36
Masters	10	18	6	11	18
PhD	4	9	6	5	7

Graduate Student Enrollment: 25 Masters/69 Ph.D.
ABET Accreditation: B.S. (N.E.)

Nuclear Science and Engineering Faculty

Rizwan Uddin, Professor and Department Head (217-244-4944) [rizwan@illinois.edu] Ph.D., University of Illinois at Urbana-Champaign**,** 1987. Reactor thermal hydraulics; computational methods; nuclear reactor theory; homogenization techniques; nuclear engineering education; virtual reality; computational biology; nonlinear dynamical systems. Website: http://verl.npre.illinois.edu

Shiva Abbaszadeh, Assistant Professor (217-300-2542) [sabbasza@illinios.edu] Ph.D., University of Waterloo, Canada, 2014. Radiation detection and instrumentation for molecular imaging; biomedical devices and sensors; data acquisition and readout electronics; computational problem solving; quantitative characterization of biological processes. Website: https://ril.npre.illinois.edu

Jean Paul Allain, Professor and Associate Head for Graduate Programs (217-244-4789) [allain@illinois.edu] Ph.D., University of Illinois at Urbana-Champaign, 2001. Engineering design for global social impact; ion-driven nanostructures on metals, semiconductors and polymers; advanced nanostructured biointerfaces for regenerative medicine; multi-scale computational surface physics; plasma-surface and materials interactions in fusion devices; in-situ surface characterization techniques; irradiation surface science. Website: http://rssel.engineering.illinois.edu

Daniel Andruczyk, Research Assistant Professor (217-244-4583) [andruczy@illinois.edu] Ph.D., The University of Sydney-Australia, 2006. Experimental plasma and fusion research; fusion and plasma diagnostics; plasma heating; fusion materials; plasma material interaction; plasma facing components. Website: http://npre.illinois.edu

Caleb Brooks, Assistant Professor (217-265-0519) [csbrooks@illinois.edu] Ph.D., Purdue University, 2014. Nuclear thermal hydraulics and reactor safety; boiling heat transfer; modeling and experiment of multiphase flows; multiphase flow instrumentation. Website: http://mtdl.npre.illinois.edu

Davide Curreli, Assistant Professor (217-300-1787) [dcurreli@illinois.edu] Ph.D., University of Padova, Italy, 2011. Plasma sources; transport phenomena in plasmas; plasma modeling using fluid models; plasma-material interactions. Website: http://curreli.npre.illinois.edu/

Brent J. Heuser, Professor and Associate Head for Undergraduate Programs (217-333-9610) [bheuser@illinois.edu] Ph.D.**,** The University of Michigan**,** 1990. Application of scattering techniques to materials science; hydrogen in metals; nuclear materials, fuel and cladding. Website: http://positron.npre.illinois.edu

Kathryn D. Huff, Blue Waters Assistant Professor (217-300-3132) [kdhuff@illinois.edu] Ph.D., University of Wisconsin - Madison, 2013. Development of modeling and simulation tools for advanced nuclear reactors and fuel cycles; coupled multi-physics simulation; open & reproducible scientific computing; repository system performance analysis. Website: http://arfc.npre.illinois.edu

Tomasz Kozlowski, Associate Professor (217-333-4096) [txk@illinois.edu] Ph.D., Purdue University, 2005. Reactor physics and thermal-hydraulics; reactor design and safety analysis; multi-physics methods and modeling; numerical analysis and computational methods. Website: http://arts.npre.illinois.edu/

Ling-Jian Meng, Professor (217-333-7710) [ljmeng@illinois.edu] Ph.D., University of Southampton-UK**,** 2001. High resolution X and gamma ray detectors for radiological imaging applications; ultra-high resolution SPECT system for small animal brain studies; multi-modality imaging systems; nuclear imaging system. Website: http://radimg.npre.illinois.edu

Zahra Mohaghegh, Assistant Professor (271-300-5076) [zahra13@illinois.edu] Ph.D., University of Maryland, College Park, 2007. Probabilistic risk assessment and management; socio-technical risk analysis; big data analytics for risk assessment; probabilistic physics of failure; systems reliability; predictive causal modeling of failure mechanisms; risk-informed decision making and regulation; human reliability; safety culture; organizational influences on technical system risk.
Website: http://soteria.npre.illinois.edu

Magdi Ragheb, Associate Professor (217-333-6569) [mragheb@illinois.edu] Ph.D., University of Wisconsin, 1978. Computational methods; radiation protection and shielding; probabilistic risk assessment; applied artificial intelligence; supercomputing. Website: http://mragheb.com/

David N. Ruzic, Bliss Professor (217-333-0332) [druzic@illinois.edu] Ph.D., Princeton University**,** 1984. Experimental fusion research; modeling of edge plasma; atomic properties of potential first-wall materials; plasma-material interaction; plasma processing of semiconductors; extreme ultraviolet (EUV) sources for lithography; physical and chemical vapor deposition. Website: http://cpmi.illinois.edu

James F. Stubbins, Willett Professor (217-333-6474) [jstubbin@illinois.edu] Ph.D., University of Cincinnati**,** 1975. Japan WPI International Institute on Carbon Neutral Energy Research; development, analysis and application of materials, primarily for energy-related applications; nuclear systems design and analysis; nuclear materials; irradiation damage and effects, mechanical properties; high temperature corrosion; electron microscopy; energy analysis and policy. Professional Engineer. Website: http://materials.npre.illinois.edu/

Yang Zhang, Assistant Professor (217-300-0452) [zhyang@illinois.edu] Ph.D., Massachusetts Institute of Technology, 2010. Materials far from equilibrium and in extreme environments; extreme properties of liquids; and glassy or jammed soft matters; neutron and X-ray scattering; atomistic theory, computation, and simulation. Website: http://zhang.npre.illinois.edu

Other Faculty

Michael Aref, Adjunct Assistant Professor (217-333-2295) [maref@illinois.edu] Ph.D., University of Illinois at Urbana-Champaign, 2003. M.D., University of Illinois at Urbana-Champaign, 2006. Research interests in nuclear medicine and specificially MRI imaging; contrast agent effectiveness; bioreseptors and bioresponse; functional MRI.

Roy A. Axford, Emeritus Professor (217-333-4399) [prefers phone or regular mail] Sc.D., Massachusetts Institute of Technology, 1958. Reactor physics, safety, and risk assessment; radiation hydrodynamics; heat transfer; optimal reactor control; synthesis and nuclear fuel management; hydrodynamic stability; lie groups and systems of nonlinear differential equations; plasma physics; group invariant difference schemes. Website: http://npre.illinois.edu

Jeffrey Louis Binder, Adjunct Professor (217-244-0338) [jlbinder@illinois.edu] Ph.D., University of Illinois at Urbana-Champaign, 1990. Associate Laboratory Director at Argonne national Laboratory; research interests in nuclear systems and technologies; advanced nuclear systems design; energy and nuclear energy policy; nuclear reactor thermal-hydraulics and reactor safety analysis.

Thomas J. Dolan, Adjunct Professor (217-333-2295) [dolantj@illinois.edu] Ph.D.**,** University of Illinois at Urbana-Champaign**,** 1970. Nuclear fusion technology; molten salt fission reactors; thorium energy; low energy nuclear reactions.

Masab H. Garada, Adjunct Assistant Professor (217-333-2295) [masab.garada@provena.org] Ph.D.**,** University of Illinois at Urbana-Champaign**,** 2006. Intensity modulated radiation therapy (IMRT); image guided radiation therapy (IGRT); three-dimensional conformal radiation therapy; linac radiosurgery and stereotactic; low dose-rate brachytherapy: prostate seed implants, medium dose-rate brachytherapy; cervical cesium implants, high dose-rate brachytherapy; iridium lung implants, tumor and normal tissue response and radiobiological models.

Barclay G. Jones, Emeritus Professor (217-333-2295) [bgjones@illinois.edu] Ph.D., University of Illinois at Urbana-Champaign, 1966. Thermal hydraulics/reactor safety; multiphase flow; boiling heat transfer;

turbulence measurement and modeling; flow-induced vibrations and hydroacoustics; human-machine interfaces for reactor control and simulation; food irradiation safety.

Brian E. Jurczyk, Adjunct Research Assistant Professor (217-333-2295) [bjurczyk@starfireindustries.com] Ph.D., University of Illinois at Urbana-Champaign, 2003. Advanced plasma debris mitigation; advanced tin and lithium fuels research; optics contamination; erosion and lifetime research; self-healing optics research; halide etching and condensable material removal; fast ion suppression with light gas mixtures. Website: http://www.starfireindustries.com

Michael David Kaminski, Adjunct Associate Professor (217-333-2295) [mdkamins@illinois.edu] Ph.D., University of Illinois at Urbana-Champaign, 1998. Research interests in radiochemistry; radioactive materials separations technologies; radiological decontamination; radiological and nuclear threat mitigation; spent nuclear fuel separations; nuclear materials analysis and security applications; pre and post detonation analysis; magnetic-based separations; portable detection systems.

Ernie J L Kee, Research Associate Professor (217-333-2295) [erniekee@illinois.edu] B.S., University of Idaho. Reserach interests in light water reactor risk assessment, operations, research, performance evaluation, and maintenance with the South Texas Project Nuclear Operating Company; dynamic thermal-hydraulics analysis with RELAP5 and TRAC.

Charles P. Marsh, Adjunct Professor (217-333-2295) [Charles.P.Marsh@usace.army.mil] Ph.D., University of Illinois at Urbana-Champaign, 1989. Materials research across multiple scales; corrosive degradation, assessment and mitigation; quantum dot based self-sensing materials; pumped thermal flow and transfer using Microencapsulated Phase Change Materials (MPCM) and nanofluids; fullerene based material synthesis and incorporation into composites; bacteria based biodeposition for self-healing concrete; induced vortical flow for enhanced heat transfer.

George H. Miley, Emeritus Professor (217-333-3772) [ghmiley@illinois.edu] Ph.D., The University of Michigan, 1959. Fusion systems; plasma engineering; reactor kinetics; high voltage technology; nuclear pumped lasers; direct energy conversion; hydrogen energy production; low-energy nuclear reactions in solids. Professional Engineer. Website: http://fsl.npre.illinois.edu

David W. Miller, Adjunct Assistant Professor (217-333-2295) [dwmiller2@aep.com] Ph.D., Purdue University, 1976. Occupational dose reduction at nuclear power plants; colloidal source term removal and mitigation studies in primary coolant at light water reactors; tritium recapture modeling at pressurized water reactors; UNSCEAR US effluent databases and analysis; radiological work management research at nuclear power plants; medical shielding validation studies; ACCESS relational database development for dose trend analysis.

Richard F. Nelson, Adjunct Assistant Professor (217-351-0846) [rfnelson@illinois.edu] Ph.D., University of Illinois at Urbana-Champaign, 1984. Radiological physicist; Radiation oncology-external beam and internal sources; diagnostic radiology; consultant physicist.

Martin J. Neumann, Adjunct Assistant Professor **(**217-840-5490) [martin@mjneumann.com] Ph.D., University of Illinois at Urbana-Champaign**,** 2007. EUVL related technologies; semiconductor fabrication and processing and plasma-material interactions related to fusion applications.

William R. Roy, Adjunct Professor **(**217-333-1197) [wroy@illinois.edu] Ph.D., University of Illinois at Urbana-Champaign**,** 1985. Geochemistry and soil/environmental chemistry; equilibrium distribution and thermodynamics of chemical constituents at solid-liquid interfaces; solid-phase equilibria of natural and anthropogenic materials in aqueous; solution; environmental impacts of coal utilization; chemical fate and transport of contaminants in soil and groundwater; carbon sequestration; radioactive waste management.

Clifford E. Singer, Emeritus Professor (217-333-1814) [csinger@illinois.edu] Ph.D., University of California, Berkeley, 1971. Advanced spacecraft propulsion systems, spent nuclear fuel management, nuclear proliferation, energy systems analysis, and energy econometrics. Website: http://npre.illinois.edu

Robert A. Stubbers, Adjunct Research Assistant Professor (217-333-2295) [rstubbers@starfireindustries.com] Ph.D., University of Illinois at Urbana-Champaign, 1994. Plasma innovations for aerospace; defense, industrial, instrumentation, medical; semiconductor applications. Website: http://www.starfireindustries.com

Clair Sullivan, Adjunct Research Assistant Professor (217- 333-2295) [cjsulli@illinois.edu] Ph.D., University of Michigan, 2002. Radiation detection; instrumentation; radiation dosimetry and shielding; measurements and localization of algorithms for detector devices.

Nuclear Science and Engineering Research Centers

The **Center for Plasma Material Interactions (CPMI),** http://cpmi.illinois.edu, objective is to study plasma material interactions relevant to fusion, semiconductors, plasma manufacturing, and plasma-nanosynthesis through a combination of computational and experimental means. Projects are supported by both government and commercial partners to further the application and knowledge of plasma physics. Facilities include HIDRA: the Hybrid Illinois Device for Research and Applications, which is a major-scale stellarator and/or tokamak. HIDRA will be used for testing plasma-material interactions, liquid lithium technologies, nanosynthesis and electron transport.

The **North American Technical Center (NATC) for the Information System on Occupational Exposure (ISOE)** is located at the Department of Nuclear, Plasma, and Radiological Engineering. NATC is one of four technical centers for the Organization for Economic Co-operation and Development (OECD) Nuclear Energy Agency and International Atomic Energy Agency (IAEA) global occupational dose reduction information exchange engineering database. NATC manages the Canadian, Mexican, and US nuclear power plants data analysis. Website: http://isoe-network.net

The **High Temperature Nuclear Material Laboratory** (HTNML), http://materials.npre.illinois.edu/members.html, objective is to study nuclear material relevant to microstructure, properties, performance, and interactions with irradiation through microscopy, x-ray analysis, experimental approaches, and modeling for light water reactor, and advanced nuclear reactor. Material studied in this lab includes structural material: copper alloys, nickel-based alloys, stainless/ austenitic/ ferritic/ ODS steel, zirconium alloy, silicon-carbide composites, and fuel material: uranium dioxide, and cerium dioxide. Frederick Seitz Materials Research Laboratory (FS-MRL) in UIUC provides variety of analytical techniques. NSUF program supports activities of post irradiation examination (PIE). State-of-the-art characterization technologies such as IVEM, APS, and ATP enhance research progress via tight coloration with ANL, ORNL and INL. Projects are supported by department of energy (DOE) to further application and knowledge of nuclear material at elevated temperature. Facilities includes in situ biaxial creep-fatigue system which is capable of dynamic measurement of tubular specimen's dimension change under high temperature creep-fatigue test.

The **Non-Equilibrium Matter Laboratory** focuses on the study of non-equilibrium matter, with particular emphasis on liquids and soft matter, using integrated atomistic theory, computation, and simulation and neutron and synchrotron light experimental probes. The structure and dynamics of these systems are either inherently complex or driven away from equilibrium by extreme conditions. In particular, our current interests include a range of fundamental and technical problems involving slow phenomena and rare events, such as: materials far from equilibrium and in extreme environments; extreme properties of liquids; and glassy or jammed soft matters. Website: http://zhang.npre.illinois.edu

The **Socio-Technical Risk Analysis (SoTeRiA) Laboratory** (http://soteria.npre.illinois.edu/), directed by Zahra Mohaghegh, is advancing Probabilistic Risk Assessment (PRA) for conventional Nuclear Power Plants (NPPs) and advanced reactors by explicitly incorporating the underlying science of accident causation into risk scenarios. Explicit inclusion of failure phenomena allows for a model-based Common Cause Failure (CCF) analysis that deals with modeling dependent failures and is one of the most challenging topics of PRA. The research provides quantitative insights that aid in: (a) reducing CCF occurrence in operating NPPs and (b) making risk-informed designs and licensing decisions for new reactors. Two key areas of theoretical and methodological scientific developments include: (1) spatio-temporal causal modeling of social and physical failure mechanisms in PRA, and (2) the fusion of big data analytics with PRA. The SoTeRiA Laboratory has integrated classical PRA techniques with simulation-based methods, leading to the development of an Integrated PRA (I-PRA) that enables explicit incorporation of time and space in a "spatio-temporal" PRA. These new PRA approaches are quantified using state-of-the-art big data analytics. The lab's on-going research applications for NPPs include: fire PRA; location-specific Loss-Of-Coolant Accident (LOCA) frequency estimations; global risk importance measure; modeling the effects of human and organizational influences on technical system failure; monetary value of PRA; and risk-informed emergency preparedness, planning and response modeling for severe accidents. The SoTeRiA Lab has also been actively involved in the risk-informed resolution of Generic Safety Issue 191, a long-standing issue for commercial nuclear power plants and the NRC.

Virtual Education and Research Laboratory (VERL): Goals of VERL in the Department of Nuclear, Plasma, & Radiological Engineering at the University of Illinois at Urbana-Champaign span research, teaching, service and outreach. Tools used in this lab are innovative and mostly computer based. From fundamental

advances in numerical methods; advanced modeling and simulation of different aspects of scientific and engineering problems; to virtual, 3D models for training, education and outreach; this laboratory is focused on development and use of new methods and tools to address fundamental scientific and applied engineering problems. 3D, interactive and immersive virtual models have been developed for labs mimicking measurement of half-life and attenuation coefficients measurements. Applications to problems specific to the field of nuclear power include advanced numerical methods development; high performance computing; neutronics, thermal hydraulics and coupled problems; digital I&C and cyber security of NPPs; etc. Website: http://verl.npre.illinois.edu

Other Relevant Research Facilities

The **Beckman Institute for Advanced Science and Technology** at the University of Illinois at Urbana-Champaign is an interdisciplinary research institute devoted to leading-edge research in the physical sciences, computation, engineering, biology, behavior, cognition, and neuroscience. The Institute's primary mission is to foster interdisciplinary work of the highest quality, transcending many of the limitations inherent in traditional university organizations and structures. The Institute was founded on the premise that reducing the barriers between traditional scientific and technological disciplines can yield research advances that more conventional approaches cannot. Website: http://beckman.illinois.edu

The University of Illinois' **Coordinated Science Laboratory** is a premier, multidisciplinary research laboratory that focuses on information technology at the crossroads of computing, control and communications. With a rich history of more than 60 years of innovation, CSL has developed and deployed new technologies that have achieved international scientific recognition and transformed society. Led by a faculty of world-renowned experts and researchers, CSL uses these innovations to explore critical issues in defense, medicine, environmental sciences, robotics, life-enhancement for the disabled and aeronautics. Website: http://csl.illinois.edu

The **Materials Research Laboratory** Central Research Facilities allow for the sharing of expensive and complex cutting-edge research instrumentation while providing for maintenance and continuous development by a dedicated professional staff. The presence of the facilities dramatically enhances intellectual interactions among users. Additionally, having expert scientists to work with users improves efficiency as well as the quality of the scientific results. Website: http://mrl.illinois.edu

Micro and Nanotechnology Laboratory (MNTL) is one of the country's largest and most sophisticated university facilities for conducting photonics, microelectronics, biotechnology, and nanotechnology research. MNTL is the place where campus researchers and visiting scientists come to design, build, and test innovative nanoscale technologies with feature sizes that span the range of atoms to entire systems. Our 16 class 100 and 1000 cleanrooms, 46 general purpose labs, and 2,500 square foot biosafety level-2 bionanotechnology complex contain all the tools researchers need to conduct their work. The building houses faculty and graduate students from the departments of Electrical & Computer Engineering, Bioengineering, Physics, Mechanical Science & Engineering, Material Science & Engineering, Agricultural and Biological Engineering, and Chemical & Biomolecular Engineering. Website: http://mntl.illinois.edu

The **National Center for Supercomputing Application**s (NCSA) is a hub of transdisciplinary research and digital scholarship where University of Illinois faculty, staff, and students, and collaborators from around the globe, unite to address research grand challenges for the benefit of science and society. Current research focus areas are Bioinformatics and Health Sciences**,** Computing and Data Sciences**,** Culture and Society**,** Earth and Environment**,** Materials and Manufacturing**,** and Physics and Astronomy**.** The Center also provides integrated cyberinfrastructure—computing, data, networking, and visualization resources and expertise that are essential to the work of scientists, engineers, and scholars at the University of Illinois at Urbana-Champaign and across the country. NCSA is also an engine of economic impact for the state and the nation, helping companies address computing and data challenges and providing hands-on training for undergraduate and graduate students and post-docs. Website: http://www.ncsa.illinois.edu

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
B.S.	55	11	7	12	*
Masters	2	0	1	0	*
PhD	9	1	2	2	*

Graduate Student Enrollment: 7 Masters/10 Ph.D.
ABET Accreditation: ME

Distance Education Program
Offers Nuclear Engineering Courses Online
www.mne.ksu.edu/big12ne
http://www.dce.k-state.edu/engineering/minors/nuclear/

Nuclear Science and Engineering Faculty

William L. Dunn, Professor and Nuclear Program Director (785-532-6805) [dunn@mne.ksu.edu] Ph.D., North Carolina State University, 1974. Radiation measurement and applications; explosives detection; nondestructive evaluation; quantitative analysis; radiation shielding and dosimetry; Monte Carlo methods and applications; fusion-fission energy systems. Website: www.mne.ksu.edu/people/faculty/dunn

Amir Bahadori, Assistant Professor (785-532-7040) [bahadori@ksu.edu] Ph.D, University of Florida, 2012. Characterization of radiation environments; response of humans to radiation exposure.
Website: http://www.mne.k-state.edu/people/faculty/bahadori/

Hitesh Bindra, Assistant Professor (785-532-3039) [hbindra@ksu.edu] Ph.D., University of Illinois at Urbana Champaign, 2010. Passive nuclear safety; rhermal-hydraulics; energy storage; computational physics. Website: http://www.mne.ksu.edu/people/faculty/bindra

Douglas S McGregor, Professor (785-532-4093) [mcgregor@ksu.edu] Ph.D., University of Michigan, 1993. Development of room temperature gamma ray spectrometers; semiconductor radiation detectors; solid-state neutron detectors; miniaturized neutron detectors; scintillator crystal growth; compound semiconductor crystal growth; radiation detector arrays.
Website: http://www.mne.ksu.edu/people/faculty/mcgregor

Walter McNeil, Assistant Professor (785-532-3379) [wmcneil@ksu.edu] Ph.D., Kansas State University, 2010. Radiation detection systems design; gamma-ray imaging; radiation background monitoring.

Jeremy Roberts, Assistant Professor (785-532-7182) [jaroberts@ksu.edu] Ph.D., Massachusetts Institute of Technology, 2014. Computational nuclear engineering; reactor physics; neutron transport (both deterministic and stochastic); optimization, sensitivity and uncertainty analysis.
Website: http://www.mne.ksu.edu/people/faculty/roberts

J. Kenneth Shultis, Professor (785-532-5626) [jks@ksu.edu] Ph.D., University of Michigan, 1969. Radiation transport and shielding; Monte Carlo techniques; radiation detector design; simulations and modeling.
Website: www.mne.ksu.edu/~jks

Nuclear Science and Engineering Research Centers

SMART Lab: design, fabrication and testing of novel radiation detectors. TRIGA MArk II Reactor Facility: 1.25 MS steady power and pulsing capability.

Radiation Measurement Applications Lab: research concerning application of radiation to the measurement of physical properties of matter.

UNIVERSITY OF MARYLAND

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
Masters	4	6	3	5	*
PhD	3	1	1	1	*

Graduate Student Enrollment: 6 Masters/2 Ph.D.

Distance Education Program
Offers Nuclear Engineering Courses and Degree Online
http://www.oaee.umd.edu/

Nuclear Science and Engineering Faculty

Mohammad Modarres, Professor and Director of Nuclear Engineering Program (301-405-5226) [modarres@umd.edu] Ph.D., Massachusetts Institute of Technology, 1979. Probabilistic risk assessment, Probabilistic modeling of failure mechanisms, Reliability analysis of complex engineering systems, nuclear safety analysis.

Mohamad Al-Sheikhly, Professor (301 -405-5214) [mohamad@umd.edu] Ph.D., University of Newcastle Upon Tyne, England, 1981. Polymers, radiation engineering, electronic packaging materials, environmental effects.

Aris Christou, Professor (301-405-5208) [christou@umd.edu] Ph.D., University of Pennsylvania, 1971. Materials processing and manufacture technology, Strained engineered materials for optoelectronics, Physics-of-failure in electronic materials, Opto-electronic monolithically integrated optoelectronics, Analog mm-wave integrated circuits; Molecular nanoelectronics devices using 1D and 2D Structures; Tribology of ceramics and surface lubricants; Finite element methods applied to metal alloys, metal-nonmetal composites and electronic packaging.

Gary Pertmer, Associate Dean, A. James Clark School of Engineering & Associate Professor (301-405-3936) [pertmer@umd.edu] Ph.D., University of Missouri-Columbia, 1978. Reliability engineering, nuclear power systems design and analysis.

Nuclear Science and Engineering Research Centers

University of Maryland Radiation Facilities: Laboratory for Radiation and Polymer Science; High-Energy Linear Accelerator (LINAC); The Biophysical and Polymer Radiation Laboratory

Maryland University Training Reactor: a dry cell gamma vault irradiator, and a 10 MeV electron linear accelerator. Website: http://radiation.umd.edu

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
B.S.	11	7	8	9	17
Masters	11	13	22	15	9
PhD	13	22	14	13	14

Graduate Student Enrollment: 62 Masters/49 Ph.D.
ABET Accreditation: SB

Nuclear Science and Engineering Faculty

Dennis G. Whyte, Hitachi America Professor of Engineering and Head of the Department of Nuclear Science and Engineering; Director of the Plasma and Fusion Center (617-253-1748) [whyte@psfc.mit.edu] Ph.D., Université du Quebec, 1992. Plasma-surface interactions physics and diagnostics for magnetic fusion energy; accelerator-based simulation of plasma-surface interaction in fusion reactors.
Website: http://web.mit.edu/nse/people/faculty/whyte.html

Emilio Baglietto, Norman C Rasmussen Associate Professor (617-253-4231) [emiliob@mit.edu] Ph.D., Tokyo Institute of Technology, 2004. Turbulence modeling; Unsteady flow phenomena; multiphase flow and boiling; virtual reactor modeling. Website: http://web.mit.edu/nse/people/faculty/baglietto.html

Ronald G. Ballinger, Professor of Nuclear Science and Engineering and Materials Science and Engineering (617-253-5118) [hvymet@mit.edu] Sc.D., Massachusetts Institute of Technology, 1982. Corrosion and fatigue. Fuel behavior modeling, environmental effects on materials performance.
Website: http://web.mit.edu/nse/people/faculty/ballinger.html

Matteo Bucci, Assistant Professor (617-253-2336) [mbucci@mit.edu] Ph.D., University of Pisa, Italy, 2009. Multi-phase flow and heat transfer; Reactor thermal-hydraulics; Nanotechnologies for advanced heat transfer; Integration of sensors, simulations and machine learning tools.
Website: http://web.mit.edu/nse/people/faculty/bucci.html

Jacopo Buongiorno, TEPCO Professor of Nuclear Science and Engineering and Mechanical Engineering and Associate Department Head of Nuclear Science and Engineering (617-253-7316) [jacopo@mit.edu] Ph.D.,

Massachusetts Institute of Technology, 2000. Multi-phase flow and heat transfer; advanced reactor design; reactor thermal-hydraulic; nanofluid technology.
Website: http://web.mit.edu/nse/people/faculty/buongiorno.html

Paola Cappellaro, Esther and Harold E Edgerton Associate Professor (617-253-8137) [pcappell@mit.edu] Ph.D., Massachusetts Institute of Technology. Quantum control; quantum information; precision measurement; nuclear magnetic resonance.
Website: http://web.mit.edu/nse/people/faculty/cappellaro.html

Areg Danagoulian, Assistant Professor (617-324-6329) [aregjan@mit.edu] Ph.D., University of Illinois at Urbana-Champaign, 2006. Nuclear security; arms reduction; non-proliferation; nuclear safeguards.
Website: http://web.mit.edu/nse/people/faculty/danagoulian.html

Benoit Forget, Associate Professor (617-253-1655) [bforget@mit.edu] Ph.D., Georgia Institute of Technology, 2006. Computational transport theory; Reactor Physics and Nuclear Fuel Cycle.
Website: http://web.mit.edu/nse/people/faculty/forget.html

Michael W. Golay, Professor **(**617-253-5824) **[**golay@mit.edu] Ph.D.**,** Cornell University**,** 1969. Nuclear power innovation, risk and regulation, non-proliferation**.**
Website: http://web.mit.edu/nse/people/faculty/golay.html

Zachary Hartwig, John C. Hardwick Assistant Professor of Nuclear Science and Engineering (617-253-5471) [hartwig@mit.edu] Ph.D., Massachusetts Institute of Technology, 2013. Accelerator-based nuclear science and fusion diagnostics; Fusion energy device design; Neutronics for accelerator and fusion systems; Particle and radiation detector design and simulation.

Ian H. Hutchinson, Professor and Co-Principal of the Alcator-C Mod Program **(**617-253-8670) [ihutch@mit.edu] Ph.D.**,** Australian National University**,** 1976. Plasma physics and controlled fusion.
Website: http://web.mit.edu/nse/people/faculty/hutchinson.html

Alan Pradip Jasanoff, Associate Professor of Biological Engineering (617-452-2538) [jasanoff@mit.edu] Ph.D., Harvard University. Functional Magnetic Resonance Imaging (MRI); molecular neuroimaging; behavioral and systems neuroscience. Website: http://web.mit.edu/jasanofflab/

R. Scott Kemp, Norman C. Rasmussen Assistant Professor (617-324-3308) [rsk@mit.edu] Ph.D., Princeton University, 2010. National security, nonproliferation, and arms control policy; verification techniques; energy policy and climate change. Website: http://lnsp.mit.edu/r-scott-kemp

Richard K. Lester, Associate Provost for International Activities, Japan Steel Industry Professor and faculty chair of Industrial Performance Center (617-253-7704) [rklester@mit.edu] Ph.D., Massachusetts Institute of Technology, 1979. Local, national and international systems of innovation; nuclear technology innovation, management and controls; energy innovation policy.
Website: http://web.mit.edu/nse/lester/index.html

Ju Li, Battelle Energy Alliance Professor of Nuclear Science and Engineering and Professor of Materials Science (617-253-0166) [liju@mit.edu] Ph.D., Massachusetts Institute of Technology, 2000. Overcoming timescale challenges in atomistic simulations; energy storage and conversion; materials in extreme environments and far from equilibrium. Website: http://web.mit.edu/nse/people/faculty/li.html

Mingda Li, Assistant Professor (617-452-2505) [mingda@mit.edu] Ph.D., Massachusetts Institute of Technology, 2015. Defects on functional properties; Nanoscale radiation matter interaction; Artificial intelligence aided spectroscopy development; Nanoscale energy transport.
Website: http://engnano.mit.edu/

Nuno F. G. Loureiro, Assistant Professor (617-253-9741) [nflour@mit.edu] Ph.D., Imperial College, 2005. Theory and computational modeling of plasma physics and controlled fusion.
Website: http://web.mit.edu/nse/people/faculty/loureiro.html

Korush Shirvan, Assistant Professor (617-452-3017) [kshirvan@mit.edu] Ph.D., Massachusetts Institute of Technology, 2012. Nuclear reactor design; Nuclear fuel performance; Reactor safety; Advanced energy systems. Website: http://web.mit.edu/nse/people/faculty/shirvan.html

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Anne E. White, Cecil and Ida Green Associate Professor in Nuclear Science and Engineering (617-253-8667) [whitea@psfc.mit.edu} Ph.D., University of California, Los Angeles, 2008. Plasma physics, turbulence and turbulence-driven transport, fluctuation diagnostics for magnetic confinement fusion experiments.
Website: http://web.mit.edu/nse/people/faculty/white.html

Bilge Yildiz, Associate Professor of Nuclear Science and Engineering & Materials Science and Engineering (617-324-4009) [byildiz@mit.edu] Ph.D., Massachusetts Institute of Technology, 2002. Conducting oxide surfaces for enhanced activity and durability in high temperature electrocatalytic devices for hydrogen, synthetic gas (H2+CO), and electricity production; engineered micro- and nano-structures in alloys for improved resistance against corrosion and stress corrosion cracking in nuclear and other energy systems subject to harsh environments. Website: http://web.mit.edu/nse/people/faculty/yildiz.html

<u>Other Faculty</u>

John A. Bernard, Jr., Principal Research Engineer (617-253-4202) [bernardj@mit.edu] Ph.D., Massachusetts Institute of Technology. Closed-Loop Digital Control of Nuclear Reactors; Use of Nuclear Energy for the Exploration of Space; Artificial Intelligence Applications to Nuclear Reactors; Nuclear Medicine, particularly Neutron Capture Therapy; Health Physics; Radiation Biology; Operator Training; Reactor Operations; Energy Planning; and the Interaction of Technology and Law.
Website: http://web.mit.edu/nse/people/researchstaff/bernard.html

Peter Catto, Senior Research Scientist (617-253-5825) [catto@psfc.mit.edu] Ph.D.
Plasma and neutral flows; electric fields, and edge physics issues in diverted tokamak plasmas, and dipole stability. Website: http://www.psfc.mit.edu/people_new/faculty/catto.html

Sow-Hsin Chen, Professor of Nuclear Science and Engineering Emeritus (617-253-3810) **[**sowhsin@mit.edu] Ph.D**.,** McMaster University**,** 1964. Thermal Neutron Spectroscopy of Soft Condensed Matter. Website: http://web.mit.edu/nse/people/faculty/chen.html

Michael J. Driscoll, Professor of Nuclear Science and Engineering Emeritus **(**617-253-4219) **[**mickeyd@mit.edu] Ph.D. Deep borehole waste disposal; Fast reactor physics and engineering.

Charles W. Forsberg, Principal Research Scientist; Executive Director, MIT Nuclear Fuel Cycle Project **(**617-324-4010) [cforsber@mit.edu] Sc.D**.,** Massachusetts Institute of Technology**,** 1974**.** Development of integrated nuclear fuel cycles, advanced high-temperature nuclear reactors using liquid-salt coolants, and development of global nuclear-renewables energy systems. Professional Engineer.
Website: http://web.mit.edu/nse/people/faculty/forsberg.html

Jeffrey P. Freidberg, Professor of Nuclear Science & Engineering Emeritus (617-253-8670) [jpfreid@mit.edu] Ph.D., Polytechnic Institute of Brooklyn, 1964. Plasma Physics; Fusion Technology.
Website: http://www.psfc.mit.edu/people_new/faculty/jf.html

Linn W. Hobbs, Professor of Nuclear Science and Engineering and Materials Science and Engineering Emeritus **(**617-253-6835) **[**hobbs@mit.edu] D.Phil**.,** Oxford University, UK 1972. Radiation effects in materials (principally ceramics, but also metals and organics); extended defects and non-stoichiometry in nonmetalic solids; atomistic and topological modeling of glass structures; high-temperature corrosion; orthopaedic biomaterials and biomineralization. Website: http://web.mit.edu/hobbsgroup/

Richard C. Lanza, Senior Research Scientist (617-253-2399) Ph.D. Radiation imaging; radiation detectors; nondestructive testing; radiological and industrial applications of radiation; development of new radiation sources.

Ronald R. Parker, Professor Emeritus of Nuclear Science and Engineering and Electrical Engineering and Computer Science (617-258-6662) [parker@mit.edu] Sc.D., Massachusetts Institute of Technology, 1967. Plasma physics and controlled thermonuclear fusion.

Kord Smith, Korea Electric Power Company (KEPCO) Professor of the Practice of Nuclear Science and Engineering (617-252-1570) [kord@mit.edu] Ph.D., Massachusetts Institute of Technology, 1980. Reactor analysis methods; computational methods; high performance computing (HPC)s.
Website: http://web.mit.edu/nse/people/faculty/smith.html

Neil E. Todreas, Professor of Nuclear Science and Engineering and Professor of Mechanical Engineering Emeritus (617-253-5296) [todreas@mit.edu] Ph.D. Reactor engineering; reactor thermal analysis; heat transfer and fluid flow.

Sidney Yip, Professor Emeritus of Nuclear Science and Engineering, and Materials Science and Engineering (617-253-3809) [syip@mit.edu] Ph.D., University of Michigan 1962. Statistical physics and condensed matter of sciences, atomistic simulations. Website: http://web.mit.edu/nse/people/faculty/yip.html

Nuclear Engineering Research Centers

Plasma Science and Fusion Center [http://web.psfc.mit.edu/] Director, Professor Dennis Whyte (NSE) [whyte@psfc.mit.edu]. The Plasma Science and Fusion Center carries out a broad range of experimental and theoretical research in understanding the physics of plasmas and their applications to magnetic and inertial confinement fusion, the physics of waves and beams, development of state-of-the-art superconducting magnet systems, and development of plasma technologies for industry applications. The Center's Magnetic Resonance Division is internationally recognized for advances in Magnetic Resonance Imaging (MRI) and Nuclear Magnetic Resonance (NMR) Spectroscopy, in NMR and MRI magnet development, and in nanoscience condensed matter physics.

Center for Advanced Nuclear Energy Systems [http://web.mit.edu/canes/] Director, Professor Jacopo Buongiorno (NSE). CANES has four research themes: Near-term Innovations in Fission Systems, Inventing the Future of Fission, Working at the Foundations of Nuclear Energy Technology, and Educating the Community/Informing the Policy. Ongoing projects cover the full spectrum of fission energy technology and policy from Advanced Reactors to Nuclear Fuel Cycles, from Enhanced Plant Performance to Nuclear Energy and Sustainability. The Center offers three short summer professional courses: Nuclear Systems Safety, Reactor Technology for Power Plan Executives, and Probabilistic Methods for Nuclear Plant Management. Annual Research Expenditure: $14,000,000.

Industrial Performance Center (IPC) [http://web.mit.edu/ipc] Director, Richard K. Lester (Japan Steel Industry Professor of Nuclear Science and Engineering). The Industrial Performance Center (IPC) is an MIT-wide research unit, based in the School of Engineering. The Center serves as a focus at MIT for interdisciplinary research on the rapidly changing global economy. Our interdisciplinary teams observe, analyze and report on strategic, technological, and organizational developments in a broad range of industries and examine the implications for society and the global economy. The IPC currently has four main research areas: innovation; production; energy and globalization and global value chains.

MIT Nuclear Reactor Laboratory [nrl.mit.edu] Director, Prof. David Moncton (dem@mit .edu). The Nuclear Reactor Laboratory is an interdepartmental laboratory that operates the 6 MW MIT Research Reactor (MITR) which is a partner of the Department of Energy's National Science User Facilities. NRL has research programs including in-core experiments for advanced materials, fuel and instrumentation irradiation tests, reactor physics modeling, neutron beam applications, and neutron activation analysis. New methods are under development to enable advanced x-ray and neutron imaging of irradiated nuclear materials. The MITR is also used to support lab courses, irradiation services, student operator training and public outreach activities.

Laboratory for Nuclear Security and Policy (LNSP) [http://lnsp.mit.edu] Director, R. Scott Kemp (NSE). LNSP is home to interdisciplinary research that aims to solve the social challenges arising from nuclear technologies. Research has focused in areas such as the detection of nuclear proliferation, the proliferation risk of emerging fuel-cycle technologies, verification technologies for arms control treaties, and the detection of smuggled nuclear material in cargo. LNSP researchers combine a broad range core analytical methods, ranging from low-energy nuclear physics to information science, and history to international politics.

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
B.S.	11	15	12	*	*
Masters	14	14	14	*	*
PhD	5	5	6	*	*

Graduate Student Enrollment: 30 Masters/41 Ph.D.
ABET Accreditation: Nuclear Engineering Option in Chemical Engineering (BS),
Radiological Health Physics Option in Physics (BS, MS)
CAMPEP Accreditation: Medical Physics (MS, PhD)

Distance Education Program
Offers Nuclear Engineering Courses Online

Nuclear Science and Engineering Faculty

Sukesh Aghara, Associate Professor and Director, Nuclear Engineering Program (979-934-4000) [Sukesh_Aghara@uml.edu] Ph.D., The University of Texas at Austin, 2003. Radiation transport; space radiation protection; reactor experiments; radiation protection and shielding.

Partha Chowdhury, Professor (978-934-3730) [Partha_Chowdhury@uml.edu] Ph.D., S.U.N.Y. Stonybrook, 1979. Gamma-ray spectroscopy; nuclear structure.

Clayton S. French, Jr., Professor (978-934-3286) [Clayton_French@uml.edu] Ph.D., University of Lowell, 1985. Internal dosimetry; health physics.

Wilfred Ngwa, Assistant Professor (978-934-3791) [WNGWA@LROC.HARVARD.EDU] Ph.D., University of Leipzig, Germany, 2004. Nanoparticle-aided radiotherapy; Motion management during radiotherapy; pre-clinical radiotherapy; Biophysics.

Justin M. Pounders, Assistant Professor (978-934-5204) [justin_pounders@uml.edu] Ph.D., Georgia Institute of technology, 2010. Reactor physics; radiation transport; multiphysics; nuclear plant simulation.

Erno Sajo, Professor (978-934-3288) [Erno_Sajo@uml.edu] Ph.D., University of Lowell, 1989. Radiation transport; medical physics, aerosol physics; radiation biology.

Mark Tries, Associate Professor (978-934-3353) [Mark_Tries@uml.edu] Ph.D.**,** University of Massachusetts, Lowell, 2000**.** External dosimetry; shielding; radiochemistry.

Dean Wang, Associate Professor (978-934-5275) [dean_wang@uml.edu] Ph.D., Massachusetts Institute of Technology. Reactor dynamics and safety; transport phenomena; multiscale and multi physics modeling; high-order methods; parallel computing.

John R. White, Professor (978-934-3165) [John_White@uml.edu] Ph.D.**,** University of Tennessee, 1976**.** Research reactor digital control and data acquisition; computational reactor physics; computer methods; reactor modeling.

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Other Faculty

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Gilbert J. Brown, Emeritus Professor (978-934-3166) [Gilbert_Brown@uml.edu] Ph.D., Massachusetts Institute of Technology, 1974. Nuclear workforce development; public acceptance; material characterization; safety energy economics.

James Egan, Professor Emeritus (978-934- 3774) [James_Egan@uml.edu] Ph.D.**,** University of Kentucky**.** Experimental nuclear physics; neutron physics; spectroscopy; detection.

Marco Marzo, Associate Director (978-934-5284) [Marco_Marzo@uml.edu] Ph.D., University of Karlsruhe, Germany, 1981. Nuclear non-proliferation, nuclear safeguards and security; nuclear material accountancy; state evaluation approaches.

Thomas Regan, Adjunct Professor and Chief Reactor Operator (978-934-3548) [Thomas_ Regan@uml.edu] M.S., University of Lowell. Research Reactor operations; materials.

Sirikul Sriprisan, Sr., Research Associate (978-934-2519) [Sikikul_Sriprisan@uml.edu] Ph.D., University of Tennessee, 2008. Radiation shielding and protection, mathematical modeling, space radiation transport, neutron and proton beam experiments.

Nuclear Science and Engineering Research Centers

The **UMass Lowell Radiation Laboratory** houses a 1 megawatt Research Reactor, a multimega curie Cobalt-60 Irradiation Facility, and a 5.5 MeV Van de Graaf particle accelerator. The Radiation Laboratory provides controlled radiation environments and analytical measurement services to government organizations and to industry. The laboratory also provides facilities for proton, neutron and gamma environments and has been used for pure and applied nuclear physics research, for simulating radiation conditions of hostile space environments, for non-destructive testing and analysis, for research and development of radiation resistant electronics and materials, and for research and development of radiation induced modifications to materials.
Website: http://www.uml.edu/centers/RadLab/default.html

Integrated Nuclear Security and Safeguards Laboratory (INSSL) is a multidisciplinary laboratory structured to bring together the expertise in the Nuclear Science and Engineering programs and Center for Terrorism Security Studies to form strategic partnerships in the nuclear security and safeguards area. The INSSL laboratory personnel in partnership with industry and national laboratories work on research projects in radiation detection, material accountancy, and State evaluation processes. INSSL is also engaged in the development of MS and the Graduate Certificate program in Nuclear Security and Safeguards and specialized training programs in this area for working professionals.

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
B.S.	26	26	*	*	*
Masters	10	10	*	*	*
PhD	4	4	*	*	*

Graduate Student Enrollment: 22 Masters/15 Ph.D.

Distance Education Program
Offers Nuclear Engineering Courses and Degrees Online
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Nuclear Science and Engineering Faculty

Adriaan Buijs (905-525-9140 x24925) [buijsa@mcmaster.ca] Ph.D.**,** Utrecht University**,** 1987. The physics of nuclear reactor cores, in particular of heavy-water moderated pressure-tube reactors (CANDU); development of analysis tools for research in reactor physics.
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John C. Luxat, Professor (905-525-9140 x 24670) [luxatj@mcmaster.ca] Ph.D.**,** University of Windsor**,** 1972. Nuclear safety; severe accidents; thermalhydraulics; advanced fuel cycles; safety analysis methodology; reactor core physics. Professional Engineer.

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David R. Novog, Associate Professor **(**905-525-9140) **[**novog@mcmaster.ca] Ph.D., McMaster University**,** 1999. Nuclear safety; thermalhydraulics; reactor physics; reactor control; uncertainty analysis; safety system design and performance; critical heat flux; computational fluid synamics; computer code coupling**.** Professional Engineer. Website**:** engphys.mcmaster.ca/faculty_staff/faculty/novog/index.htm

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-7/17
B.S.	38	28	34	37	25
Masters	26	23	23	29	29
PhD	16	17	20	15	24

Graduate Student Enrollment: 26 Masters/ 110 Ph.D.
ABET Accreditation: B.S.E. (N.E.R.S)

Nuclear Science and Engineering Faculty

Ronald M. Gilgenbach, Glenn F. & Gladys H Knoll Department Chair, Chihiro Kikuchi Collegiate Professor, and Director of Plasma, Pulsed Power and Microwave Laboratory (734-763-1261) [rongilg@umich.edu] Ph.D.**,** Columbia University**,** 1978. Plasmas; fusion, z-pinches, intense electron beam physics, and high power microwave generation. Website**:** http://www.ners.engin.umich.edu

Michael Atzmon, Professor (734-764-6888) [atzmon@umich.edu] Ph.D.**,** California Institute of Technology**,** 1985. Thermodynamics and kinetics of materials; amorphous metal alloys; radiation effects in materials. Website**:** http://www.ners.engin.umich.edu

Alex F. Bielajew, Professor (734-764-6364) [bielajew@umich.edu] Ph.D.**,** Stanford University**,** 1982. Theory of electron and photon transport; Monte Carlo theory and development; radiation dosimetry theory; radiotherapy treatment planning algorithms. Website**:** http://www.ners.engin.umich.edu

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John E. Foster, Professor (734-764-1976) [jefoster@umich.edu] Ph.D., University of Michigan, 1996. Low-temperature plasma science; propulsion, environmental, energy conversion, and processing plasmas; space and atmospheric plasma phenomena. Website: http://www.ners.engin.umich.edu

Fei Gao, Professor (734-615-0697) [gaofeium@umich.edu] Ph.D., University of Liverpool, UK, 1995. Computational Nuclear Materials; Radiation Detector Materials; Radiation Effects in Metals, ceramics and glasses; Multi-scale computer simulations of ion-solid interaction, electron-solid interaction, mechanical and electrical properties of nanostructures. Website: http://www.ners.engin.umich.edu

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John C. Lee, Professor **(**734-764-9379) [jcl@umich.edu] Ph.D., University of California, Berkeley, 1969. Nuclear reactor physics; reactor safety; power plant simulation and control; fuel cycle analysis. Website: http://www.ners.engin.umich.edu

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William R. Martin, Professor (734-764-5534) [wrm@umich.edu] Ph.D.**,** University of Michigan**,** 1976. Computational methods development for the solution of the Boltzmann transport equation including deterministic and Monte Carlo methods. Website: http://www.ners.engin.umich.edu

Martha Matuszak, Assistant Professor (734-936-4309) [marthamm@med.umich.edu] Ph.D., University of Michigan, 2007. Treatment planning and optimization for external beam radiotherapy with an emphasis on intensity modulated radiotherapy, volumetric modulated arc therapy, and seteriotactic body radiation therapy.

Ryan D. McBride, Associate Professor (734-763-7504) [mcbrider@umich.edu] Ph.D., Cornell, 2009. Plasma physics; high-energy-density physics; nuclear fusion; radiation generation; pulsed-power technology; plasma diagnostics; magnetically driven, cylindrically imploding systems. Website: http://www.engin.umich.edu/ners/people/faculty/ryan-mcbride

Sara Pozzi, Professor (734-615-4970) [pozzisa@umich.edu] Ph.D., Polytechnic of Milan, Italy, 2001. Development of new methods for nuclear materials identification and characterization for nuclear nonproliferation and homeland security applications.
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Xiaodong Sun, Professor (734-615-9749) [xdsun@umich.edu] Ph.D., Purdue University, 2001. Thermal hydraulics and reactor safety;two-phase flow experimentation, modeling and numerical simulation;interfacial structure characterization and bubble dynamics;thermal hydraulics in high-temperature reactors

Alexander G.R. Thomas, Associate Professor, (734-763-6008) [agrt@umich.edu] Ph.D.**,** Imperial College, London, UK**,** 2007**.** High-power laser-plasma interactions, particle accelerators, radiation sources, kinetic plasma computation. Website: http://www.ners.engin.umich.edu

Lumin Wang, Professor (734-647-8530) [lmwang@umich.edu] Ph.D.**,** University of Wisconsin-Madison**,** 1988. Ion beam modification of materials; transmission electron microscopy; nanocrystalline materials; and nuclear materials. Website: http://www.ners.engin.umich.edu

Gary S. Was, Professor of Nuclear Engineering and Radiological Sciences and Materials Science and Engineering; Walter J. Weber, Jr. Professor of Sustainable Energy, Environmental and Earth Systems Engineering (734-763-4675) [gsw@umich.edu] Sc.D., Massachusetts Institute of Technology, 1980. Radiation materials science; materials degradation and design for advanced reactor systems; materials

processing with radiation; ion beam modification and analysis of materials; corrosion, stress corrosion cracking, hydrogen embrittlement, materials degradation modes, nuclear fuels and fuel materials. Website: http://www.ners.engin.umich.edu

David K. Wehe, Professor (734-763-1151) [dkw@umich.edu] Ph.D.**,** University of Michigan**,** 1984. Radiation measurements and applications. Website: http://www.ners.engin.umich.edu

Won Sik Yang, Professor (734-647-8117) [wonyang@umich.edu] Ph.D., Purdue University, 1989. Nuclear Engineering; Nuclear reactor physics; computational methods for reactor analysis; reactor core design; fuel cycle analysis; fast reactors; accelerator driven systems; sensitivity/uncertainty analysis; cross section processing; stability analysis; and reliability analysis. Website: https://ners.engin.umich.edu/

Other Faculty

Ziya A. Akcasu, Professor Emeritus of Nuclear Engineering and Radiological Sciences (734-764-5534) [ziya@umich.edu] Ph.D., University of Michigan, 1963. Nonlinear reactor dynamics; Reactor noise analysis; theory and applications of stochastic differential equations; dynamics of dense fluids; calculation of time-correlations and transport coefficients; dynamics of macromolecular solutions and melts. Particle transport in stochastic media (current).

Kristy Brock, Adjunct Professor (736-936-4294) [kkbrock@med.umich.edu] Ph.D., University of Michigan, 2003. Developing biomechanical models for cancer diagnosis, image-guided therapies and treatment response assessment.

Forrest Brown, Adjunct Professor (505-667-7581) [fbrown@lanl.gov] Ph.D., University of Michigan, 1981. International reputation in Monte Carlo simulation & advanced computing; reactor physics, criticality safety, radiation transport, teraflop & petaflop computers, large-scale engineering computations, parallel/vector computing, distributed computing, computer benchmarking, & computer code development. Website: http://www.ners.engin.umich.edu

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Jeremy Busby, Adjunct Associate Professor (865-241-4622) [jbusby@umich.edu] Ph.D.**,** University of Michigan**,** 2000. Irradiation effects in metals for high temperature reactors, fusion reactors, and spacecraft reactors, radiation-effects in refractory metals, identifying the mechanisms of embrittlement for materials under high temperature irradiation, irradiation-assisted stress corrosion cracking, radiation-induced microstructure and microchemistry changes, characterization of radiation-induced changes, deformation mechanics, transmission electron microscopy, scanning electron microscopy.
Website: http://www.ners.engin.umich.edu

Shaun D. Clarke, Associate Research Scientist (734-615-7830) [clarkesd@umich.edu] Ph.D., Purdue University, 2007. Simulation techniques for active interrogation systems using high-energy photons - methods under investigation include photoneutron energy spectra and multiplicity analysis.
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Rodney C. Ewing, Emeritus Professor of Geological Sciences, Materials Science and Engineering, and Professor of Nuclear Engineering and Radiological Sciences (734-763-9295) [rodewing@umich.edu] Ph.D., Stanford University, 1974. Nuclear waste management; radiation effects in complex ceramics and glasses.
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Ronald F. Fleming, Emeritus Professor of Nuclear Engineering and Radiological Sciences (734-647-9661) [flemingr@umich.edu] Ph.D., University of Michigan, 1976. Neutron activation analysis; materials analysis using nuclear techniques; radiation measurements.
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Mitchell Goodsitt, Adjunct Professor of Nuclear Engineering and Radiological Sciences, Professor of Radiological Sciences Department of Radiology (734-936-7474) **[**goodsitt@umich.edu] Ph.D., University of

Wisconsin, 1982. Medical physicist specializing in research in diagnostic x-ray and ultrasound imaging and quality control such as development of a combined 3D X-ray and 3D ultrasound breast imaging system; diagnostic radiology quality assurance research projects.
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Mark Hammig, Associate Research Scientist **(**734-764-5225) [hammig@umich.edu] Ph.D.**,** University of Michigan**,** 2005. Radiation detector development; stochastic systems research; photonic devices.
Website: http://www.ners.engin.umich.edu

Zhijie Jiao, Associate Research Scientist (734-615-7761) [zjiao@umich.edu] Ph.D., Polytechnic University of New York, 2004. Irradiation-assisted stress corrosion cracking; high temperature corrosion; radiation effects; microstructure evolution under irradiation; transmission electron microscopy; focus ion beam microscopy; atom probe tomography. Website: http://www.ners.engin.umich.edu

Nicholas M. Jordan, Assistant Research Scientist (734-763-0213) [jordann@umich.edu] Ph.D., University of Michigan, 2008. Plasma Physics.

Terry Kammash, Stephen S. Attwood Professor of Engineering and Professor Emeritus of Nuclear Engineering and Radiological Sciences (734-764-0205) [tkammash@umich.edu] Ph.D., University of Michigan, 1958. Theoretical and computational investigations of high temperature plasma confinement in magnetic fusion devices, including the study of equilibrium, transport, and stability of plasma in toroida and open-ended devices; inertial confinement fusion; plasma engineering; power producing fusion reactors; space applications of nuclear energy. Website: http://www.ners.engin.umich.edu

Brendan Kochunas, Assistant Research Scientist (734-763-4391) [bkochuna@umich.edu] Ph.D., University of Michigan, 2013. 3-D neutron transport.

Wenjun Kuang, Assistant Research Scientist (734-763-7499) [kuangw@umich.edu] Ph.D., Chinese Academy of Sciences, 2011. Radiation effects on materials, materials degradation in the reactor environment.

Yuxuan Liu, Assistant Research Scientist (734-764-5603) [yuxuanl@umich.edu] Ph.D., University of Michigan, 2015. Reactor physics; neutron transport and cross section processing.

Chenyang Lu, Assistant Research Scientist (734-647-8529)[chenylu@umich.edu] Ph.D., Northeastern University, China, 2014. Nuclear Engineering. Website: http://www.ners.engin.umich.edu

Martha Matuszak, Adjunct Assistant Professor (734-936-4309) [marthamm@med.umich.edu] Ph.D., University of Michigan, 2007. Treatment planning and optimization for external beam radiotherapy; Treatment plan individualization and adaption based on physiologic factors and imagin; Radiation Oncology and medical physics education; National radiation therapy treatment protocols for Children's Oncology Group (COG) and the Radiation Therapy Oncology Group (RTOG).
Website: http://www.ners.engin.umich.edu

Namdoo Moon, Adjunct Professor (734-764-4260) [namdoo.moon@HQ.DHS.GOV] Ph.D., University of Michigan, 1993. Nuclear Detection.

Imre Pazsit, Adjunct Professor (46-31-772-3081) [imre@nephy.chalmers.se] Ph.D., Roland Eotvos University, Budapest, 1975. Theory of neutron fluctuations in multiplying materials with application to nuclear material detection and identification; stochastic theory of neutron slowing down, energy deposition and light generation in detectors; solving inverse problems in material identification; deterministic and stochastic transport of neutrons and charged particles; dynamics and diagostics of current and future reactor systems. Website: http://www.ners.engin.umich.edu

Victor Petrov, Assistant Research Scientist (734-763-4626) [petrov@umich.edu] Ph.D., Institute of Engineering Physics (IIF) and Moscow State Industrial University, Russia, 2008. Computational Fluid Dynamics.

Dipankar Ray, Adjunct Assistant Professor (734-963-7286) [dipray@med.umich.edu] Ph.D, Indian Institute of Science, Bangalore, India, 2001. Radiation pneumonities and lung fibrosis;understanding and development of molecularly targeted approaches in cancer therapeutics.
Website: http://www.med.umich.edu/radonc/research/CanBio/Ray_D.html

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Dieter Vincent, Professor Emeritus of Nuclear Engineering and Radiological Sciences (734-936-1592) [dvincent@umich.edu] Ph.D., Universitaet Goettingen, 1956. Radiation effects in materials, hydrogen (and helium) in metals; ion beam analysis; moessbauer spectroscopy; positron lifetime spectroscopy. Website: http://www.ners.engin.umich.edu

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Ruth Weiner, Adjunct Assistant Professor (505-284-8406) [rfweine@sandia.gov] Ph.D**.,** Johns Hopkins University**,** 1962. Radiation risk analysis; radioactive waste management, transportation and storage of radioactive materials. Website: http://www.ners.engin.umich.edu

Yuefeng Zhu, Assistant Research Scientist (734-763-8566) [zhuyuef@umich.edu] Ph.D., University of Michigan, 2012. Digital signal processing methods for pixelated 3-D Position Sensitive Room-Temperature Semiconductor Detectors.

Nuclear Science and Engineering Research Centers

Applied Nuclear Science Instrumentation Laboratory. The Applied Nuclear Science Instrumentation Laboratory (ANSIL) was established in the new Nuclear Engineering Building in 2017. This facility features approximately 1000 ft^2 of high-cleanliness laboratory space and supports the development of advanced instrumentation for a wide range of projects. Some examples of current research include the development of novel neutron and antineutrino detectors and detection methodologies for applications in nuclear security, nonproliferation, nuclear power, and fundamental scientific research.
Website: https://ansg.engin.umich.edu/applied-nuclear-science-instrumentation-laboratory/

Center for Ultrafast Optical Science (CUOS-EECS): The Center for Ultrafast Optical Science (CUOS) is an interdisciplinary research center in the College of Engineering at the University of Michigan in Ann Arbor. CUOS was sponsored as a Science and Technology Center by the National Science Foundation during 1990- 2001, and as a College of Engineering Center continues its research in ultrafast optics with funding from a variety of government agencies and industry. Its mission is to perform multidisciplinary research in the basic science and technological applications of ultrashort laser pulses, to educate students from a wide variety of backgrounds in the field, and to spur the development of new technologies.
Website: https://cuos.engin.umich.edu/

The Detection for Nuclear Nonproliferation Laboratory: The Detection for Nuclear Nonproliferation Lab develops new techniques for radiation detection and characterization for nuclear nonproliferation and homeland security applications. In addition, we study the detailed response of liquid and plastic scintillation detectors in the presence of neutron and gamma-ray sources. The laboratory is equipped with many detection systems, including a dual-particle imager for standoff detection of special nuclear material, a portable dual-particle imager, a fast-neutron multiplicity counter for the assay of fissile material, and radiation portal monitors. The lab also hosts a 9 MV electron linear accelerator for active interrogation experiments. The laboratory is also equipped with tens of detectors and dedicated readout electronics, including silicon photomultiplier arrays, fast (GHz) digitizers for pulse acquisition and workstations for data real-time analysis and post-processing.
Website: http://www-ners.engin.umich.edu/labs/dnng/

Experimental and Computational Multiphase Flow (ECMF) Laboratory: This lab was established in 2013 with the purpose of advancing and understanding thermal-hydraulics and fluid-dynamics phenomena of relevance for nuclear applications. It is used to perform experiments for single-phase and two-phase flows using advanced state-of-the-art high-resolution experimental techniques. The highly-resolved (in time and space) experimental data are used to establish a database for the validation and further development of Computational Fluid Dynamics models.
Website: http://www.umich.edu/~nuclear/labs/ecmf/

Glenn F. Knoll Nuclear Measurements Laboratory: The Position-Sensing Semiconductor Radiation Detector Laboratory is dedicated to the development of room-temperature semiconductor radiation detectors. The focuses of research include the design of advanced semiconductor-based gamma and neutron spectrometers, ultra- low noise Application Specific Integrated Circuitries (ASICs), real- time gamma-ray imaging reconstruction algorithms, and real-time nuclear isotope detection techniques.

These instruments are being developed for applications in national security, nuclear non-proliferation, homeland security, nuclear power safety, medical imaging, astrophysics, planetary sciences, particle physics, etc. Website: https://cztlab.engin.umich.edu/

High Temperature Corrosion Laboratory (HTCL): The High Temperature Corrosion Laboratory (HTCL) contains five high pressure, high temperature autoclave systems that provide the capability to conduct corrosion, stress corrosion cracking, and hydrogen embrittlement tests in high temperature aqueous environments and, in particular, simulated light water reactor environments.
Website: https://htcl.engin.umich.edu

Irradiated Materials Testing Complex (IMTC): The PML hot cells combined with the Irradiated Materials Testing Laboratory provides the capability to conduct high temperature corrosion and stress corrosion cracking of neutron irradiated materials and to characterize the fracture surfaces after failure.
Website: https://imtl.engin.umich.edu/

Materials Preparation Laboratory: The Materials Preparation Laboratory provides facilities for the preparation and characterization of materials for materials research studies. The lab houses a grinding and polishing table for metallographic sample preparation, a tube furnace for annealing and heat treating, an electropolishing and etching system, a jet-electropolisher for making TEM disc samples, a slow speed cut-off wheel, a slurry drill, and a microscope and camera for imaging sample surfaces. Website: https://ners.engin.umich.edu/research/labs/materials/

MCASL Center: The University of Michigan branch of CASL, the Consortium for Advanced Simulation of Light Water Reactors (LWRs) that is centered at Oak Ridge National Laboratory. CASL was established in 2010 as a ten-institution partnership to create a virtual reactor for predictive simulation of LWRs. The partnership includes three universities (Michigan, MIT and NC State), four national labs (Oak Ridge, Los Alamos, Sandia, and Idaho), a reactor manufacturer (Westinghouse), a reactor owner/operator (TVA), and the research arm of the nuclear utility industry (Electric Power Research Institute). The MCASL Center includes faculty, PhD students, and postdoctoral fellows from four engineering departments: NERS, Aerospace, Mechanical Engineering, and Materials Science and Engineering. MCASL faculty are involved in development of advanced computational methods for analysis of coupled nuclear reactor phenomena including neutron transport, thermal/hydraulics, materials performance, and validation of these methods against experimental data.
Website: https://ners.engin.umich.edu/research/labs/fission-radiation/

Metastable Materials Laboratory: In the Metastable Materials Laboratory, phase transformations and mechanical behavior of nanocrystalline and amorphous materials are studied. The lab is equipped with facilities for x-ray diffraction, calorimetry, mechanical alloying, and annealing in high-purity atmosphere. Website: https://ners.engin.umich.edu/research/labs/materials/

Michigan Center for Materials Characterization [$(MC)^2$-MSE]: $(MC)^2$ supports a diverse multi-disciplinary user-base of more than 450 users from various colleges and department across the UM campus, more than 100 internal research groups, and 20 non-academic companies. The mission of $(MC)^2$ is to provide

cost effective, efficient, safe, and socially responsible access to advanced characterization equipment and expertise thereby promoting, enabling, and encouraging cutting-edge education, research, and business development. Website: https://mc2.engin.umich.edu/

Michigan Ion Beam Laboratory (MIBL): The Michigan Ion Beam Laboratory for Surface Modification and Analysis (MIBL) was completed in October of 1986, and extensively renovated and expanded in 2015. The laboratory was established for the purpose of advancing our understanding of ion-solid interactions by providing up-to-date equipment with unique and extensive facilities to support research at the cutting edge of science. Researchers from the University of Michigan as well as industry and other universities are encouraged to participate in this effort. MIBL is houses 3 accelerators, 9 beam lines and 5 end stations in addition to a transmission electron microscope for conducting in situ irradiations in the TEM. MIBL is a fully, digitally controlled laboratory providing unparalleled capabilities and control for radiation damage studies. Website: https://mibl.engin.umich.edu/

Neutron Science Laboratory. The Neutron Science Laboratory (NSL) is dedicated to advancing the fundamental understanding and applications of neutrons science, particularly the development of radiation detection materials, devices, and systems. This laboratory is also an important educational resource, providing hands-on measurement experience to NERS students. The laboratory is equipped with DD and DT neutron generators, a Cf-252 neutron source, and a variety of standard and advanced radiation detectors and nuclear electronics. The neutron sources are also available for researchers in NERS and elsewhere within the university who require a neutron radiation field for the conduct of their research. Website: https://ansg.engin.umich.edu/facilities/neutron-science-laboratory/

Plasma, Pulsed Power and Microwave Lab: The purpose of this lab is to investigate the fundamental physics and technologies associated with pulsed-power-driven plasmas and electron beams. Focus areas include experimental and theoretical plasma physics, high-energy-density physics, nuclear fusion (magneto-inertial fusion, inertial confinement fusion, and fusion energy), pulsed-power technology development (including linear transformer drivers), magnetically driven implosions (fast z-pinches), advanced diagnostic instrumentation (plasma imaging techniques, plasma spectroscopy, electric and magnetic field measurements), laboratory astrophysics, and radiation source development (x-rays, neutrons, and high-power microwaves). Numerous state-of-the-art high-power accelerators, lasers, high-power microwave sources, diagnostic instruments, and simulation codes are utilized in this research. Website: http://www-ners.engin.umich.edu/labs/plasma/

Plasma Science and Technology Laboratory: The Plasma Science and Technology Laboratory's focus is on understanding basic plasma science phenomena and applying plasma science concepts to real world problems. The lab has four major thrust areas: plasma space propulsion, environmental hazards mitigation, plasma processing, and plasma-materials interactions as related to fusion. Particular attention is paid to those applications that protect the environment and those that improve the quality of life in underdeveloped countries. Website: http://www-ners.engin.umich.edu/lab/pstlab/

Radiation Effects and Nanomaterials Lab: The Radiation Effects and Nanomaterials Laboratory is for the preparation and analysis of materials for the study of radiation effects and nanoscience/technology. The laboratory facilities include: a Regarku Miniflex x-ray diffractometer (XRD), a high temperature furnace,

a Gatan precision ion polishing (PIPS) workstation, an ultramicrotomy workstation, a carbon coater, and other standard equipment for TEM sample preparation.

Radiation Imaging Laboratory: The Radiation Imaging Laboratory's goal is to develop high- energy gamma ray imaging systems for industrial, space, homeland security, and medical applications. The laboratory explores the fundamental properties of nuclear radiation detectors, develops novel pulse processing electronics, simulates builds and tests unique radiation measurement systems, and explores new ideas in radiation image formation and reconstruction.
Website: http://www-ners.engin.umich.edu/labs/radmeas/

Radiological Health Engineering Laboratory: The Radiological Health Engineering (RHE) Laboratory includes equipment and space for the development and testing of new instruments and systems for application to specific radiological health problems. Work is concentrated on practical systems and radiation measurements methods deployable within the immediate future. Work is conducted in novel detector and dosimeter design, as well as improvements in measurement methods for medical, industrial, laboratory and nuclear power radiation safety applications.
Website: https://rhelab.engin.umich.edu/

UNIVERSITY OF MISSOURI, COLUMBIA

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
Masters	*	11	15	*	*
PhD	*	6	11	*	*

Graduate Student Enrollment: 33 Masters/36 Ph.D.
ABET Accreditation: MS and PhD degree in Medical Physics

Distance Education Program
Offers Nuclear Engineering Courses Online
http://mudirect.missouri.edu/degprog/specialized/_homeland.shtm

Nuclear Science and Engineering Faculty

Mark A. Prelas, Professor and Director of Research (573-882-9691) [prelasm@missouri.edu] Ph.D**.,** University of Illinois Urbana Champaign**,** 1979**.** Radiation damage; diamond and related materials; direct energy conversion; radiation detection; molecular sensors; directed energy; nonproliferation; risk management**.** Professional Engineer. Website: http://prelas.nuclear.missouri.edu/

Tushar Ghosh, Director of Graduate Studies and Professor (573-882-9736) [GhoshT@missouri.edu] Ph.D., Oklahoma State University 1989. High temperature adsorption of fission products, Diffusion of fission products in graphite—experimental and theoretical investigation, adsorption phenomena in biochemical systems, kinetics and reaction mechanisms of catalytic reactions, nuclear waste treatment.

Sudarshan K. Loyalka, Curators' Professor, Professor, and Director of Particulate Systems Research Center (573-882-8201) [LoyalkaS@missouri.edu] Ph.D., Stanford University, 1967. Kinetic theory of gases, Diffusion of fission products in graphite, neutron transport, mechanics of aerosols, physics and thermal hydraulics of nuclear reactors, reactor safety analysis.

Robert V. Tompson, Associate Professor (573-882-2881); [TompsonR@missouri.edu]; Ph.D., University of Missouri, 1988. Kinetic theory of gases, experimental and theoretical aerosol mechanics, neutron transport theory, nuclear reactor physics and safety, lasers and laser applications, materials.

Other Faculty

William H. Miller, Professor and Director of Energy Systems and Resources Program, Emeritus (573-882-9692) [MillerW@missouri.edu] Ph.D., University of Missouri, 1976. Detectors and digital instrumentation, radiation-based analytical techniques, proton recoil neutron spectrometers, energy systems, public information.

Nuclear Engineering Research Centers

Particulate Systems Research Center: Aerosol mechanics, dynamics, interactions; Particulate production; nuclear safety, very high temperature reactor fuels.

MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
B.S.	25	38	40	34	37
Masters	8	6	20	6	9
PhD	0	4	5	5	3

Graduate Student Enrollment: 8 Masters/32 Ph.D.
ABET Accreditation: BS Nuclear Engineering

Nuclear Science and Engineering Faculty

Hyoung Koo Lee, Associate Professor & Program Chair (573-341-4747) [leehk@mst.edu] Ph.D., University of California-Berkeley, 1995. Radiation Imaging; Radiation Detection; Nondestructive Evaluation**.** Website: http://web.mst.edu/~leehk/

Ayodeji B. Alajo, Assistant Professor (573-341-6609) [alajoa@mst.eu] Ph.D., Texas A&M University, 2010. Nuclear systems design and modeling; Advanced fuel cycles; Nuclear waste minimization; Nuclear forensics. Website: http://nuclear.mst.edu/facultyandfacilities/alajo.html

Muthanna H. Al-Dahhan, Professor (573-341-7518) [aldahhanm@mst.edu] Ph.D., Washington University in St. Louis, 1993. Advanced process measurement and monitoring techniques; Radiometric techniques and applications of radioisotopes and nuclear technology in industrial process imaging and visualization; 4th generation nuclear energy and related topics; Multiphase reaction engineering, reactors and processes via advanced measurement, modeling and computational techniques; modeling of transport (momentum, mass, heat) – kinetic interactions; energy efficient and environmentally responsible design, scale-up and performance of multiphase reactors and flow systems; sustainable development via advancing the knowledge and investigating various multiphase processes related to sustainable energy and environment, production of clean energy, bio-energy, fuels, chemicals, and petrochemicals, petroleum processes, biomass and coal conversion and their clean utilization, wastes treatment, animal and farm wastes treatment via anaerobic digestion, environmentally responsible and risk free proliferation nuclear energy, etc.

Carlos H. Castano, Associate Professor (573-341-6766) [castanoc@mst.edu] Ph.D., Nuclear Engineering**,** University of Illinois at Urbana Champaign**,** 2007**.** Nano particles with radiation, simulation nuclear systems, Nuclear Materials, Vacuum breakdown.
Website: http://nuclear.mst.edu/facultystaffandfacilities/castano.html

Joseph T. Graham, Assistant Professor (573-341-7759) [grahamjose@mst.edu] Ph.D., The University of Texas at Austin, 2013. Radiation effects; Radiation-solids interactions; Nuclear Materials; Nuclear Ceramics. Website: http://nuclear.mst.edu/facultystaffandfacilities/faculty/josephgraham/

Xin Liu, Assistant Professor (573-341-4693) [xinliu@mst.edu] Ph.D., University of Wisconsin-Madison, 2003. Radiation Detection and Spectroscopy; Radiation Imaging; Nuclear Medicine; Monte Carlo Simulation; Nuclear Well-Logging. Website: http://web.mst.edu/~xinliu

Gary E. Mueller, Associate Professor (573-341-4348) [gmueller@mst.edu] Ph.D., University of Missouri, Rolla, 1980. Packed Bed Particle Characterization; Analytical Fluid Flow; Sub-Atomic Particle Interaction; Professional Engineer.
Website: http://nuclear.mst.edu/faculty/staffandfacilities/mueller.html

Joshua P. Schlegel, Assistant Professor (573-341-7703) [schlegelj@mst.edu] Ph.D. Purdue University, 2012. Two-phase flow experiments and modeling, nuclear reactor thermalhydraulics, heat transfer, fluid mechanics. Website: http://people.mst.edu/faculty/schlegelj/

Joseph Smith, Joint Professor (573-341-4294) [smithjoseph@mst.edu] Ph.D., Brigham Young University, 1990. Research focuses includes developing resilient hybrid energy systems with fossil, nuclear and renewable energy. Develops and applies multi-physics computational tools to analyze turbulent flow inside Small Modular Nuclear Reactors and to analyze dynamic behavior in large processing facilities including Foundries and Aluminum Smelters.
Website: http://chemeng.mst.edu/facultystaffandfacilities/pagejosephsmith/

Shoaib Usman, Associate Professor **(**573-341-4745) [usmans@mst.edu] Ph.D., University of Cincinnati, 1997. Thermo-fluids; natural convection and passive safety; radiation detection; nuclear fuel cycle.
Website: http://nuclear.mst.edu/facultystaffandfacilities/usman.html

Haiming Wen, Assistant Professor (573-341-6167) [wenha@mst.edu] Ph.D., University of California-Davis, 2012. Nuclear materials. Website: http://people.mst.edu/faculty/wenha/index.html

<u>Other Faculty</u>

Mohammed S. Aljohani, Adjunct Professor [mjohani@kau.edu.sa]
Ph.D., Georgia Tech, 1996. Nuclear desalination; Thermal and membrane desalination; Renewable energy; Nuclear and non-nuclear tomography techniques; Radiation detection and measurement.

Mariesa Crow, F. Finley Distinguished Professor (573-341-6305) [crow@mst.edu] Ph.D., U. Illinois, 1989. Electric power engineering; microgrids. Professional Engineer.

Delbert E. Day, Curators Professor Emeritus **(**573-341-4354) [day@mst.edu]
Ph.D., Pennsylvania State University, 1961. Vitrification of nuclear waste; microspheres for radioembolization of tumors; radiotherapy; glasses for brachytherapy. Professional Engineer.

Arvind S. Kumar, Professor Emeritus **(**573-341-4747) [kumar@mst.edu]
Ph.D., University of California-Berkeley, 1977. Nuclear materials, radiation effects, mechanical properties, nuclear plant life extension.
Website: http://nuclear.mst.edu/facultystaffandfacilities/kumar/

Tod Moser, Adjunct Professor (573-823-9253) [tmoser@ameren.com] MSNE**,** University of Missouri – Columbia**,** 1992**.** Professional Engineer.

Nuclear Science and Engineering Research Centers

The Nuclear Reactor: The Missouri S&T Nuclear Reactor is a Nuclear Regulatory Commission (NRC) licensed 200 kilowatt pool-type reactor that is used to support the engineering and science activities on campus. Using the facility, the reactor staff provides hands-on laboratory, research and development, and project opportunities. The reactor uses uranium fuel and is cooled by either natural convection or a forced cooling system in a pool containing approximately 30,000 gallons of water. The open pool design allows access to the reactor core where experiments and samples to be irradiated can be positioned. The facility is equipped with a pneumatics sample irradiation system, a neutron beam port that provides a collimated neutron beam, a thermal column, and an internet accessible hot cell. The reactor is open to the greater campus community and offers an active (operations) licensure program for interested students and others.

Radiation Measurements and Spectroscopy Laboratory (RMSL): The Nuclear Engineering RMSL is equipped with NIM standard electronic units, neutron and gamma scintillation detectors, solid-state detectors, coincidence electronics, and multi-channel analyzers connected to PCs for automated data analysis. The laboratory also includes two portable EG&G HPGe detectors, a Canberra Thermoluminescent dosimeter with state-of-the-art electronics and software, and a Lynx digital data analysis system for remote web-based experimental capacity.

Graduate Center for Materials Research: The facilities of the Graduate Center for Materials Research, and metallurgical engineering and nuclear engineering departments are available for nuclear materials-related research. The Nuclear Materials Lab allows for use of instruments such as a scanning electron microscope, a 300 keV EM-430 Phillips transmission electron microscope, an atomic absorption spectrometer, and a quadrupole mass spectrometer.

Internet-Accessible Hot Cell Facility: A dual-chambered internet-accessible heavily shielded facility with pneumatic access to the 200 kW Research Nuclear Reactor (MSTR) allows authorized distance users to remotely manipulate and analyze neutron irradiated samples. The system consists of two shielded compartments, one for multiple sample storage, and the other dedicated exclusively for radiation measurements and spectroscopy. The second chamber has multiple detector ports, with graded shielding, and has the capability to support gamma spectroscopy using radiation detectors such as a HPGe detector. Both these chambers are connected though a rapid pneumatic system with access to the MSTR nuclear reactor core. The total transportation time between the core and the hot cell is less than 3.0 second.

Advanced Radiography and Tomography Lab (ARTLAB): The Nuclear Engineering ARTLAB is designed to perform radiation imaging for medical or industrial purpose. Students have opportunities of running Monte Carlo simulation codes for radiation imaging systems and experimenting with digital x-ray radiography, x-ray computed tomography (CT), neutron radiography, neutron CT, etc. The technologies developed in the lab can be applied to either medical imaging or non-destructive inspection of various materials or objects including nuclear fuel rods and plates. On-going researches include flat-panel x-ray source for imaging, neutron and x-ray combined CT, and digital image processing.

Neutron Generator Laboratory: The neutron generator laboratory has a D-D neutron generator that produces approximately 109 neutrons/sec. The neutron generator is available for both graduate and undergraduate research and education at Missouri S&T. Examples of research using the neutron generator are reactor kinetics research, the study of two-phase flow, research in nuclear forensics and radiochemistry, particle tracking in complex flows, and the photon-neutron tomography for mechanical testing of structural materials.

US NAVAL ACADEMY

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	7/15-6/16	7/16-6/17
B.S.	8	29

ABET Accreditation: Mechanical Engineering

Nuclear Science and Engineering Faculty

Mark Murray, Professor and Nuclear Engineering Program Director (410-293-6451) [mmmurray@usna.edu] Ph.D., Duke University, 2000. Reactor plant operations, dosimetry, radiation detection, heat transfer and fluid flow. Professional Engineer.

Brad Baker, Assistant Professor (410-293-6511) [bbaker@usna.edu] Ph.D., Naval Postgraduate School, 2013. Nuclear materials; Additive Manufacturing; Joining methods.

Stuart Blair, Assistant Professor (410-293-6502) [sblair@usna.edu] Ph.D., Naval; Post Graduate School, 2012. Computational fluid dynamics; Fluid-structure interactions; Nuclear reactor plant design; Thermal-hydraulics.

Elizabeth Getto, Assistant Professor (410-293-6506) [getto@usna.edu] Ph.D., University of Michigan, 2016. Nuclear materials; Ion irradiation effects in materials; Reactor structural materials.

Stephen McHale, Assistant Professor (410-293-6495) [mchale@usna.edu] Ph.D., Air Force Institute of Technology, 2011. Radiation transport and shielding; Nuclear weapons effects; Neutron imaging and activation analysis.

Marshall G. Millett, Assistant Professor [mmillett@usna.edu] Ph.D., University of Maryland, 1997. Radiation transport and detection modeling, detector use in homeland security. Professional Engineer.

Other Faculty

Travis Chapman, Senior Instructor (410-293-6530)[tchapman@usna.edu] M.E. Nuclear Engineering, University of Maryland, 2016. Reactor plant operations; waste monitoring; regulatory implementation; thermal-hydraulics.

Martin E. Nelson, Professor Emeritus (410-293-6427) [nelson@usna.edu] Ph.D., University of Virginia**,** 1972**.** Dosimetry, radiation detection and measurement, radiation effects on microelectronics, radiation transport. Professional Engineer.

Matt Schell, Instructor (410-293-6498) [schell@usna.edu] M.S., University of Pittsburgh, 1999. Reactor plant operations, Thermonuclear supernova; Radiation detection and measurement.

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
Masters	*	2	2	2	0
PhD	*	0	1	1	4

Graduate Student Enrollment: 4 Masters/ 3 Ph.D.

Nuclear Science and Engineering Faculty

Alexander Barzilov, Associate Professor (702-895-4325) [alexander.barzilov@unlv.edu] Ph.D., Institute for Physics and Power Engineering. Nuclear engineering, radiation applications, nondestructive assay methods. Website: http://www.unlv.edu/people/alexander.barzilov

William G. Culbreth, Associate Professor (702-895-3426) [William.Culbreth@unlv.edu] Ph.D., University of California, Santa Barbara, 1981. Molten Salt Technology for Energy Storage; Spent Nuclear Fuel Storage, Pulsed Reactor Design. Website: https://www.unlv.edu/me

Thomas Hartmann, Associate Professor (702-895-1934) [thomas.hartmann@unlv.edu] Ph.D., University Heidelberg / Karlsruhe Institute of Technology (Germany). Nuclear waste forms; advanced nuclear fuels; x-ray crystallography; solid phase analysis. Website: https://www.unlv.edu/me

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Graduate Student Enrollment: 2 Masters/1 Ph.D.
ABET Accreditation BScE

Nuclear Science and Engineering Faculty

Esam MA Hussein, Professor & Associate Dean (506-447-3105) [hussein@unb.ca]
PhD, McMaster University, 1983. Nuclear Methods for Nondestructive Testing & Imaging, Inverse Problems and Monte Carlo Methods. Professional Engineer.
Website: http://www.unb.ca/fredericton/engineering/depts/mechanical/people/hussein.html/

Nuclear Science and Engineering Research Centers

Laboratory for Threat Material Detection: using atomic/nuclear radiation to detect and characterize concealed objects.

UNIVERSITY OF NEW MEXICO

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FAX: 505-277-5433
Administrative Contact: Elaine Finke
505-277-2692
efinke01@unm.edu
Website: ne.unm.edu

	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
B.S.	13	11	16	16	*
Masters	4	8	12	10	*
PhD	4	4	5	1	*

Graduate Student Enrollment: 30 Masters/ 20 Ph.D.
ABET Accreditation: BS in ChE and BS in NE

Distance Education Program
Offers Nuclear Engineering Courses Online
ne.unm.edu

Nuclear Science and Engineering Faculty

Anil K. Prinja, Professor and Chair (505-277-4600) [prinja@unm.edu] Ph.D., Queen Mary College, University of London, U.K., 1980. Stochastic theory of neutron populations; theory and modeling of high-energy charged particle transport; stochastic uncertainty quantification techniques for radiation transport. Website: www.chne.unm.edu

Osman Anderoglu, Assistant Professor (505-277-0667) [oanderoglu@unm.edu] Ph.D., Texas A&M University, 2010. Advanced Nuclear Materials Development, Characterization and Manufacturing. Website: http://ne.unm.edu/faculty-staff/faculty-profiles/osman-anderoglu.html

Gary W. Cooper, Associate Professor (505-277-2557) [garywc@unm.edu] Ph.D., University of Illinois, 1976. Neutron diagnostics of fusion plasmas. Website: www-chne.unm.edu

Cassiano R. E. de Oliveira, Professor **(**505-277-5661) [cassiano@unm.edu] Ph.D., University of London, 1987. Computational nuclear science; deterministic and stochastic radiation transport; reactor physics methods; nuclear criticality safety; radiation shielding and dosimetry; high performance computing; advanced numerical discretization methods; data assimilation and optimization methods. Website: http://www-chne.unm.edu/faculty/oliveira/oliveira.htm

Mohamed S. El-Genk, Regents' Professor, Chemical, Nuclear and Mechanical Engineering (505-277-5442) [mgenk@unm.edu] Ph.D. Nuclear reactors neutronics analysis, design, thermal-hydraulics and safety; nuclear fuel and fuel cycle; energy conversion; space nuclear power and propulsion; radiation shielding of space energetic particles; thermal management and energy storage; heat pipes; CFD analysis of advanced reactors and complex systems; boiling heat transfer and two-phase flow; advanced cooling of electronics; and fluid flow and heat transfer in micro-systems.

Adam A. Hecht, Associate Professor (505-277-1654) [hecht@unm.edu] Ph.D.**,** Yale University**,** 2004**.** Radiation detection and measurement with work in nuclear nonproliferation; experimental work in array detection techniques to extract further radioactive source information; calculational work expanding Monte Carlo simulations to fission for use in active interrogation radiation detection; deasurement work on fission output for a range of interrogation beams; investigating properties of novel materials for radiation detection and spectroscopy. Website: www.unm.edu/~hecht

Youho Lee, Assistant Professor (505-277-0686) [euo@unm.edu] Ph.D., Massachusetts Institute of Technology, 2013. Nuclear fuel; Thermomechanical analysis; Long-term storage of spent nuclear fuel; Integrated fission reactor system design.

Other Faculty

Robert D Busch, Principal Lecturer (505-277-8027) [busch@unm.edu] Ph.D.**,** University of New Mexico**,** 1976**.** Nuclear criticality safety; reactor physics measurements; laboratory educational techniques**.** Professional Engineer.

Nuclear Science and Engineering Research Centers

AGN Reactor, Small sample reactivity measurements and rossi-alpha measurements.

Center for Nuclear Nonproliferation Science and Technology: Interdisciplinary center promoting class and lab coursework and laboratory research.

Nuclear nonproliferation research laboratory: For work on radiation detection materials and techniques, with capabilities in multichannel digital data acquisition, high vacuum and controlled gas environments.

NORTH CAROLINA STATE UNIVERSITY

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
B.S.	35	28	43	23	39
Masters	25	25	12	12	13
PhD	6	4	3	11	9

Graduate Student Enrollment: 36 Masters/88 Ph.D.
ABET Accreditation: BS

Distance Education Program
Offers Nuclear Engineering Courses and Degrees Online
http://engineeringonline.ncsu.edu/PS/grad_degrees.html

Nuclear Science and Engineering Faculty

Kostadin Ivanov, Professor and Head (919-515-1466**)** [knivanov@ncsu.edu] Ph.D., Institute for Nuclear Research and Nuclear Energy, Bulgarian Academy of Sciences, 1990. Reactor physics; methods in static and dynamic analysis; nuclear power plant modeling; fuel management; verification and validation of multi-physics simulations and uncertainty quantification. Professional Engineer.
Website: https://www.ne.ncsu.edu/people/knivanov

Dmitriy Y. Anistratov, Associate Professor (919-513-4353) [anistratov@ncsu.edu] Ph.D., Mathematical and Physical Sciences Institute for Mathematical Modeling, Russian Academy of Sciences, 1993. Computational physics, transport theory, numerical analysis.
Website: https://www.ne.ncsu.edu/people/dyanistr

Maria Avramova, Associate Professor (919-513-6354) [mnavramo@ncsu.edu] Ph.D., Pennsylvania State University, 2007. Reactor thermal-hydraulics; core design; transient and safety analysis; multi-physics multi-scale simulations; verification and validation; uncertainty and sensitivity analysis.
Website: https://www.ne.ncsu.edu/people/mnavramo

Yousry Y. Azmy, Distinguished Professor of Nuclear Engineering, Director of CNEC (919-515-3385) [yyazmy@ncsu.edu] Ph.D., University of Illinois, Urbana-Champaign, 1985. Nuclear computational Science. Computational transport theory. Multiprocessing.
Website: https://www.ne.ncsu.edu/people/yyazmy

Igor A. Bolotnov, Associate Professor (518-542-8939) [igor_bolotnov@ncsu.edu] Ph.D., Rensselaer Polytechnic Institute, 2008. Multiscale approaches for nuclear reactor simulations; development of new spectral cascade transfer multiphase flow. Website: https://www.ne.ncsu.edu/people/iabolotn/

Mohamed A. Bourham, Alumni Distinguished Graduate Professor of Nuclear Engineering (919-515-7662)[bourham@ncsu.edu]Ph.D., Ain Shams University, Cairo Egypt, 1976. Plasma-matter interaction, plasma diagnostics, plasma-driven Launch Technology, fusion engineering and technology, plasma dynamics, plasma propulsion and space thrusters, industrial and atmospheric plasmas, physics of low temperature and non-ideal plasmas, physics of beams, particle accelerators and electron beam irradiation systems, atmospheric and industrial plasmas, x-ray sources for medical and screening imaging. Website: https://www.ne.ncsu.edu/people/bourham

Nam Dinh, Professor (919-515-5421) [ntdinh@ncsu.edu] Ph.D., Moscow Power Engineering Institute, 1991. Mechanistic modeling and analysis of multi-phase thermal-fluid phenomena of importance to nuclear reactor design and safety. Website: https://www.ne.ncsu.edu/people/nam-dinh

Joseph M. Doster, Alumni Distinguished Undergraduate Professor of Nuclear Engineering (919-515-3658) [doster@ncsu.edu] Ph.D., North Carolina State University, 1982. Systems dynamics, systems simulation, Computational methods in two-phase flow, Systems simulation in support of advanced control and diagnostic systems, design and optimization of advanced targetry for the cyclotron production of radiopharmaceuticals. Website: https://www.ne.ncsu.edu/people/doster

Jacob Eapen, Associate Professor (919-515 5952) [jacob.eapen@ncsu.edu] Sc.D., MIT, 2006. Molecular and Multiscale Simulations, Nuclear Materials, Radiation Interactions with Materials, Computational Material Science, Thermal and Fluid Transport. Website: https://www.ne.ncsu.edu/people/jeapen/

Robin P. Gardner, Alumni Distinguished Graduate Professor of Nuclear & Chemical Engineering and Director of Center for Engineering Applications of Radioisotopes (919-515-3378) [gardner@ncsu.edu] Ph.D., The Pennsylvania State University, 1961. Industrial Radiation and Radioisotope Measurement Applications including: Radioisotope Tracers; Radiation Gauges; Radiation Analyzers; Monte Carlo Simulation of Previous Three; and Radiation Detection. Professional Engineer.
Website: https://www.ne.ncsu.edu/people/gardner

John G. Gilligan, Distinguished University Professor of Nuclear Engineering, Executive Associate Dean of Engineering, and Director of the Nuclear Energy University Programs Integration Office for the US DOE (919-513-7144) [john_gilligan@ncsu.edu] Ph.D., University of Michigan, 1977. High power density plasma modeling and applications; Fission and fusion energy systems; Engineering education programs and methods. Website: https://www.ne.ncsu.edu/people/gilligan

Ayman I. Hawari, Professor of Nuclear Engineering, Director of Nuclear Reactor Program (919-515-4598) [ayman.hawari@ncsu.edu] Ph.D., University of Michigan, 1995. Neutron thermalization; slow neutron scattering models and atomistic simulations; Nondestructive examination with slow neutron and positron beams; Neutron imaging; Radiation measurements; Nuclear materials assay; Research reactors and accelerator-based neutron sources. Website: https://www.ne.ncsu.edu/people/aihawari

Robert Hayes, Associate Professor (919-515-2321) [rbhayes@ncsu.edu] Ph.D., University of Utah, 1999. Nuclear nonproliferation technologies; radiation detection; air monitoring; luminescence and magnetic resonance; Monte Carlo radiation transport modeling. Professional Engineer.
Website: https://www.ne.ncsu.edu/people/rbhayes

Djamel Kaoumi, Associate Professor (919-515-2301) [dkaoumi@ncsu.edu] Ph.D., Penn State, 2007. Metallic Materials degradation in harsh environments; Irradiation damage and effects in advanced alloys for structural and cladding applications; Mechanical properties and deformation mechanisms of high-temperature; advanced alloys; Characterization techniques of predilection.
Website: https://www.ne.ncsu.edu/people/dkaoumi

David Kropaczek, Duke Energy Distinguished Professor of Nuclear Engineering , Chief Scientist of CASL [dkropac@ncsu.edu] Ph.D., North Carolina State University. Fuel cycle and plant optimization, computational reactor physics and thermal-hydraulics, and numerical algorithm development. Website: https://www.ne.ncsu.edu/people/dkropac

John K. Mattingly, Associate Professor (919-515-0224) [john_mattingly@ncsu.edu] Ph.D., University of Tennessee, Knoxville, 1998. Research focus on developing active neutron interrogation methods that employed time-correlation signatures using fast organic scintillators. The principal objective was to estimate bulk SNM properties like fissile mass and multiplication to enable monitoring and surveillance of SNM production, use, storage, movement, and disposition activities to help foster transparency in NMC&A, safeguards, arms control, and nonproliferation.
Website: https://www.ne.ncsu.edu/people/jkmattin

Korukonda L. Murty, Progress Energy Distinguished Professor of Nuclear Engineering and Director of Graduate Programs (919-515-3657) [murty@ncsu.edu] Ph.D., Cornell University 1970. Nuclear materials, radiation effects, mechanical properties, creep, fatigue and fracture mechanics, processing and characterization of nanograin structured metals, NDE, NMR. Website:
https://www.ne.ncsu.edu/people/murty

Steven C. Shannon, Professor (919-515-3292) [scshannon@ncsu.edu] Ph.D., University of Michigan, 1999. Industrial plasma applications; plasma diagnostics; radiation/material interaction; nanofabrication; compact neutron generators for low fluence applications.
Website: https://www.ne.ncsu.edu/people/scshanno

Katharina Stapelmann, Assistant Professor (919-515-5987) [kstapel@ncsu.edu] Ph.D., Ruhr University Bochum, Germany, 2013. Low-temperature plasma; plasma medicine; interactions of technical plasmas with biological systems; plasma diagnostics.

Paul J. Turinsky, Professor (919-515-5098) [turinsky@ncsu.edu] Ph.D., Univerity of Michigan, 1970. Computational reactor physics; nuclear fuel management and mathematical optimization; validation and verification of software; uncertainty quantification; data assimilation and optimum experimental design; adaptive model refinement; multiphysics simulation.
Website: https://www.ne.ncsu.edu/people/turinsky/

Ge Yang, Assistant Professor (919-515-5267) [gyang9@ncsu.edu] Ph.D., Northwestern Polytechnical University. Novel materials for radiation sensor applications; Effects of radiation on electronic, photonic and structural materials; Radiation imaging and measurement.

Other Faculty

Donald J. Dudziak, Professor Emeritus (505-667-7983) (505-661-3832) [dudziak@ncsu.edu, dudziak@lanl.gov] Ph.D., University of Pittsburgh, 1963. Transport and Reactor Theory. Professional Engineer.

Jason Hou, Research Assistant Professor (919-513-6705) [jason.hou@ncsu.edu] Ph.D., The Pennsylvania State University, 2013. Multi-physics reactor simulations; advanced reactor design; in-core fuel management and fuel cycle analysis; uncertainty quantification and sensitivity analysis; simulators including real-time simulations. Website: https://www.ne.ncsu.edu/people/jasonhou/

Lisa Marshall, Director of Outreach-Instructor-Adviser (919-515-5876) [lisa.marshall@ncsu.edu] Graduate Certificate in GIS. Engineering education, geographic information science, energy studies.

Scott Palmtag, Teaching Associate Professor (919-865-6696) [sppalmta@ncsu.edu] Ph.D., Massachusetts Institute of Technology, 1997. Reactor physics; multiphysics applications; computational methods.

Michael Simpson, Adjunct Associate Professor (208-520-1068) Ph.D., Princeton University. Nuclear fuel cycle.

Matthew Stokely, Adjunct Associate Professor (919-619-3851) Ph.D., North Carolina State University. Advanced characterization methods.

Avneet Sood, Adjunct Assistant Professor (505-667-2119) [sooda@lanl.gov] Ph.D., North Carolina State University, 2000. Monte Carlo methods and code development for radiation transport; Application of radiation transport codes to radiation detection problems.

Kuruvilla Verghese, Emeritus Professor Ph.D. Iowa State University. Reactor Engineering/Fuel Cycles.

Monroe Wechsler, Adjunct Professor (919-515-2301) Ph.D., Columbia University. Nuclear materials, radiation effects.

Bernard W. Wehring, Research Professor (retired, University of Texas at Austin) (919 515-4599) [bwwehrin@ncsu.edu] Ph.D., Nuclear Engineering, University of Illinois at Urbana Champaign, 1966. Radiation Science; Neutron and Fission Physics. Website: https://www.ne.ncsu.edu/people/bwwehrin/

Gerald Wicks, Reactor Health Physicist and Lecturer (919-515-4601) [wicks@ncsu.edu] M.S., University of Lowell, 1983.

Nuclear Science and Engineering Research Centers

Nuclear Reactor Program operates the 1MW PULSTAR with the following major experimental facilities: Positron Annihilation Spectroscopy, Ultracold neutron source, neutron diffractometer, neutron imaging.
Director: Ayman I. Hawari

Consortium for Advanced Simulation of LWRs Modeling & Simulation Hub
Chief Scientist: David Kropaczek
Website: www.casl.gov

Consortium for Engineering Applications of Radioisotopes (CEAR)
Director: Robin Gardner
Website: www.cearonline.com

Consortium for Nonproliferation Enabling Capabilities (CNEC)
Director: Yousry Azmy
Chief Scientist Robin Gardner
Technical Director: John Mattingly
Website: www.cnec.ncsu.edu

Reactor Dynamics and Fuel Modeling Group (RDFMG)
Director: Maria Avramova
Website: www.ne.ncsu.edu/rdfmg

OHIO STATE UNIVERSITY

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614-292-3204
holland.129@osu.edu
Website: http://mae.osu.edu/nuclear

	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
Masters	14	5	7	10	11
PhD	6	3	5	4	7

Graduate Student Enrollment: 4 Masters/19 Ph.D.
ABET Accreditation: B.Sc. in Engineering with Nuclear Minor

Nuclear Science and Engineering Faculty

Tunc Aldemir, Professor (614-292-4627) [aldemir.1@osu.edu] Ph.D., University of Illinois, 1978. Nuclear reactor safety; probabilistic risk assessment; smart sensors, plant aging, maintenance and on-line monitoring; digital instrumentation and control systems.
Website: https://mae.osu.edu/people/aldemir.1

Lei (Raymond) Cao, Associate Professor (614-247-8701) [cao.152@osu.edu] Ph.D., The University of Texas at Austin, 2007. Nuclear instrumentation; development of semiconductor neutron sensors; radiation detection; nuclear analytical technologies (PGAA, NDP and neutron radiography); reactor design. Website: https://mae.osu.edu/people/cao.152

Marat Khafizov, Assistant Professor (614-292-2544) [Khafizov.1@osu.edu] Ph.D., University of Rochester, 2008. Materials science of nuclear materials.
Website: https://mae.osu.edu/people/khafizov.1

Vaibhav Sinha, Assistant Professor of Practice (614-292-3571) [sinha.181@osu.edu] Ph.D., University of Missouri, Rolla, 2013. Radiation imaging; design and development of radiation imaging system (gamma, X-ray and neutron tomography); radiation protection and dosimetry; radiation shielding; radiation detection, measurement and instrumentation; thermal hydraulics; reactor physics and techniques. Website: https://mae.osu.edu/people/sinha.181

Carol S. Smidts, Professor (614-292-6727) [smidts.1@osu.edu] Ph.D., Universite Libre de Bruxelles, Belgium, 1991. Reliability Engineering; Probabilistic Risk Assessment; Software Reliability; Software Safety; Dynamic Risk Assessment; Human Reliability; Digital Systems Risk and Reliability.
Website: https://mae.osu.edu/people/smidts.1

Richard Vasques, Assistant Professor (510-340-0930) [vasques.4@osu.edu] Ph.D., University of Michigan, 2009. Neutron transport; radiative transfer; mathematical and computational modeling of transport phenomena. Website: https://mae.osu.edu/people/vasques.4

Other Faculty

Thomas E. Blue, Professor Emeritus (614-292-0629) [blue.1@osu.edu] Ph.D., University of Michigan, 1978. Space nuclear systems; advanced nuclear reactor instrumentation, including semiconductor sensors, static and dynamic characterization of radiation-induced degradation of semiconductor power devices; fiber-optics. Website: https://mae.osu.edu/people/blue.1

Steven J. Maheras, Lecturer (614-486-5350) [Maheras.1@osu.edu] Ph.D., Colorado State University**,** 1988**.** Health physics; radioactive waste management; decontamination and decommissioning; transportation risk assessment; radiological and nuclear terrorism; and radiation dose reconstruction.

Nuclear Science and Engineering Research Centers

The Ohio State University Nuclear Reactor Laboratory (OSUNRL)
The OSUNRL is a major asset of the OSU NE Program. The OSUNRL houses the OSURR a 500-kW pool type reactor, a Co-60 high-dose rate irradiation facility, and a sub-critical assembly. Director: Dr. Thomas E. Blue; Associate Director: Dr. Lei (Raymond) Cao
Website: http://reactor.osu.edu/

The Ohio State University Research Reactor: The Ohio State University Research Reactor (OSURR) is a general-purpose research and testing reactor based on the Materials Testing Reactor (MTR) design.
Website: http://reactor.osu.edu/

Laboratories:
Academic Center of Excellence (ACE) in Instrumentation, Control and Safety Structure
OSU Director: C. Smidts
OSU Co-Director: T. Aldemir
Website: http://www.mecheng.osu.edu/lab/risk/ACE

UNIVERSITY OF ONTARIO INSTITUTE OF TECHNOLOGY

FACULTY OF ENERGY SYSTEMS AND NUCLEAR SCIENCE
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905.721.8668 X5521
FAX: 905.721.3046
Administrative Contact: Akira Tokuhiro
Akira.Tokuhiro@uoit.ca
Administrative Contact: Michelle Cholak
michelle.cholak@uoit.ca
Website: http://nuclear.uoit.ca

	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
B.S.	56	60	50	61	63
Masters	9	11	10	11	15
PhD	-	2	3	1	2

Graduate Student Enrollment: 39Masters/21 Ph.D.

Nuclear Science and Engineering Faculty

Akira Tokuhiro, Dean and Professor of Nuclear Science (905-721-8668 x5511)[Akira.Tokuhiro@uoit.ca] Ph.D., Purdue University. Small to large nuclear reactor design, thermal-hydraulics, safety and accident analyses. Experimental and computational methods and data analyses. Instrumentation in heat transfer

George Bereznai, Professor of Nuclear Engineering. (905-721-8668 x5495)[George.Bereznai@uoit.ca] Ph.D., McMaster University. Computer Control of Nuclear Power Plants, Real-time simulation, Educational technology.

Hossam A. Gaber, Professor of Nuclear Engineering (905-721-8668 x5497)[hossam.gaber@uoit.ca] Ph.D., Okayama University. Plasma Generation and Control for Nuclear Fusion, Safety and Control Systems for Nuclear Power Plants and SMR, Operation Design, Emergency Shutdown/Disaster Management Systems, Fault Diagnosis and Condition Monitoring, Risk Assessment and Management, and Smart Energy Grid Engineering.

Glenn Harvel, Professor of Nuclear Engineering (905-721-8668 x5508)[Glenn.Harvel@uoit.ca] Ph.D., McMaster University. Small Nuclear Reactors, Nuclear plant ageing and design, decommissioning, multiphase flow, instrumentation for multiphase flow, neutron radiography.

Daniel Hoornweg, Associate Professor and Richard Marceau Chair of Energy Systems (905-721-8668 x5560)[daniel.hoornweg@uoit.ca] Ph.D., University of Toronto. Energy and material flows of cities, urban

systems, sustainability, smart cities, renewable energy, waste management, integrated energy and transportation systems.

Brian Ikeda, Associate Professor of Nuclear Engineering (905-721-8668 x5523)[Brian.Ikeda@uoit.ca] Ph.D., University of Newcastle upon Tyne. Corrosion of materials in molten fluoride salts, electrochemical and physical behavior of fluorine generating anodes, corrosion of nuclear waste container materials, stress assisted corrosion cracking of metals, radioactive waste management, localized corrosion, elevated temperature corrosion.

Matthew Kaye, Associate Professor of Nuclear Engineering (905-721-8668 x5524) [Matthew.Kaye@uoit.ca] Ph.D., Queen's University. Nuclear materials, high temperature materials chemistry, phase diagram development, nuclear fuel behavior, aqueous chemistry of nuclear materials and corrosion.

Lixuan Lu, Professor of Nuclear Engineering (905-721-8668 x5526)[Lixuan.Lu@uoit.ca] Ph.D., University of Western Ontario. Nuclear power plant instrumentation and control, distributed control, network control systems, reliability and safety of I&C Systems, risk-informed decision making, nuclear based hydrogen generation.

Rachid Machrafi, Associate Professor of Nuclear Science (905-721-8668 x5522) [rachid.machrafi@uoit.ca] Ph.D., Joint Institute for Nuclear Research. Transmutation of nuclear waste, health physics and dosimetry, radiation detection technology, radiation techniques, space radiation, Monte Carlo modelling and education technology.

Jennifer McKellar, Assistant Professor of Energy Systems (905-721-8668 x5498) [jennifer.mckellar@uoit.ca] Ph.D., University of Toronto. Techno-economic and environmental assessments of energy systems. Conventional and unconventional fuels. Options for improving the sustainability of energy systems. Tools in support of decision-making.

Eleodor Nichita, Associate Professor of Nuclear Engineering (905-721-8668 x5527) [Eleodor.Nichita@uoit.ca] Ph.D., Georgia Institute of Technology. Neutronic design and analysis methods for advanced nuclear reactors, reactor kinetics and control, neutron and radiation transport, mathematical modeling and numerical analysis.

Igor Pioro, Professor of Nuclear Engineering (905-721-8668 x5528)[Igor.Pioro@uoit.ca] Ph.D., National Technical University of Ukraine. Thermalhydraulics of nuclear reactors and Generation IV reactor concepts, boiling and forced convection including supercritical pressures, two-phase thermosyphons, heat exchangers, and heat recovery systems.

Markus Piro, Assistant Professor of Nuclear Engineering and Canada Research Chair in Nuclear Fuels and Materials (905-721-8668 x5525) [markus.piro@uoit.ca) Ph.D., Royal Military College of Canada. Nuclear fuel performance and safety, nuclear materials, GenIV reactors (*i.e.*, MSR, SFR, SCWR), small modular

reactors, additive manufacturing, experimental and computational thermodynamics, experimental and computational fluid dynamics, multi-physics nuclear code development and simulations.

Anthony Waker, Professor of Nuclear Science (905-721-8668 x5520)[Anthony.Waker@uoit.ca] Ph.D. London South Bank University. Radiation detector development, experimental microdosimetry, high LET radiation, X-ray and beta particle impact on cellular and molecular systems.

Edward Waller, Professor of Nuclear Engineering (905-721-8668 x5521)[Ed.Waller@uoit.ca] Ph.D., Rensselaer Polytechnic Institute. Applied health physics, radiation detection, dosimetry, biological effects of radiation, risk analysis, non-intrusive investigation, threat detection and security.

Other Faculty

John Froats, Nuclear Engineer in Residence (905-721-8668 x5507) [john.froats@uoit.ca] B.Eng. McMaster University, Electrical engineering, nuclear plant design.

Sharman Perera, Senior Lecturer and Undergraduate Laboratory Manager of the Faculty in Energy Systems and Nuclear Science (905-721-8668 x5505) [sharman.perera@uoit.ca] M.A.Sc. Ryerson University, Computational Fluid Dynamics, Aerosol Mechanics, Integrated Engineering Design and Undergraduate Laboratory Design

Nuclear Science and Engineering Research Center

SIMULATION LABORATORY
The simulation lab contains a state of the art computer and display system for simulation of nuclear power plants, such as the Pickering and Darlington nuclear-electric generating units, and the School has the capability to develop software for advanced reactor designs. Dr. George Bereznai.

AEROSOL AND RADIATION RESEARCH LABORATORY
A state-of-the-art aerosol research laboratory is used to investigate potential hazards from terrorist use of radiological dispersal devices (RDDs). The research is widely applicable to determination of hazards from airborne radioactive contaminants. Dr. Ed Waller.

DETECTOR PHYSICS AND EXPERIMENTAL MICRODOSIMETRY LABORATORY
The radiation detector development and experimental microdosimetry laboratory is set up for the custom design, construction and testing of advanced gas ionization detectors such as tissue equivalent proportional counters and gas electron multipliers and other detection systems for mixed-field radiation protection dosimetry and microdosimetry. Coupled with these detectors are the electronic and computer facilities necessary for the development of novel data acquisition systems and control software. Dr. Anthony Waker.

CORROSION AND ELECTROCHEMISTRY LABORATORY The corrosion and Electrochemistry lab is set-up to investigate the electrochemical processes that drive corrosion at elevated temperatures. A particular

emphasis is placed on the chemical and electrochemical processes associated with localized corrosion processes such as localized corrosion and stress assisted corrosion cracking. Special facilities are used to examine processes in molten salts that range from ow melting point, but noxious fluoride salts to high temperature metal chloride salts. A variety of electrochemical methodologies are available to interrogate localized corrosion processes. Dr. Brian Ikeda.

NUCLEAR DESIGN LABORATORY

The primary mission of the Nuclear Design Laboratory is to study multi-disciplinary interfaces and integrated designs related to nuclear technology including mechanical design, system controls, instrumentation, and nuclear thermalhydraulics. Dr. Glenn Harvel.

HIGH PERFORMANCE COMPUTING AND VISUALIZATION LAB

The High Performance Computing and Visualization Lab is set up for the investigation of computationally and output intensive problems that appear in reactor and radiation physics. It supports research into parallel algorithms and into methods for displaying large amounts of data in a meaningful way using three-dimensional graphic representations. Dr. Eleodor Nichita.

NUCLEAR MATERIALS LABORATORY

The nuclear materials laboratory investigates and characterizes metals, alloys, and aqueous systems that are important in nuclear reactor systems and other energy production facilities. The lab houses an X-ray Diffractometer capable of characterizing samples at both room temperature and elevated temperatures. Custom built vessels allow for exploration of aqueous systems up to 250 ºC. The experimental work can provide fundamental thermochemical data that supports applied thermodynamic modelling work also performed in this laboratory. Dr. Matthew Kaye.

APPLIED THERMODYNAMICS LABORATORY

The applied thermodynamics laboratory investigates various thermodynamic properties of nuclear fuels, nuclear materials, and other non-nuclear materials pertinent to energy systems and manufacturing. Examples include oxidation tests of advanced research reactor fuels and Accident Tolerant Fuel (ATF) cladding materials. Experimental measurements play an integral role in providing validation data for various modelling and simulation efforts. Dr. Markus Piro.

ADVANCED PLASMA ENGINEERING LABORATORY

Advanced Plasma Engineering Laboratory (UOIT) specializes in high density, high energy plasma research and thermal engineering research. The research has numerous applications in nuclear fusion, aerospace, waste-to-energy, oil and gas, nanotechnology, biochemical instruments, and manufacturing. The APEL lab emphasizes on innovations in plasma generation, diagnostics, and experimentations, and their applications on multiple disciplines. The plasma generation include inductive and capacitive plasma discharge. Experimental work includes ion optics, propulsion, and energy harvesting. Dr. Hossam Gaber.

ENERGY SAFETY AND CONTROL LABORATORY

Energy Safety and Control Laboratory (ESCL) specializes in advanced safety and control systems and their applications in nuclear, energy and plasma systems. Research includes: Development of probabilistic risk

models for accurate NPP safety verification; Improved performance of safety and shutdown systems and recovery operation in NPP; Improved NPP performance with intelligent control systems; and Fault propagation modeling and real time safety verification of NPP. Experimental work on fault diagnosis in control loops, CATHENA simulation code, and uncertainty estimation software tools. Dr. Hossam Gaber

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
B.S.	45	40	34	37	*
Masters	31	30	26	21	*
PhD	7	3	3	9	*

Graduate Student Enrollment: ?? Masters/?? Ph.D.
ABET Accreditation: BS Nuclear Engineering; BS Radiation Health Physics
CAMPEP Accreditation: Medical Physics Graduate Program

Distance Education Program
Offers Nuclear Engineering Courses & Degrees Online
http://ne.oregonstate.edu/

Nuclear Science and Engineering Faculty

Kathryn A. Higley, Department Head and Professor (541-737-0675)[kathryn.higley@oregonstate.edu] Ph.D., Colorado State University, 1994. Health physics; human and ecological risk assessment; environmental pathway analysis; environmental radiation monitoring; radionuclide and hazardous chemical transport; radiochemistry; neutron activation analysis; nuclear emergency response planning; environmental regulations. Certified Health Physicist.
Website: http://ne.oregonstate.edu/ kathryn-higley

Abdollah T. Farsoni, Associate Professor (541-737-9645) [abi.farsoni@oregonstate.edu] Ph.D., Oregon State University, 2006. Radiation Detectors; real-time digital electronics; FPGA design; digital pulse processor; radioxenon detection; nuclear weapon test monitoring; low-cost radiation spectroscopy; direction-sensitive detectors. Website: http://web.engr.oregonstate.edu/~tavakola/

David M. Hamby, Professor, Graduate Program Chair (541-737-8682)[david.hamby@oregonstate.edu] Ph.D., University of North Carolina, 1989. Health physics; beta dosimetry; beta spectroscopy; radiation instrumentation; environmental health physics; environmental transport; fate and transport model analysis; radiation risk; uncertainty analysis. Website: http://ne.oregonstate.edu/david-m-hamby

Jack F. Higginbotham, Professor, Director of Space Programs (541-737-9949) [jack.higginbotham@oregonstate.edu] Ph.D., Kansas State University, 1987. Space reactor development, nuclear spectroscopy, radiation dosimetry, radiation shielding. Certified Health Physicist. Prof. Higginbotham is currently on a full-time, administrative appointment as Director of Space Programs in the College of Science. Website: http://ne.oregonstate.edu/jack-f-higginbotham

Andrew C. Klein, Professor (541-737-7061) [andrew.klein@oregonstate.edu] Ph.D., University of Wisconsin, Madison, 1983. Nuclear energy policy; space nuclear systems design; transient analysis of nuclear power systems; radiation shielding; nuclear nonproliferation; safeguards and security; and fusion energy systems design. Professional Engineer.
Website http://ne.oregonstate.edu/andrew-c- klein

Wade Marcum, Assistant Professor (541-737-3018) [wade.marcum@oregonstate.edu] Ph.D., Oregon State University, 2010. Nuclear reactor thermal hydraulics; computational fluid dynamics; reactor safety; flow induced vibration; advanced reactor design. Website: http://ne.oregonstate.edu/wade- marcum

Todd S. Palmer, Professor (541-737-7064) [palmerts@ne.orst.edu] Ph.D., Nuclear Engineering and Scientific Computing**,** University of Michigan**,** 1993. Numerical techniques for particle transport and diffusion; computational fluid dynamics; reactor physics; general numerical methods; nuclear criticality safety; Monte Carlo methods; transport in stochastic mixtures.
Website: **h**ttp://ne.oregonstate.edu/todd-s-palmer

Alena Paulenova, Associate Professor (541-737-7070) [alena.paulenova@oregonstate.edu] Ph.D. Radiochemistry; chemistry of fuel cycle; advanced separations methods for used fuel reprocessing and fuel waste forms; behavior of actinides and fssion products; environmental and biomedical applications. Website: http://ne.oregonstate.edu/alena-paulenova

Brian G. Woods, Professor (541-737-6335) [brian.woods@oregonstate.edu] Ph.D., University of Maryland, 2001. Experimental and computational fluid dynamics and heat transfer; nuclear reactor thermal-hydraulics; nuclear reactor safety. Website: http://ne.oregonstate.edu/brian- g-woods

Qiao Wu, Professor (541-737-7066) [qiao.wu@oregonstate.edu] Ph.D., Purdue University**,** 1995. Nuclear reactor thermal-hydraulics, two-phase flow theory and experiments, multiphase flow instrumentation, nuclear reactor safety, scaling analysis of complex systems, neutron radiography for two-phase flow visualization, nuclear system system design, fuel enrichment, system safety analysis code validation. Website: http://ne.oregonstate.edu/qiao-wu

Haori Yang, Assistant Professor (541 737-7057) [Haori.Yang@oregonstate.edu] Ph.D., University of Michigan at Ann Arbor, 2009. Non-destructive interrogation techniques; development of innovative radiation sensors; general applications of nuclear engineering. Website: http://ne.oregonstate.edu/ haori-yang

Other Faculty

Camille J. Palmer, Assistant Professor Senior Researcher, (541 737 7059) [Camille.Palmer@Oregonstate.edu] Ph.D., University of Cincinnati, 2003. Interdisciplinary projects related to national nuclear forensics. Website: http://ne.oregonstate.edu/node/243

Steven R. Reese, Radiation Center Director **(**541-737-2341) [steve.reese@oregonstate.edu] Ph.D., Colorado State University, 1997. Regulatory Compliance; Reactor Dosimetry; Neutron Radiography; Neutron Depth Profiling; Prompt Gamma Neutron Activation Analysis. Certified Health Physicist. Website: http://ne.oregonstate.edu/steven-r-reese

Jose N. Reyes, Jr. Professor-currently on leave (541-737-2343) [jose.reyes@oregonstate.edu] Ph.D.**,** University of Maryland**,** 1986. Thermal hydraulics; multi-phase fluid flow; scaling analyses; reactor safety; reactor system design. Professional Engineer. Website: http://ne.oregonstate.edu/jos%C3% A9-n-reyes

Nuclear Science and Engineering Research Center

OSU Radiation Center: The department is housed in the **OSU Radiation Center**. Research facilities include a 1.1 MW TRIGA Mark II nuclear reactor; Advanced Thermal-Hydraulic Research Laboratory (ATHRL) which includes Advanced Plant Experiment (APEX) facility and the Multi-Application Light Water Reactor (MASLWR) facility; the Advanced Nuclear Systems Engineering Laboratory (ANSEL) which includes a High Temperature Test Facility (HTTF), a 1/4-scale test model of a modular High Temperature Gas-Cooled Reactor (HTGR), and a Fuel Development Hydro-Mechanical test loop; the Advanced Nuclear Instrumentation Development Laboratory; Radiochemical Analytical Laboratory with radio-HPLC- and radio-LC-IS-MS/MS systems; Cobalt-60 Gamma Irradiator; Neutron Radiography facilities; Gamma and Alpha Spectrometry facilities; Radiological Instrument Calibration facilities; Liquid Scintillation Counting Systems; Thermoluminescent Dosimetry Systems.

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
B.S.	107	89	68	99	63
Masters	34	28	31	30	21
PhD	10	6	5	8	6

Graduate Student Enrollment: 41 Masters/27 Ph.D.
ABET Accreditation: BS

Distance Education Program
Offers Nuclear Engineering Courses and MEng Degree Online
http://www.engr.psu.edu/cde/nuce/index.html

Nuclear Science and Engineering Faculty

Arthur T. Motta, Chair and Professor of Nuclear Engineering (814-865-0036) [atm2@psu.edu] Ph.D., University of California- Berkeley**,** 1988. Materials behavior in the nuclear reactor environment, especially nuclear fuel cladding.

Nicholas R. Brown, Assistant Professor of Nuclear Engineering [nrb26@psu.edu] Ph.D., Purdue University, 2011. Nuclear reactor analysis and design; nuclear reactor safety; sustainable nuclear fuel cycles; advanced reactors; advanced nuclear fuel and cladding materials; process heat applications of nuclear energy.

Fan-Bill Cheung, Professor of Mechanical and Nuclear Engineering (814-863-4261) [fxc4@psu.edu] Ph.D.**,** University of Notre Dame**,** 1974. Director of Global Nuclear Power Safety Center; Solidification and Melting; Turbulent Natural Convection; Two-Phase Flow and Heat Transfer; Nuclear Reactor Thermal Hydraulics and Safety; Thermal Processing of Materials; Thermal Behavior of High-Temperature Ablatives; Dense Spray and Atomization.

Marek Flaska, Assistant Professor of Nuclear Engineering (814-867-4754) [mxf5309@psu.edu] Ph.D. Applied Physics, Delft University of Technology, 2006. Detection of neutrons, gamma rays and x-rays for nuclear nonproliferation, safeguards, and forensics; radiation imaging; data-acquisition and data-processing electronics; fundamental nuclear physics.

Azaree T. Lintereur, Assistant Professor (814-867-1783) [atl21@psu.edu] Ph.D., University of Florida, 2013. Radiation detector development, multiplicity and coincidence counting, MCNP, nuclear safeguards.

Asok Ray, Distinguished Professor of Mechanical and Nuclear Engineering (814-865-6377) [axr2@psu.edu] Ph.D. Northeastern University. Instrumentation and control; Signal processing and identification; Robotics and automation; Nondestructive evaluation; Fatigue and fracture; Aerospace systems; Power systems.

Kenan Unlu, Director of Radiation Science and Engineering Center and Professor of Nuclear Engineering (814-865-6351) [kxu2@psu.edu] Ph.D., University of Michigan, 1989. Development and Applications of Nuclear Analytical Techniques; Neutron Depth Profiling; Cold Neutron Prompt Gamma Activation Analysis; Neutron Radiography, Neutron Activation Analysis; Radiation Detection; Radiochemistry; Nuclear Forensics and Nuclear Security Education and Research.

William J. Walters, Assistant Professor of Nuclear Engineering (814-867-4329) [wjw24@psu.edu] PhD, Virginia Tech 2015. Monte Carlo, deterministic, and hybrid methods for radiation transport simulation; Applications in reactor physics, nuclear safeguards, and spent fuel pool monitoring.

Justin K. Watson, Research Associate and Assistant Professor of Nuclear Engineering, Applied Research Laboratory The Pennsylvania State University (814-863-6754) [jkw104@psu.edu] Ph.D., Pennsylvania State University, 2010. Computational fluid mechanics; Nuclear reactor safety analysis; core design; System simulation; Advanced numerical methods for multi-physics simulations; Parallel computation for nuclear reactor safety analysis.

Leigh Winfrey, Associate Professor (814-865-1339) [lzw290@psu.edu] Ph.D., North Carolina State University, 2010. Plasma physics; High energy density plasmas; Fusion reactor fueling; Plasma materials interactions; Nuclear materials.

Robert Zboray, Assistant Professor of Nuclear Engineering (814-863-1323) [rzz656@engr.psu.edu] Ph.D., University of Delft, 2002. Experimental nuclear reactor thermalhydraulics; advanced two-phase flow instrumentation; radiation-based imaging methods; neutron tomography; imaging detector technology; fuel bundle thermalhydraulics, turbulent mixing flows..

Other Faculty

Maria Avramova, Adjunct Professor of Nuclear Engineering, Ph.D. Penn State, 2007. Reactor thermalhydraulics; transient and safety analysis.

Jack S. Brenizer, Jr., Professor Emeritus of Mechanical and Nuclear Engineering (814-863-6384) [brenizer@engr.psu.edu] Ph.D., Pennsylvania State University, 1981. Radiation detection, neutron radiography, neutron activation analysis, nuclear materials monitoring devices.

Gary L. Catchen, Professor Emeritus of Nuclear Engineering (814-865-1339) [g9c@psu.edu] Ph.D. Columbia University, 1979. Hyperfine interactions; radiation detection and measurement; radiation dosimetry; developing teaching techniques for nuclear science.

Darryl Farber, Assistant Professor of Science, Technology, and Society and Affiliate Assistant Professor of International Affairs (814-865-3042) [dfarber@engr.psu.edu] Ph.D., The Pennsylvania State University, 1999. Policy and management of nuclear waste; scenario analysis and planning for engineering systems; nuclear ethics.

Massimiliano Fratoni, Adjunct Professor of Nuclear Engineering. Ph.D., University of California, Berkeley, 2008. Advanced reactor design; core modeling and analysis; nuclear fuel cycle; nuclear waste repository modeling and analysis; system analysis.

Igor Jovanovic, Adjunct Professor of Nuclear Engineering, Ph.D. University of California, Berkeley, 2001. Nuclear Detection and non-proliferation; inertial confinement fusion' ultrafast and intense laser science and technology.

Seungjin Kim, Adjunct Professor of Mechanical and Nuclear Engineering, PhD Purdue University, 1999 Thermal hydraulics, reactor safety, interfacial area transport

Kostadin Ivanov, Adjunct Professor of Nuclear Engineering, Ph.D. Bulgaraian Academy of Sciences, Core analysis, computational methods in reactor statics and dynamics, core design and management.

Amanda Johnsen, Research Associate (814-863-2653) [ajohnsen@psu.edu] Ph.D., University of California, Berkeley (2008). Production and purification of radioisotopes; neutron activation analysis; chemistry of used nuclear fuel and reprocessing; environmental radiochemistry; radiochemistry education.

Barry Scheetz, Professor of Civil and Nuclear Engineering (814-865-3539) [se6@psu.edu] Ph.D., Materials. Radioactive waste disposal, cementitious and ceramic waste forms, x-ray diffraction.

Michael Tonks, Assistant Professor (814-863-1323) [mrt5296@psu.edu] Ph.D., University of Illinois, Urbana-Champaign, 2008. Nuclear materials, radiation damage, mesoscale material behavior, multiscale materials modeling, phase field method, crystal plasticity.

James Turso, Assistant Director, Penn State Radiation Science and Engineering Center (814-863-2820) [jat127@engr.psu.edu] Ph.D. Advanced reactor/power plant instrumentation, control and simulation. Reactor system identification and parameter estimation. Professional Engineer.

Nuclear Science and Engineering Research Centers

Advanced Multi-Phase Flow Laboratory (AMFL): To perform scaled experiments, model two-phase flow phenomena, develop instrumentation, improve the reactor system analysis, and to provide hands-on experience to both graduate and undergraduate students.

The Multiphysics Modeling and Simulation Group (MMSG) Performs research to develop state-of-art analysis tools for nuclear reactor safety analysis. Research areas involve many different aspects of reactor analysis from fuel management and core design to full-scale thermal hydraulic analysis of nuclear reactors. Of paramount importance in multiphysics simulations is understanding the feedback parameters between the systems and modeling them correctly. Prof. Justin Watson.

Radiation Science and Engineering Center: The Radiation Science and Engineering Center (RSEC) is a unit under the College of Engineering and the Vice President for Research at Penn State. The RSEC is affiliated with the Department of Mechanical and Nuclear Engineering. The mission of the RSEC is, in partnership with faculty, staff, students, alumni, government, and corporate leaders, to safely utilize nuclear technology to benefit society through education, research, and service. The RSEC promotes research, education, and applications of radiation and nuclear science and engineering to students, faculty, and staff at Penn State, as well as to scientists in universities, governments, and industries worldwide. The RSEC facilities include the Penn State Breazeale Reactor (PSBR), gamma-ray irradiation facilities (in-pool irradiator and dry irradiator), the Neutron Beam Laboratory, the Hot Cell Laboratory, the Radionuclear Applications Laboratory, the Radiochemistry Teaching Laboratory, the Nuclear Security Education Laboratory, the Subcritical Graphite Reactor Facility, and various radiation detection and measurement laboratories. The PSBR is a 1 MW, TRIGA with moveable core in a large pool and with pulsing capabilities. Prof. Kenan Unlu.

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	7/14-6/15	7/15-6/16	7/16-6/17
Masters	4	4	2

Graduate Student Enrollment: 5 Masters
ABET Accreditation: Mechanical Engineering, Materials Science and Engineering

Distance Education Program
Offers Nuclear Engineering Courses and Degrees Online
http://www.engineering.pitt.edu/nuclear/

Nuclear Science and Engineering Faculty

Daniel Cole, Associate Professor and Director of Nuclear Engineering (412-624-3069) [dgcole@pitt.edu] Ph.D., Virginia Polytechnic Institute and State University, 1998. Dynamic systems; measurement and control. Professional Engineer

Heng Ban, R.K. Mellon Professor in Energy (412-624-0325) [heng.ban@pitt.edu] Ph.D., University of Kentucky, 1994. Thermal properties and measurement techniques for nuclear materials, transient fuel performance, sensor development for in-pile applications. Professional Engineer.

Minking Chyu, Leighton Orr Chair Professor and Associate Dean for International Initiatives (412-624-9783) [mkchyu@pitt.edu] Ph.D., University of Minnesota, 1986. Heat and mass transfer; turbomachinery.

Jung-Kun Lee, Assistant Professor (412-648-3395) [jul37@pitt.edu] Ph.D.**,** Seoul National University**,** 2000**.** Nanotechnology; radiation effects on Material Properties; Ion-beam Synthesis of functional materials. Website: http://www.engr.pitt.edu/mems/people/facstaff/lee_jungkun.html

Jorg Wiezorek, Associate Professor (412-624-5430) [wiezorek@pitt.edu] Ph.D., University of Cambridge, Cambridge, UK**,** 1994**.** Materials Science & Engineering; Physical Metallurgy & Metal Physics; Phase

Transformations; Micro-Characterization & Analysis by Diffraction and Spectroscopy; Transmission Electron Microscopy; Scanning Electron Microscopy; Mechanical Behavior; Microstructure Engineering.

Other Faculty

David Aumiller, Adjunct Associate Professor (724-516-9437) [dla12@pitt.edu] Ph.D., The Pennsylvania State University, 1996. Two-phase flow and heat transfer; best-estimate plus uncertainty methods development; reactor safety code development.

Ken Balkey, Adjunct Lecturer (412-374-4633) [balkeykr@westinghouse.com] M.S., University of Pittsburgh, 1980. Nuclear codes and standards; risk assessment; mechanical component integrity; nuclear reactor pressure vessel integrity; piping design-by-analysis.

John Bartocci, Adjunct Lecturer (412-624-5430) [jtb51@pitt.edu] B.S., Massachusetts Institute of Technology. SRO Certified Instructor.

Bruce Berquist, Adjunct Associate Professor (412-476-6053) [berqb@comcast.net] Ph.D., University of Pittsburgh, 1979. Nuclear materials development.

Thomas Congedo, Adjunct Associate Professor and Associate Directory of Nuclear Engineering (412-624-9799) [tvc9@pitt.edu] Ph.D. Nuclear Physics. Nuclear Core Engineering, Criticality Safety, and nuclear technology applications in substance detection and materials modification.

Heather Detar, Faculty Lecturer (412-716-1445) [detarhl@westinghouse.com] B.S., The Pennsylvania State University, 2005. PRA Research.

Gary Elder, Faculty Lecturer (412-856-5967) [eldergg@westinghouse.com] Ph.D., University of Pittsburgh, 1982. Operating nuclear plants.

Daniel Gill, Adjunct Lecturer (412-476-7714) [dfg3@pitt.edu] Ph.D., The Pennsylvania State University, 2009. **N**umerical particle transport theory; computational physics; numerical analysis.

David Griesheimer, Adjunct Assistant Professor (412-624-5430) [dpg20@pitt.edu] Ph.D., University of Michigan, 2004. Computational methods of radiation transport; Monte Carlo methods; multiphysics methods for reactor analysis; high performance and parallel computing.

Jason Gruber, Adjunct Assistant Professor (412-624-5430) [jas182@pitt.edu] Ph.D., Carnegie Mellon University, 2007. Computational materials science, multiscale materials modeling, microstructural science, texture and anisotropy, numerical methods and global optimization.

David Haser, Faculty Lecturer (412-367-9177) [haserd@firstenergy.com] MBA, Youngstown State University, 2005. SRO License; Safety Culture; Plant Operation Improvements; Nuclear Plant Operations and Safety. Professional Engineer.

David Helling, Faculty Lecturer (724-722-5301) [davidh179@gmail.com] B.S., Miami University, 1969. SRO License; Nuclear Power Plant safety and operations; Nuclear Power Plant instrumentation and control; Curriculum integration and online learning.

Vefa N. Kucukboyaci, Adjunct Professor (412-374-5652) [kucukbvn@westinghouse.com] Ph.D., Pennsylvania State University, 2001. Multi-Physics Methods and Applications; Lattice Physics methods; Criticality Safety Analysis; Particle transport theory and applications; Thermal-Hydraulics methods; High performance/ parallel computing on supercomputer platforms; LOCA Analysis methods; Radiation shielding applications; Power and research reactor applications.

Charles M. Laymon, Assistant Professor (412-647-0730) [cml14@pitt.edu] Ph.D., University of Pennsylvania, 1989. Positron Emission Tomography acquisition systems; image and signal processing; data analysis

Neale S. Mason, Research Associate Professor (412-647-0736) [masons@upmc.edu] Ph.D., Vanderbilt University, 1991. PET radiochemistry; Molecular Imaging.

Kurshad Muftuoglu, Adjunct Lecturer (412-480-2067) [kurshad.muftuoglu@ge.com] Ph.D., Pennsylvania State University. Experience includes nuclear reactor safety with emphasis on loss-of-coolant accident; best-estimate methodology development; computational thermal-hydraulics; and system codes development.

Donald Scheef, Faculty Lecturer (724-722-5318) [scheefdm@westinghouse.com] M.S.**,** Purdue University**,** 1972.

David Teolis, Adjunct Lecturer (412-310-3389) [dsteolis@comcast.net] M.S. Statistics, Colorado State University, 2010. M.S. Industrial Engineering, University of Pittsburgh, 1984. Experience includes all aspects of probabilistic risk and safety assessment including hazard identification and analysis, determination of fault paths, fault tree analysis, development of reliability block diagrams, analysis of safety systems, and model quantification. Registered Professional Engineer.

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	7/14-6/15	7/15-6/16	7/16-6/17
Masters	5	3	2
PhD	7	3	4

Graduate Student Enrollment: 8Masters/6 Ph.D
ABET Accreditation: Ph.D., M.Sc.

Nuclear Science and Engineering Faculty

Alain Hébert, Professor **(**514-340-4711 x 4519) [alain.hebert@polymtl.ca] Ph.D., Paris-XI**,** 1980. Reactor Physics; lattice code; neutron diffusion theory. Professional Engineer.

Jean Koclas, Professor **(**514-340-4711 x 4263) [jean.koclas@polymtl.ca] Ph.D.**,** MIT**,** 1980. Safety; reactor kinetics; reactor physics; control and simulation. Professional Engineer.

Guy Marleau, Professor (514-340-4711 x 4204) [guy.marleau@polymtl.ca] Ph.D., McGill University, 1983. Reactor physics, lattice code, neutron transport theory.

Alberto Teyssedou, Professor **(**514-340-4711 x 4522) [alberto.teyssedou@polymtl.ca]
Ph.D. Ecole Polytechnique de Montreal, 1987. Diphasic flow; thermodynamics; supercritical flows.

PURDUE UNIVERSITY

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
B.S.	49	34	22	20	22
Masters	25	20	13	11	6
PhD	8	11	7	4	4

Graduate Student Enrollment: 17 Masters/31 Ph.D.
ABET Accreditation: B.S. (N.E.)

Nuclear Science and Engineering Faculty

Seungjin Kim, Professor and Capt. James F. McCarthy, Jr. and Cheryl E. McCarthy Head of the School of Nuclear Engineering (765-494-5742) [seungjin@purdue.edu] Ph.D.**,** Purdue University**,** 1999. Thermal-hydraulics; Reactor Safety; Modeling of two-phase flow and fluid particle interactions; interactions; interfacial area transport modeling; Two-phase flow experiment and instrumentation; Thermal-hydraulics systems analysis code.

Hany S. Abdel-Khalik, Associate Professor (765-496-9718) [abdelkhalik@purdue.edu] Ph.D., North Carolina State University, 2004. Validation and Uncertainty Quantification. Big Data Analytics and Data Assimilation. Cyberattack-resilient Control Systems. LWR Computational Reactor Physics.

Robert Bean, Assistant Professor (765-496-3573) [bean@purdue.edu] Ph.D., Purdue University, 2003. Application of Advanced Safeguards to the Design of Nuclear Facilities (Specifically Next-Generation Nuclear Reactors, Aqueous Processing Plants, and Pyroprocessing facilities); Radiation Detection and Measurement (Gas detectors, Solid State Detectors, Gamma Spectroscopy, Neutron Detectors).

Chan Choi, Professor; Professor-in-Charge of Academic Programs (765-494-6789) [choi@purdue.edu] Ph.D.**,** Southern Illinois University**,** 1973**.** Fusion Plasma Engineering; Compact Tori Plasma Studies; Inertial Confinement Beam Target Stability; Space Propulsion; Energy Conversion; Nuclear Nonproliferation.

Allen Garner, Assistant Professor (765-494-0618) [algarner@purdue.edu] Ph.D. University of Michigan - Ann Arbor, 2006. Biomedical applications of pulsed power and plasmas; Plasma Physics; Pulsed Power; High Power Microwaves; Theoretical biophysics.

Ahmed Hassanein, Paul L. Wattelet Distinguished Professor (765-496-9731) [hassanein@purdue.edu] Ph.D., University of Wisconsin, Madison, 1982. Plasma Material Interactions; Magnetic and Inertial Fusion Research; Computational Physics and Hydrodynamics; Extreme Ultraviolet Lithography; Laser and discharge produced plasma; Radiation and Particle Transport in Materials; Biomedical Engineering Applications.

Takashi Hibiki, Professor (765-496-9033) [hibiki@purdue.edu] Ph.D., Osaka University, 1990. Basic two-phase flow experiments and modeling; Interfacial area transport equation development; Development of fast neutron radiography systems; Thermal-hydraulic research at micro-gravity conditions; Flow-induced vibration analysis; Research reactor utilization for industrial purposes.

Mamoru Ishii, Walter H. Zinn Distinguished Professor (765-494-4587) [ishii@purdue.edu] Ph.D., Georgia Institute of Technology, 1971. Two-phase flow experiments and modeling research; 3-D two -fluid model and interfacial area transport.

Martin Lopez-De-Bertodano, Associate Professor, Undergraduate Program Chairman (765-494-9169) [bertodan@purdue.edu] Ph.D., Rensselaer Polytechnic Institute, 1992. Experimental Two-Phase Flow; Computational Fluid Dynamics; Turbulence; Thermal Hydraulics and Reactor Safety; Nuclear Systems Simulation.

Gennady Miloshevsky, Associate Professor (765-494-8618) [gennady@purdue.edu] Ph. D., Academic Scientific Complex "A.V. Luikov Heat and Mass Transfer Institute" of the National Academy of Sciences of Belarus, 1998. Atomic and plasma physics; Interaction of radiation with matter; Space radiation transfer; Nuclear physics; Computational physics; Computational fluid dynamics; Multiphase flows; Medical radiation physics; Ion and water permeation in proteins; Gating of protein channels and transporters; Protein aggregation in lipid bilayer.

Shripad T Revankar, Professor, Graduate Programs Chairman (765-496-1782) [shripad@purdue.edu] Ph.D., Karnatak University, 1983. Two-Phase Flow and Heat Transfer; Reactor Safety and Thermal Hydraulics; Next Generation Reactors; High Conductivity Nuclear Fuel; Multiphase Flow in Packed Beds (Trickle Bed Reactors); Multiphase Instrumentation Development; Fuel Cell -Design and Simulation; Regenerative Fuel Cell; Distributed Energy Generation; Hydrogen Generation -High Temperature Thermochemical Reactions; Hydrogen Storage. Website: http://cobweb.ecn.purdue.edu/~shripad/

Tatyana Sizyuk, Assistant Professor (765-494-4262) [tsizyuk@purdue.edu] Ph.D., University of Rzeszow, Poland, 2014. Models and methods in computational physics; Laser Produced Plasmas - models development and validation, applications and research; Plasma-material interactions in fusion reactor and industrial applications; Advanced nanolithography; Advanced numerical methods; Algorithms for parallel computing on multiprocessor system.

Rusi Taleyarkhan, Professor of Nuclear Engineering (765-313-1876) [rusi@purdue.edu] Ph.D.(1982), M.B.A.(1980), Rensselaer Polytechnic Institute. Nuclear power engineering, safety, thermal-hydraulics; homeland security; combating nuclear terrorism via novel sensor development; Nano-to-macro scale

applications of nuclear technology; acoustic inertial confinement fusion; radiation-matter interactions coupled with thermal hydraulics; metastable fluid technologies for nanoscale energetic burst generation; advanced nuclear particle detection technologies based on metastable fluid states; novel explosives and propellant systems for less-than-lethal and barrier penetration devices.

Lefteri Tsoukalas, Professor (765-496-9696) [tsoukala@purdue.edu] Ph.D.**,** University of Illinois**,** 1989. Neurofuzzy methodologies for complex power systems modeling, diagnostics and control; Intelligent instrumentation systems and sensors; Man-machine interface; Autonomous systems and robotics.

Janelle P. Wharry, Assistant Professor (765-494-0782) [jwharry@purdue.edu] Ph.D., University of Michigan, 2012. Materials for nuclear power applications; Irradiation effects on microstructure-property relationships; Micromechanics and small-scale mechanical testing of materials; Materials characterization. Website: https://engineering.purdue.edu/NuclearMaterials

Other Faculty

Miltiadis Alamaniotis, Research Assistant Professor (765-496-9696) [malamani@purdue.edu] Ph.D., Purdue, 2012. Methods for Radiation Detection; Intelligent Systems and Algorithms for: Spectrometry, Radiation Detection, and Nuclear Material Identification; Intelligent Control of Energy and Power Systems; Machine Learning for: Control Systems, Smart Sensors, and Signal Processing; Artificial Intelligence Applications for: Monitoring, Prognostics, Diagnostics and Fault Detection in Nuclear systems/Power systems; Smart Grid/Cities Technologies for: Control and Management of Energy Distribution.

Valeryi Sizyuk, Research Associate Professor (765-494-4217) [vsizyuk@purdue.edu] Ph.D., Belarus State University, Minsk Belarus, 1997. Reactor Fusion; Plasma. Prof. V. Sizyuk has extensive background in computational physics, plasma physics and hydrodynamics, computing technologies and their application in high volume manufacture.

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
B.S.	30	18	18	33	33
Masters	5	2	2	7	8
PhD	3	6	4	3	5

Graduate Student Enrollment: 6 Masters/27 Ph.D.
ABET Accreditation: Nuclear Engineering (BS)

Nuclear Science and Engineering Faculty

Yaron Danon, Professor, Director, Gaerttner Linear Accelerator and Nuclear Engineering Program Director (518-276-4008) [danony@rpi.edu] Ph.D., Rensselaer Polytechnic Institute, 1993. Accelerator technology and radiation applications; Nuclear data and instrumentation.
Website: http://www.rpi.edu/~danony

Wei Ji, Associate Professor (518-276-6602) [jiw2@rpi.edu] Ph.D., University of Michigan, 2008. Nuclear reactor physics; Monte Carlo method development for radiation transport computation; Multiphysics computation for reactor safety analysis; Radiation effects on electronics for terrestrial and space applications. Website: http://www.rpi.edu/~jiw2

Hyun Gook Kang, Associate Professor (518-276-8251) [kangh6@rpi.edu] Ph.D., KAIST, 1999. Probabilistic Risk Assessment; Emergency Operation Procedure; Safety System Design.

Jie Lian, Associate Professor (518-276-6081) [lianj@rpi.edu] Ph.D., University of Michigan, 2003. Nanoscale characterization and nanofabrication; Radiation damage and Radiation effects; Materials behavior under extreme environment; Advanced nuclear waste form and effective nuclear waste management; Accident tolerant fuels; Validation of fuel modelling and simulation.

Li (Emily) Liu, Associate Professor (518-276-8592) [liue@rpi.edu] Ph.D., Massachusetts Institute of Technology, 2005. Physics of water in confined geometry, Instrumentation and methodology development

for X-ray and neutron scattering; Structure and dynamics of nano to meso-scale materials and biological systems; Radiation damage of materials and devices.
Website: http://www.rpi.edu/~liue/

Bimal K Malaviya, Professor; Curriculum Coordinator (518-276-8578) [malavb@rpi.edu]
Ph.D., Harvard University, 1964. Radioactive waste management; fission and fusion reactor physics and technology; biomedical applications; human factor engineering.

Michael Z. Podowski, Professor; Director of Center for Multiphase Research (518-276-4000) [podowm@rpi.edu] Ph.D., Warsaw University of Technology, 1972. Reactor dynamics and safety; Applied mathematics; System stability; Two-phase flow and heat transfer.
Website: http://www.rpi.edu/~podowm

George Xu, Professor (518-276-4014) [xug2@rpi.edu] Ph.D., Texas A&M University, 1994. Radiation protection dosimetry; Biomedical applications of radiation for cancer imaging and treatment; Radiation protection, radiotherapy and diagnostic imaging; advanced human models for Monte Carlo simulations of ionizing radiation. Website: http://www.rpi.edu/~xug2

Other Faculty

Robert C. Block, Professor Emeritus (518-276-6404) [blockr@rpi.edu] Ph.D., Duke University, 1956. Nuclear structure and data; Accelerator technology; Neutron reactions; Industrial applications of radiation; Radiation effects in microelectronics; Nondestructive testing.

Peter F. Caracappa, Radiation Safety Officer (518-276-2212) [caracp3@rpi.edu] Ph.D., Rensselaer Polytechnic Institute, 2006. Nuclear Engineering Education. Website: http://www.rpi.edu/~caracp3

Donald A. Drew, Chair, Mathematical Sciences; Eliza Ricketts Foundation Professorship of Mathematics; Professor of Mechanical, Aerospace, and Nuclear Engineering (518-276-6903) [drewd@rpi.rdu], Ph.D., Rensselaer Polytechnic Institute, 1970. Multiphase flows.

Mark J. Embrechts, Associate Professor (518-276-4009) [embrem@rpi.edu] Ph.D., Virginia Polytechnic Institute, 1981. Application of neutral networks and fuzzy logic for manufacturing and process control; image recognition and classification with the aid of neural networks; neural networks, fractals, chaos, and wavelets for time-series analysis; data mining and computational intelligence.

Richard T Lahey, Jr., Professor Emeritus (518-276-6351) [laheyr@rpi.edu] Ph.D., Stanford University, 1971. Multiphase flow and boiling heat transfer; Nuclear reactor thermal-hydraulics and safety analysis; Sonofusion technology.

Don Steiner, Professor Emeritus (518-276-4016) [profsteiner@nycap.rr.com]
Ph.D., Massachusetts Institute of Technology, 1967. Fusion systems analysis; plasma engineering; blanket design and overall fusion reactor design.

Timothy H Trumbull, Adjunct Assistant Professor; Director of Reactor Critical Facility (518-276-6351) [trumbt2@rpi.edu] Ph.D., Rensselaer Polytechnic Institute, 2004. Nuclear engineering education; critical facility operations and experimentation.

Glenn Winters, Adjunct Professor (518-584-8796) [winteg@rpi.edu] MBA, Union College, 1983. Reactor Physics.

Nuclear Science and Engineering Research Centers

The **Gaerttner Linear Accelerator (LINAC) Center** has been engaged in active research continuously for over 45 years, and is centered around a multi-million dollar, high power, >60 MeV, L-band traveling wave, electron linear accelerator. The primary research thrust of the center is obtaining nuclear data for use in a variety of applications, ranging from the design of nuclear reactors and analysis of criticality to radiation damage and new nuclear medicine technologies. A newly constructed facility adds new research capabilities in the area of nuclear criticality safety, with a new detection system designed to measure the probability of neutron capture in different materials.

The **Walthousen Critical Reactor Facility** is a low watt, fully functioning reactor for operational training and core physics studies and is available for student use in conjunction with modern nuclear radiation detection and characterization systems.

The **Center for Multiphase Research (CMR)** brings together faculty from the Schools of Engineering and Science. There are opportunities for both graduate and undergraduate students to participate in research at the CMR. Current areas of research include: Designing and performing two-phase flow experiments, including fundamentals of two-phase flow physics and system-type experiments. Examples include: two-phase flow turbulence, interfacial forces, bubble size distribution, phase separation, boiling heat, pressure drop in two-phase channels and loops, phase distribution in various channel geometries, gas distribution and heat transfer form ablating surfaces exposed to spreading liquid flows, multi- channel effects, flooding, two-phase flow transients and oscillations. Development of physically-based constitutive models of two-phase flow, and of component models of two-phase flow systems. Examples: mechanistic models of interfacial forces, a mechanistic model of void distribution in subcooled boiling, a widely used model of wall heat flux partitioning in subcooled boiling, a mechanistic model of critical heat flux (CHF). Application of Computational Multiphase Fluid Dynamics (CMFD) and other computational methods to simulate two-phase flow systems, including steady-state operation, transients/instabilities and 3-dimensional effects. Development of graphical tools, such as graphical user interface (GUI) for computer simulations.

The **Multiscale Science & Engineering Center (MSEC)** was established in October 2006 to create a collaborative environment of faculty to develop and transition Multiscale technologies to industry and government. Rensselaer is among the first universities to recognize that a systematic multiscale theory combined with intensive technology transfer effort would propel the Institute's initiatives in numerous fields. One MSEC project is the VIP-Man Virtual Patient, with which researchers study multiscale human computing applications on radiation modeling in geometry modeling, radiation transport, treatment optimization, and X-ray CT imaging.

The **Center for Engineering-Based Patient Modeling (CEPM)** brings together engineers, biomedical scientists and clinicians who conceive and carry out synergistic projects that solve important clinical problems using physics-based and design-driven computational and experimental methods.

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
Masters	10	13	6	4	7
PhD	2	0	2	1	0

Graduate Student Enrollment: 19 Masters/14 Ph.D.

Distance Education Program
Offers Nuclear Engineering Courses and Degrees Online
http://www.me.sc.edu/apogee/

Nuclear Science and Engineering Faculty

Travis W. Knight, Professor and Director (803-777-1465) [twknight@sc.edu]
Ph.D., University of Florida, 2000. Advanced nuclear fuels and materials; nuclear safeguards; nuclear fuel cycle analysis; alternative uses of nuclear power including hydrogen; risk and safety analysis; space nuclear power and propulsion. Faculty Website:
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<u>Other Faculty</u>

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Nuclear Science and Engineering Research Centers

USC Nuclear Materials Laboratory: The USC Nuclear Materials Laboratory is equipped and licensed for working with uranium ad thorium based fuels as well as non-radioactive materials routinely studied including high temperature alloys and ODS steels. The key facilities of this laboratory include high temperature furnaces for processing and testing of high temperature ceramics and metals, high vacuum systems, inert atmosphere glovebox, radiological hood, a customized fluidized-bed chemical vapor deposition coater for studies of coated particle fuels, a very high-temperature mechanical testing machine including a creep/tensile test stand, TEM sample holder for in-situ straining experiments, differential scanning calorimeter, thermogravimetric analyzer and equipment for characterization such as density, particle size, surface area, and porosity measurement and a full suite of metallographic sample preparation (grinder/polisher, electropolisher).

Thermal Hydraulics Laboratory: Thermal hydraulic test loops and laboratories are dedicated to studies of enhanced heat transfer, fluid flow, pressure drop and other phenomena associated with nuclear fuel rods and assemblies.

High Performance Computing: High performance computing facilities are used to analyze and model nuclear reactors, advanced fuel cycles, and advanced nuclear fuels and materials. Modeling and simulation codes and tools are employed for neutronic, thermal hydraulic, computational fluid dynamics (CFD), thermochemical, safety and risk, shielding, and finite element analyses. Sample code packages include MCNP6.2, SCALE6.2, ERANOS2.1, FACT-SAGE7.0, ABAQUS, Comsol Multiphysics, etc.

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
B.S.	3	10	8	*	*

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Nuclear Science and Engineering Faculty

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Musa B Danjaji, Professor **(**803-516-4591) [mbdanjaji@scsu.edu] Ph.D**.,** University of Illinois at Urbana-Champaign**,** 1993. Environmental Radioactivity; Radiation Effects in Material; Radiation Protection; Alternative Energy Studies.

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Other Faculty

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
B.S.	56	51	40	30	38
Masters	25	24	29	35	18
PhD	8	12	9	16	14

Graduate Student Enrollment: 26 Masters/116 Ph.D.
ABET Accreditation: B.S. (N.E.)

Nuclear Science and Engineering Faculty

J. Wesley Hines, Professor and Department Head (865-974-6561) [jhines2@utk.edu] Ph.D., Ohio State. Research interests: Diagnostics and surveillance, artificial intelligence methods, expert systems and neural networks. Website: http://www.engr.utk.edu/nuclear/Projects/JWH-Grants10-09.pdf

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Website: http://hall-research.engr.utk.edu/Welcome_to_Professor_Halls_Research_Group.html

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Website: http://www.engr.utk.edu/nuclear/Projects/JPHGrantsContracts-12-09.pdf

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Maik K. Lang, Assistant Professor (865-974-2525) [mlang2@utk.edu] Ph.D., University of Heildelberg, Germany. Research interests: Radiation damage and high-pressure studies, materials science.

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Laurence F. Miller, Professor **(**865-974-5048) [lfmiller@utk.edu] Ph.D., Texas A&M. Research interests: Particle and radiation transport, diagnostics and surveillance, waste management, health physics, modeling and simulation, instrumentation and control. Professional Engineer.

Ronald E. Pevey, Associate Professor (865-974-7573) **[**rpevey@utk.edu] Ph.D., University of Tennessee. Research interests: Reactor physics, thermal hydraulics, computer methods development, shielding, nuclear criticality safety. Professional Engineer.

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Richard T. Wood, Professor **(**865-974-8841) [rwood11@utk.edu] Ph.D., University of Tennessee. Research Interests: Digital instrumentation and control (I&C) technology, nuclear power plant I&C systems, safety system regulation, space nuclear power and propulsion, systems engineering, autonomy and control, surveillance and diagnostics, and simulation. Current research activities focus on common-cause failure for embedded digital devices and development of I&C architectures for advanced reactors.

Brian D. Wirth, Governor's Chair Professor (865-974-2552) [bdwirth@utk.edu] Ph.D., University of California. Research Interests: computational modeling and measurements of radiation effects in materials, molecular dynamics simulation, nano-materials.

Steven J. Zinkle, Governor's Chair Professor (865-974-2525) [szinkle@utk.edu] Ph.D., University of Wisconsin, Madison. Research interests: Physical metallurgy of structural materials; the effects of ion and neutron irradiation on the microstructure, physical properties, and mechanical properties of metals and ceramics; transmission electron microscopy; and fusion and space fission reactor materials studies.

Other Faculty

John Auxier II, Research Assistant Professor (303-514-6515) [jauxier@utk.edu] Research interests: Advanced radionuclide separations; nuclear forensics for post-detonation analysis; advanced imaging techniques and methodologies for pre-detonation forensic samples.

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Andrei Gribok, Research Associate Professor (865-974-2525) [agribok@utk.edu] Ph.D., Moscow Inst of Biological Physics. Research interests: Artificial intelligence techniques, surveillance and diagnosis, Inverse and ill-posed problems, Regularization theory.

Peter G. Groer, Professor Emeritus (8659742525) [ggroer@utk.edu] Ph.D., Vienna. Research interests: Radiation risk assessment, competing risk theory, health physics, reliability analysis

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Alan S. Icenhour, Adjunct Professor (865-576-5315) [aicenhou@utk.edu] Ph.D., University of Tennessee-Knoxville. Research Interests: Radiochemical processing, nuclear fuels, isotope and radioisotope production, reactor and nuclear facility operations, radioactive waste management, and nuclear security.

Vincent Jodoin, Adjunct Associate Professor (865-574-0420) [jodoinvj@ornl.gov] Ph.D., Air Force Institute of Technology, 1994. Research Interests: Nuclear security, nuclear fallout modeling, radiological source term modeling, and nuclear forensics.

Thomas Kerlin, Research Professor (86-597-42525) [jkerlin@utk.edu] Ph.D., University of Tennessee. Research interests: Diagnostics and surveillance, modeling and simulation, instrumentation and control.

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
B.S.	62	63	56	46	48
Masters	31	22	26	24	23
PhD	18	8	14	14	17

Graduate Student Enrollment: 57 Masters/91 Ph.D.
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Nuclear Science and Engineering Faculty

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Pavel V. Tsvetkov, Associate Professor and Graduate Program Advisor (979-845-7078) [tsvetkov@tamu.edu] Ph.D., Texas A&M University, 2002. Nuclear Power Engineering: Reactor Analysis and Design; Space Power.

Karen Vierow Kirkland, Associate Professor and Associate Department Head (979-458-0600) [vierow@tamu.edu] Ph.D., University of Tokyo, 1999. Nuclear Power Engineering: Thermal Hydraulics

Other Faculty

David Boyle, Deputy Director, NSSPI (979-862-8037) [dboyle@tamu.edu] Ph.D., Massachusetts Institute of Technology, 1980. Nuclear Security and Nonproliferation.

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Sunil S. Chirayath, Assistant Professor (979-862-2616) [sunil@tamu.edu] Ph.D., University of Madras, India, 2005. Nuclear Security and Nonproliferation.

Cable Kurwitz, Senior Lecturer (979-845-6126) [kurwitz@tamu.edu] Ph.D**.,** Texas A&M University**,** 2009. Nuclear Power Engineering: Space Power; Thermal Hydraulics**.** Professional Engineer.

Craig Marianno, Assistant Professor; TEES Research Engineer, NSSPI (979-845 -6093) [mairanno@tamu.edu] Ph.D., Oregon State University**,** 2000. Nuclear Security and Nonproliferation.

William H. Marlow, Professor Emeritus (979-845-2271) [w-marlow@tamu.edu] Ph.D., University of Texas at Austin, 1973. Nuclear Materials and Fuel Cycles.

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Warren Miller, TEES Distinguished Research Professor (979-847-6192) [wmiller@tamu.edu] Ph.D., Northwestern University, 1973. Nuclear Security; Computational Methods.

Paul Nelson, Professor Emeritus; Associate Director for International Programs, NSSPI (979-845-4132) [p-nelson@tamu.edu] Ph.D., University of New Mexico, 1969. Nuclear Security and Nonproliferation.

Duy-Thein Nguyen, Research Assistant Professor (979-845-4161) [thien.duy.ng@tamu.edu] Ph.D., Ristumeikan University, Japan, 2010. Thermal Hydraulics; Experimental and Computational Fluid Dynamics.

Theodore Parish, Professor Emeritus, Ph.D. University of Texas, 1973. Reactor Physics.

Natela Ostrovskaya, Senior Lecturer (979-862-4409) [natela@ne.tamu.edu] Ph.D., Texas A&M University**,** 2005**.** Health Physics; Radiation Biology; Medical Physics.

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Galina Tsvetkova, Lecturer (979-845-4162) [tsvetkovag@tamu.edu] Ph.D., Texas A&M University**,** 2003. Health Physics; Radiation Biology; Medical Physics.

Nuclear Science and Engineering Research Centers

Center for Large-scale Scientific Simulations (CLASS): Dr. Jim Morel, Director. CLASS' objectives are to advance the state of the art in large-scale scientific simulations, and to lead the development of educational programs whose participants will be exceptionally well qualified for careers in scientific simulation. http://class.tamu.edu

Institute for National Security Education & Research (INSER): Dr. Marvin Adams, Director. INSER develops and implements graduate-level education programs targeted at national security professionals as well as organizes and implements multidisciplinary research and development programs that are relevant to national security. http://inser.tamu.edu

Nuclear Security Science and Policy Institute (NSSPI): Dr. William Charlton, Director. The mission of NSSPI is to work collaboratively with national laboratories and other partners to develop and apply science and

technology to detect, prevent, and reverse the proliferation of nuclear and radiological weapons and guard against nuclear terrorism; educate the next generation of leaders in the field of nuclear security sciences; and to study the policy implications of deploying new technologies. http://nsspi.tamu.edu.

Nuclear Science Center (NSC): This facility has a one-megawatt TRIGA swimming pool reactor that can be pulsed and a variety of other features including experimental laboratories, a large irradiation cell, beam ports, a thermal column and a pneumatic "rabbit" system. One of the best-equipped facilities of its type in the country, the facility is used in our laboratory courses as well as our research program. http://nsc.tamu.edu

Nuclear Power Institute (NPI): Dr. K. Lee Peddicord, Director. NPI brings together four-year universities, two-year technical and community colleges, and public schools with the nuclear power industry, state and local organizations, and state, federal, and international agencies to assist with meeting the challenge of providing the trained workforce needed to operate new and existing reactors in Texas. http://www.nuclearpowerinstitute.org

UNIVERSITY OF TEXAS at AUSTIN

Nuclear and Radiation Engineering Program
Mechanical Engineering
1 University Station C2200
Austin, Texas 78712-0292
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Administrative Contact: Dana Judson
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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
Masters	7	8	6	10	6
PhD	13	2	3	4	6

Graduate Student Enrollment: 24 Masters/23 Ph.D.
ABET Accreditation: BS in Mechanical Engineering

Distance Education Program
Nuclear Engineering Courses for MS and PhD Degrees
http://nuclear.engr.utexas.edu/distance-learning

Nuclear Science and Engineering Faculty

William Charlton, John J. McKetta Energy Professor and Director, Nuclear Engineering Teaching Laboratory [wcharlton@austin.utexas.edu] Ph.D., Texas A&M University, 1999. Nuclear security; nuclear nonproliferation; nuclear detection; nuclear forensics; nuclear policy; reactor physics.
Website: http://www.me.utexas.edu/faculty/faculty-directory/charlton

Derek Haas, Assistant Professor (512-468-3871) [derekhaas@utexas.edu] Ph.D., University of Texas at Austin, 2008. Radiation detection for nuclear arms control and non-proliferation; fundamental physics of radioactive decay processes; fission yields; detection techniques.
Website: http://www.me.utexas.edu/faculty/faculty-directory/haas

Dale Klein, Professor and Associate Vice Chancellor for Research for the UT System (512-499-4689) [dklein@utsystem.edu] Ph.D., University of Missouri-Columbia**,** 1977**.** Nuclear power sustainability, nuclear regulations; nuclear nonproliferation.
Website: http://www.me.utexas.edu/faculty/faculty-directory/klein

Sheldon Landsberger, Professor (512-796-0287) [s.landsberger@mail.utexas.edu] Ph.D., University of Toronto, 1982. Nuclear analytical measurements and their applications in nuclear forensics; natural

radioactivity; environmental monitoring of radioactivity, trace and heavy metals; nuclear instrumentation.
Website: http://www.me.utexas.edu/faculty/faculty-directory/landsberger

Erich Schneider, Professor (512-232-5412) [eschneider@mail.utexas.edu] Ph.D., Cornell University, 2002. Computational modeling and simulation of nuclear system; nuclear systems engineering; research of nuclear reactor technologies; nuclear fuel; the sustainability of nuclear power; modeling the transport of neutrons and other subatomic particles to study the performance of nuclear fuel in very intense radiation fields such the next generation of nuclear reactors.
Website: http://www.me.utexas.edu/faculty/faculty-directory/schneider

Other Faculty

Joe Artnak, Research Fellow (512-577-6998 [ut@att.net] Ph.D., University of Texas, 2012. Prompt gamma activation analysis; hydrogen embrittlement, susceptibility, and detection in metals; boron quantification in semiconductors for neutron detection and voltaic systems; radioxenon and radioargon production.
Website: http://www.nuclear.engr.utexas.edu/netl/netl-people

Mitch Pryor (512-471-5182) [mpryror@utexas.edu] Ph.D., The University of Texas, Austin, 2002. Robotics in hazardous areas with special nuclear materials; design; controls, decision making
Website: http://robotics.me.utexas.edu/mitch-pryor

Nuclear Science and Engineering Research Centers

Nuclear Engineering Teaching Laboratory (NETL): Constructed in 1986 at the J.J. Pickle Research Campus, a separate research center of the University of Texas, featuring a 1 Megawatt TRIGA reactor. Areas of study include health physics, radiation engineering, research reactor beam port experiments, radioactive waste management, reactor and computational nuclear engineering and environmental pathways, and nuclear forensics. NETL also houses a 14 MeV neutron generator, 2 Pu(Be) sources, three Compton suppression germanium systems, three gamma-gamma coincidence systems, beta-gamma coincidence system, and radiochemistry and neutron activation analysis laboratories.

Nuclear and Applied Robotics Laboratory: Advanced research in efforts to deploy robotics in hazardous, uncertain environments to perform manufacturing and special nuclear material handling.

UNIVERSITY OF UTAH

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
Masters	6	4	3	8	3
PhD	3	1	0	2	3

Graduate Student Enrollment: 5 Masters/12 Ph.D.
ABET Accreditation: Civil Engineering

Nuclear Science and Engineering Faculty

Michael Barber, Interim Director, Professor and Chair (801-581-6931)[barber@civil.utah.edu} Ph.D., University of Texas at Austin, 1991. Water Resources Engineering; Water Quality; and Climate Change Impact on Water Resources; Field Investigations and Numerical Modeling Studies.
Website: www.nuclear.utah.edu/director

Tatjana Jevremovic, Professor and Energy Solutions Presidential Endowed Chair **currently on leave of absence** (801-587-9696) [Tatjana.Jevremovic@utah.edu] Ph.D., The University of Tokyo, 1993. Nuclear reactor simulation and modeling; radiation transport modeling and applications; Nuclear forensics and nuclear safeguards; Nuclear materials detection, simulation and modeling; Nuclear medicine; Radiation in space; Advanced visualizations of nuclear engineering software with accelerations; Environmental engineering. Neutron Activation Analysis. Engineering nuclear materials for power applications. Professional Engineer.

Azaree T. Lintereur, Assistant Professor (801-581-6785) [Azaree.Lintereur@utah.edu] Ph.D., University of Florida, 2013. Radiation Detection; Coincidence and Multiplicity Counting; Nuclear Safeguards.

Luther McDonald IV, Assistant Professor (801-581-7768) [luther.mcdonald@utah.edu] Ph.D., Washington State University, 2012. Radiochemistry; Nuclear Forensics; Nuclear Materials.
Website: www.mcdonald-radiochemistry-research.com

Michael F. Simpson, Associate Professor (801-581-4013) [michael.simpson@utah.edu] Ph.D., Princeton University, 1996. Nuclear fuel cycle technology; molten salt chemistry; nuclear safeguards; electrochemical analysis and separations.
Website: https://faculty.utah.edu/u0907827-MICHAEL_F_SIMPSON/research/index.hml

UTAH STATE UNIVERSITY

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Graduate Student Enrollment: 5 Masters/8 Ph.D.
ABET Accreditation: Mechanical Engineering

Nuclear Science and Engineering Faculty

Ling Liu, Assistant Professor (435-797-9149) [ling.liu@usu.edu] Ph.D., Columbia University, 2010. Atomistic simulation; crystal plasticity; continuum modeling; multiscale simulation.

Jason Quinn, Assistant Professor (435-797-0341) [jason.quinn@usu.edu] Ph.D., Colorado State University, 2010. Technoeconomics: systems engineering: life cycle assessment.

Barton Smith, Professor (435-797-8147) [bsmith@engineering.usu.edu] Ph.D., Georgia Tech, 1999. Fluid dynamics: measurement uncertainty.

Other Faculty

Aaron Katz, Assistant Professor (435-797-7021) [aaron.katz@usu.edu] Ph.D., Stanford, 2009. Computational fluid dynamics.

Nicholas Roberts, Assistant Professor (435-797-9455) [nick.roberts@usu.edu] Ph.D., Vanderbilt University, 2010. Materials; Nanotechnology; Thermal Transport.

VIRGINIA COMMONWEALTH UNIVERSITY

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	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
B.S.	17	18	16	23	11
Masters	3	7	15	18	12
PhD	0	1	2	6	9

Graduate Student Enrollment: 55 Masters/55 Ph.D.
ABET Accreditation: B.S. in Mechanical Engineering,
B.S. in Mechanical Engineering with a Nuclear Concentration

Nuclear Science and Engineering Faculty

Sama Bilbao y León, Associate Professor and Director of Nuclear Engineering Programs (804-828-2570) [sbilbao@vcu.edu] Ph.D., University of Wisconsin, Madison, 1999. Experimental and computational thermal-hydraulics, two-phase flow and heat transfer for nuclear applications, energy and environmental policy, systems and decision analysis, outreach and communications.

Braden Goddard, Assistant Professor (804-827-7029) [bgoddard@vcu.edu] Ph.D., Texas A&M University, 2013. Nuclear security and counter terrorism, nonproliferation and international safeguards, radiation detection and measurements, environmental measurements and assay.

James Miller, Assistant Professor (804-827-4000) [jgmiller@vcu.edu] M.S., Pennsylvania State University, 1975. Reactor Theory, nuclear safety, modeling and simulation of nuclear systems. Professional Engineer.

Supathorn Phongikaroon, Associate Professor (804-827-2278) [sphongikaroon@vcu.edu] Ph.D., University of Maryland, 2001. Electrochemical and chemical separation for used nuclear fuel reprocessing, molten salt systems, pyroprocessing technology, laser-induced breakdown spectroscopy. Professional Engineer.

Jessika Rojas Marin, Assistant Professor (804-828-7126) [jvrojas@vcu.edu] Ph.D., Missouri University of Science & Technology, 2014. Nuclear materials, radiation induced synthesis of nanomaterials, medical applications of radiation.

Gary Tepper, Professor and Department Chair (804-827-4079) [gctepper@vcu.edu] Ph.D, University of California, San Diego, 1993. Radiation detection and measurement, sensor design, nanoscale materials.

Zeyun Wu, Assistant Professor (804-827-0237) [zwu@vcu.edu] Ph.D., Texas A&M University, 2010. Reactor Physics; Reactor core design and analysis; Computational methods for neutron transport; Uncertainty and sensitivity analysis. Website: https://egr.vcu.edu/directory/zeyunwu/

Other Faculty

Gene Grecheck, Instructor (804-827-4000) M.S. Rensselaer Polytechnic Institute. Energy policy, nuclear power operations and strategic development.

Nuclear Science and Engineering Research Centers

Specialized nuclear engineering laboratories include a the VCU Radiation Detection and Measurement Laboratory, the VCU Radiochemistry Laboratory, the VCU Laser Spectroscopy Laboratory, the Advanced Nuclear Modeling and Simulation Laboratory, the NanoNuclear and Radiation Effects Laboratory, the Nuclear Security and Nonproliferation Laboratory, the Microsensor and Radiation Detector Laboratory, the VCU Nuclear Simulator, and the VCU Inertial Electrostatic Confinement Fusion Reactor. Other relevant research centers within the VCU School of Engineering include the Institute for Engineering and Medicine, the VCU Nanomaterials Core Characterization Center, the VCU da Vinci Center for Innovation and the Wright Virginia Microelectronics Center.

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

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FAX: (540) 231 – 7894

National Capital Region (NCR) Campus
Virginia Tech Research Center
900 N Glebe Road
Arlington, VA 22203

Administrative Contact: Alireza Haghighat
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haghighat@vt.edu
Website: http://nuclear.ncr.vt.edu

	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
Masters	0	1	1	3	2
PhD	0	0	2	0	0

Graduate Student Enrollment: 4 Masters/12 Ph.D.

Distance Education Program
Offers Nuclear Engineering Courses Online
www.me.vt.edu

Nuclear Science and Engineering Faculty

Alireza Haghighat, Program Director, Professor (571-858-3333) [haghighat@vt.edu] Ph.D., University of Washington, 1986. Research in particle transport methods (deterministic and statistical Monte Carlo) and their applications in simulation of nuclear systems; parallel computing for nuclear applications; reactor physics; perturbation techniques; design of nondestructive interrogation systems for nuclear safeguards, security, and nonproliferation applications; simulation of nuclear reactors, radiation systems, and medical devices and image reconstruction.

Celine Hin, Assistant Professor (540-231-1924) [celhin@vt.edu] Ph.D., Institut National Polytechnique of Grenoble, 2005. Kinetic Monte Carlo simulation; thermoelectric material design; nuclear materials simulation of radiation effects and development of nuclear fuel and cladding material.

Mark Pierson, Associate Professor of Practice (540-231-9112) [mark.pierson@vt.edu] Ph.D., Virginia Polytechnic Institute and State University, 2005. Carbon nanomaterial radiation detector development; radioisotope betavoltaic batteries; transmutation of used nuclear fuel through accelerator-driven sub-critical systems; accelerator production of medical isotopes; nuclear fuel cycle; nuclear safeguards and nonproliferation; radiation detection and measurement; radiation transport; nuclear power plant operations and safety.

Yang Liu, Assistant Professor (540-231-8068) [liu130@vt.edu] Ph.D., Purdue University, 2008. Multi-scale modeling of multiphase flow; interfacial area transport equation and particle interaction mechanism; constitutive closures of 3-D two-fluid models; two-phase flow CFD with dynamic interfacial model; two-phase instrumentation for interfacial measurement; two-phase flow instabilities; experimental methods.

Jinsuo Zhang, Professor (540-231-1988)[zjinsuo@vt.edu] Ph.D., Zhejiang University, 2001,
Nuclear materials compatibility (materials corrosion/degradation); Nuclear fuel materials (metallic fuel, fuel-cladding chemical interactions, fuel-coolant interactions); Nuclear fuel cycle technology (pyroprocessing); Electrochemical separation; Nuclear safeguards and nonproliferation; Advanced coolant materials (molten salt, liquid metal). Website: http://www.nuclear.ncr.vt.edu

Other Faculty

David Clark, Professor and Head of Materials Science and Engineering Department (540-231-6640) [dclark@mse.vt.edu] Ph.D., University of Florida, 1976. Nuclear waste materials; environmental degradation of glass and ceramics; microwave sintering of fuel pellets.

Diana Farkas, Professor of Materials Science and Engineering (540-231-4742) [diana@vt.edu] Ph.D., University of Delaware, 1980. High performance computer simulation techniques for application to nuclear materials and for designing materials with improved radiation resistance including nanofoam materials; Molecular dynamics and many body interatomic potentials to simulate materials response at the atomic scale in multimillion atom virtual samples.

Robert Hendricks, Professor and Associate Department Head, Materials Science and Engineering (540-231-6917) [robert.hendricks@mse.vt.edu] Ph.D., Cornell University, 1964. Physical metallurgy and modeling metal casting; semiconductor processing and characterization; X-ray and neutron diffraction.

Patrick Huber, Professor, Physics (540-231-8727), [pahyber@vt.edu) Ph.D., Technische Universität München, Theoretical Physics, Numerical methods to accurately and efficiently predict physics sensitivities of yet to be built experiments; theoretical analysis of neutrino physics

Alan Kornhauser, Associate Professor of Mechanical Engineering (540-231-7064) [alkorn@vt.edu] Sc.D., Massachusetts Institute of Technology, 1989. Interphase drag in liquid-vapor flows in once-through steam generators (OTSGs); liquid-vapor flows in ejectors; the follow of flashing liquids through restrictions; and liquid-vapor flow instrumentation.

Johnathan Link, Professor of Physics & Director of Center for Neutrino Physics (540-231-5321) [jonathan.link@vt.edu] Ph.D., University of California at Davis.

Roop Mahajan, Professor of Mechanical Engineering (571-858-3355) [mahajanr@vt.edu] Ph.D., Cornell University, 1977, Advanced Electronic Cooling; Two-Phase Flows; Porous Media; Synthesis and application of graphene and its derivatives and composites; Biomedical Devices; Emerging and Black Swan Technologies; Cross-cutting technologies for sustainable communities; Next generation engineering curriculum.

Camillo Mariani, Associate Professor (540-231-4449)[camillo@vt.edu] Ph.D., University of Rome "La Sapienza", Experimental particle physics and in particular neutrino physics; various accelerator neutrino experiments; long baseline (DUNE at Fermilab and SURF) and short baseline (MicroBooNE and SBND at Fermilab), in non-proliferation experiment (SOLID and CHANDLER) and in electron scattering experiments at JLAB in Virginia; study of neutrino interactions in matter from a theoretical and experimental point of view.

Sonja Schmid, Assistant Professor of Science and Technology in Society (703-538-8482) [sschmid@vt.edu] Ph.D., Cornell University, 2005. Nuclear security and safeguards; S&T policy; emergency response; energy policy in international perspective.

Danesh Tafti. Professor and Interim Head, Mechanical Engineering Department (540-231-9975) [dtafti@exchange.vt.edu]. Ph.D., Pennsylvania State University, 1989. Develop and apply large-scale high performance simulation tools to a wide range of physical phenomena in the fluid-thermal sciences; applications include internal and external cooling of turbine vanes and blades, heat transfer enhancement surfaces in compact heat exchangers, fluidized beds, cardio-vascular flows, cooling of reactor reflector regions and in-core self-powered neutron detectors, aerodynamics of flapping flight for Micro-Air Vehicle (MAV) applications, CO2 capture, microfluidics, and flows in solid rocket motors.

Nuclear Science and Engineering Research Centers

Center for Nuclear Materials and Nuclear Fuel Cycle (NMFC): Director, Jinsuo Zhang [zjinsuo@vt.edu] (540-231-1988). Research activities including liquid metal and molten salt coolant chemistry and control, material corrosion by liquid metal, high temperature water and molten salt and corrosion control, electrochemical separation for spent fuel treatment, metallic nuclear fuel and fuel/cladding chemical interactions. The center current have a molten chloride salt loop, two high-temperature loops, electrochemical cells for high/room temperature corrosion studies, six electrochemical potentiostat for molten salt chemistry studies, three glovebox systems for providing inert conditions for experiments with chemistry control.

MARS - Center for Multiphysics for Advanced Reactor Simulation: Director, Alireza Haghighat [haghighat@vt.edu] (571-858-3333), The vision of MARS is to establish itself as the Center for the development of detailed Multiphysics algorithms and simulation tools capable of design and safety

analysis of advanced and innovative reactors in real-time. This will be accomplished by combining a team of highly-skilled professors (both domestic and international) with different backgrounds (such as reactor physics, reactor thermal-hydraulics, material science, and chemistry), and private organizations. (https://gemi.ictas.vt.edu/research/s3npower.html)

Multiphase Flow and Thermal-hydraulics Laboratory (MFTL): Director, Yang Liu [liu130@vt.edu] (540-231-8068). Research activities include two-phase flow visualization and measurement, advanced conductivity probe, fast X-ray flow imaging system, particle image velocimetry, measurement uncertainty quantification, bubble, drop and film dynamics, multi-group two-fluid model, interfacial area transport equation, computational fluid dynamics, interface resolved simulation, two-phase flow induced vibration, passive safety system design, reactor safety analysis. (https://sites.google.com/a/vt.edu/vtmftl/)

Nuclear Science and Engineering Laboratory (NSEL) at NCR: Director, Alireza Haghighat [haghighat@vt.edu] (571-858-3333). Advanced high-performance computational methodologies, algorithms and visualization tools, innovative detection devices and materials, and establishment and utilization of benchmarking and testing environments and laboratories, fuel cycle and waste management, digital monitoring, nuclear security, nonproliferation, and safeguards, medical imaging, nuclear policy. (http://nsel.ncr.vt.edu)

Radiation Measurement, Simulation and Visualization Laboratory (RMSVL): Director, Mark Pierson [mark.pierson@vt.edu] (540-231-9112). Research activities in radiation detection and materials, radiation dosimetry, light-weight radiation shielding materials, radiation detection arrays, medical physics, nuclear safeguards, benchmarking of particle transport codes and radiation transport visualization. In addition, it provides modeling, simulation and visualization of the results.

Virginia Tech Transport Theory Group (VT^3G): Leader, Alireza Haghighat [haghighat@vt.edu] (571-858-3333), VT^3G is engaged in development of hybrid 3-D, multi-scale, parallel particle transport algorithms and codes, and their application to nuclear energy, nuclear security and non-proliferation and radiation therapy and diagnosis; development virtual reality systems for particle transport simulation. (http://nsel.ncr.vt.edu/vt3g.html)

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timjensen@wisc.edu
Website: http://www.engr.wisc.edu/ep/

	7/12-6/13	7/13-6/14	7/14-6/15	7/15-6/16	7/16-6/17
B.S.	22	21	32	33	28
Masters	30	19	33	23	29
PhD	6	9	10	9	10

Graduate Student Enrollment: 23 Masters/75 Ph.D.
ABET Accreditation: Nuclear Engineering

Nuclear Science and Engineering Faculty

Douglas L. Henderson, Professor and Department Head (608-263-0808) [henderson@engr.wisc.edu] Ph.D., University of Wisconsin, Madison, 1987. Reactor physics; radiation transport; fusion reactor technology; nuclear waste. Website: http://www.engr.wisc.edu/ep/faculty/

Matt S. Allen, Associate Professor (608-890-1619) [msallen@engr.wisc.edu] Ph.D.**,** Georgia Institute of Technology**,** 2005**.** Dynamics, vibrations and controls; micro/nano systems; uncertainty and stochastic systems; linear/nonlinear system identification; model reduction/substructuring.
Website: http://www.engr.wisc.edu/ep/faculty

Vicki M. Bier, Professor (608-262-2064) [bier@engr.wisc.edu] Ph.D., Massachusetts Institute of Technology, 1981. Technological hazards, risk analysis, decision analysis, operations research. Industrial and Systems Engineering. Website: http://www.engr.wisc.edu/ep/faculty

James P. Blanchard, Professor (608-263-3091) [blanchard@engr.wisc.edu] Ph.D.**,** University of California, Los Angeles**,** 1988. Nuclear microbatteries; radiation damage; fusion technology; laser-induced stresses; surface property characterization; reactor vessel embrittlement.
Website: http://www.engr.wisc.edu/ep/faculty/

Riccardo Bonazza, Professor (608-265-2337**)** [bonazza@engr.wisc.edu) Ph.D.**,** California Institute of Technology**,** 1992**.** Experimental fluid mechanics and heat transfer; impulsive unsteady phenomena; shock tube applications; laser and X-ray imaging & measuring techniques**.**

Adrien Couet, Associate Professor (608-265-7955) [couet@wisc.edu] Ph.D., Penn State University, 2014. Corrosion; Nuclear Materials; Fuels; Radiation Damage; Electrochemistry.

Wendy C. Crone, Professor (608-262-8384) [crone@engr.wisc.edu**]** Ph.D., University of Minnesota**,** 1998. Experimental mechanics of materials; characterization of materials such as shape memory alloys, hydrogels, and biomaterials; therapeutic medical devices.
Website: http://www.engr.wisc.edu/ep/faculty/

Ray J. Fonck, Professor (608-263-7799) [fonck@engr.wisc.edu] Ph.D.**,** Princeton, 1978. Plasma & fusion science and technology; plasma turbulence; burning plasmas; tokamaks; alternative fusion schemes; atomic physics and applied optics; high temperature plasma diagnostics.
Website: http://www.engr.wisc.edu/ep/faculty/

Chris C. Hegna, Professor (608-263-0810) [cchegna@wisc.edu] Ph.D., Columbia**,** 1989. Theoretical plasma physics; fusion science; magnetic confinement of plasmas; magnetohydrodynamics.
Website: http://www.engr.wisc.edu/ep/faculty/

Franklin K Miller, Professor (608-263-2479) [fkmiller@wisc.edu] Ph.D., Massachusetts Institute of Technology, 2005. Cryogenics; thermodynamics of Superfluid 3He-4He mixtures; Sub-Kelvin cooling for space science; energy systems. Also Mechanical Engineering.
Website: http://www.engr.wisc.edu/ep/faculty/

Dane D Morgan, Professor (608-265-5879) [ddmorgan@wisc.edu] Ph.D., University of California-Berkeley, 1998. Computational materials science for materials design; ab initio electronic structure methods and multiscale techniques for large time / length scales and thermokinetics. Also Materials Science and Engineering. Website: http://www.engr.wisc.edu/ep/faculty/

John M Pfotenhauer, Professor (608-263-4082) [pfot@engr.wisc.edu] Ph.D., University of Oregon**,** 1984. Cryogenics; low temperature refrigeration; applied superconductivity. Also Mechanical Engineering.
Website: http://www.engr.wisc.edu/ep/faculty/

Raluca Scarlat, Assistant Professor (608-890-4256) (roscarlat@wisc.edu) PhD., University of California-Berkeley, 2012. Thermodynamics, heat and mass transport, safety analysis, and energy systems.

Oliver Schmitz, Associate Professor (608-263-1547) (oschmitz@wisc.edu) PhD., Physics, Heinrich-Heine-Universität, Düsseldorf., 2006. Plasma wall interaction, plasma edge transport, atomic physics for plasma diagnostics, high density plasmas, and neutral particle dynamics.
Website: http://www.engr.wisc.edu/ep/faculty

Leslie M. Smith, Professor (608-262-3852) [lsmith@math.wisc.edu] Ph.D., Massachusetts Institute of Technology**,** 1988. Statistical physics, turbulence and turbulence modeling for engineering and geophysical applications; applied mathematics, stability theory and fluid dynamics; field theoretical techniques, the

dynamic renormalization group and universality in complex systems. Also Mathematics. Website: http://www.engr.wisc.edu/ep/faculty

Carl R Sovinec, Professor (608-263-5525) [csovinec@wisc.edu] Ph.D., University of Wisconsin, Madison**,** 1996. Computational plasma physics; computational fluid dynamics; magnetohydrodynamics; numerical methods for partial differential equations. Website: http://www.engr.wisc.edu/ep/faculty/

Izabela Szlufarska, Professor (608-265-5878) [izabela@engr.wisc.edu] Ph.D., University of Tennessee, 2004. Atomistic simulations: Massively parallel molecular dynamics and ab initio-based simulations. -- Nanocrystalline materials: Computational design of materials with superior mechanical properties; Grain boundary nanoengineering; Nanoindentation. -- Fundamentals of friction & adhesion at the nanoscale -- Coupling between surface/interface chemistry and mechanical properties: Materials for MEMS applications in extreme environments. -- Nano-bio-mechanics: Viscoelastic response of mechanical bio-sensors. -- Materials for nuclear applications: Radiation damage resistance, multi-scale modeling of defect and impurity kinetics. Website: http://www.engr.wisc.edu/ep/faculty/

Mario F. Trujillo, Professor. (608-262-0944) [mtrujillo@wisc.edu] Ph.D., University of Illinois, 2001. Thermodynamics, fluid dynamics computational fluid dynamics. Also Engine Research Center, Mechanical Engineering. Website: http://www.engr.wisc.edu/ep/faculty/

Fabian Waleffe, Professor (608-263-3269) [waleffe@math.wisc.edu] Ph.D., Massachusetts Institute of Technology**,** 1989. Math; fluid dynamics; bifurcations and turbulence; scientific computing. Also Mathematics. Website: http://www.engr.wisc.edu/ep/faculty/

Paul P. H. Wilson, Professor (608-263-0807) [paul.wilson@wisc.edu] Ph.D.**,** University of Wisconsin, Madison**,** 1999. Nuclear fuel cycles; transmutation/depletion/activation; proliferation analysis; energy policy; Monte Carlo methods; reactor core design & analysis.
Website: http://www.engr.wisc.edu/ep/faculty/

Robert J. Witt, Associate Professor (608-263-2760) [witt@engr.wisc.edu**]** Ph.D., Massachusetts Institute of Technology**,** 1987. Computational methods in fluid and solid mechanics.
Website: http://www.engr.wisc.edu/ep/faculty/

Other Faculty

Michael L Corradini, Professor Emeritus (608-263-1648) [corradini@engr.wisc.edu] Ph.D.**,** Massachusetts Institute of Technology**,** 1978**.** Multi-phase fluid mechanics and heat transfer; fission and fusion reactors; nuclear reactor safety; severe accident phenomena; power plant operation and design; energy policy; nuclear fuel cycle. Professional Engineer.
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Noah Hershkowitz, Professor Emeritus (608-263-4970) [hershkowitz@engr.wisc.edu] Ph.D.**,**Johns Hopkins**,** 1966. Plasma etching; plasma-aided manufacturing; basic plasma physics; ICRF effects; laboratory space plasma physics. Website: http://www.engr.wisc.edu/ep/faculty/

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