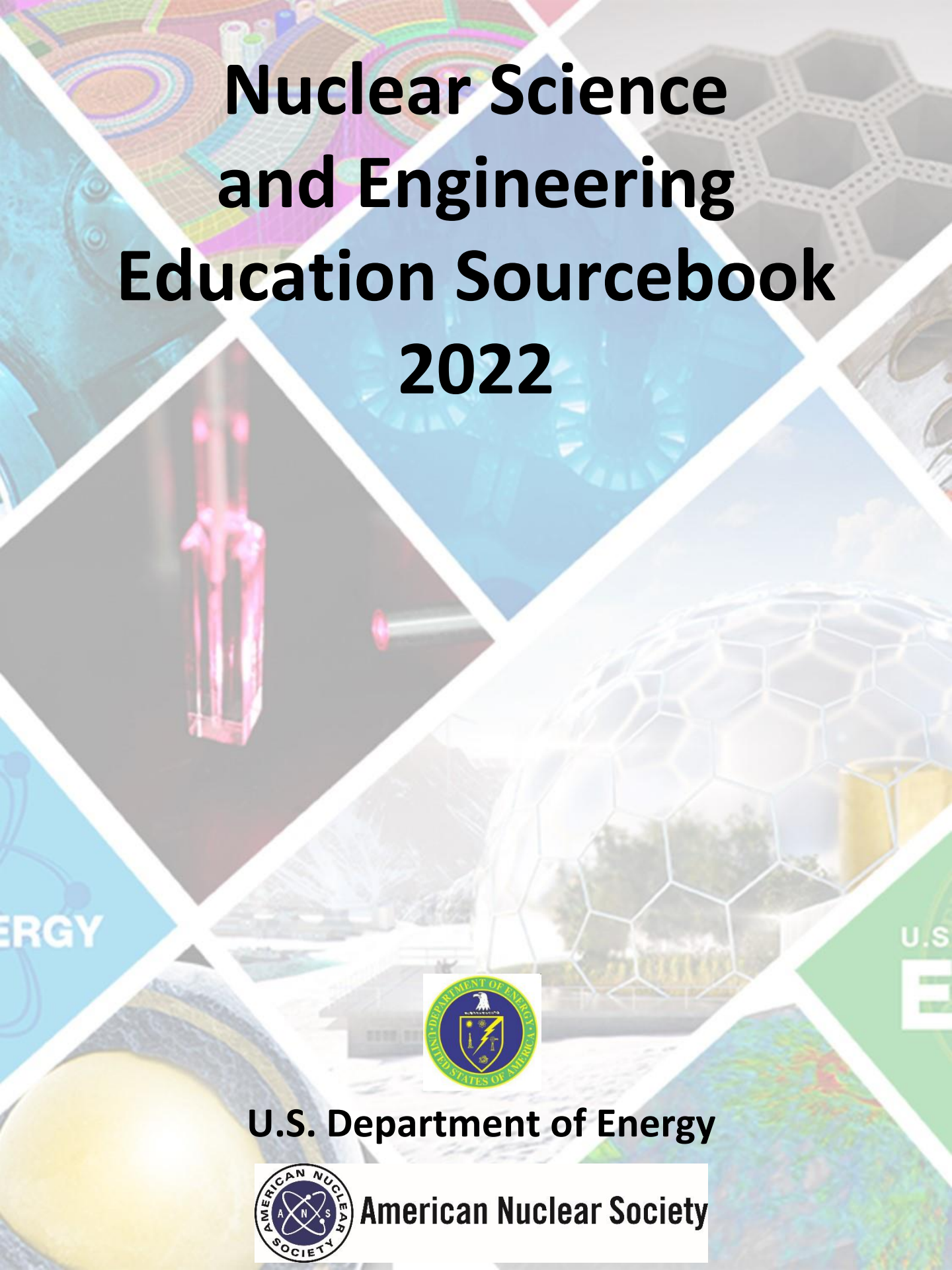
Nuclear Science and Engineering Education Sourcebook 2022



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American Nuclear Society

Nuclear Science & Engineering Education Sourcebook 2022

North American Edition

American Nuclear Society
Education, Training, and Workforce Division

US Department of Energy
Office of Nuclear Energy

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North Carolina State University

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North Carolina State University

Version 6.22

*Front Cover Photo – Graphic from U.S. Department of Energy, Office of Nuclear Energy Website

Welcome to the 2022 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.

We currently use a web based input format that allows 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. 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 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. The Sourcebook is usually printed on even years. When printed, copies are 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 2022 Edition of the NS&EE Sourcebook (Version 6.22) 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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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	8	14	19	18	11	17
Masters	14	8	24	19	21	14
PhD	9	6	11	11	18	21

Number of Graduates

Graduate Student Enrollment: 19 Masters/ 93 Ph.D.
ABET Accreditation: BS degree in Nuclear Engineering

Nuclear Science and Engineering Faculty

Peter Hosemann, Professor and Department Chair (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: https://materials.nuc.berkeley.edu/

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.
Website: http://actinide.lbl.gov/gtsc/BioAn/index.html

Lee Bernstein, Associate 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.
Website: http://nucleardata.berkeley.edu/

Massimilliano Fratoni, Associate Professor and Vice Chair (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

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

Raluca O. Scarlat, Assistant Professor [scarlat@berkeley.edu] Ph.D., Nuclear Engineering, University of California, Berkeley, 2012. Chemical and termophysical characterization of high-temperature molten salts and other inorganic fluids, and heat and mass transport pertaining to energy systems. Electrochemistry, corrosion, thermodynamics. Nuclear reactor safety analysis, licensing and design, and engineering ethics. Website: https://salt.nuc.berkeley.edu/

Rachel Slaybaugh, Associate 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

Karl A. van Bibber, Professor and Executive Associate Dean for the College of Engineering (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

Kai Vetter, (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

Other Faculty

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

Carl Schroeder, Adjunct Professor (510-486-4723) [cbschroeder@berkeley.edu] Ph.D.**,** University of California, Berkeley, 1999**.** Interests include intense laser-plasma and beam-plasma interactions, plasma-based accelerators, advanced acceleration concepts, novel radiation sources, free-electron lasers, and related topics. Website: https://nuc.berkeley.edu/people/carl-schroeder/

Youngho Seo, Professor in Residence (415-353-9464) [yseo@berkeley.edu] Ph.D., University of California, Los Angeles, 2002. Primary research focus is to use quantitative SPECT/CT, PET/CT, and PET/MR molecular imaging tools for a broad range of research areas from small animal imaging using dedicated animal imaging systems and basic instrumentation development to physics analysis of clinical research data. Website: https://radiology.ucsf.edu/physics & https://nuc.berkeley.edu/people/youngho-seo/

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

Haruko Wainright, Associate Adjunct Professor (510-847-0036) [HMWainwright@lbl.gov] Ph.D., University of California, 2010. Environmental remediation at nuclear contaminated sites; regional-scale radiation monitoring; groundwater remediation and long-term monitoring; radionuclide transport modeling; uncertainty quantification and parameter estimation; Bayesian geostatistical methods; geospatial ecological mapping and modeling. Website: https://eesa.lbl.gov/profiles/haruko-murakami-wainwright/

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.

Nuclear Science User Facility Partner Institution: UCB-NE's department is a NSUF partner facility providing facilities to the NE community as a whole. SEM/FIB/EBSD/EDS for active and non-active samples is available as well as nanoindentation, (insitu and ex-situ) as well as Helium Ion Beam Microscopy, cry and heating capability, macroscale tensile testing on active and non-active samples as well as heat treatments and sample preparation. All facilities are available through the NSUF user facility access process.

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.

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	7/18-6/19	7/19-6/20	7/20-6/21
Masters	4	3	2
PhD	1	1	2

Number of Graduates

Graduate Student Enrollment: 8 Masters/ 11 Ph.D.

Nuclear Science and Engineering Faculty

Kyle S. Brinkman, Professor and Department Chair (864-656-1405) [ksbrink@clemson.edu] Ph.D., Swiss Federal Institute of Technology, 2004. Ceramics; Fuel Cells; Energy Materials including Ionic Conduction; Nuclear Materials and Experimental Thermodynamics of Materials.
Website: https://cecas.clemson.edu/ceramicmaterials4energy/

Timothy A. DeVol, Toshiba Professor (864-656-1014) [devol@clemson.edu] Ph.D., University of Michigan, 1993. Radiation detection and measurements; environmental health physics, homeland security; radiation damage.
Website: https://www.clemson.edu/cecas/departments/eees/people/facultydirectory/devol.html

Luiz G. Jacobsohn, Associate Professor (864-656-5965) [luiz@clemson.edu] D. Sc., Pontifical Catholic University of Rio de Janeiro, Brazil, 1999. Luminescent Materials; Scintillators; Luminescent Dosimeters; Interaction of Ionizing Radiation with Matter; Radiation Damage; Synthesis and Processing of Ceramic Materials; Structure-Property Relationships.
Website: https://www.clemson.edu/cecas/departments/mse/people/faculty/jacobsohn.html

Nicole E. Martinez, Associate Professor (864-656-1984) [nmarti3@clemson.edu] Ph.D., Colorado State University, 2014. Health physics; radioecology; radiobiology; environmental risk assessment.
Website: https://www.clemson.edu/cecas/departments/eees/people/facultydirectory/martinez.html

Brian A. Powell, Fjeld Professor in Nuclear Environmental Engineering and Science (864-656-1004) [bpowell@clemson.edu] Ph.D., Clemson University, 2004. Radiochemistry; actinide chemistry, biogeochemistry, radioactive waste.
Website: https://www.clemson.edu/cecas/departments/eees/people/facultydirectory/powell.html

Lindsay Shuller-Nickles, Associate Professor (864-656-1448) [lshulle@clemson.edu] Ph.D., University of Michigan, 2010. Environmental mineralogy; actinide chemistry; geochemistry; computational materials science.
Website: https://www.clemson.edu/cecas/departments/eees/people/facultydirectory/shuller.html

Endre Takacs, Professor (864-656-3419) [etakacs@clemson.edu] Ph.D., University of Debrecen, Hungary, 1992. Atomic Physics; Medical Physics.
Website: https://science.clemson.edu/takacs/index.html

Ming Tang, Associate Professor (864-656-1946) [mingt@clemson.edu] Ph.D., New Mexico Institute of Mining and Technology, 2006. Ceramics and Glasses; Materials under Extreme Environments; Radiation Damage Effects; Electron Microscopy; Materials for Nuclear Energy and Environment Management Application.
Website: https://www.clemson.edu/cecas/departments/mse/people/faculty/tang.html

Other Faculty

Julia Brumaghim, Professor (864-656-0481) [brumagh@clemson.edu] Ph.D.**,** University of Illinois at Urbana-Champaign**,** 1999**.** Metal-mediated DNA damage by reactive oxygen species; metal oxide nanoparticle generation of reactive oxygen species and toxicology; metal-binding drugs; radiation damage by reactive oxygen species.
Website: https://chemistry.sites.clemson.edu/brumaghimgroup/index.html

Robert A. Fjeld, Emeritus Dempsey Professor (864-656-3276) [fjeld@clemson.edu] Ph.D.**,** The Pennsylvania State University**,** 1976**.** Environmental aspects of nuclear technologies; transport and measurement of radionuclides in the environment, with a specific emphasis on the behavior and sub-surface transport of radionuclides at Department of Energy sites. Professional Engineer.
Website: https://www.clemson.edu/cecas/departments/eees/people/emeritus/fjeld.html

Rachel B. Getman, Murdoch Family Endowed Associate Professor (864-656-5423) [rgetman@clemson.edu] Ph.D.**,** University of Notre Dame**,** 2009**.** Computational Catalysis; Multiscale Modeling; Computationally-Driven Materials Design.
Website: https://computationalcatalysis.sites.clemson.edu/

Scott M. Husson, William B. “Bill” Sturgis, ’57 & Martha Elizabeth “Martha Beth” Blackmon Sturgis Annual Distinguished Professor in Chemical & Biomolecular Engineering (864-656-4502) [shusson@clemson.edu] Ph.D.**,** University of California at Berkeley**,** 1998**.** Advanced Separation Materials; Bioseparations; Water-Energy Nexus.
Website: https://www.clemson.edu/cecas/departments/chbe/people/husson_s.html

Andrew R. Metcalf, Assistant Professor (864-656-0464) [ametcal@clemson.edu] Ph.D.**,** California Institute of Technology**,** 2012**.** Air pollution and air quality, with a particular focus on atmospheric aerosol particles; developing methods to collect atmospheric aerosol particles; microfluidics.
Website: https://www.clemson.edu/cecas/departments/eees/people/facultydirectory/metcalf.html

Fei Peng, Associate Professor (864-656-4134) [fpeng@clemson.edu] Ph.D.**,** Georgia Institute of Technology**,** 2009**.** Advanced Uranium Fuel Fabrication; Smart Embedded Strain Sensors for Joint Replacement; Laser-Based Additive/Subtractive Manufacturing of Ceramic Devices; Microstructure Prediction and Engineering Using Machine Learning and Artificial Intelligence; Thermal and Mechanical Properties of Materials; Sintering and Grain Growth; High-Temperature Kinetics and Microstructure.
Website: https://www.clemson.edu/cecas/departments/mse/people/faculty/peng.html

Chad Sosolik, Professor (864-656-0310) [sosolik@clemson.edu] Ph.D.**,** Cornell University**,** 2001**.** Atomic, Molecular & Optical Physics; Electron Bean Ion Trapping.
Website: https://www.clemson.edu/science/departments/physics-astro/people/profiles/sosolik

Nuclear Science and Engineering Research Centers

Radiochemistry Preparation and Analyses Laboratories: Clemson University is licensed by the South Carolina Department of Health and Environmental Control to conduct research with a range of fission/activation products (for example, ^{3}H, ^{57}Co, ^{60}Co, ^{90}Sr, ^{99}Tc, ^{137}Cs), uranium isotopes (^{232}U, ^{233}U, ^{234}U, ^{235}U, and ^{238}U), and transuranics (^{238}Pu, ^{239}Pu, ^{240}Pu, ^{241}Pu, ^{242}Pu, ^{241}Am, ^{237}Np, ^{244}Cm, ^{252}Cf). The Environmental Engineering & Earth Sciences department maintains three radiochemistry laboratories within the Linvil G. Rich Environmental Laboratory plus six radiochemistry laboratories and two radioecology laboratories in the adjacent Clemson Environmental Technology Laboratory. These include a teaching laboratory, a low-level counting laboratory for environmental samples, three radiation detection and measurement laboratory, multiple radiochemical separation laboratories equipped for working with sealed and unsealed sources. These laboratories total up to approximately 2500 ft^2 of space. Additionally, the laboratories have HEPA filtered anaerobic chambers and glove boxes as needed to perform work in inert atmospheres.
These laboratories contain an array of standard gas and solid-state detectors and pulse processing instrumentation for both routine and specialized applications including:

- Seven High-Purity Germanium Gamma-Ray Spectrometers (one portable)
- One low-energy high-resolution X-ray spectrometer (HPGe, Be window)
- Three NaI(Tl) spectrometers (5" x 5", 3" x 3" and 2" x 2")
- Four alpha/beta discriminating Liquid Scintillation Counters (LSC)
- Wallac 1220 Quantulus LSC
- Two Perkin Elmer 2910 Alpha Beta Discriminating LSCs
- Flow cell detector (Beta-ram Model 5)
- Eight alpha spectrometers
- One gas-flow proportional counter with automated sample changer
- Miscellaneous gas-filled and scintillation detectors

Analytical instrumentation immediately available for analysis of radionuclides

- Thermo XSeries2 quadrupole Inductively Coupled Plasma Mass Spectrometer
- Metrohm Tirando 836 Potentiometric Titration System

- Thermo-Nicolet 6700 FTIR with 1) single bounce diamond ATR, 2) mutlibounce (~11) Ge HATR accessories, and 3) multibounce (~9) diamond integrator ATR.
- TA Instruments TAM III Thermostat with two Isothermal Titration Microcalorimeters
- MILAbs Vector CT (x-ray computed tomography)
- Numerous incubating shaking systems for equilibrating samples at variable temperatures

General Analytical Laboratories*:* In addition to the radiochemistry laboratories, several dedicated laboratories including an instrument room, an organic separations laboratory, a biotechnology laboratory, a laminar-flow clean room, and a two-story open-bay laboratory, and numerous general-purpose laboratories are located in the facility. Also included are research support areas, including a darkroom, an autoclave and media preparations room, and a gas cylinder storage area. A loading dock for receiving supplies and environmental samples is conveniently located adjacent to the various storage rooms. Some instrumentation that is relevant to the proposed work is listed below:

- Thermo FlashEA 1112 Series CHNS/O Analyzer
- Varian 4000 GC-MS/MS
- Perkin Elmer 5100 atomic absorption spectrometer with graphite furnace
- Cary 300 Bio Spectrophotometer
- Beckman DU640 UV/VIS spectrophotometer
- Hewlett-Packard 5890 gas chromatographs with FID and ECD
- Hewlett-Packard 5890 Series II gas chromatograph with 5971A Mass Selective Detector
- Hewlett-Packard 5890 Series II gas chromatograph with FID and NPD
- Hewlett-Packard 6890 gas chromatograph with FID and ECD
- Waters 840 and Hewlett-Packard 1069 computer-controlled high performance liquid chromatograph with diode array and fluorescence detectors
- Waters 510 liquid chromatograph with UV/Vis detector
- Shimadzu TOC-5050 low-level organic carbon analyzer
- Shimadzu TOC—V CSH low-level organic carbon analyzer
- Micrometrics ASAP2010 Surface Area Analyzer
- Dionex Ion Chromatograph with gradient elution and multiple detectors

Clemson Electron Microscope Facility is a general user facility that will be fully utilized for examination of surface precipitation and generation of elemental maps of metal distribution across the mineral phases used in this work. There are multiple instruments but a few of note that can be utilized for studies with radioisotopes are:

- Nano-duet Double Beam Scanning Electron / Focused Ion Beam Microscope (NB5000)
- High-resolution Transmission Electron Microscope (H-9500)
- Variable Pressure Scanning Electron Microscope (SU6600)
- Imaging X-ray Photoelectron Spectroscopy (XPS) & AES - PHI 5000 VersaProbe III Scanning XPS & AES Microprobe

Computational Mineralogy and Geochemistry Laboratory is housed in EE&ES, and currently has four dual monitor workstations. Students use these computers to construct files, analyze data, and connect to the Palmetto Cluster. Palmetto is Clemson University's primary high-performance computing (HPC) resource; heavily utilized by researchers, students, faculty, and staff from a broad range of disciplines.

Currently, Palmetto is comprised of 2115 compute nodes (totalling 32600 CPU cores), and features:

- 639 nodes are equipped with 2x NVIDIA Tesla GPUs, with a total of 1278 GPUs in the cluster; out of these, 34 nodes each have 2x NVIDIA Tesla A100 GPUs
- 3 nodes with Intel Phi co-processors (2 per node)
- 15 large-memory nodes (with 0.75 TB - 1.5 TB of memory); in addition, 604 nodes have at least 128 GB of RAM
- 100 GB of personal space (backed up daily for 42 days) for each user
- 2.2 PB of scratch storage space for computing and a burst-buffer
- 10 and 25 Gbps Ethernet, and 56 and 100 Gbps Infiniband networks
- benchmarked at 1.4 PFlops (44,016 cores from Infiniband part of Palmetto)
- the cluster is 100% battery-backed

Machine Shops*:* A moderate scale machine shop for fabrication of experimental apparatus. This is accessible free of charge to all departmental faculty. The Clemson College of Engineering, Computing and Applied Sciences also has a full-scale machine shop capable of production of high-quality materials with high precision. This shop is available to all faculty on a per hour fee basis.

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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
Masters	6	4	4	4	4	2
PhD	3	1	3	1	0	3

Number of Graduates

Graduate Student Enrollment: 10 Masters/ 16 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, 1994. Nuclear fuel cycle; chemical separations; biochemistry and environmental chemistry of the transuranium elements. Website: https://chemistry.mines.edu/project/jensen-mark/

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, 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

Kyle G. Leach, Associate Professor (303-273-3044) [kleach@mines.edu] Ph.D., University of Guelph. Nuclear structure; radioactive decay; radiation detection; neutrino physics.
Website: https://physics.mines.edu/project/leach-kyle/

Andrew G. Osborne, Assistant Professor (303-384-2003) [osbornea@mines.edu] Ph.D., University of Glasgow, 2006. Nuclear reactor theory; nuclear fuel cycles; reactor optimization; numerical methods; energy systems analysis. Website: https://mechanical.mines.edu/project/osborne-andrew/

Jenifer C. Shafer, Associate Professor (303-273-3996) [jshafer@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/

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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Nuclear Engineering Program
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(352) 846-3782
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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	20	24	15	12	21	9
Masters	9	16	7	6	4	4
PhD	2	6	6	5	5	3

Number of Graduates

Graduate Student Enrollment: 8 Masters/ 14 Ph.D.
ABET Accreditation: Nuclear Engineering (BS)

Nuclear Science and Engineering Faculty

Andreas Enqvist, Nuclear Engineering Program Director and Associate 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, Data Fusion and Machine Learning. Website: http://enqvist.mse.ufl.edu

James Baciak, 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. Website: http://mse.ufl.edu/people/name/james-baciak/

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

Kyle Hartig, Assistant Professor (202-270-4721)[hartig@mse.ufl.edu] Ph.D., Pennsylvania State University. Remote Sensing, Nuclear Nonproliferation/counterproliferation, Nuclear Security, and Nuclear Policy.

Christopher McDevitt, Associate Professor (352-846-3785) [cmcdevitt@ufl.edu] Ph.D., University of San Diego at California, 2008. Fusion; Plasma Physics; Plasma Turbulence; Momentum Transport; Runaway Electrons; Monte Carlo Methods.

Michael Tonks, Professor (352-846-3779) [michael.tonks@ufl.edu] Ph.D., University of Illinois, Urbana-Champaign, 2008. Computational nuclear materials, reactor fuel performance, computational materials science, computational mechanics. Website: http://tonks.mse.ufl.edu/

Nathalie A. Wall, Professor (352-273-0279) [Nathalie.Wall@ufl.edu] Doctorate, University of Paris, France, 1993. Radiochemistry; environmental behavior of radionuclides; nuclear forensics.
Website: https://faculty.eng.ufl.edu/wall-research/

Justin Watson, Associate Professor (352-273-0241)[justin.watson@ufl.edu] Ph.D., The Pennsylvania State University, 2010. Reactor Kinetics and Dynamics, Neutronics, Thermal Hydraulics, Multiphysics Simulation, Advanced Numerical Methods, Applied Mathematics, Advanced Code Coupling Techniques, Scientific Software Development, High Performance Computing. Website: watson.mse.ufl.edu

Yong Yang, Associate Professor (352-392-1401) [yongyang@ufl.edu] Ph.D.**,** University of Wisconsin-Madison**,** 2005**.** Reactor structure materials; nuclear fuel and cladding materials; environmental degradations including thermal aging, corrosion and radiation damage; advanced manufacturing including additive manufacturing and new welding technology development. Website: http://manatee.mse.ufl.edu/

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.

Ira Harkness, Instructional Assistant Professor (352-846-3329) [ira@mse.ufl.edu] Ph.D., University of Florida, 2018. Monte Carlo methods; neutron transport; nuclear safeguards; nonproliferation; engineering education.

Michele V. Manuel, Professor & Department Chair (352-846-3780) [mmanuel@ufl.edu] Ph.D., Northwestern University, 2007. Computational Thermodynamics and Kinetics; Materials Design; Materials Characterization and Processing in Extreme Environments.

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. Nuclear fuel and clad; mechanical properties; thermal transport properties, point defects and microstructure; hierarchical waste forms.

DuWayne Schubring, Instructional Associate Professor and NE Undergraduate/ABET Coordinator (352) 294-7870 [dlschubring@ufl.edu] Ph.D., University of Wisconsin-Madison, 2009. Two-phase flow (esp. annular flow), reactor thermal hydraulics, liquid metal fast-spectrum reactors, and nuclear engineering education/accreditation.

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.

Donald E. Wall, Professor of Practice & Director University of Florida Training Reactor (352-273-3662) [donald.wall@ufl.edu] Ph.D., Florida State University, 2001. Nuclear reactor cooling systems; research reactor operation; actinide and fission product thermodynamics; research reactor operator licensing.

Nuclear Science and Engineering Research Centers

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.

HiperGator: The Department of Research Computing provides comprehensive support for researchers that use HiPerGator, the university supercomputer. HiPerGator is currently ranked as the 136th most powerful supercomputer in the world, and third most powerful among public U.S. universities. UF anticipates acquiring some of the nation's most advanced AI machinery before the end of 2020, through collaboration and donation form Nvidia. **Website:** https://www.rc.ufl.edu/services/hipergator/

Nuclear Fuels & Materials Characterization Facility: Characterization of nuclear fuels and materials, including scanning electron microscope (SEM), focused ion beam (FIB), transmission electron microscope (TEM), energy dispersive spectrometer (EDS), electron backscattering diffraction (EBSD), and in-situ mechanical testing. *Drs. Assel Aitkaliyeva & Yong Yang*.
Website: https://rsc.aux.eng.ufl.edu/nfmcf/

Optical Science and Remote Sensing Laboratory: The laboratory comprises approximately 1,000 ft^2 of quality laboratory space that is approved for use of radioactive materials and contains state-of-the-art experimental laser sources, plasma diagnostics, and scientific infrastructure. His group and laboratory conduct extensive work on machine learning, X-ray imaging, laser remote sensing of nuclear materials, laser induced plasmas, and chemistry of actinides in plasmas for nuclear forensics, fuel cycle, and security applications. *Dr. Kyle C. Hartig*

Radiochemistry Laboratory: Radioanalytical tools and instrumentations for nuclear fuel cycle applications, including environmental behavior of radionuclides, nuclear forensics, and radiopharmaceutical compounds. *Dr. Nathalie A. Wall.*

Radiation Detection and Nuclear Instrumentation Lab: 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.

Radiation measurement and detection system labs: Labs focused on radiation measurements, radiation detector development; new radiation detector materials; detector testing and characterization for gamma-ray spectroscopy; Radiation -detection interaction measurements, Neutron detector development and characterization, Radiation data Analysis, non-proliferation and treaty verification; nuclear security. *Drs. James E. Baciak & Andreas Enqvist*.

Simulation and modelling center: Investigates the co-evolution of microstructure and properties of materials in harsh environments using multiscale modeling and simulation (*Dr. Tonks*). Kinetic simulation of magnetic and inertial confinement fusion plasmas (*Dr. McDevitt*). Coupled multi-scale, multi-physics simulations for design, operation, and safety analysis of light water and Gen IV nuclear power systems (Dr. Watson). Atomic-level simulation of fuel systems and waste forms *(Dr. Phillpot*).

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.

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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	23	21	30	32	19	16
Masters	29	8	5	12	19	15
PhD	11	9	11	6	7	6

Number of Graduates

Graduate Student Enrollment: 42 Masters/ 49 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.

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.

Shaheen A. Dewji, Assistant Professor (404-894-5800) [shaheen.dewji@gatech.edu] Ph.D., Georgia Institute of Technology, 2014. Nuclear engineering; health physics; radiation protection; computational dosimetry; nuclear medicine; radiation detection and simulation; gamma spectroscopy; nuclear safeguards; gamma-ray spectroscopy; emergency response. Website: https://sites.gatech.edu/dewji/

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.

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.

Tianye Niu, Associate Professor (404-894-4085)[tyniu@gatech.edu] Ph.D., University of Science and Technology of China, 2009**.** Nuclear imaging, advanced conebeam CT reconstruction, artifacts correction, dual-energy imaging, radiomics analysis with emphasis on the guidance and evaluation in cancer treatment.

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.

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.

Fan Zhang, Assistant Professor (404-894-5735)[fan@gatech.edu] Ph.D., University of Tennessee, Knoxville, 2019. Nuclear Power Plant Operation Optimization; Cybersecurity; Predictive Maintenance; Autonomous Control; Anomaly Detection; Advanced Reactors; Risk Assessment; Machine Learning Applications; Robotics Applications in Nuclear. Website: https://www.me.gatech.edu/faculty/zhang-2

Other Faculty

Said I. Abdel-Khalik, Emeritus 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.

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, 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.

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.

Weston M. Stacey, Jr., Emeritus 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.

Adam N. Stulberg, 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, Professor Emeritus (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 of 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.

Dingkang Zhang, Research Engineer II (404-894-2087) [dingkang.zhang@me.gatech.edu] Ph.D., Georgia Institute of Technology, 2005. Computational radiation transport theory; computational reactor physics; medical physics. Website: http://nremp.gatech.edu/faculty/dzhan

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.

UNIVERSITY OF IDAHO

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icharit@uidaho.edu
Alice Allen
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alicew@uidaho.edu
Website: www.uidaho.edu/idahofalls/nuclearengineering
https://www.uidaho.edu/engr/departments/neim

	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
Masters	5	6	3	4	7	10
PhD	5	0	3	0	0	4

Number of Graduates

Graduate Student Enrollment: 35 Masters/ 25 Ph.D.

Nuclear Science and Engineering Faculty

Indrajit Charit, Professor and Department Chair (208-885-5964) [icharit@uidaho.edu] Ph.D., University of Missouri-Rolla, 2004. Nuclear materials, radiation effects, high temperature materials, microstructure-properties correlation, advanced manufacturing including additive manufacturing.

David Arcilesi, Assistant Professor (208-533-8107) [darcilesi@uidaho.edu] Ph.D., The Ohio State University. Thermal sciences, reactor thermal hydraulics, safety.

Robert Borrrelli, Associate Professor (208-533-8122) [rborrelli@uidaho.edu] Ph.D., University of California, Berkeley. Safeguards-by-design, fuel cycle analysis, modeling, scientific computing, risk assessment, nuclear hybrid energy system design, fuel cask design and analysis, nuclear system data analytics, cybersecurity

Samrat Choudhury, Assistant Professor (208-885-7572) [samrat@uidaho.edu] Ph.D., Pennsylvania State University, 2008. Structural nuclear materials; nuclear fuels; machine learning; multi-scale modeling of materials; photovoltaic and alloy design.

Richard Christensen, Professor (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 flow; heat transfer.

Samrat Choudhury, Assistant Professor (208-885-7572) [samrat@uidaho.edu] Ph.D., Pennsylvania State University, 2008. Structural nuclear materials; nuclear fuels; machine learning; multi-scale modeling of materials; photovoltaic and alloy design.

Michael Haney, Assistant Professor (208-533-8209) [mhaney@uidaho.edu] Ph.D., University of Tulsa, 2015. Cybersecurity for nuclear, power and water systems, critical infrastructure resilience, human-cyber-physical systems (industrial control protocols, digital instrumentation and control), computer and network security, digital forensics, active defenses.

Robert Hiromoto, Professor (208-533-8119) [hiromoto@uidaho.edu] Ph.D., California State University-Long Beach, 1978. Secure wireless networks, parallel algorithms, communication protocols for unmanned aerial systems.

Michael McKellar, Assistant Research Professor, Director of Industrial Technology (208-757-5431) [mmckellar@uidaho.edu] Ph.D., Purdue University. Process heat applications and power conversion with nuclear micro-reactors, heat exchangers, modeling of thermal and chemical processes, food processing.

Krishnan Raja, Associate Professor (208-301-2949) [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. Power system stability and security; high performance control; renewable energy integration; estimation and detection.

Vivek Utgikar, Professor (208-885-6970) [vutgikar@uidaho.edu] Ph.D., University of Cincinnati, 1993. Advanced fuel cycles, hydrogen and energy systems, energy storage.

Haiyan Zhao, Associate Professor (208-533-8123) [haiyanz@uidaho.edu] Ph.D., Virginia Polytechnic University, 2009. Fuel cycles, molten salts/ionic liquids, pyroprocessing, waste form, electrochemistry, corrosion, catalysis.

Other Faculty

Matthew Bernards, Associate Professor (208-885-2150) [mbernards@uidaho.edu] Ph.D., University of Washington, 2008. Beta-votaic micro batteries, biology-material interfacial interactions, bone tissue engineering.

Lee Ostrom, Professor of Engineering, Center Executive Officer (208-757-5427) [ostrom@uidaho.edu] Ph.D., Texas Technology University, 1988. Nuclear safety, risk assessment, project management, industrial ergonomics.

You Qiang, Professor (208-885-7558) [youqiang@uidaho.edu] Ph.D., Albert Ludwig University Freiburg. Nuclear radiation shielding, nanomaterials and nanotechnology for nuclear energy, advanced magnetic separation nanotechnology for spent nuclear fuel recycling, neutron radiation detection and instrumentation.

John Russell, Associate Professor, Associate Director for Center for Advanced Energy Studies (208-533-8164)[jtrussell@uidaho.edu] Ph.D., University of Illinois, Chicago. Energy policy; cybersecurity; big data and analytics.

Robert Smith, Professor (208-885-2560) [smithbob@uidaho.edu] Ph.D., New Mexico Mining & Technology. Nuclear waste disposal and management, aqueous biogeochemistry, groundwater contamination remediation, geological carbon sequestration, geothermal energy.

Nuclear Science and Engineering Research Centers

Center for Advanced Energy Studies – Website: www.uidaho.edu/idahofalls/caes

IDAHO STATE UNIVERSITY

Nuclear Engineering and Health Physics
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Fax: 208-282-4538
Administrative Contact: Chad L. Pope
208-282-2875
popechad@isu.edu
Website: www.engr.isu.edu/ne

	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	16	8	14	14	15	15
Masters	13	13	14	11	6	6
PhD	3	2	5	4	4	2

Number of Graduates

Graduate Student Enrollment: 25 Masters/ 9 Ph.D.
ABET Accreditation: B.S. in Nuclear Engineering, B.S. in Health Physics, & MS in Health Physics

Nuclear Science and Engineering Faculty

Chad L. Pope, Professor and Program Director (208-282-2875) [popechad@isu.edu] Ph.D., Idaho State University, 2011. Risk analysis, nuclear safety. Professional Engineer.

Amir Ali, Assistant Professor (208-553-8113) [aliamir@isu.edu] Ph.D., University of New Mexico, 2013. Experimental and computational thermal-hydraulics; two-phase heat transfer; heat-pipe; thermal energy storage. Professional Engineer.

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.

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

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

Daniel LaBrier, Assistant Professor (208-533-8165) [labrdani@isu.edu] Ph.D., Idaho State University, 2013. Nuclear materials; high-temperature degredation; used fuel recycling; thermal hydraulics; fuel; and material qualification processes. 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

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.

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, 5 W 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) [breyrich@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: Richard Brey, Ph.D. (208-282-4539) [gesethom@isu.edu] Low level radiation monitoring, radio analytical analysis, instrument calibration, trace element analysis. Research Expenditures: $300,000/year.

CAES (Center for Advanced Energy Studies) Director, Dr. Noel Bakhtian (INL), Associate Director, Dr. Richard Jacobson (ISU) [jacorich@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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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	36	36	37	30	30	23
Masters	11	18	16	13	22	9
PhD	5	7	16	9	11	7

Number of Graduates

Graduate Student Enrollment: 38 Masters/ 54 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

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, Associate 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; microreactors. Website: http://mtdl.npre.illinois.edu

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

Angela Di Fulvio, Assistant Professor (217-300-3739) [difulvio@illinois.edu] Ph.D., University of Pisa, Italy, 2012. Neutron detection, spectroscopy, dosimetry, and imaging; detection systems and inference

algorithms for safeguards and nonproliferation applications; measurement-aided artificial intelligence clinical decision support. Website: https://nmlab.npre.illinois.edu/

Brent J. Heuser, Professor (217-333-9610) [bheuser@illinois.edu] Ph.D.**,** The University of Michigan**,** 1990. Nuclear materials; corrosion and radiation damage processes in LWR metals; accident tolerant cladding; molten salt reactor materials issue; application of scattering techniques to materials science; hydrogen in metals. Website: https://publish.illinois.edu/h-lab-npre/

Kathryn D. Huff, Blue Waters Assistant Professor **on leave* (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; data science applications in nuclear energy. Website: http://arfc.npre.illinois.edu

Tomasz Kozlowski, Associate Professor and Associate Head for Undergraduate Programs (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. Professor Meng's research area is focused on advanced radiological imaging techniques and their applications in medicine and biology, which include the development of high-performance semiconductor imaging sensors, Positron Emission Tomography (PET), Single Photon Emission Computed Tomography (SPECT), functional X-ray CT instrumentations, radiation-induced therapeutics and image-guided drug delivery. Website: http://radimg.npre.illinois.edu

Zahra Mohaghegh, Associate Professor (271-300-5076) [zahra13@illinois.edu] Ph.D., University of Maryland, College Park, 2007. Probabilistic Risk Assessment (PRA) for light water & advanced reactors; risk-informed regulation & policymaking; probabilistic physics of failure; coupled human-physics failure simulation; system reliability & maintainability; uncertainty quantification.
Website: http://soteria.npre.illinois.edu

R. Mohan Sankaran, Donald Biggar Willett Professor (217-244-7316)[rms1002@illinois.edu] Ph.D., California Institute of technology, 2004. Low-temperature, atmospheric-pressure plasmas; plasma synthesis of nanoparticles; plasma-liquid electrochemistry; plasma synthesis of chemicals; plasma-assisted additive methods to thin-film fabrication.

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, Abel Bliss Professor (217-333-0332) [druzic@illinois.edu] Ph.D., Princeton University**,** 1984. Experimental fusion research especially the use of lithium as a plasma-facing component; plasma-material interactions; plasma processing of semiconductors; atmospheric-pressure plasmas for industrial processing and material creation; extreme ultraviolet (EUV) sources for lithography; physical

and chemical vapor deposition especially high-powered impulse magnetron sputtering (HIPIMS); plasma diagnostics and plasma sources. Website: http://cpmi.illinois.edu

James F. Stubbins, Donald Biggar 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.

Yang Zhang (YZ), Associate Professor, Donald Biggar Willett Faculty Scholar and Associate Head for Graduate Programs (217-300-0452) [zhyang@illinois.edu] Ph.D., Massachusetts Institute of Technology, 2010. Non-equilibrium physics and accelerated molecular simulations (long timescale phenomena, rare events, irreversibility, randomness); Physics and chemistry of liquids and complex fluid, especially under interfacial/non-equilibrium/extreme conditions (water, metallic liquids, molten salts, ionic liquid, electrolyte solutions); Neutron scattering, sources, and instrumentation); soft robotic sand human-compatible machines; Robots in extreme environments; Understandable artificial intelligence. Website: http://z.engineering.illinois.edu

Other Faculty

Shiva Abbaszadeh, Adjunct 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.

John R. Abelson, Affiliate Professor Emeritus (217-333-7258)[abelson@illinois.edu] Ph.D. Stanford University, 1987. Chemical vapor deposition of coatings using novel precursors to afford metals, oxides, nitrides, and borides for extreme environments. Surface mechanisms leading to superconformal growth, ultra-smoothness, and filling of deep features. Website: http:// www.matse.illinois.edu/directory/profile/abelson

Jean Paul Allain, Adjunct Professor (814-863-8575) [allain@psu.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.

Jont Allen, Affiliate Professor (217-369-7711)[jontalle@illinois.edu] Ph.D., The University of Pennsylvania, 1970. Multi-physics modeling and simulation; plasma physics and fusion; two-phase flow and heat transfer. Website: http://auditorymodels.org/

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.

Stephen Boppart, Affiliate Professor (217-244-7479 [boppart@illinois.edu] Ph.D., Massachusetts Institute of Technology, 1998; M.D., Harvard Medical School, 2000. Optical diagnostics of cancer; medical engineering; image-guided surgery; optical coherence tomography; lasers in medicine and biology; optical biomedical imaging. Website: http://biophotonics.illinois.edu/

Paul T. Debevec, Affiliate Professor Emeritus (217-333-0285)[debevec@illinois.edu] Ph.D., Princeton University, 1972. Measurement of the stored muon distribution; parent muon distribution; development of microstrip gas chamber.

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.

Pegah Farshadmanesh, Research Scientist (217-300-6903) [pegah2@illinois.edu] Ph.D.**,** Illinois Institute of Technology, Chicago**,** 2017. Modeling of multi-hazards (e.g., fire following earthquake) and societal impacts; Seismic Probabilistic Risk Assessment (SPRA); structural reliability modeling; data analytics; risk-informed decision-making. Website: http://soteria.npre.illinois.edu

Masab H. Garada, Adjunct Assistant Professor (217-333-2295) [Masab.H.Garada@osfhealthcare.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.

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 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. Research 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.

Kyekyoon Kim, Affiliate Professor (217-333-7162)[kevinkim@illinois.edu] Ph.D., Cornell University, 1971. Tailored organometallic, Sol-Gel processing, charged liquid cluster beam deposition and chemical vapor deposition; controlled fabrication of thin films, nanofibers, and nanoparticles using charged liquid cluster beams of precursor solutions; fabricating micro and nanoscale structures for development of new devices and material systems for controlled release, lighting, display, solar cells, photosensors, and power storage; fabricating uniform micro and nano spheres and capsules of biodegradable and biocompatible materials for advanced drug delivery and cell-based therapy; development of high power electronic devices based on III-V Nitride semiconductors using plasma assisted molecular beam epitaxy and selective area growth technology. Website: http://tfcp.ece.illinois.edu/index.htm

Susan Larson, Affiliate Associate Professor (217-244-3817) [smlarson@illinois.edu] Ph.D., California Institute of Technology, 1982. Experimental, field, and modeling investigations in air quality; aerosol optics; growth mechanisms of air pollution particles.

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) [dmiller2@illinois.edu] 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.

Madicken Munk, Research Scientist (217-300-6680) [mmunk2@illinois.edu] Ph.D., University of California - Berkeley, 2017. Hybrid methods for radiation transport in reactor and shielding simulations; computational methods development for neutral particle transport; reactor physics; open-source tools for science and engineering; data science applications in nuclear energy. Website: http://arfc.npre.illinois.edu

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.

Seyed A. Reihani, Research Scientist (217-300-5077) [sreihani@illinois.edu] Ph.D., University of Maryland, College Park**,** 2005. Incorporating Physical Phenomena into Risk Models; Risk-Informed Designs; Application of Catalytic Combustion in Power Generation Systems; Modeling and Analysis of Fuel Cell Systems. Website: https://soteria.npre.illinois.edu/

William R. Roy, Adjunct Professor **(**217-840-9769) [wroy@illinois.edu] Ph.D., University of Illinois at Urbana-Champaign**,** 1985. Geology/Geochemistry radioactive and hazardous waste management; partitioning of chemical constituents at solid-liquid interfaces; solid-phase equilibria and kinetics in aqueous solution; chemical fate and transport of contaminants in groundwater and environmental impacts of coal utilization.

Tatsuya Sakurahara, Research Assistant Professor (217-244-7546)[sakurah2@illinois.edu] Ph.D., University of Illinois, Urbana-Champaign, 2018. Probabilistic Risk Assessment (PRA) for conventional plants and advanced reactors; Fire PRA; Common Cause Failure (CCF) modeling; reliability engineering; maintenance analysis; Human Reliability Analysis (HRA); Bayesian inference; uncertainty quantification; importance measure; sensitivity analysis; risk-informed decision-making. Website: https://soteria.npre.illinois.edu/

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.

Dallas Trinkle, Affiliate Professor (217-244-6619)[dtrinkle@illinois.edu] Ph.D., The Ohio State University, 2003. Computational materials science: atomistics, electronic structure; mechanical behavior: plasticity and phase transformation at atomistic scale; defect properties: point defects, dislocations, interfaces; transport: interstitial diffusion, vacancy-mediated diffusion.
Website: http://dtrinkle.matse.illinois.edu/dokuwiki/doku.php

Nuclear Science and Engineering Research Centers

The **Advanced Reactors and Fuel Cycles** group seeks to advance the safety and sustainability of nuclear energy production through improved reactor designs, fuel cycle strategies, and waste management techniques. We achieve this by advancing computational methods and developing software for nuclear engineering with features essential to advanced reactor multiphysics modeling and fuel cycle simulation. Website: http://arfc.npre.illinois.edu

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. Mock-up Entry Module for EAST (MEME) which is a major facility for development of plasma facing components and liquid metal technology allowing for plug and play systems to be built for EAST and other devices.

The **Functional X-ray Imaging Laboratory (FXIL)**, directed by Professor Ling-Jian Meng, is an extensively equipped experimental facility dedicated to the development of functional X-ray imaging techniques, such as X-ray fluorescence Emission Tomography (FXET), X-ray Luminescence Computed Tomography (XLCT), and the study of physical, chemical and biological mechanisms underlying the interaction of ionizing radiation with matter and ways to activate, modulate and mediate the delivery of radiotherapy and to facilitate the control over fundamental biological processes in living mechanisms.

Illinois Plasma Institute (IPI), http://ipi.illinois.edu, objective is to do translational research between industry and the University working at TRL-5 and TRL-6 – putting successful university research directly into industrial projects. IPI has three current partners: Tokyo Electron (TEL), a semiconductor equipment manufacturer; Tokyo Ohka Kogyo (TOK), a semiconductor-processing chemical supplier; and LytEn, which uses proprietary unique energy-optimized plasmas at atmospheric pressure to make new nanomaterials at high production volumes. Employees and students from the partner companies work hand-in-hand with University personnel in 3,000+ sq ft. of secure laboratory space on the Research Park adjacent to campus.

The **Laboratory of Computational Plasma Physics (LCPP)** develops theoretical and computational models for a variety of Plasma Physics and Plasma Chemistry applications ranging from fusion edge plasmas to industrial plasmas and nuclear forensic, utilizing advanced, predictive simulation capabilities on high-performance computing machines, and multi-physics multi-scale models.
Website: http://curreli.npre.illinois.edu/

The **Multiphase Thermo-fluid Dynamics Laboratory**, directed by Assistant Professor Caleb Brooks, conducts research focusing on two phase flow and heat transfer. Active research includes: Generating validation data for CFD and system analysis codes; Natural circulation and thermal hydraulic instability; Characterizing wall nucleation parameters in forced convective flows; Critical Heat Flux (CHF) on

traditional and engineered surfaces; Two-fluid model with Interfacial Area Transport Equation (IATE); Two-Phase Flow in Molten Salt. Website: http://mtdl.npre.illinois.edu

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 **Nuclear Measurements and Neutron Metrology Laboratory** (NML) is a neutron experimental facility for both NPRE students and researchers in NPRE and elsewhere. The lab is equipped with a D-T neutron generator with an emission rate of ~1E8 neutrons/s. The neutron flux density is well-characterized in energy and intensity employing various instruments, including novel multisphere spectrometers, deuterated scintillators, ionization chambers, long counters, calibrated to primary reference standards.

Radiological Imaging Laboratory (RIL), directed by Professor Ling-Jian Meng. RIL is the home of an extensive collection of instrumental development projects on developing advanced imaging sensors, PET, SPECT, and Functional X-ray Imaging, and application-specific image processing techniques. It is also the hub for many of our ongoing collaborations with premier medical centers around the world to tackle some of the most pressing medical problems, such as cancer, cardiovascular diseases, and brain disorders.

The **Socio-Technical Risk Analysis (SoTeRiA) Laboratory**, ttp://soteria.npre.illinois.edu/) has a proven track record of advancing Probabilistic Risk Assessment (PRA) for conventional nuclear power plants and advanced reactors. SoTeRiA's key research impacts include (1) making scholarly contributions to risk analysis of complex socio-technical systems; (2) bridging scientific research with industry and regulatory challenges; (3) providing strong leadership in risk analysis conferences; (4) advancing risk-informed solutions for new technologies; and (5) promoting international safety and security through risk analysis. SoTeRiA research has received funding from several sponsors, for example, the Nuclear Regulatory Commission (NRC) to advance uncertainty analysis in risk- informed regulation; the National Science

Foundation (NSF) to develop a big data-theoretic approach for theorizing and quantifying organizational failure mechanisms in PRA; the Department of Energy (DOE) to advance risk analysis algorithms for the deployment of new technologies; the DOE to develop a systematic enterprise risk management to promote the nuclear fleet sustainability; and the nuclear power industry for fire PRA and for the risk-informed resolution of Generic Safety Issue 191 (GSI-191), a long-standing issue for the NRC and the industry. To promote international safety, the SoTeRiA laboratory has conducted research collaborations with the International Atomic Energy Agency (IAEA) to develop risk methodologies for advanced reactors and the Japan Atomic Energy Agency (JAEA) to advance simulation models for risk-informed emergency preparedness and response.

The **Extreme Robotics Laboratory**, directed by Prof. Yang Zhang (YZ), advances the development of soft robotics and human-compatible machines, robots in extreme environments, intelligent and continuous control algorithms, and understandable artificial intelligence, leveraging their expertise in novel soft materials and sensors. These robotic systems, both soft and hard, have demonstrated promising capabilities that could enable a wide range of unique applications not possible with traditional robots. Website: http://z.engineering.illinois.edu

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. 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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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	12	8	9	8	16	11
Masters	0	2	1	3	1	0
PhD	2	2	1	3	6	4

Number of Graduates

Graduate Student Enrollment: 3 Masters/ 13 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, Associate 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, Associate Professor (785-532-3039) [hbindra@ksu.edu] Ph.D., University of Illinois at Urbana Champaign, 2010. Passive nuclear safety; thermal-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, Associate 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, Associate 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.

Radiological Engineering Analysis Laboratory: Research involving radiation transport and dosimetry with a focus on radiation protection and imaging applications. |Substantial computational resources, including dedicated nodes on the KSU high performance computing system Beocat; several radiation software/code packages, including COMSOL Multiphysics, HZETRN-2015, Geant4, PHITS, and MCNP; a 3D printer used for rapid prototyping; a hand-held 3D scanner; a RadSource RS 1800 irradiator for x-ray experiments; several pieces of equipment enabling passive radiation dosimetry, including a Harshaw 5500 TLD reader; Timepix-based pixel detectors with semiconductor radiation sensors

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

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Website: www.mse.umd.edu

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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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	9	9	7	12	9	5
Masters	15	15	14	14	11	4
PhD	13	13	19	14	14	16

Number of Graduates

Graduate Student Enrollment: 16 Masters/ 91 Ph.D.
ABET Accreditation: SB

Nuclear Science and Engineering Faculty

Anne E. White, Professor of Nuclear Science and Engineering and Head of the Department of 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

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

Matteo Bucci, Norman C. Rasmussen 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://bucci.mit.edu

Jacopo Buongiorno, TEPCO Professor of Nuclear Science and Engineering and Mechanical Engineering (617-253-7316) [jacopo@mit.edu] Ph.D., Massachusetts Institute of Technology, 2000. Multi-phase flow and heat transfer; innovations in nuclear fission technology; advanced reactor design; reactor thermal-hydraulic. 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 control; non-proliferation; nuclear safeguards. Website: http://web.mit.edu/nse/people/faculty/danagoulian.html

Benoit Forget, Professor and Associate Department head of Nuclear science and Engineering (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

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. Head of the SPARC project. High-field superconducting magnet engineering; fusion energy device design; accelerator-based nuclear science; neutronics and radiation detection for accelerator and fusion energy systems.

Ian H. Hutchinson, Professor **(**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, Associate 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, Associate 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

Michael Short, Associate Professor of Nuclear Science and Engineering (617-324-6329) [hereiam@mit.edu] Ph.D., Massachusetts Institute of Technology, 2010. Mesoscale nuclear materials, corrosion and foulding; radiation damage quantification. Website: http://web.mit.edu/nse/people/faculty/short.html

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

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. Electrochemical materials and interfaces; electrochemical energy conversion by fuel cells, electrolyzers, membranes; corrosion and hydrogen resistant films in extreme environments; electrochemical energy storage by solid state batteries; neuromorphic computing materials; redox based memristive information storage and processing; cation based memristive information storage and processing; ceramics; surface science; computational materials science; synchrotron and scanning probe experiments. Website: http://web.mit.edu/nse/people/faculty/yildiz.html

Other Faculty

Ronald G. Ballinger, Emeritus 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

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

Michael W. Golay, Professor Emeritus of nuclear science and Engineering **(**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

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

Center for Advanced Nuclear Energy Systems (CANES)
[http://energy.mit.edu/reserach/future-nuclear-energy-carbon-constrained-world/]
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, Nuclear Energy: Key Facts and Issues, Reactor Technology for Power Plan Executives, and Probabilistic Methods for Nuclear Plant Management. Annual Research Expenditure: >$10M. The Center has recently completed the seminal study of the Future of Nuclear Energy in a Carbon-Constrained World.

Plasma Science and Fusion Center [http://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.

Industrial Performance Center (IPC) [http://web.mit.edu/ipc] Faculty Director, Richard K. Lester (Japan Steel Industry Professor of Nuclear Science and Engineering); Executive Director, Elisabeth B. Reynolds (Principal Research Scientist and Lecturer, DUSP). 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. It currently leads the Institute-wide Task Force on the Work of the Future.

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.

MIT Nuclear Reactor Laboratory (6 MW reactor) [http://nrl.mit.edu/] Directors, Dr. Gordon Kohse, Prof. Jacopo Buongiorno, Dr. Lance Snead . The MIT NRL is an interdepartmental center that operates a high-performance 6 MW nuclear research reactor known as the MIT Reactor (MITR), which is a partner of the

Department of Energy's National Science User Facilities. The MITR is a light-water cooled and moderated, heavy-water reflected, reactor that utilizes flat, finned, aluminum-clad, plate-type, fuel elements. The average core power density is about 70 kW per liter. The maximum fast and thermal neutron flux available to experimenters are 1.2×10^{14} and 6×10^{13} neutrons/cm^2-s, respectively. Experimental facilities available at the MITR include two medical irradiation rooms, beam ports, automatic transfer facilities (pneumatic tubes), and graphite-reflector irradiation facilities. In addition, several types of in-core experimental facilities are available, e.g., a pressurized-water loop capable of reproducing the temperature, pressure, flow, neutron flux and water chemistry conditions of a commercial power reactor. Focus is on 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.

Center for Ultracold Atoms [https://www.rle.mit.edu/cua_responsive/] CUA is an NSF-funded physics frontier center bringing together faculty from MIT and Harvard. CUA research exploits the growing power of controlling complex quantum systems, and single atoms and photons. These techniques are applied to problems of central interest in condensed matter physics, and quantum information science.

Center for Quantum Engineering [https://www.rle.mit.edu/cqe/] The MIT-CQE is a platform for research, education, and engagement in support of quantum engineering – a new discipline bridging quantum science and engineering to accelerate the development of quantum technologies.

Research Laboratories

Center for Science and Technology with Accelerators and Radiation (CSTAR)
[https://cstar.mit.edu/home.php] CSTAR is dedicated to advancing nuclear science and engineering through the development and application of particular accelerators, particle detectors, and linear plasma devices.

Concrete Sustainability Hub [http://cshub.mit.edu/] The MIT Concrete Sustainability Hub, CSHub, is a dedicated interdisciplinary team of researchers from several departments across MIT working on concrete and infrastructure science, engineering, and economics since 2009. The MIT CSHub brings together leaders from academia, industry, and government to develop breakthroughs using a holistic approach that will achieve durable and sustainable homes, buildings, and infrastructure in ever more demanding environments.

H.H.Uhlig Corrosion Laboratory [http://uhliglab.scripts.mit.edu/] The H. H. Uhlig Corrosion Lab investigates the causes of failure in materials and the prevention of failure in materials, with an emphasis on nuclear materials.

Computational Fluid Dynamics Research Group [https://baglietto.mit.edu/] The CFD group in NSE focuses on the advancement of single and multiphase closure models that incorporate novel physical understanding that more generally represent the complex anisotropic nature of the mass, momentum and heat flux processes. The objective is to deliver advances in computational fluid flows and heat transfer

simulations, which will benefit the operation and safety of the current nuclear reactor fleet, and support the deployment of next generation nuclear power systems.

Laboratory for Nuclear Innovation in Fission Technologies (NIFT)
[http://web.mit.edu/kshirvan/www/] NIFT focuses on acceleration of innovations in nuclear fission technology by utilizing an integrated system-level approach. Innovation is the key for unlocking nuclear energy technology potential for deployment and to support its sustainability. The innovations at NIFT are based on three pillars: artificial intelligence, additive manufacturing and high performing materials. NIFT uses a multi-disciplinary approach including detailed economics and regulatory assessment to quantify the impact of innovations and formulate accelerated pathways for their adoption.

Laboratory for Electrochemical Interfaces [http://web.mit.edu/yildizgroup/LEI/index.html] Director: Professor Bilge Yildiz (NSE/DMSE). The lab's research focuses on laying the scientific groundwork and proof-of-principle material systems for the next generation of high-efficiency devices for energy conversion and information processing, based on solid state ionic-electronic materials.

Laboratory for Innovation in Fusion Technologies (LIFT) The Laboratory for Innovations in Fusion Technologies (LIFT) is dedicated to exploring disruptive technology solutions for fusion energy with private-sector sponsors within the broader framework of the PSFC, NSE, and the MIT Energy Initiative. Research topics include materials, liquid-immersion blankets and fusion fuels. Commonwealth Fusion Systems and ENI are present sponsors.

Laboratory for Thermal-Hydraulics Engineering and Design (The Red Lab) The laboratory for Thermal-Hydraulics Engineering and Design is dedicated to exploring the fundamentals and the application of advanced heat transfer solutions for power technology. The research portfolio includes the development of high-resolution diagnostics and data processing tools, first-of-a-kind experimental capabilities, heat transfer enhancement techniques, and modeling approaches.

MIT Computational Reactor Physics Group (CRPG) [http://crpg.mit.edu/] CRPG focuses on the development of novel methods and algorithms for accurate and efficient nuclear reactor simulations. Better simulations help the nuclear industry set well-informed safety margins, but also enable assessment of innovative new fuel and reactor designs. From accurate quantification of uncertainty of neutron cross sections to Exascale simulation of nuclear systems, computing is pushing the boundaries of reactor physics.

Quantum Engineering Group [http://qeg.mit.edu] Director: Professor Paola Cappellaro (NSE). The Quantum Engineering Group develops transformative tools based on the fundamental laws of quantum physics, with applications in quantum simulation of complex systems, quantum computation beyond current classical limits, and quantum sensing of atomic-scale phenomena in the physical and life sciences.

<u>Collaborating MIT Academic & Research Units</u>

Computer Science and Artificial Intelligence Laboratory (CSAIL) [https://www.csail.mit.edu/]
Laboratory for Nuclear Science [http://web.mit.edu/lns/]
Research Laboratory of Electronics [https://www.rle.mit.edu/]

UNIVERSITY OF MASSACHUSETTS, LOWELL

Nuclear Engineering and Science Programs
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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	*	4	7	*	*	*
Masters	*	2	2	*	*	*
PhD	*	0	0	*	*	*

Number of Graduates

Graduate Student Enrollment: *Not Reported*
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, Professor and Director, Nuclear Engineering Program (979-934-3115) [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.

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.

Anna N. Yaroslavsky, Associate Professor (978-934-3766) [Anna_Yaroslavsky@uml.edu] Ph.D., Saratov State University, Russia. Multimodal image-guided intervention techniques; Biophotonics.

Other Faculty

Leo Bobek, Adjunct Professor and Nuclear Reactor Supervisor (978-934-3365) [Leo_Bobek@uml.edu] M.S.**,** University of Lowell**.** Research reactor operations.

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.

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

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.

John R. White, Professor Emeritus (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.

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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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	17	21	20	25	24	24
Masters	9	8	8	14	12	10
PhD	12	13	12	11	10	11

Number of Graduates

Graduate Student Enrollment: 10 Masters/ 32 Ph.D.

Distance Education Program
Offers Nuclear Engineering Courses and Degrees Online
Through the University Network of Excellence in Nuclear Engineering (www.unene.ca)

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 Small and Very Small Modular Reactors; Development of analysis tools for research in reactor physics.
Website: www.eng.mcmaster.ca/engphys/people/faculty/adriaan-buijs

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.
Website: www.eng.mcmaster.ca/engphys/people/faculty/john-luxat

Shinya Nagasaki, Professor (905-525-9140 x27090) [nagasas@mcmaster.ca] Ph.D., University of Tokyo, 1993. Safety and security of used nuclear fuel and high-level radioactive waste management, Actinide and radionuclide chemistry, and ethics of nuclear fuel cycle engineering in 21st century's society.
Website: www.eng.mcmaster.ca/engphys/people/faculty/shinya-nagasaki

David R. Novog, 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**:** www.eng.mcmaster.ca/engphys/people/faculty/Dave-Novog

Other Faculty

Simon Day, Adjunct Professor, Engineering Physics (905-525-9140 x 23191)[dayse@mcmaster.ca] Ph.D., McMaster University, 2003. Reactor Physics with specialties in Safety Analysis, Operations Support, and Criticality Safety. Leading the Reactor Analysis group at the McMaster Nuclear Reactor.

Laurence Leung, Adjunct Professor, Ph.D., Ottawa. Manager, Advanced Concepts & Collaboration at Canadian Nuclear Laboratories (retired) [leungl@sympatico.ca].
Website: experts.mcmaster.ca/display/leungl1

Thambiayah Nitheanandan,Industry Professor, Director, Canadian Nuclear Safety Commission. Ph.D., Manitoba. [nitheant@mcmaster.ca]. Website: experts.mcmaster.ca/display/nitheant

Nik Popov, Adjunct Professor, Program Director at University Network of Excellence in Nuclear Engineering (UNENE) Ph.D., Zagreb. [npopov@mcmaster.ca] experts.mcmaster.ca/display/npopov

Ben Rouben Adjunct Professor, Ph.D. (Massachusetts Institute of Technology), Reactor Physics, [roubenb@alum.mit.edu]. Website: experts.mcmaster.ca/display/roubeb1

Victor G. Snell, Industry Professor (905-525-9140 x20168) [snellv@mcmaster.ca], Ph.D., University of Toronto, 1972. Nuclear safety concepts and philosophy, safety system design and performance, safety analysis, education of staff working in the nuclear industry, nuclear licensing.
Website: experts.mcmaster.ca/display/snellv

Peter Vilks, Adjunct Professor (204-753-2311 ext. 63172) [peter.vilks@cnl.ca] Ph.D., McMaster University, 1984. Geochemistry and transport of radionuclides such as sorption, colloids, natural organics and diffusive and advective processes in fractures and rock matrix.

Nuclear Science and Engineering Research Centers

McMaster Nuclear Reactor (MNR). MNR is an open-pool type Materials Test Reactor (MTR) with a core of low enriched uranium (LEU) fuel that is moderated and cooled by light water. Primary and secondary cooling systems act to remove the heat that is generated in the core of the reactor, with external cooling towers acting as the ultimate thermal sink. The reactor is housed within a concrete containment building and generally operates weekdays from 8 a.m. until 12 midnight at a thermal power of 3 MW. The nuclear reactor was designed with its end use as a multi-purpose research facility in mind. Its open-pool design provides ready access to the reactor core and allows for easy insertion and removal of samples for neutron irradiation, imparting a degree of flexibility that many other classes of reactors lack. As well, several beam-tubes were built into the reactor structure: today, the neutron beams extracted by these tubes are used for applications including neutron radiography and neutron diffraction experiments. MNR also has an industrial hot cell inside the reactor containment building for handling highly radioactive samples.

Staff at the McMaster Nuclear Reactor conduct hundreds of thousands of neutron irradiations every year, many in support of industry (mining exploration, environmental samples). MNR is a world leader in the production of iodine-125, a radioactive isotope that is used in the treatment of prostate cancer, with hundreds of doses produced each week. Neutrons from MNR are also used by Nray Services Inc. to conduct quality assurance testing on turbine blades for jet engines using the neutron radiography facility at one of the beam-ports. Research activities at MNR continue to expand, with a new neutron diffractometer installed in 2009 and a state of the art positron beam facility currently being designed.

The Centre for Advanced Nuclear Systems (CANS) CANS provides a unique world-class capability to advance research in three focus areas: 1) nuclear materials, 2) nuclear safety thermalhydaulic behavior, and 3) health physics.
CANS McMaster is comprised of three primary facilities, namely:
1. Post-Irradiation Examination of Nuclear Materials: an irradiated materials examination facility consisting of a suite of custom designed, fabricated and installed hot cells including an instrument room containing a shielded dual beam Scattering Electron Microscope/Focused Ion Beam (SEM/FIB) and a Transmission Electron Microscope (TEM).
2. Nuclear Materials Characterisation Facility: a materials characterization and analysis facility that will be used to investigate the mechanical behaviour of existing and newly developed materials (including irradiated in-reactor core components, GEN IV materials and technology). The facility includes a Three Dimensional Atom Probe (3DAP) and Scattering Electron Microscope/Focused Ion Beam (SEM/FIB).
3. Thermal Testing Facility: to obtain experimental data to develop and test nuclear safety thermalhydraulic models. This facility include a heated Flow Loop, upgraded power supply with 265 kW capacity, cooling heat exchangers, a new heat transfer test section and 3-D Tomography and High Speed Video instrumentation for state-of-the-art visualization.

UNIVERSITY OF MICHIGAN

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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	37	25	24	20	20	23
Masters	29	29	23	23	18	32
PhD	15	24	15	18	24	20

Number of Graduates

Graduate Student Enrollment: 19 Masters/ 111 Ph.D.
ABET Accreditation: B.S.E. (N.E.R.S)

Nuclear Science and Engineering Faculty

Todd R. Allen, Chair and Professor (734-647-5845)[traumich@umich.edu] Ph.D., University of Michigan, 1997. Nuclear & Climate Policy; Radiation Damage of Materials; High-Temperature Corrosion; Nuclear Fuels. Website: http://www.ners.engin.umich.edu/people/allen-todd/

Michael Atzmon, Professor (734-764-6888) [atzmon@umich.edu] Ph.D.**,** California Institute of Technology**,** 1985. Thermodynamics and kinetics of materials; mechanical and thermal properties of metallic glasses. Website: https://ners.engin.umich.edu/people/atzmon-michael/

Scott D. Baalrud, Associate Professor (734-615-5010) [baalrud@umich.edu] Ph.D.**,** University of Wisconsin, Madison**,** 2010. Plasma theory; low temperature plasmas; high energy density plasmas; computational plasma physics. Website: https://ners.engin.umich.edu/people/baalrud-scott/

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**:**https://ners.engin.umich.edu/people/bielajew-alex/

Thomas Downar, Professor (734-615-9002) [downar@umich.edu] Ph.D.**,** Massachusetts Institute of Technology**,** 1984. Computational nuclear reactor physics; nuclear reactor dynamics, and the development of coupled neutronics and thermal-hydraulics methods for power reactor safety analysis. Website**:** https://ners.engin.umich.edu/people/downar-thomas/

Kevin G. Field, Associate Professor (734-764-4260([kgfield@umich.edu] Ph.D., University of Wisconsin-Madison, 2012. Advanced manufacturing, radiation effects, irradiation design and control, advanced characterization, small angle scattering, analytical microscopy, materials processing & design. Website: https://ners.engin.umich.edu/people/field-kevin/

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: https://ners.engin.umich.edu/people/foster-john/

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/people/gao-fei/

Ronald M. Gilgenbach, 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://plasmabay.engin.umich.edu/people/gilgenbach-ron/

Zhong He, Professor (734-764-7130) [hezhong@umich.edu] Ph.D., Southampton University, U.K., 1993. Room-temperature semiconductor gamma-ray imaging spectrometers and associated electronics. Website: https://ners.engin.umich.edu/people/he-zhong/ or https://cztlab.engin.umich.edu/

Igor Jovanovic, Professor (734-647-4989) [ijov@umich.edu] Ph.D., University of California, Berkeley, 2001. Radiation detection, nuclear security, high-power lasers and optics. Website: http://ners.engin.umich.edu/people/jovanovic-igor/

Kimberlee J. Kearfott, Professor of Nuclear Engineering and Radiological Sciences and Biomedical Engineering (734-763-9117) [kearfott@umich.edu] Sc.D. and C.H.P.**,** Massachusetts Institute of Technology**,** 1980. Radiation safety, medical physics; radiation detection and dosimetry; environmental radioactivity; explosives detection; homeland security.
Website: https://ners.engin.umich.edu/people/kearfott-kimberlee/

Brian Kiedrowski, Associate Professor (734-615-5978) [bckiedro@umich.edu] Ph.D., University of Wisconsin, 2009. Monte Carlo methods development for radiation transport; sensitivity analysis and uncertainty quantification. Website: https://ners.engin.umich.edu/people/kiedrowski-brian/

Brendan Kochunas, Assistant Professor (734-763-3867)[bkochuna@umich.edu] Ph.D., University of Michigan, 2013. Computational reactor physics methods; multiphysics methods; data-driven methods; nuclear reactor design; parallel algorithms and high performance computing.
Website: https://ners.engin.umich.edu/people/kochunas-brendan/

Karl M. Krushelnick, Professor (734-763-4877) [kmkr@umich.edu] Ph.D., Princeton University, 1994. Plasma physics; nuclear fusion; high power lasers. Website: https://ners.engin.umich.edu/people/krushelnick-karl/

Carolyn C. Kuranz, Associate Professor (734-615-6282[ckuranz@umich.edu] Ph.D., University of Michigan, 2009. Plasma physics, high-energy-density physics, nuclear fusion, radiation hydrodynamics, hydrodynamic instabilities, magnetized plasmas. Website: https://ners.engin.umich.edu/people/kuranz-carolyn/

Mark Kushner, Professor (734-647-1695) [mjkush@umich.edu] Ph.D.**,** California Institute of Technology**,** 1979. Computational low temperature plasmas and plasma surface interactions; plasma materials processing; plasma-liquid interactions; applications in biotechnology.
Website: http://uigelz.eecs.umich.edu

Y.Y. Lau, Professor of Nuclear Engineering and Radiological Sciences and Applied Physics Program (734-764-5122) [yylau@umich.edu] Ph.D.**,** Massachusetts Institute of Technology**,** 1973**.** Plasma and beam physics; high power radiation sources; vacuum microelectronics.
Website: https://ners.engin.umich.edu/people/lau-yue-ying/

Annalisa Manera, Professor (734-647-2433 [manera@umich.edu] Ph.D., Delft University of Technology, The Netherlands, 2003. Experimental two-phase flow, thermal-hydraulics, computational fluid dynamics, and multiphysics methods for power reactor safety analysis.
Website: https://ners.engin.umich.edu/people/manera-annalisa/

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. Website: https://ners.engin.umich.edu/people/matuszak-martha/

Ryan D. McBride, Associate Professor and Director of Plasma, Pulsed Power, and Microwave Laboratory (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/mcbride-ryan/

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.
Website: https://ners.engin.umich.edu/people/pozzi-sara/

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 and high temperature compact heat exchangers.
Website: https://ners.engin.umich.edu/people/sun-xiaodong/

Alexander G.R. Thomas, 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: https://ners.engin.umich.edu/people/thomas-alec/

Lumin Wang, Professor (734-647-8530) [lmwang@umich.edu] Ph.D.**,** University of Wisconsin-Madison**,** 1988. Radiation effects, ion beam modification of materials; transmission electron microscopy; nano-structured materials, and nuclear engineering materials.
Website: https://ners.engin.umich.edu/people/wang-lu-min/

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: https://ners.engin.umich.edu/people/was-gary/

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/people/wehe-david/ or https://radmeas.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/people/yang-won-sik/

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). Website: https://ners.engin.umich.edu/people/akcasu-ziya/

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. Website: https://ners.engin.umich.edu/people/brock-kristy/

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/people/brown-forrest

Frederick W. Buckman, Adjunct Professor **(**734-764-4260) [fwb@umich.edu] Ph.D.**,** Massachusetts Institute of Technology**,** 1970**.** Interests are in the design, development, and operation of nuclear power plants; historical performance of plants, people, and the evolution of our licensing and self-assessment processes. Website: https://ners.engin.umich.edu/people/buckman-frederick/

Adam Burak, Assistant Research Scientist (734-764-4260)[ajburak@umich.edu] Ph.D., University of Utah, 2019. Molten salt chemistry, electrochemistry, high temperature spent nuclear fuel reprocessing, severe environment materials, molten salt corrosion, experimental design, and prototype design. Website: https://ners.engin.umich.edu/people/burak-adam/

Milos Burger, Assistant Research Scientist (734-764-8234)[milosb@umich.edu] Ph.D., University of Belgrade, 2015. Laser-matter interactions, plasma and laser spectroscopy, nonlinear optically-driven processes in gases. Website: https://ners.engin.umich.edu/people/burger-milos/

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: https://ners.engin.umich.edu/people/busby-jeremy/

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.
Website: https://ners.engin.umich.edu/people/clarke-shaun/

Benjamin Collins, Adjunct Assistant Professor (734-764-4260) [bscollin@umich.edu] Ph.D., University of Michigan, 2011. Nuclear Engineering and Radiological Sciences; and Scientific Computing. Website:
Website: https://ners.engin.umich.edu/people/collins-benjamin/

Denia Djokic, Assistant Research Scientist (734-764-4260) [djokic@umich.edu] Ph.D., University of California, Berkeley, 2013. Impacts of nuclear technologies through a feminist and antiracist perspective.

Gianluigi De Geronimo, Adjunct Research Scientist (516-983-4859) [dgianlui@umich.edu] Ph.D., Milan Polytechnic, Italy, 1997. Low-noise electronics and microelectronics for radiation detectors.
Website: https://www.dgcircuits.com

Donghai Du, Assistant Research Scientist (734-353-5027)[donghaid@umich.edu] Ph.D., Shanghai Jiao Tong University, 2017. Degradation of nuclear materials in high temperature water.

James J. Duderstadt, President Emeritus, University of Michigan and University Professor of Science and Engineering (734-647-7300) [jjd@umich.edu] Ph.D., California Institute of Technology, 1967. Nuclear reactor theory and design (both fission and fusion); radiation transport theory; kinetic theory and statistical mechanics; interaction of intense laser and particle beams with plasmas; inertial confinement fusion, energy systems analysis; computer simulation and networking; energy policy.
Website: https://ners.engin.umich.edu/people/duderstadt-james/

Rodney C. Ewing, Professor Emeritus 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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Gennady Fiksel, Research Scientist (734-647-3769) [gfiksel@umich.edu] Ph.D., University of Wisconsin, Madison, 1991. Plasma Physics. Website: https://ners.engin.umich.edu/people/fiksel-gennady/

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.
Website: https://ners.engin.umich.edu/people/ronald-fleming/

Michael Flynn, Adjunct Professor (313-874-4483) [mikef@rad.hfh.edu] Ph.D., University of Michigan, 1975. Radiation imaging with emphasis on medical applications; statistical concepts of image formation for radiography; radioisotope imaging, and computed tomography; measurement methods for image quality assessment; high fidelity image display and human visual perception as pertains to radiological interpretation; active research projects in quantitative lung densitometry, musculo-skeletal tomosynthesis, phase contrast imaging, display calibration, and radiological informatics.
Website: https://ners.engin.umich.edu/people/michael-flynn/

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.
Website: https://ners.engin.umich.edu/people/goodsitt-mitchell/

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: https://ners.engin.umich.edu/people/hammig-mark/

James P. Holloway, Arthur F. Thurnau Professor Emeritus and Professor Emeritus of Nuclear Engineering and Radiological Sciences (734-936-3126) [hagar@umich.edu] Ph.D., University of Virginia, 1989. Radiation transport, reactor physics, plasma kinetic theory, computational physics, nonlinear dynamics.
Website: https://ners.engin.umich.edu/people/holloway-james/

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: https://ners.engin.umich.edu/people/jia-zhijie/

Nicholas M. Jordan, Associate Research Scientist (734-763-0213) [jordann@umich.edu] Ph.D., University of Michigan, 2008. Plasma Physics. Website: https://ners.engin.umich.edu/people/jordan-nicholas/

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: https://ners.engin.umich.edu/people/kammash-terry/

Dale Lancaster, Adjunct Professor (814-574-1912)[dalelan@umich.edu] Ph.D., Massachusetts Institute of Technolgy, 1981. Criticality, Spent Fuel Management, Core Design and Fuel Management.
Website: https://ners.engin.umich.edu/people/lancaster-dale/

Edward W Larsen, Professor Emeritus of Nuclear Engineering and Radiological Sciences, College of Engineering (734-936-0124) [edlarsen@umich.edu} Ph.D.**,** Rensselaer Polytechnic Institute**,** 1971**.** Numerical and analytical methods for neutron, electron, photon, and thermal radiation transport.
Website: https://ners.engin.umich.edu/people/larsen-edward/

John C. Lee, Professor Emeritus of Nuclear Engineering and Radiological Sciences (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: https://ners.engin.umich.edu/people/lee-john/

Yuxuan Liu, Assistant Research Scientist (734-764-5603) [yuxuanl@umich.edu] Ph.D., University of Michigan, 2015. Computational neutron transport, cross section data and nuclide transmutation methods; Reactor physics; Numerical methods and scientific computation. Website:
https://ners.engin.umich.edu/people/liu-yuxuan/

Yang Ma, Assistant Research Scientist (734-239-34840[yongm@umich.edu] Ph.D., Institute of Physics, University of the Chinese Academy of Sciences, 2016. Laser-plasma interactions; Laser Wakefield accelerators; Advanced Radiation Sources.
Website: https://cuos.engin.umich.edu/researchgroups/hfs/profiles/Yong-Ma/

William R. Martin, Professor Emeritus of Nuclear Engineering and Radiological Sciences (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:
https://ners.engin.umich.edu/people/martin-william/

Thomas A. Mehlhorn, Adjunct Professor (505-363-6106)[thmehlho@umich.edu] Ph.D., University of Michigan, 1978. Plasma physics and nuclear fusion.
Website: https://ners.engin.umich.edu/people/mehlhorn-tom/

Namdoo Moon, Adjunct Professor (734-764-4260) [namdoo.moon@HQ.DHS.GOV] Ph.D., University of Michigan, 1993. Nuclear Detection. Website: https://ners.engin.umich.edu/people/moon-namdoo/

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: https://ners.engin.umich.edu/people/pazsit-imre/

Victor Petrov, Associate Research Scientist (734-763-4626) [petrov@umich.edu] Ph.D., Institute of Engineering Physics (IIF) and Moscow State Industrial University, Russia, 2008. Experimental and Computational Fluid Dynamics. Website: https://ners.engin.umich.edu/people/petrov-victor/

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: https://ners.engin.umich.edu/people/ray-dipankar/

Piyush Sabharwall, Adjunct Professor (734-764-4260) [sabhp@umich.edu] Ph.D., University of Idaho, 2009. Applied Heat Transfer and Enhancement; Thermal-Hydraulics; Thermodynamics; Energy Storage Systems; Advanced Reactors (Gas Cooled, Molten Salt Cooled, Liquid Metal Cooled); Advanced Energy Systems (Microreactors and Fission Battery Systems); Nuclear safety analyses and Integrated Energy Systems (Hybrid Energy Systems). Website: https://ners.engin.umich.edu/people/sabharwall-piyush/

Kristine Svinicki, Adjunct Professor (734-764-4260) [svinicki@umich.edu] BSE, University of Michigan, 1988. Public Policy. Website: https://ners.engin.umich.edu/people/svinicki-l-kristine/

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: https://ners.engin.umich.edu/people/vincent-dietrich/

Peng Wang, Associate Research Scientist (734-763-3116) [wpf@umich.edu] Ph.D., University of Manchester, UK, 2011. Corrosion Behavior of Zirconium Alloys, High Temperature Aqueous Environment by Electrochemical Impedence Spectroscopy. Website: https://ners.engin.umich.edu/people/peng-wang/

Yuefeng Zhu, Associate 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. Website: https://ners.engin.umich.edu/people/zhu-yuefeng/

Nuclear Science and Engineering Research Centers

Applied Nuclear Science Instrumentation Laboratory

The Applied Nuclear Science Instrumentation Laboratory features approximately 1000 sqft of quality 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 Laboratory Astrophysics (CLA)

The Center for Laboratory Astrophysics (CLA) is a National Nuclear Security Administration (NNSA) Center of Excellence. We study fundamental high-energy-density plasmas relevant to astrophysical systems, the NNSA mission of science-based stockpile stewardship, and inertial confinement fusion concepts. We create these systems using high-energy laser and pulsed-power facilities and simulate them using the radiation hydrodynamics code CRASH. Our research focus is hydrodynamic instabilities, radiation hydrodynamics, and magnetized flows. In addition, we fabricate and characterize experimental targets and research novel diagnostic techniques.

Detection for Nuclear Nonproliferation Laboratory

The Detection for Nuclear Nonproliferation Lab is used to explore novel 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. This laboratory is used in the senior-graduate laboratory course in detection for nuclear non-proliferation, NERS 590. Website: dnng.engin.umich.edu/labs/

Experimental and Computational Multiphase Flow (ECMF) Laboratory

The lab was established in 2013 with the purpose of advancing and understanding thermal-hydraulics and fluid-dynamics phenomena of relevance for nuclear applications. In the ECMF lab, we perform fluid-dynamic experiments using in-house advanced state-of-the-art high-resolution experimental techniques such as wire-mesh sensors and Particle Image Velocimetry (PIV) combined with novel refractive-index matching techniques. Experimental facilities in the lab are used to investigate the propagation of stratified fronts, mixing in plena, and turbulence-induced thermal fatigue in isolated branch lines. 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/

Gérard Mourou Center for Ultrafast Optical Science (CUOS-EECS)
CUOS researchers develop optical instrumentation and techniques to generate, manipulate, and detect ultrashort and ultrahigh-peak-power light pulses. They use these ultrashort pulses to study ultrafast physical phenomena in atomic, nuclear, plasma, and materials physics, in solid-state electronics, in high-energy-density physics, and in biomedicine. When amplified to even modest energies, such short pulses can achieve the highest peak powers: the HERCULES laser at CUOS holds the world record for on-target laser-focused intensity. The center is currently building ZEUS, which when finished will be the most powerful laser in the U.S. Website: cuos.engin.umich.edu

High-Resolution TH Imaging Laboratory
In the high-resolution TH imaging laboratory, we develop and apply measurement techniques for quantitative imaging of single-phase and multiphase flows in complex geometries and high-pressure systems. The latest developments include an in-house, high-resolution gamma tomography system, and a high-speed X-ray radiography system. Additional high-resolution instrumentation employed in the lab includes wire-mesh sensors and fiber optic probes. The high-resolution experiments are being performed two investigate two-phase flows in fuel bundles, helical coils and for post-CHF two-phase flow regimes at high pressure/temperature. Additional experiments include setups to investigate the behavior of heat pipes for micro-reactors applications and hydrogen migration in nuclear fuel cladding materials**.**

High Temperature Corrosion Laboratory (HTCL)
The High-Temperature Corrosion Laboratory (HTCL) provides 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. The corrosion laboratory has unique facilities for conducting both high and low-temperature corrosion, stress corrosion cracking (SCC), electrochemical testing, and mechanical testing. Website: https://htcl.engin.umich.edu

Irradiated Materials Testing Complex (IMTC)
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. The laboratory consists of a high-temperature autoclave, circulating water loop, load frame, and servo motor for conducting constant extension rate tensile (CERT) and crack growth rate (CRG) tests in subcritical or supercritical water up to 600°C. 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, and a jet-electropolisher for making TEM disc samples.

Metastable Materials Laboratory
In the Metastable Materials Laboratory, studies of the kinetics and thermodynamics of nanocrystalline and amorphous materials are conducted. The lab is equipped with facilities for x-ray diffraction, calorimetry, mechanical alloying, and annealing of samples. This laboratory is used in the senior laboratory course NERS 425, Applications of Radiation.

Michigan Center for Materials Characterization [(MC)2-MSE]
(MC)2 houses state-of-the-art equipment, including aberration-corrected transmission electron microscopes, dual-beam focused ion beam/scanning electron microscopes, an x-ray photoelectron spectrometer, a tribo-indenter, an atomic force microscope, and an atom probe tomography instrument. A few of the instruments contained at the laboratory include: Tescan MIRA3 FEG SEM, Tescan RISE SEM, FEI Quanta 3D e-SEM/FIB, FEI Nova 200 Nanolab SEM/FIB, and more. Website: https://mc2.engin.umich.edu/

Michigan Ion Beam Laboratory (MIBL)
The Michigan Ion Beam Laboratory for Surface Modification and Analysis (MIBL) 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. The lab houses a 1.7 MV tandem ion accelerator, a 400 kV ion implanter, and an ion beam assisted deposition (IBAD) system. This laboratory is used in the senior laboratory course NERS 425, Applications of Radiation. Website: mibl.engin.umich.edu

Neutron Science Laboratory
The Neutron Science Laboratory is dedicated to advancing the fundamental understanding and applications of neutron science, particularly the development of radiation detection materials, devices, and systems. The lab space is equipped with DD and DT neutron generators, radioisotope neutron sources, and a variety of standard and advanced radiation detectors and nuclear electronics. Website: https://ansg.engin.umich.edu/facilities/neutron-science-laboratory/

Nuclear Plant Simulation Laboratory (NPSL)
The Nuclear Plant Simulator Laboratory was recently established with the installation of the Generic Pressurized Water Reactor Simulator. This simulator represents the entire instrumentation and control (I&C) system of a three-loop Westinghouse PWR plant with all its gauges, knobs, recorders and control systems. The Simulator satisfies the U.S. Nuclear Regulatory Commission requirements for licensed reactor operator training and is being modified to represent the I&C system of the six-unit NuScale SMR plant under development. With an investment of $105,000 made for the Simulator, it is currently used for a cyber-security NEUP project and for various nuclear reactor analysis and design classes. With the development of efficient and secure digital I&C systems looming as a new frontier for nuclear engineers, we plan to use the Simulator as an integral part of advanced nuclear plant development projects going forward. The NPSL also includes an interactive Virtual Reality (VR) model of Michigan's Ford Nuclear Reactor. This environment is used for teaching and conducting experiments that were previously a part of the NERS curriculum when the FNR was still operational. This platform that was developed with support from Michigan's Center for Academic Innovation also provides a unique digital infrastructure for research into developing digital twin and VR technology for nuclear engineering applications.

Nuclear Reactor Analysis and Methods (NURAM) Center
The NURAM center provides technical expertise in reactor analysis, including design and safety analysis, and methods development. NURAM Center includes faculty, research scientists, postdoctoral fellows, and PhD students from four departments across the University of Michigan: NERS, Aerospace, Mechanical Engineering, and Math. NURAM faculty, staff, and students, are involved in the 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. Specifically the NURAM center develops and maintains the U.S. Nuclear Regulatory Commission's core simulator PARCS, and the next generation high-fidelity neutronics code MPACT that is a part of VERA. We also develop the AGREE code for the US NRC, as well as derivatives for industry partners. In addition to developing codes, the personnel of the NURAM center also maintain expertise in many other computational tools used for reactor analysis. These tools come from U.S. National Labs, many from the NEAMS program, including: VERA, Griffin, BISON, RAVEN, SAM, MC2, SHIFT, SCALE, MCNP, and DIF3D. The NURAM center, with the University of Michigan, also maintains academic licenses to many industry products such as Westinghouse's APA package, CASMO-4/SIMULATE, HELIOS, STAR-CCM+, ANSYS, and more. Website: https://nuram.engin.umich.edu

Nuclear Reactor Design and Simulation Laboratory (NRDSL)
NRDSL aims to develop advanced nuclear reactor and associated fuel cycle concepts and core design and fuel cycle analysis methods by integrating the advances in reactor physics, thermal-hydraulics, materials, and computing technologies**.**

Plasma, Pulsed Power, and Microwave Laboratory
PPML uses powerful electromagnetic pulses to generate plasmas and charged particle beams. The lab features three premier pulsed power facilities: MELBA, MAIZE, and BLUE. These machines produce momentary bursts of electrical power (hundreds of billions of watts) to study high-power electromagnetic phenomena. Areas of interest include nuclear fusion, extreme material states, and extreme radiation generation (x-rays, neutrons, and high-power microwaves). Lab research efforts include experiment, theory, and computation. Website: plasmabay.engin.umich.edu
Plasma Science and Technology Laboratory
The Plasma Science and Technology Laboratory's focus is on understanding and applying plasma science to real-world problems. The lab has four major thrust areas: plasma/nuclear-derived space propulsion, environmental hazard mitigation (water treatment, surface sterilization, sanitation), and basic plasma science such as self-organization and the mysteries of the plasma liquid interface. Particular attention is paid to those applications that protect the environment and those that improve the quality of life in underdeveloped countries. Here, research focuses on using plasmas to achieve sustainability and reuse of resources here on Earth—the resulting technologies have applications in space exploration as well, supporting in situ resource utilization. The laboratory houses a number of vacuum tanks and associated power systems such as DC, rf, and microwave power sources for plasma production. Advanced laser diagnostics are also used to probe fields and particles in the plasmas under test. Website: pstlab.engin.umich.edu

Position-Sensing Semiconductor Radiation Detector Laboratory
The Position-Sensing Semiconductor Radiation Detector Laboratory is dedicated to the development of room-temperature semiconductor radiation detectors. These instruments are being developed for applications in nuclear nonproliferation, homeland security, astrophysics, planetary sciences, medical imaging, high- energy physics experiments. This lab is home to the Orion Radiation Measurement Group. Website: cztlab.engin.umich.edu

Radiation Effects and Nanomaterials Laboratory
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.

Radiological Health Engineering (RHE) 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 measurement methods deployable within the immediate future. This laboratory is used in the senior laboratory course NERS 425, Applications of Radiation. Website: rhelab.engin.umich.edu

Thermal Hydraulics Laboratory (THL)
The Thermal Hydraulics Laboratory carries out separate-effect and integral-effects tests in reactor thermal hydraulics to support the improvement of light water reactors (LWRs) and the development of advanced non-LWR reactors, including molten salt reactors and high-temperature gas-cooled reactors. It has established a number of high-temperature test facilities, including molten salt and helium test facilities.

UNIVERSITY OF MISSOURI, COLUMBIA

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573-882-9691
prelasm@missouri.edu
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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
Masters	*	0	0	*	*	*
PhD	*	4	4	*	*	*

Number of Graduates

Graduate Student Enrollment: *Not Reported*
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. Thompson, 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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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	34	38	32	35	25	26
Masters	6	9	3	2	5	6
PhD	5	3	4	6	8	4

Number of Graduates

Graduate Student Enrollment: 12 Masters/ 20 Ph.D.
ABET Accreditation: BS Nuclear Engineering

Nuclear Science and Engineering Faculty

Ayodeji B. Alajo, Associate Professor and Interim Chair (573-341-6609) [alajoa@mst.edu] Ph.D., Texas A&M University, 2010. Nuclear systems design and modeling; Advanced fuel cycles; Nuclear waste minimization; Nuclear forensics. Website: https://people.mst.edu/faculty/alajoa/index.html

Syed Alam, Assistant Teaching Professor (573-341-4881) [sbagqm@mst.edu] Ph.D., University of Cambridge, 2018. Radiation transport methods for reactor physics analysis; Design of advanced reactor core; Multiphysics for thermal-hydraulics coupling; Uncertainty quantification; Health physics. Website: https://people.mst.edu/faculty/sbagqm/index.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.

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: https://people.mst.edu/faculty/castanoc/index.html

Joseph T. Graham, Associate 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: https://people.mst.edu/faculty/grahamjose/index.html

Joshua P. Schlegel, Associate 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: https://people.mst.edu/faculty/schlegelj/index.html

Joseph Smith, Professor & Laufer Endowed Chair in Energy (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: https://people.mst.edu/faculty/smithjose/index.html

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: https://people.mst.edu/faculty/usman/index.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

Other Faculty

Syed Alam, Assistant Teaching Professor (573-341-4881) [sbagqm@mst.edu] Ph.D., University of Cambridge, 2018. Radiation transport methods for reactor physics analysis; Design of advanced reactor core; Multiphysics for thermal-hydraulics coupling; Uncertainty quantification; Health physics.
Website: https://nuclear.mst.edu/facultystaffandfacilities/alam/

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.

Gary E. Mueller, Associate Professor Emeritus (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.

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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	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	29	31	23	*	*

Number of Graduates

ABET Accreditation: Nuclear 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.

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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
Masters	2	0	1	2	0	3
PhD	1	4	1	1	2	0

Number of Graduates

Graduate Student Enrollment: 7 Masters/ 6 Ph.D.
Graduate Certificates in Nuclear Criticality Safety & Nuclear Safeguards and Security.

Nuclear Science and Engineering Faculty

Alexander Barzilov, 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, Instructor (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

UNIVERSITY OF NEW BRUNSWICK

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

Nuclear Science and Engineering Faculty

William G. Cook, Professor (506-452-6318) [wcook@unb.ca] Ph.D., University of New Brunswick, 2005. Reactor chemistry; corrosion; molten salts reactors, sodium fast reactors. Professional Engineer.

Olga Y. Palazhchenko, Assistant Professor (506-453-4540) [olga.palazhchenko@unb.ca] Ph.D., University of New Brunswick, 2017. Simulation & modelling; reactor chemistry & corrosion; ion-exchange processes. Professional Engineer.

Other Faculty

Derek H. Lister, Professor Emeritus (506-447-3299) [dlister@unb.ca] Ph.D., University of New Brunswick, 2017. Flow-accelerated corrosion; reactor chemistry; film forming substances. Professional Engineer.

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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505-277-2692
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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	16	13	16	16	11	12
Masters	10	4	7	11	12	8
PhD	1	6	6	5	3	1

Number of Graduates

Graduate Student Enrollment: 18 Masters/ 35 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

Hyoung Koo Lee, Professor and Chair (505-277-0686) [leehk@unm.edu] Ph.D., University of California-Berkeley, 1995. Radiation Imaging; Radiation Detection; Nondestructive Evaluation.
Website: https://ne.unm.edu/faculty-staff/faculty-profiles/hyoung-k.-lee.html

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

Minghui Chen, Assistant Professor (505-277-1941) [mnu@unm.edu] Ph.D., University of Michigan, 2018. Nuclear Reactor Thermal-Hydraulics.
Website: http://ne.unm.edu/faculty-staff/faculty-profiles/minghui-chen.html

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.
Website: https://ne.unm.edu/faculty-staff/faculty-profiles/mohamed-el-genk.html

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

Christopher M Perfetti, Assistant Professor (505-277-1945) [cperfetti@unm.edu] Ph.D., University of Michigan, 2012. Sensitivity and Uncertainty Analysis; Radiation Transport and Computational Methods Development; Monte Carlo Methods; Criticality Safety; Reactor Physics and Advanced Reactor Design; Radioisotope Production; Radiation Shielding; Nuclear Data Evaluation and Integral Experiment Design.
Website: https://ne.unm.edu/faculty-staff/faculty-profiles/christopher-perfetti.html

Other Faculty

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

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

Anil K. Prinja, Distinguished Professor Emeritus (505-277-4600) [prinja@umn.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

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.

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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	23	39	30	32	18	11
Masters	12	13	8	16	15	15
PhD	11	9	10	18	23	14

Number of Graduates

Graduate Student Enrollment: 25 Masters/ 97 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, 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, Professor and Director of CNP (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, Duke Energy Distinguished Professor of Nuclear Engineering, Director of CNEC and NCSU NUC University Lead (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

Alexander William Bataller, Assistant Professor (919-515-3612) [awbatall@ncsu.edu] Ph.D., University of California, Los Angeles, 2014. Dense plasmas; ultrafast spectroscopy; molten salts.
Website: https://www.ne.ncsu.edu/people/awbatall

Benjamin W. Beeler, Assistant Professor (919-515-3737)[bwbeeler@ncsu.edu] Ph.D., Georgia Institute of Technology, 2013. Computational nuclear materials science; Next generation nuclear fuels; Molten salt systems for nuclear applications; radiation damage and defect evolution; Density functional theory; Molecular dynamics.

Igor A. Bolotnov, 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 echnology, 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

Mihai A. Diaconeasa, Assistant Professor (919-515-3768) [madiacon@ncsu.edu] Ph.D., University of California, Los Angeles, 2017. Probabilistic risk assessment; dynamic probabilistic risk assessment; reliability analysis; resilient systems design; probabilistic physics of failure modeling; Bayesian inference.
Website: https://www.ne.ncsu.edu/people/madiacon

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-din

Jacob Eapen, 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/

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, Distinguished 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

Jason Hou, Assistant Professor and Director of RDFMG (919-513-6705) [jason.hou@ncsu.edu] Ph.D., The Pennsylvania State University, 2013. Multi-physics reactor simulation; Advanced reactors; In-core fuel management; Fuel cycle analysis; Uncertainty analysis; Plant simulator.
Website: https://www.ne.ncsu.edu/people/jasonhou/

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

John K. Mattingly, Professor and Chief Scientist of CNEC (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

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

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.

Xu Wu, Assistant Professor (919-515-6570) [xwu27@ncsu.edu] Ph.D., University of Illinois at Urbana-Champaign, 2017. Calibration, Validation, Data Assimilation, Uncertainty and Sensitivity Analysis; Scientific Machine Learning; Computational Statistics and Reduced Order Modeling.
Website: https://www.ne.ncsu.edu/people/xwu27

Ge Yang, Associate 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

Joseph M. Doster, Professor Emeritus (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

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.

Robin P. Gardner, Professor Emeritus and Director of CEAR (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

David Kropaczek, Adjunct Professor [dkropac@ncsu.edu] Ph.D., North Carolina State University. Fuel cycle and plant optimization, computational reactor physics and thermal-hydraulics, and numerical algorithm development.

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.

Paul J. Turinsky, Professor Emeritus (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/

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

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

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

Consortium for Nuclear Power (CNP)
Director: Maria Avramova
Website: https://www.ne.ncsu.edu/wp-content/uploads/2017/06/CNP-Flyer.pdf

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

OHIO STATE UNIVERSITY

Nuclear Engineering Graduate Program
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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
Masters	10	11	7	6	3	3
PhD	4	7	3	4	3	6

Number of Graduates

Graduate Student Enrollment: 3 Masters/ 22 Ph.D.
ABET Accreditation: B.Sc. in Engineering with Nuclear Minor

Nuclear Science and Engineering Faculty

Lei (Raymond) Cao, Professor and Director of Nuclear Engineering Program (614-247-8701) [Cao.152@osu.edu] Ph.D.**,** The University of Texas at Austin**,** 2007. Instrumentation and Sensors; In-pile Instrumentation; Radiation Detection; Neutron Radiography/Tomography; PGNAA, NDP, Radiation Effects on Electronics. Website: https://nars.osu.edu/

Tunc Aldemir, Professor (614-292-4627) [aldemir.1@osu.edu] Ph.D., University of Illinois, 1978. Dynamic system reliability; probabilistic risk assessment. Website: https://mae.osu.edu/people/aldemir.1

Marat Khafizov, Assistant Professor (614-292-2544) [Khafizov.1@osu.edu] Ph.D., University of Rochester, 2008. Radiation effects on physical properties of materials, nuclear fuel and ceramics, thermal transport, in-pile sensors, optical spectroscopy and ultrasonics. 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 (Gamma, X-ray and Neutron Imaging); Radiation Detection, Measurement and Instrumentation; Radiation Protection and Dosimetry; Radioisotope Technology; Nuclear Power and 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. Particle transport; radiative transfer; mathematical and computational modeling of transport phenomena; reactor theory; acceleration schemes; diffusion theory.
Website: https://mae.osu.edu/people/vasques.4

Dean Wang, Associate Professor (614-292-1337) [wang.12239@osu.edu] Ph.D., Massachusetts Institute of Technology, 2003. Transport Theory and Computation; Nuclear reactor design, modeling and simulation; Nuclear reactor systems and safety. Website: https://ncg.engineering.osu.edu

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

Richard Denning, Adjunct Professor (614-736-1793) [denningrs.8@gmail.com] Ph.D., University of Florida**,** 1967**.** Probabilistic Risk Assessment; Severe Accident Phenomena; Advanced Reactor Source Term Methodology; Regulatory Analysis.

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 and is partner facility of DOE Nuclear Science User Facilities. The OSUNRL houses the OSURR a 500-kW pool type reactor, a Co-60 high-dose rate irradiation facility, and a sub-critical assembly.
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: https://rrl.osu.edu/

ONTARIO TECH UNIVERSITY

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Website: http://nuclear.ontariotechu.ca

	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	61	63	70	64	52	71
Masters	11	15	6	8	10	25
PhD	1	2	1	3	2	1

Number of Graduates

Graduate Student Enrollment: 56 Masters/ 26 Ph.D.

Nuclear Science and Engineering Faculty

Akira Tokuhiro, Dean and Professor of Nuclear Science (905-721-8668 x5511) [Akira.Tokuhiro@ontariotech.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

Kirk Atkinson, Associate Professor (905-721-8668 x5501), (kirk.atkinson@ontariotechu.ca) Ph.D in Physics, King's College London, UK. An applied radiation physicist with experience in radiation science, reactor physics, radiation transport, shielding, detector physics, radiation imaging and computational methods.

Hossam A. Gaber, Professor of Nuclear Engineering (905-721-8668 x5497) [hossam.gaber@ontariotechu.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@ontariotechu.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@ontariotechu.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@ontariotechu.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@ontariotechu.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@ontariotechu.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, Professor of Nuclear Science (905-721-8668 x5522) [rachid.machrafi@ontariotechu.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, Associate Professor of Energy Systems (905-721-8668 x5498) [jennifer.mckellar@ontariotechu.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@ontariotechu.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@ontariotechu.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, Associate Professor of Nuclear Engineering and Canada Research Chair in Nuclear Fuels and Materials (905-721-8668 x5525) [markus.piro@ontariotechu.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.

Edward Waller, Professor of Nuclear Engineering (905-721-8668 x5521)[Ed.Waller@ontariotechu.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@ontariotechu.ca] B.Eng. McMaster University, Electrical engineering, nuclear plant design.

Filippo Genco, Associate Teaching Professor (905-721-8668 ext. 5444)[Filippo.Genco@ontariotechu.ca] Ph.D. Purdue University, 2013. Plasma Material Interactions; Magnetic Fusion Applications; Radiation damage in materials; Advanced numerical methods; Renewable Energies and Alternative Technologies; Nuclear and electric propulsion; Direct energy conversion systems and applications; NanoFluids & Nanopatterning applications.

Sharman Perera, Associate Teaching Professor, Faculty of Energy Systems and Nuclear Science (905-721-8668 x5505) [sharman.perera@ontariotechu.ca] M.A.Sc. Ryerson University, Computational Fluid Dynamics, Aerosol Mechanics, Integrated Engineering Design and Undergraduate Laboratory Design.

Anthony Waker, Professor Emeritus of Nuclear Science (905-721-8668 x5520)[Anthony.Waker@ontariotechu.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.

Nuclear Science and Engineering Research Centre

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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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	37	46	44	44	37	33
Masters	21	32	19	27	32	49
PhD	9	4	11	8	8	8

Number of Graduates

Graduate Student Enrollment: 92 Masters/ 36 Ph.D.
ABET Accreditation: BS Nuclear Engineering; BS Radiation Health Physics

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

Nuclear Science and Engineering Faculty

Kathryn A. Higley, 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: https://ne.oregonstate.edu/ kathryn-higley

Samuel A. Briggs, Assistant Professor (541-737-7838) [samuel.briggs@oregonstate.edu] Ph.D., University of Wisconsin-Madison, 2016. Materials development for next-generation nuclear reactors; microstructural characterization and microscopy of radiation damage in materials; materials degradation in liquid sodium and molten salt environments; in-situ monitoring of materials health in nuclear reactors; combined effects of superimposed environmental stressors. Website: https://ne.oregonstate.edu/samuel-briggs

Tianyi Chen, Assistant Professor (541-737-8190) [Tianyi.chen@oregonstate.edu] PhD, Texas A&M University, 2015. Nuclear materials including applying the combined techniques of irradiation, microstructure analysis, multiscale mechanical testing, and molecular dynamics simulations to materials research and development. Website: https://ne.oregonstate.edu/tianyi-chen

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/

Izabela Gutowska, Assistant Professor (541-737-7053) [izabela.gutowska@oregonstate.edu] Ph.D., Oregon State University, 2016. Nuclear reactor thermal hydraulics, with emphasis on application of computational fluid dynamics. Experimental and computational thermal hydraulics aspects involving Generation IV (e.g., very high temperature, molten salt) and small modular reactors. Computational fluid dynamics verification, validation, and uncertainty analyses. Website: https://ne.oregonstate.edu/izabela-gutowska

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

Wade Marcum, Associate Dean for Undergraduate Programs and 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: https://ne.oregonstate.edu/wade-marcum

Camille J. Palmer, Associate Professor and Graduate Program Committee Chair (541-737-7065) [camille.palmer@Oregonstate.edu] Ph.D., University of Cincinnati, 2003. International nuclear security and nonproliferation, investigating robotic applications for nuclear safeguards, introducing new analytical techniques for nuclear forensics, and nuclear forensic signature development. Website: https://ne.oregonstate.edu/camille-j-palmer

Todd S. Palmer, Professor (541-737-7064) [todd.palmer@oregonstate.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: http://ne.oregonstate.edu/todd-s-palmer

Alena Paulenova, Professor and Faculty Status Committee Chair (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

Steven R. Reese, Associate Professor, Radiation Center Director, and Curriculum Committee Chair (541-737-2344) [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

Brian G. Woods, School Head and Professor (541-737-2343) [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: https://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, Associate School Head and Associate 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: https://ne.oregonstate.edu/haori-yang

Other Faculty

David M. Hamby, Professor Emeritus (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

Trevor Howard, Assistant Professor, Senior Research (541-737-6152) [trevor.howard@oregonstate.edu] Ph.D., Oregon State University, 2018. Fluid-structure interactions; computational multiphysics; nuclear reactor thermal hydraulics; novel instrumentation and data analysis techniques; verification, validation and uncertainty quantification for multiphysics; artificial intelligence applications in design and analysis. Website https://ne.oregonstate.edu/trevor-howard

Andrew C. Klein, Professor Emeritus (541-737-2343) [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 https://ne.oregonstate.edu/andrew-c-klein

Mitch K. Meyer, Professor of Practice (208-533-7155) [mitchell.meyer@inl.gov] Ph.D. Iowa State University. Director of Characterization and Advanced PIE division at INL's Materials and Fuels Complex. Developing advanced methods for measuring and characterizing irradiated fuels and materials. Website: https://ne.oregonstate.edu/mitchell-meyer

Guillaume Mignot, Assistant Professor Senior Research (541-737-6382) [guillaume.mignot@oregonstate.edu] Ph.D. University of Wisconsin-Madison, 2008. Study nuclear reactor severe accidents, development of advanced instrument and metering techniques for condensation film measurement, operational manager of the Naval Reactor Test Loop (NRTL).

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Jose N. Reyes, Jr. Professor Emeritus (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: https://ne.oregonstate.edu/jose-n-reyes

Aaron W. Weiss, Senior Faculty Research Assistant I (541-737-7084) [weissa@oregonstate.edu] M.S. Oregon State University, 2017. Thermal hydraulics experimental research, instrumentation development, operational manager of the Hydro-Mechanical Fuel Test Facility (HMFTF).
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Nuclear Science and Engineering Research Center

OSU Radiation Center: The school 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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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	99	63	69	44	46	45
Masters	30	21	13	18	14	13
PhD	8	6	5	3	5	3

Number of Graduates

Graduate Student Enrollment: 60 Masters/ 50 Ph.D.
ABET Accreditation: BS

Distance Education Program
Offers Nuclear Engineering Courses and MEng Degree Online
https://www.worldcampus.psu.edu/degrees-and-certificates/nuclear-engineering-masters/overview

Nuclear Science and Engineering Faculty

Jean Paul Allain, Professor and Department Head (814-863-8575) [allain@psu.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.

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, Associate 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.

Jeffrey A. Geuther, Associate Director for Operations of the RSEC and Associate Research Professor of Nuclear Engineering (814-863-2745) [jag671@psu.edu] Ph.D., Rensselaer Polytechnic Institute, 2007. Nuclear reactor control systems; neutron activation analysis; radiation detection; radioisotope production; neutron beam experiments.

Miaomiao (Mia) Jin, Assistant Professor (814-863-6938) [mmjin@psu.edu] Ph.D., Massachusetts Institute of Technology, 2019. Computational materials science and engineering; Materials behavior in extreme environments; Development of radiation-tolerant structural materials; Defects and microstructure evolution in materials; Materials informatics.

Amanda Johnsen, Assistant Professor (814-865-6351) [amj15@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.

Hojong Kim, Associate Professor of Materials Science and Engineering and Nuclear Engineering (814-865-3117) [huk29@psu.edu] Ph.D., Massachusetts Institute of Technology, 2004. Electrochemistry; Pyroprocessing; Molten Salt Chemistry; Corrosion.

Saya Lee, Assistant Professor of Nuclear Engineering (814-865-0043) [sjl6054@psu.edu] Ph.D., Texas A&M University, 2014. Experimental Nuclear Thermal Hydraulics; Turbulent Flow Analysis; Flow in Porous Media; Boiling Heat Transfer; Non-Water-Coolant Experiment; Development of Thermal-Fluid Measurement Techniques.

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.

Elia Merzari, Associate Professor (814-863-7469)[ebm5351@psu.edu] Ph.D., Tokyo Institute of Technology, 2008. Nuclear thermal-hydraulics; Computational fluid dynamics; Supercomputing; Multiphysics simulations.

Arthur T. Motta, Professor and Graduate Program Chair 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.

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.

Justin Schwartz, Harold and Inge Marcus Dean of Engineering and Professor (814-865-7757) [DeanSchwartz@psu.edu] Ph.D., Massachusetts Institute of Technology, 1990. Superconducting magnets and materials technology for fusion reactors, and energy, medical and defense systems; optical fiber sensors for cryogenic and radiation environments; fusion reactor engineering and design.

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] Ph.D., Virginia Tech, 2015. Monte Carlo, deterministic, and hybrid methods for radiation transport simulation; Applications in reactor physics, nuclear safeguards, and spent fuel pool monitoring.

Xing Wang, Assistant Professor of Nuclear Engineering (814-863-0413) [xvw5285@psu.edu] Ph.D., University of Wisconsin-Madison, 2016. Radiation damage in materials; Materials in extreme environments; Development of structural materials for advanced reactors; Electron microscopy and atom probe tomography.

Douglas Wolfe, Metals, Ceramics and Coatings Processing Department Head for the Applied Research Laboratory, Professor of Materials Science and Engineering, and Engineering Science and Mechanics and Nuclear Engineering. (814-865-0316) (dew125@arl.psu.edu). Ph.D. The Pennsylvania State University, 2001. Structure-processing-property-performance relationships and the development of coatings and materials characterization.

Other Faculty

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 Rosa, Assistant Teaching Professor of Nuclear Engineering (814-865-4863) [mzr127@psu.edu] Ph.D., The Pennsylvania State University, 2007. Fundamentals of Nuclear Engineering; Nuclear Reactor Theory; Mathematics and Computation; Deterministic Transport Methods.

Melika Sharifironizi, Assistant Teaching Professor of Nuclear Engineering (814-863-6938) [mvs6807@psu.edu] Ph.D., University of Notre Dame, 2017. Environmental radiochemistry; Reactive transport modeling; Sustainable energy systems.

Jogender Singh, Professor of Materials Science and Engineering (814-863-9898) [jxs46@psu.edu] Ph.D., Banaras Hindu University, 1981. Powder sintering (metal, ceramic and composite) by Field Assisted Sintering Technology (FAST); design and development of heat sink components; coatings for extreme environments; materials characterization and evaluation.

Leigh Winfrey, Adjunct Associate Professor (814-865-1339) [lzw290@psu.edu] Ph.D., North Carolina State University, 2010. Plasma-material interactions, plasma boundary layer physics, plasma materials deposition, space nuclear propulsion.

Dennis L. Youchison, Adjunct Professor of Nuclear Engineering (814-863-6938) [dxy111@psu.edu] Ph.D., Pennsylvania State University, 1989. Plasma facing components and plasma-material interactions; high heat flux engineering; materials development for extreme environments.

Matthew Zerphy, Instructor in Nuclear Engineering (814-863-6720) [mxz206@psu.edu] M.S.S.I, National Intelligence University, 2002. Nuclear Security Threat Analysis; Nuclear Security System Design.

Nuclear Science and Engineering Research Centers

Detector Development Laboratory (DDL): Established in 2017, DDL features a variety of detectors (including a muon detector and a large number of NaI detectors) as well as electronics and computational stations. The group performs both fundamental and applied radiation detection related research and provides graduate and undergraduate students with hands-on learning opportunities.

FUNNEL - FUsioN NEutron Laboratory - A dual-tube D-T neutron-generation system is available in this laboratory: one tube with a neutron output of 1e8 n/sec and the other tube with a neutron output of 1e10 n/sec. The neutron-producing tubes have separate control units so they can be operated independently. The lower-neutron-output part of the system will provide a capability to accurately detect the alpha particles resulting from the D-T fusion reaction, thereby allowing for accurate measurements of neutron emission angles.

LEAF - Laboratory for Experiments to Advance Fission - A low-backscatter, stand-alone, off-campus, suppressed-room-return building houses a large-area, neutron/gamma-ray multi-detector system to significantly reduce the back-scatter effects that are relevant for time-correlated experiments. The experimental building has dimensions of 25’ x 25’ x 25’ and is internally completely covered, including the floor and ceiling, by 1” of borated polyethylene to minimize the neutron return. Also, because the building is a pre-fabricated, stand-alone structure, only a minimal amount of concrete has been used to minimize the gamma-ray return. This unique laboratory is used for measurements of high-fidelity prompt and delayed gamma-ray/neutron data.

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 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 reactor with moveable core in a large pool and with pulsing capabilities. A new core moderator assembly and five new beam ports including a cold neutron source were installed at the PSBR in the summer of 2018. An expanded neutron beam hall is being added to RSEC as a joint initiative with the Ken and Mary Alice Lindquist Department of Nuclear Engineering in order to accommodate Small Angle Neutron Scattering capabilities.

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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
Masters	4	2	1	3	4	5

Number of Graduates

Graduate Student Enrollment: 95 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

Heng Ban, R.K. Mellon Professor in Energy and Director of Nuclear Engineering (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.

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

Thomas Congedo, Professor and Associate Director 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.

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, 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.

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

Eric Loewen, Adjunct Professor (412-624-9799)[eric.loewen@ge.com] Ph.D., Uniersity of Wisconsin. Advanced reactors and advanced recycling of spent fuel.

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.

Justin Pounders, Faculty Lecturer. Ph.D., Georgia Institute of Technology. Dr. Pounders works at the Bettis Atomic Power Laboratory in the area of multiphysics methods development. He is generally interested in computational methods development for reactor physics problems. His most recent research efforts have been in the areas of neutronic homogenization and equivalence methods in plant simulations, transient multiphysics code coupling, and tightly-coupled multiphysics computations.

Richard Siergiej, Adjunct Associate Professor. Ph.D. Lehigh University, 1992. Dr. Siergiej is presently employed by the Bettis Atomic Power Laboratory and previously worked at the Westinghouse Science and Technology Center. His interests are computer simulation and modeling, advanced energy conversion technologies, semiconductor physics, fabrication, and materials, and next generation instrumentation and control system.

Sola Talabi, Adjunct Professor (412-448-6823)[sola@pit-tech.com] Ph.D, Carnegie Mellon University, 2013. Identification and characterization of additional post-nuclear accident decontamination mechanisms to support Level II PRA safety margin characterization; measurement and analysis to account for additional post-accident aerosol decontamination in SMR systems, and methodology to improve post-accident evacuation time estimates and allow potential emergency planning zone size reduction.
Website: www.pit-tech.com

David S. Teolis, Instructor (412-624-9799)[DAT121@pitt.edu] MS Statistics, Colorado State University, 2010. MS Industrial Engineering, University of Pittsburgh, 1984. Analysis of Transportation Systems.

Michael T. Wenner, Adjunct Professor (724-940-8295)[wennermt@westinghouse.com] Ph.D., University of Florida, 2010. Technical analyses in the areas of criticality safety for spent fuel pool storage; radiation shielding; source term analyses for various systems; reactor physics modeling; advanced fuel cycle analysis; related software design and development.

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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
Masters	3	2	*	2	3	2
PhD	3	4	*	2	1	0

Number of Graduates

Graduate Student Enrollment: 4 Masters/ 3 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.

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

Other Faculty

Cornelia Chilan, Senior Research Scientist (514-340-4780) [cornelia.chilian@polymtl.ca]**;** Ph.D., Polytechnique Montréal, 2008. Nuclear engineering; Reactor design and operation; Radioactive materials; Nuclear physics; Experimental methods and instrumentation.
Website: https://www.polymtl.ca/expertises/en/chilian-cornelia

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

Nuclear Science and Engineering Research Centers

SLOWPOKE Laboratory – Development of the method of neutron activation analysis for greater sensitivity, accuracy and ease of use. Application of neutron activation analysis for the chemical analysis of new materials, plastics, rocks, biological tissues and archaeological artefacts. Research collaborations in environmental sciences, medicine and archaeology. Production of radioactive tracers for research in chemistry (dynamics of fluidized bed reactors) and medicine (digestive system).

Research Staff

Director of Laboratory and reactor operator: Cornelia Chilian
Reactor operator and research fellow: Darren Hall
Research fellow: Cyril Koclas

Specialized Equipment

SLOWPOKE nuclear reactor; five gamma-ray spectrometers.

PURDUE UNIVERSITY

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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	20	22	16	20	27	22
Masters	11	6	12	7	8	6
PhD	4	4	7	3	2	11

Number of Graduates

Graduate Student Enrollment: 23 Masters/ 40 Ph.D.
ABET Accreditation: B.S. (N.E.)

Nuclear 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.

Stylianos Chatzidakis, Assistant Professor, Associate Reactor Director and Director of Nuclear Engineering Radiation Laboratory (765-496-9698) [schatzid@purdue.edu] Ph.D., Purdue University, 2016. Artificial Intelligence and deep learning; functional sensors; remote sensing; muon tomography; nonproliferation; nuclear fuel cycle; advanced reactor monitoring.

Chan Choi, Professor (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, Associate Professor and Undergraduate Program Chairman(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**.**

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 (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.

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; Hybrid Nuclear Systems; Hydrogen Generation - High Temperature Thermochemical Reactions; Hydrogen Storage. Website: http://cobweb.ecn.purdue.edu/~shripad/

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.

Yi Xie, Assistant Professor (765-496-2912) [xie90@purdue.edu] Ph.D., The Ohio State University, 2016. Material degradation and corrosion in reactor and UNF dry storage; electrochemical techniques; advanced manufacturing in nuclear applications, microreactor, and small modular reactor; nuclear fuel design, fabrication, and characterization; in-core sensor development.

Yunlin Xu, Assistant Professor (765-496-9033) [yulin@purdue.edu] Ph.D., Purdue University, 2004. Nuclear reactor simulation method study; Nuclear reactor simulation code development; Multi-physics coupling; Nuclear reactor safety analysis; Nuclear reactor design and optimization; Nuclear reactor fuel cycle study; Methods for solving large scale linear and nonlinear systems.

Other Faculty

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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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	33	33	22	32	30	17
Masters	7	8	4	2	2	2
PhD	3	5	7	6	6	3

Number of Graduates

Graduate Student Enrollment: 5 Masters/ 26 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.

Shanbin Shi, Assistant Professor (518-276-8406) [shis3@rpi.edu] Ph.D., Purdue University, 2015. Thermal-hydraulics in advanced high-temperature nuclear reactors; Two-phase flow experiments and modeling research; Small modular reactor development; Reactor safety analysis.

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.

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.

Michael Z. Podowski, Professor Emeritus (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

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.

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 **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.

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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
Masters	4	7	6	6	6	4
PhD	1	0	0	1	1	1

Number of Graduates

Graduate Student Enrollment: 15 Masters/ 10 Ph.D.

Distance Education Program
Offers Nuclear Engineering Courses and Degrees Online
https://cec.sc.edu/nuclear

Nuclear Science and Engineering Faculty

Travis W. Knight, Professor and Chair (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; risk and safety analysis; space nuclear power and propulsion. Faculty Website: https://sc.edu/study/colleges_schools/engineering_and_computing/faculty-staff/knight_travis.php

Abdel-Moez E. Bayoumi, Professor & Director (803-777-1845) [bayoumi@cec.sc.edu]
Ph.D., NCSU. Predictive Maintenance; Condition-Based Maintenance (CBM); Design, Manufacturing; Health Monitoring System. Professional Engineer. Faculty Website:
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Theodore M. Besmann, Professor and Endowed Chair in the General Atomics Center (803-777-9853) [besmann@cec.sc.edu] Ph.D., Pennsylvania State University, 1976. Nuclear fuels, materials, high temperature behavior, thermodynamics, ceramic composites, energy policy. Faculty Website:
https://sc.edu/study/colleges_schools/engineering_and_computing/faculty-staff/besmann_theodore.php

Dan G. Cacuci, Endowed Chair Professor and Director, SmartState Center of Economic Excellence in Nuclear Science and Energy (803-777-5316) [cacuci@cec.sc.edu] Ph.D., Columbia University in New York, 1978. Predictive science, sensitivity and uncertainty quantification, model validation, reactor physics and

safety. Faculty Website: https://sc.edu/study/colleges_schools/engineering_and_computing/faculty-staff/cacuci_dan.php

Fanglin (Frank) Chen, Professor (803-777-4875) [chenfa@cec.sc.edu] Ph.D., Georgia Institute of Technology, 2001. Advanced ceramic materials for nuclear related applications; Porous and dense membranes for gas transport and separation; Tritium separation and sequestration. Faculty website: http://sc.edu/study/colleges_schools/engineering_and_computing/faculty-staff/chen_frank.php

Frederick L. Dryer, Professor (803-777-9136) [dryerf@mailbox.sc.edu] Ph.D., Princeton University, 1971. National Academy of Engineering, 2021. Thermal sciences (heat transfer, fluid dynamics, physical chemistry, and chemical kinetics); non-petroleum-derived alternative fuels, their production, their chemical kinetic properties, and their ability to address U.S. energy security and reduction in net carbon cycle emissions as well as other pollutant concerns.
Website: https://sc.edu/study/colleges_schools/engineering_and_computing/faculty-staff/dryer.php

Tanvir Farouk, Associate Professor (803-777-3380)[tfarouk@sc.edu] Ph.D., Drexel University, 2009. Plasma, Used Nuclear Fuels, Thermal Hydraulics, Nuclear Fuels Drying and Storage, Multi-physics Modeling, Emission Spectroscopy.

Xinyu Huang, Assistant Professor (803-777-6834) [huangxin@cec.sc.edu] PhD., Virginia Tech, 2001. Composite materials; mechanical and environmental testing of cladding and structural materials. Faculty Website:
https://sc.edu/study/colleges_schools/engineering_and_computing/facultystaff/huang_xinyu.php

Jamil Khan, Professor and Chair (803-777-1578) [khan@cec.sc.edu] Ph.D., Clemson, 1988. Heat transfer; fluid dynamics; heat exchanger design, power conversion. Faculty Website:
https://sc.edu/study/colleges_schools/engineering_and_computing/faculty-staff/khan_jamil.php

Michael Sutton, Professor (803-777-7158) [sutton@sc.edu] Ph.D., University of Illinois, Champaign-Urbana, 1981. National academy of Engineering, 2020. Fracture; fatigue; vision-based measurements; experimental solid mechanics; biomechanics; composite and metallic material characterization. Faculty Website: https://sc.edu/study/colleges_schools/engineering_and_computing/faculty-staff/sutton_michael.php

Yi Wang, Associate Professor (803-777-2252)[yiwang@cec.sc.edu]Ph.D., Carnegie Mellon University, 2005. Computational and data-enabled science and engineering for mechanical and nuclear systems (multiphysics simulation, real-time and massive data analytics, and systems engineering)
Website: https://sc.edu/study/colleges_schools/engineering_and_computing/faculty-staff/yi_wang.php

Lingyu Yu, Associate Professor (803-777-4902) [yu3@cec.sc.edu] Ph.D., University of South Carolina, 2006. Structural Health Monitoring and Diagnosis. ultrasonic nondestructive evaluation (NDE), sensing and instrumentation. Faculty Website:
https://sc.edu/study/colleges_schools/engineering_and_computing/faculty-staff/yu_lingyu.php

Other Faculty

Madalina Badea, Research Assistant Professor (803-777-4185) [badea@mailbox.sc.edu] Ph.D., Karlsruhe Institute of Technology, 2011. Predictive modeling; Sensitivity analysis and Uncertainty Quantification. Faculty Website: https://sc.edu/study/colleges_schools/engineering_and_computing/faculty-staff/badea_madalina.php

Luther L Hamm, Adjunct Professor (803-725-2520) [luther.hamm@srnl.gov] Ph.D., USC, 1982. Subsurface contaminant transport within the environment. Thermal hydraulic design and analysis of nuclear reactors.

Valmore (Val) J. Loiselle, Adjunct Professor **(**803-736-5588) [loiselle@cec.sc.edu] MSME w/ Minor NE, RPI, 1973. Retired.

Elwyn Roberts, Visiting Professor (803-777-2252) [robertse@cec.sc.edu] Ph.D., University of Sheffield, 1960. Materials performance in nuclear reactors; product design; manufacturing and concurrent engineering. Website: https://sc.edu/study/colleges_schools/engineering_and_computing/faculty-staff/roberts_elwyn.php

James Tulenko, Adjunct Professor. (352-219-3865) [tulenko@gmail.com] Masters in Nuclear Engineering, MIT. Nuclear Fuel Performance.

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, FACT-SAGE7.0, ABAQUS, Comsol Multiphysics, etc.

Used Fuel Drying and Disposition Laboratory

The laboratory is equipped with capabilities to test and evaluate full length LWR fuel assemblies. A 16 foot tall vacuum chamber is equipped with sensors and instruments for pressure, temperature, relative humidity, optical emission spectroscopy, and thermal imaging. Heater rods are used to simulate decay heat of fuel assemblies. A vacuum and gas recirculation network connected to the chamber is capable of simulating vacuum drying and forced circulation drying of nuclear fuel assemblies. A smaller chamber is similarly equipped for testing at a smaller scale. The equipment is used for drying, corrosion, environmental, and mechanical testing of spent fuel and related materials and components. The chamber and equipment are also used as a testbed for sensors developed for structural health monitoring of storage canisters.

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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	6	6	7	5	*	*

Number of Graduates

ABET Accreditation: Nuclear Engineering

Nuclear Science and Engineering Faculty

Musa B Danjaji, Professor & Academic Program Coordinator **(**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.

Zheng Chang, Associate Professor (803-536-7924) [zchang99@gmail.com] Ph.D., Tokyo Institute of Technology, 1993. Radiochemistry; Nuclear Engineering; Environmental Radioactivity; Nuclear Detection Technology.

Kenneth C Okafor, Associate Professor **(**803-516-4758) [kokafor@scsu.edu] Ph.D., The Ohio State University, 1988. Alternative Energy Studies.

Zaijing Sun, Assistant Professor (803-536-7924) [zsun@scsu.edu] Ph.D., Idaho State University, 2012. Nuclear Activation Analysis; Computer Simulations of Nuclear Processes; Achaeometry; Big Data in Nuclear Decommissioning and Nuclear Waste Management; Medical Isotope Production.
Website: http://arsl.scsu.edu or http://tdminer.scsu.edu

Other Faculty

Kara N. Beharry, Instructor **(**803-516-4923) [kbeharry@scsu.edu] M.S.**,** University of Florida – Gainesville**,** 2009**.** Radiation Protection.

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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	30	43	41	38	43	32
Masters	35	17	24	24	29	16
PhD	16	15	24	13	15	16

Number of Graduates

Graduate Student Enrollment: 30 Masters/ 112 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

Sandra Bogetic, Assistant Professor (865-974-7568)[sbogetic@utk.edu] Ph.D., University of California, Berkeley, 2020. Development of numerical methods in reactor core analysis; tailoring neutron beams characteristics; high-performance computing; biomedical application (BNCT); and nuclear security and nonproliferation. Website: https://ne.utk.edu/people/sandra-bogetic/

Nicholas R. Brown, Associate Professor (865-974-2525)[nbrown49@utk.edu] Ph.D., Purdue University, 2011. Nuclear reactor safety and simulation of reactor and system transients, advanced nuclear fuel and cladding materials, including nuclear fuel safety, assessment and simulation of sustainable nuclear fuel cycles.

Livia Casali, Assistant Professor (858-230-2158) [lcasali@utk.edu] Ph.D., Max Planck Institute for Plasma Physics/LMU University, Munich, Germany, 2015. Fusion Energy Science; Plasma physics; radiative and detached divertors; divertor optimization and pedestal dynamic; impurity transport and core-edge integration solution to achieve high core performance scenarios with mitigated heat loads in magnetically confined fusion devices.

Jamie B. Coble, Assistant Department Head for Undergraduate Studies and Service, Associate Professor and Southern Company Faculty Fellow (865-974-5048) [jcoble1@utk.edu] Ph.D., University of Tennessee-Knoxville. Research interests: Process monitoring, equipment condition assessment, fault detection, diagnostics, and prognostics.

David C. Donovan, Assistant Professor (865-974-0594) [ddonovan@utk.edu] Ph.D. University 0f Wisconsin – Madison. Research interests: Nuclear Fusion Technology, Boundary Plasma Physics, Plasma Diagnostics, Plasma-Material Interactions, Fusion Neutron Generators

Howard L. Hall, Professor (865-974-2525) [hhall6@utk.edu] Ph.D., University of California, Berkeley. Research Interests: Nuclear security applications, including proliferation detection, counterproliferation, detection of and response to radiological/nuclear threats, nuclear forensics, radiochemistry, and applications of nuclear-based methods to other security needs (such as explosives detection). Website: http://hall-research.engr.utk.edu/Welcome_to_Professor_Halls_Research_Group.html

Jason P. Hayward, Associate Department Head for Graduate Studies and Research, Professor and UCOR Fellow (865-974-2536) [jhayward@utk.edu] Ph.D., University of Michigan. Research interests: Radiation detection and measurement, nuclear security and safeguards, nuclear instrumentation, medical and health physics. Website: http://www.engr.utk.edu/nuclear/Projects/JPHGrantsContracts-12-09.pdf

Lawrence H. Heilbronn, John D. Tickle Assistant Professor (865-974-2525) [lheilbro@utk.edu] Ph.D., Michigan State. Research interests: High-energy neutron production from heavy-ion interactions.

Yutai Kato, Assistant Professor (865 576-5996) [ykato1@utk.edu] Ph.D., University of Tokyo, Japan. Research Interests: Materials science and engineering for fusion and fission energy systems; development and characterization of ceramics, graphite, composites and other advanced materials for high temperature and severe environment applications.

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

Eric D. Lukosi, Associate Professor (865-974-5048) [elukosi@utk.edu] Ph.D., University of Missouri, Columbia. Research interests: Neutron detection and spectrometry, dosimetry, nuclear batteries, applied plasma physics, nuclear physics and cross section evaluations.

G. Ivan Maldonado, Professor (865-974-7562) [imaldona@utk.edu] Ph.D.**,** North Carolina State University. Research interests: Incore fuel management, fuel cycle analysis, advanced reactors.

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.

Arthur E. Ruggles, Professor (865-974-2525) [aruggles@utk.edu] Ph.D., RPI. Research interests: Reactor thermalhydraulics, liquid metal flow and heat transfer, cavitation and fluid transients, accelerator target design and microchannel flow.

Steven S. Skutnik, Joint Faculty Associate Professor (865-974-2525) [sskutnik@utk.edu] Ph.D., North Carolina State University. Research interests: Nuclear security applications, including proliferation detection and counter-proliferation; advanced nuclear fuel cycles and waste management; modeling and simulation.

Vladimir Sobes, Assistant Professor (865-974-7568)[sobesv@utk.edu] Ph.D., Massachusetts Institute of technology, 2013. Nuclear data, methods and codes development for data applications, nuclear criticality safety analysis, artificial intelligence for advanced design.

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.

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.

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

Joseph M. Bowling, Adjunct Assistant Professor (865-541-1155) [jbowling@utk.edu] Ph.D., University of Tennessee – Knoxville. Research Interests: Medical Physics, health physics, radiological engineering.

Ondrej Chvala, Research Assistant Professor (865-974-5048) [ochvala@utk.edu] Ph.D., Charles University, Prague, Czech Republic. Research Interests: High performance computing applications to nuclear engineering, reactor core physics, and molten salt based nuclear systems.

David Cook, Associate Professor (865-574-5690) [cookdh@ornl.gov] Ph.D., University of Tennessee, 1984. Research Interests: Reactor safety analysis, research reactor operations and safety, two-phase flow, isotope separations, and radiological source term modeling.

Jun Ding, Research Associate Professor (865-974-2525)[jding5@utk.edu] Ph.D., University of Tennessee-Knoxville, 2004. Design, simulation and monitoring of advances reactors using digital twins,

instrumentation and control for autonomous nuclear systems, training machine learning for advanced reactor diagnosis technology.

H. L. Dodds, IBM Professor **(**865-974-2525) [utne@utk.edu] Ph.D., UT. Research interests: Reactor core analysis, transient modeling and simulation, reactor safety analysis, advanced reactors, nuclear criticality safety, energy policy. Professional Engineer.
Website: http://web.utk.edu/~hdj/

Barry D. Ganapol, Research Professor (865-974-2525) [bganapol@utk.edu] Ph.D., University of California, Berkeley. Research interests: Deterministic and analytical transport theory.

Jess Gehin, Adjunct Associate Professor (865-576-5093) [gehinjc@ornl.gov] Ph.D., Massachusetts Institute of Technology, 1992. Research Interests: Nuclear system design and analysis, reactor transient analysis, advanced simulation of light water reactors, and fuel cycle analysis.

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.

Martin L. Grossbeck, Research Professor **(**865-974-2525) [mgrossbe@utk.edu] Ph.D., University of Illinois. Research interests: Radiation effects in materials, burnable absorbers, research reactors, and ultra-high vacuum technology.

Samantha Hedrick, Adjunct Assistant Professor (573-220-8392) [samantha.hedrick@provisionproton.com} Ph.D., Washington University School of Medicine Research interests: Medical Physics treatment planning, quality assurance and clinical development

Michael Howard, Adjunct Professor, (423.493.1691) [Michael.Howard@hcahealthcare.com] Ph.D., University of Tennessee-Knoxville. Research interests: Medical Physics, Radiation Safety.

Richard H. Howard, Adjunct Assistant Professor (865-974-7568)[rhowar16@utk.edu] Ph.D., University of Tennessee, Knoxville, 2019. Radioisotope, nuclear fuels, and materials.

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.

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.

Richard "Chip" H. Lagdon, Professor of Practice (703-429-6534)[rlagdon@utk.edu] MEA, George Washington University, 1987.

Michael J. Leisenfelt, Research Assistant Professor (865-974-2525)[mlesenf@utk.edu] Ph.D., University of Florida, 2016. Advanced imaging technologies including: high speed active interrogation for security nonproliferation, industrial non-destructive testing/inspection/evaluation, medical imaging, Compton scatter radiographic methods, dual/multi energy methods, ray-tracing physics based computed tomography, radiation detection, system integration, and high performance CPUGPU data processing.

Charles L. Melcher, Research professor (865-974-0254) [cmelcher@utk.edu] Ph.D., Washington University of St. Louis. Research interests: Radiation detection, gamma-ray spectroscopy, new materials for radiation sensors, crystal growth, implementation of emerging scintillator technology in medical imaging and nuclear security

John T. Mihalczo, Research Professor (865-974-2525) [maccat15@comcast.net] Ph.D., University of Tennessee, Knoxville. Research interests: radiation measurements for nuclear safeguards and nuclear criticality safety, reactor physics

Jack Miller, Research Professor (865-974-2525) [jmill122@utk.edu] Ph.D., University of California. Research interests: Space radiation protection and radiological engineering.

Laurence F. Miller, Professor Emeritus **(**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.

Hanna Moussa, Research Assistant Professor (865-974-2525) [hmoussa@utk.edu] Ph.D., University of Tennessee-Knoxville. Research Interests: Radiation safety, Monte Carlo simulation of radiation transport.

Fred R. Mynatt, Research Professor **(**865-974-2525) [fmynatt@utk.edu] Ph.D., University of Tennessee-Knoxville. Research interests: Radiation transport, isotope production and nuclear regulations.

Giovanni Pastore, Research Associate Professor (865-974-7568)[Giovanni.Pasore@inl.gov] Ph.D., Polytechnic University of Milan, 2012. Nuclear Materials, Fuels and Performance Modeling.

Louis Qualls, Adjunct Professor (865-974-7568)[lou.qualls@comcast.net] Ph.D., University of Tennessee. Molten salt reactors, thermal nuclear propulsion, advanced reactor systems.

Stephen S. Raman, Adjunct Assistant Professor (865-574-5138)[sraiman@utk.edu] Ph.D., University of Michigan, Ann Arbor, 2016. Nuclear materials, corrosion, radiation effects.

Chester R. Ramsey, Adjunct Assistant Professor (865-974-2525) [cramsey@utk.edu] Ph.D., University of Tennessee-Knoxville. Research Interests: Medical Physics, health physics, radiological engineering.

Jason D. Readle, Adjunct Assistant Professor (865-974-7568)[jreadle@utk.edu] Ph.D., University of Illinois, Urbana-Champaign, 2010. Nuclear security, lasers, electronics.

Andrew Stephan, Research Assistant Professor (865-974-2525) Ph.D., University of Tennessee. Research interests: Radiation detection and homeland security.

Ashley C. Stowe, Assistant Professor (8659742525) [astowe1@utk.edu] M.S., Florida State University. Research interests: Radiation detection and instrument development.

Lawrence W. Townsend, Chancellor's Professor and Robert M. Condra Professor Emeritus (865-974-7569) [ltownsen@utk.edu] Ph.D., Idaho. Research interests: Radiation physics, transport, shielding and risk assessment; Nuclear and Radiological engineering; Theoretical nuclear physics

Belle R. Upadhyaya, Professor Emeritus (865-974-7576) [bupadhya@utk.edu] Ph.D., University of California, San Diego. Research interests: Dynamics, instrumentation and control, monitoring and diagnostics, advanced signal processing, next generation reactors, autonomous control of space reactors, nondestructive examination, reliability and maintainability engineering. Professional Engineer. Website: http://web.utk.edu/~bru/

Timothy Valentine, Research Associate Professor (865-974-2525) [tvalenti@utk.edu] Ph.D., University of Tennessee. Research interests: Nuclear system safety and energy policy.

Martin R. Williamson, Research Assistant Professor (865-974-2525) [mwillia3@utk.edu] Ph.D., University of Tennessee. Research interests: nuclear nonproliferation and arms control, fissile material detection and characterization, nuclear criticality safety. Professional Engineer.

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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	46	48	81	92	69	60
Masters	24	23	17	19	16	25
PhD	14	17	16	17	11	10

Number of Graduates

Graduate Student Enrollment: 75 Masters/ 66 Ph.D.
ABET Accreditation: Nuclear Engineering, Radiological Health Engineering

Nuclear Science and Engineering Faculty

Michael A. Nastasi, Department Head (979- 862-2636) [mikenastasi@tamu.edu] Ph.D., Cornell University, 1986. Materials for Extreme Nuclear Environments; Irradiation Induced Phase Transformations; Ion Irradiation and Plasma Modification Materials; Synthesis and Properties of High Strength Nanolayered Composites

Marvin L. Adams, Professor; Associate Director, Center for Large-scale Scientific Simulations; Director, National Laboratories Mission Support (979-845-4198) [mladams@tamu.edu] Ph.D., University of Michigan, 1986. Computational Method Development; Nuclear Reactor Analysis and Design. Professional Engineer.

Karim E. Ahmed, Assistant Professor (979-847-6192) [karim.ahmed@tamu.edu] Ph.D., Purdue University, 2015. Multiscale modeling and simulations of materials, irradiation effects, co-evolution of microstructure and properties of materials.

Sunil S. Chirayath, Associate Professor, Director, Center for Nuclear Security Science and Policy Initiatives (NSSPI) (979-862-2616) [sunil@tamu.edu] Ph.D., University of Madras, India, 2005. Nuclear Security and Nonproliferation; Monte Carlo Radiation Transport; Criticality Safety.
Website: https://nsspi.tamu.edu/people/sunil-sunny-chirayath/

John Ford, Associate Professor; ABET Coordinator (979-845-6271) [ford@tamu.edu] Ph.D., University of Tennessee at Knoxville, 1992. Health Physics; Radiation Biology; Medical Physics.

Yassin A. Hassan, Professor (979-845-7090) [y-hassan@tamu.edu] Ph.D**.,** University of Illinois**,** 1980**.** Nuclear Power Engineering: Thermal Hydraulics; Computational Fluid Dynamics. Professional Engineer.

Mark Kimber, Associate Professor (979-458-3952) [mark.kimber@tamu.edu] Ph.D., Purdue University, 2008. Experimental and Computational Thermal Hydraulics, Uncertainty Quantification in Isothermal and Non-isothermal Turbulent Flows and Two-Phase Heat Transport.

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

Craig Marianno, Assistant Professor; Deputy Director, NSSPI (979-845 -6093) [marianno@tamu.edu] Ph.D., Oregon State University**,** 2000. Nuclear Security and Nonproliferation; Health Physics, Radioecology; Radiation Detection System Development; Emergency Response and Consequence Management.

Sean M. McDeavitt, Professor; Director, Nuclear Science and Engineering Center (NESC) (979-845-7551) [mcdeavitt@tamu.edu] Ph.D., Purdue University, 1992. Processing and Behavior of Nuclear Fuels, Materials, and Waste Forms; Radiation Science Applications; and Nuclear System Design and Demonstration. Laboratory: Fuel Cycle and Materials Laboratory (FCML) https://engineering.tamu.edu/nuclear/research/facilities/fuel-cycle-materials-laboratory-fcml.html

Jim E. Morel, Professor; Director, Center for Large-Scale Scientific Simulations, TAMUS Co-Director, Center for Resilient National Security (979-845-6072) [morel@tamu.edu] Ph.D., University of New Mexico, 1979. Computational Methods Development for Radiation Transport, Radiation-Hydrodynamics, Uncertainty Quantification and Reduced-Order Methods.

Kenneth L. Peddicord, Professor (979-845-5802) [k-peddicord@tamu.edu] Ph.D., University of Illinois, 1972. Nuclear Materials and Fuel Cycles. Professional Engineer.

Jean Ragusa, Professor and Associate Director, Institute for Scientific Computation (979-862-2033) [jean.ragusa@tamu.edu] Ph.D., Institut National Polytechnique de Grenoble, France, 2001. Computational Methods for Radiation Transport and Multiphysics Applications; Reactor Analysis and Design; Uncertainty Quantification and Data Science Applied to Nuclear Engineering.
Website: http://multiphysics.engr.tamu.edu

Stephen S. Raiman, Assistant Professor (979-458-2477) [sraiman@tamu.edu] Ph.D., University of Michigan, 2016. Materials in extreme environments, corrosion, radiation damage, high temperature structural materials. Website: http://mihtee.engr.tamu.edu

Lin Shao, Professor and Undergraduate Program Advisor (979-845-4107) [lshao@tamu.edu] Ph.D., University of Houston**,** 2001**.** Nuclear Materials and Fuel Cycles.

Pavel V. Tsvetkov, Associate Professor and Graduate Program Advisor (979-845-7078) [tsvetkov@tamu.edu] Ph.D., Texas A&M University, 2002. Advanced Energy Systems Laboratory: Design and Demonstration of Advanced Nuclear Systems, Waste Minimization, Optimization, Systems Engineering, Data Science, Artificial Intelligence, Energy Sustainability and Environment, Direct Energy Conversion, Autonomous Control, Novel Instrumentation, Nuclear Security and Nonproliferation, Cybersecurity.

Other Faculty

Leslie A. Braby, Senior Lecturer Emeritus; Research Professor (979-862-1798) [labraby@tamu.edu] Ph.D., Oregon State University**,** 1972. Health Physics; Radiation Biology; Medical Physics.

Pasquale Fulvio, Research Assistant Professor (979-458-8164)[pfulvio@tamu.edu] Ph.D., Kent State University, 2009. Preparation and characterization of nanomaterials and composites for energy storage and conversion, for radiation shielding and detection, for heterogeneous catalysis, and for separations.

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.
Website: https://itp.tamu.edu

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.

Warren Miller, Professor of Practice[wmiller@tamu.edu] Ph.D., Northwestern University, 1973. Nuclear Security; Computational Methods, Energy Policy.

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.

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

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

Galina Tsvetkova, Senior Lecturer (979-845-4162) [tsvetkovag@tamu.edu] Ph.D., Texas A&M University**,** 2003. Nuclear Power Engineering-Reactor Analysis & Design; Small Nuclear Power & Co-Generation Applications.

Rodolfo Vaghetto, Research Assistant Professor (979-845-4109) [r.vaghetto@tamu.edu] Ph.D., Texas A&M University, 2013. Experimental and computational aspects involving high temperature gas-cooled reactors; Computational thermal-hydraulics applied to existing Light Water Reactors (LWR) and Generation IV Reactors.

Richard M. Waer, Professor of Practice (979-845-4161) [rwaer@tamu.edu] B.S., University of Arizona, 1989.

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

Center for Nuclear Security Science and Policy Initiatives (NSSPI): Dr. Sunil Chirayath, 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.

Joint Center for Resilient National Security (JCRNS), Dr. Jim Morel, TAMUS Co-Director, JCRNS is a joint center of the Texas A&M University System and Los Alamos National Laboratory. The interim LANL Co-Director is Dr. John Scott. The mission of JCRNS is to develop and enhance national security capabilities between U.S. Department of Energy laboratories and U.S. universities supporting Los Alamos National Laboratory. The JCRNS will accomplish its mission through a series of programs that will develop over time. https://nationallabsoffice.tamus.edu/joint-center-for-resilient-national-security/

Nuclear Engineering and Science Center (NESC): Dr. Sean M. McDeavitt, Director. The NESC is a multi-division center comprising reactor facilities, research laboratories, and the Nuclear Power Institute (NPI). The center contains two research reactors. The first is a 1 MW TRIGA reactor with multiple irradiation options that is used for student training, research, and isotope production. The second is a 5 W AGN-201M reactor that is useful for student training and low-power research activities. The NESC also has multiple research laboratories with hot cells, gloveboxes, materials processing equipment, and radiochemistry capabilities. http://nsc.tamu.edu

> **Nuclear Power Institute (NPI):** NPI is a state-supported division within the NESC with the mission to develop “the necessary workforce” in the state of Texas. The Institute supports education enhancement programs with K-12 students, community colleges, teachers and education professionals in Texas. http://www.nuclearpowerinstitute.org.

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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
Masters	10	6	6	7	*	*
PhD	4	6	3	2	*	*

Number of Graduates

Graduate Student Enrollment: *Not Reported*
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

Sheldon Landsberger, Professor; Robert B. Trull Chair in Engineering (512-796-0287) [s.landsberger@mail.utexas.edu] Ph.D., University of Toronto, 1982. Nuclear Instrumentation; nuclear forensics.Website: http://www.me.utexas.edu/faculty/faculty-directory/landsberger

William Charlton, John J. McKetta Energy Professor and Director, Nuclear Engineering Teaching Laboratory (865-406-1502)[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

Kevin Clarno, Associate Professor (865-406-1502)[clarno@utexas.edu] Ph.D., Texas A&M University, 2002. Multiphysics coupling methods, neutronics; fuel performance; design, optimization, and analysis of advanced commercial and test reactor concepts**.**

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

Other Faculty

Joe Artnak, Research Associate (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

Robert Blake Anderson, Postdoctoral Fellow (432-770-6028) [blakeanderson@utexas.edu] Ph.D., The University of Texas at Austin, 2020. Mobile robotic systems; autonomous radiation surveying; radioactive source localization; optimization of robotic measurements; robot task planning.
Website:https:// robotics.me.utexas.edu/blake-anderson

Benjamin Collins, Senior Research Fellow (734-764-4260) [collins.bs@gmail.com] Ph.D., University of Michigan, 2011. Nuclear Engineering and Radiological Sciences; and Scientific Computing.

Desiderio Kovar, Professor**,** Materials Science and Engineering, (512-471-5185} [dekovar@austin.utexas.edu] Ph.D. Carnegie Mellon University, 1995, Microstructure/property relationships in ceramics; metals, composites; additive manufacturing.
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Benjamin Leibowicz, Assistant Professor, Operations Research and Industrial Engineering, (512-475-9550)[bleibowicz@utexas.edu] Ph.D. Stanford University, 2012, Energy systems; energy and climate policy analysis; integrated assessment modeling; sustainable cities; technological change and innovation.
Website: https://www.me.utexas.edu/faculty/faculty-directory/leibowicz

Don Nolting, Facilities Manager Biomedical Imaging Center and Research Associate, Nuclear Engineering Teaching Laboratory (615-491-3032) [don.nolting@utexas.edu] Ph.D., University of Iowa, 2005. Inorganic and organometallic chemistry; MR, PET, SPECT, and Optical imaging contrast agent design, synthesis, and purification; radiochemical syntheses using F-18, Cu-64, Tc-99m, and In-111 isotopes.
Website: https://biomedimaging.utexas.edu/about-us

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.

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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
Masters	8	3	3	*	*	*
PhD	2	3	4	*	*	*

Number of Graduates

Graduate Student Enrollment: *Not Reported*
ABET Accreditation: Civil Engineering

Nuclear Science and Engineering Faculty

Michael Barber, 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

Edward Cazalas, Assistant Professor (801-581-7397) [edward.cazalas@utah.edu] Ph.D., Pennsylvania State University, 2015. Radiation detection; radiation effects; instrumentation and electronics.

Tara Mastren, Assistant Professor (801-581-7277) [tara.mastren@utah.edu] Ph.D., Washington University in St. Louis, 2014. Radiochemistry; Nuclear Medicine; Lanthanide and Actinide Separations; Neutron Activation Analysis. Website: https://themastrenlab.sitey.me/

Luther McDonald IV, Associate 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, 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

Glenn Sjoden, Professor (801-581-8874) [glenn.sjoden@utah.edu] Ph.D., Pennsylvania State University, 1997. Non-proliferation, reactor research, and power engineering. Professional Engineer.

UTAH STATE UNIVERSITY

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435-797-0329
FAX: 435-797-2417
Administrative Contact: Ryan Berke
435-797-8184
Ryan.berke@usu.edu
Website: www.mae.usu.edu
nuclear.usu.edu

Graduate Student Enrollment: 57 Masters/33 Ph.D.
ABET Accreditation: Mechanical Engineering

Nuclear Science and Engineering Faculty

Zhongquan "Charlie" Zheng, Professor and Department Head. (435-797-2878) [zzheng@usu.edu]. Ph.D., Old Dominion University, 1993. Vortex dynamics, CFD, heat transfer, turbulent flow, aeroacoustics, and biofluid dynamics.

Ryan Berke, Assistant Professor and Director of USU's Thermal Hydraulics and Materials Properties (TMP) Center. (435-797-8184) [ryan.berke@usu.edu] Ph.D., The Ohio State University, 2013. Experimental solid mechanics for extreme temperature environments, digital image correlation at high magnifications and long working distances. Websites: www.berkelab.com and nuclear.usu.edu .

Som Dutta, Assistant Professor. (435-797-0329) [som.dutta@usu.edu]. Ph.D., University of Illinois, Urbana-Champaign, 2016. Computational fluid dynamics, particle flow.

Thomas Fronk, Associate Professor and Associate Dean of the College of Engineering. (435-797-0116) [Thomas.fronk@usu.edu]. Ph.D., Virginia Tech, 1991. Composite structures, numerical solutions, finite elements, vibrations.

Nadia Kouraytem, Assistant Professor (435-797-6364) [nadia.kouraytem@usu.edu] Ph.D., King Abdullah University of Science and Technology (KAUST), 2016. Investigating the process-structure-property relationships of metal additive manufacturing using advanced experimental characterization techniques for applications in extreme environments.

Juhyeong Lee, Assistant Professor. (435-797-0329) [juhyeong.lee@usu.edu] Ph.D. Mississippi State University, 2017. Damage mechanisms due to thermal-electrical-mechanical coupling, effects of lightning strikes on composites. Website: https://sites.google.com/view/mscim

Nick Roberts, Associate Professor. (435-797-9455) [nick.roberts@usu.edu]. Ph.D., Vanderbilt University, 2010. Direct energy conversion and storage, materials, nanotechnology, thermal transport. Website: http://ntel.go.usu.edu

Barton Smith, Professor. (435-797-8147) [barton.smith@usu.edu]. Ph.D., Georgia Tech, 1999. Experimental fluid mechanics, validation benchmark simulations for CFD, particle image velocimetry uncertainty, flow control applied to materials processing. Website: http://efdl.neng.usu.edu/EFDL/EFDL_Home.html

Yanqing Su, Assistant Professor. (435-797-0957) [yanqing.su@usu.edu] Ph.D., Georgia Institute of Technology, 2017. Computational fluid/solid mechanics, multi-scale simulations for materials under extreme environment. Website: https://yanqingsu.github.io/

Elizabeth Vargis, Associate Professor. (435-797-0618) [elizabeth.vargis@usu.edu]. Ph.D., Vanderbilt University, 2012. Health physics, tissue engineering, effects of radiation on cardiac and skeletal muscle. Website: www.vargislab.com

Hailei Wang, Assistant Professor. (435-797-2098)[hailei.wang@usu.edu]. Ph.D., Oregon State University, 2006. Thermal fluid sciences, advanced energy systems, integration of waste heat and renewable energy, and high-performance micro-channel heat exchangers. Website: http://mae.usu.edu/faculty/hailei-wang/index

Haoran Wang, Assistant Professor. (435-797-0951)[haoran.wang@usu.edu]. Ph.D., University of Illinois, Urbana-Champaign, 2017. Solid mechanics and materials, multiscale computations, uncertainty quantification, data-driven modeling. Website: https://sites.google.com/site/haoranwangsresearch/

Nuclear Science and Engineering Research Centers

Thermal Hydraulics and Materials Properties (TMP) Center: Dr. Ryan Berke, Director. Located 140 miles south of INL, USU has emerged to play a major role regionally in nuclear engineering research and education. TMP currently has 11 active research faculty with interests grouped into two core strengths: materials characterization and thermal hydraulics. http://nuclear.usu.edu/

VIRGINIA COMMONWEALTH UNIVERSITY

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(804) 827-7030
sphongikaroon@vcu.edu
Website: http://mechanical-and-nuclear.egr.vcu.edu/

	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	23	12	14	12	10	10
Masters	18	11	4	20	23	15
PhD	6	8	7	8	6	5

Number of Graduates

Graduate Student Enrollment: 64 Masters/ 38 Ph.D.
ABET Accreditation: B.S. in Mechanical Engineering,
B.S. in Mechanical Engineering with a Nuclear Concentration

Nuclear Science and Engineering Faculty

Supathorn Phongikaroon, Professor and Director of Nuclear Programs (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.

Lane Carasik, Assistant Professor (804-828-9117) [lbcarasik@vcu.edu] Ph.D., Texas A&M University, 2017. Thermal-hydraulics; advanced reactor design and simulation.

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

Gennady Miloshevsky, Associate Professor (804-828-9117 [gennady@vcu.edu] Ph.D., Heat and Mass Transfer Institute of the National Academy of Sciences of Belarus, 1998. Computational physics; shielding of space radiation; fission SNM sources; plasma physics and atomic spectra; CFD; two-fluid liquid metal-plasma flows; warm dense matter.

Jessika Rojas, Associate 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

Carlos Castano, Assistant Professor (804-828-1998) [cecastanolond@vcu.edu] Ph.D., Missouri University of Science and Technology, 2014. Surface Engineering; Functional Coatings; Nanomaterials Engineering; Corrosion Engineering; Plasma Physics; Advanced Materials Characterization.
Website: https://expertfile.com/experts/carlos.castanophd

Carl Elks, Associate Professor (804-828-8222) [crelks@vcu.edu] Ph.D., University of Virginia, 2005. Resilient Cyber Physical Systems; Systematic SW testing; Runtime Verification and Monitoring; Fault injection; Cyber threat and vulnerability, and modernization strategies for energy and utility infrastructures, especially for Nuclear Power Plants. Website: https://expertfile.com/experts/carl.elksphd

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

Ibrahim Guven, Associate Professor (804-827-3652) [iguven@vcu.edu] Ph.D., University of Arizona, 2000. Fracture and failure analysis using Peridynamics; Impact and penetration mechanics; Multi-scale modeling of physical phenomena; Micro/nano-scale testing and measurement techniques.
Website: https://expertfile.com/experts/ibrahim.guvenphd

Milos Manic, Professor (804-827-3999) [misko@vcu.edu] Ph.D., University of Idaho, 2003. Computational Intelligence Techniques (Machine Learning) with Applications in Energy Cybersecurity and Human Machine Interfaces; Software Defined Networks; Fuzzy Neural Data Mining Techniques; Energy Security; Human-machine Interfaces. Website: https://expertfile.com/experts/milos.manicphd

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

Nuclear Engineering Program
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703-538-3790

Greater Washington DC Area (GWDCA) Campus
Northern Virginia center
7054 Haycock Road
Arlington, VA 22043

Director: Alireza Haghighat
Program Coordinator: Alison Jones
arjones@vt.edu
Website: http://nuclear.ncr.vt.edu

	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
Masters	3	2	5	3	5	3
PhD	0	0	2	3	5	2

Number of Graduates

Graduate Student Enrollment: 10 Masters/16 Ph.D.

Distance Education Program
Offers Nuclear Engineering Courses Online

Nuclear Science and Engineering Faculty

Alireza Haghighat, Program Director, Professor (703-538-3795) [haghighat@vt.edu] Ph.D., University of Washington, 1986. Research in Advanced particle transport methods (deterministic and statistical Monte Carlo) and their applications in reactor physics analysis and design, radiation shielding, nuclear security and safeguards, and medical imaging; multi-physics analysis for advanced reactor design and simulation; perturbation methods; virtual reality visualization; parallel computing (Located at the GWDCA campus).

Juliana Pacheco Duarte, Assistant Professor (540-231-7388) [pachecodurate@vt.edu] Ph.D., University of Wisconsin-Madison, 2018. Research in Nuclear Safety Analysis; Thermal-Hydraulic Systems; Experimental and Computational Two-phase flow; Boiling and Condensation phenomena; Subchannel Analysis; Advanced Light Water Reactor; Small Modular Reactors; Inverse Heat Transfer Problems.

Celine Hin, Associate Professor (540-231-1924) [celhin@vt.edu] Ph.D., Institut National Polytechnique of Grenoble, 2005. Theoretical research in physical metallurgy; Nuclear materials and radiation effects;

Behavior of materials under extreme environments; Statistical physics; Atomic physics; Thermoelectric properties; Electrochemistry; Development of analytical and numerical methods.
Website: https://nuclear.ncr.vt.edu/about/people/celine-hin

Mark Pierson, Associate Professor of Practice (540-231-9112) [mark.pierson@vt.edu] Ph.D., Virginia Polytechnic Institute and State University, 2005. Radioisotope betavoltaic batteries; nuclear fuel cycle; nuclear safeguards and nonproliferation; radiation detection and measurement; radiation transport; nuclear power plant operations and safety.

Yang Liu, Associate Professor (540-231-8068) [liu130@vt.edu] Ph.D., Purdue University, 2008. Nuclear thermal hydraulics and reactor safety; Two-phase flow modeling, instrumentation and experiment; Two-phase flow computational fluid dynamics; Advanced passive safety system design.
Website: https://sites.google.com/a/vt.edu/vtmftl/

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).

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.

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.

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. Leading the development of the CHANDLER antineutrino detection system for application to power reactor safeguards.

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 of Physics (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.

Ranga Pitchumani, George R. Goodson Professor of Mechanical Engineering (571-858-3251) [pitchu@vt.edu], Ph.D., Carnegie-Mellon University, 1992. Research in Energy Systems; Energy/Water Nexus; Electric Grid Integration of Renewable Energy; Materials Processing and Manufacturing; Uncertainty Quantification and Large Scale Optimization; and, Micro and Nanoscale Technologies.

Patrick Roberts, Associate Professor of School of Public and International Affairs (202-599-0562) [robertsp@vt.edu], Ph.D., Government, University of Virginia, 2006. Research in Emergency management in government; Development of disaster and security organizations and their capacity; Organizational autonomy; and, Current global security threats.

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.

James Turso, Adjunct Associate Professor (tursoja@gmail.com), Advisory Electrical Engineer (EE5), Newport News Shipbuilding, Washington, D.C. Research in reactor control and dynamics, and nuclear instrumentation.

Michael von Spakovsky, Robert E. Hord Jr. Professor of Mechanical Engineering (540-231-6684) [vonspako@vt.edu] Ph.D., Georgia Institute of Technology, 1986. Research is in areas of theoretical and applied non-equilibrium and equilibrium thermodynamics with two principal focuses: i) intrinsic quantum thermodynamics (IQT) and its mathematical framework steepest-entropy-ascent quantum thermodynamics (SEA-QT) and ii) SEA non-equilibrium thermodynamics (SEA-NT).

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.

Heat Transfer and Safety (HEATS) Lab: Director, Juliana Pacheco Duarte [pachecoduarte@vt.edu] (540-231-7388). HEATS Lab focuses on two-phase flow heat transfer studies to improve the safety, security, and economic features of the next generation of nuclear reactors. Research activities include experimental and computational thermal-hydraulics modeling.

MARS - Center for Multiphysics for Advanced Reactor Simulation: Director, Alireza Haghighat [haghighat@vt.edu] (703-538-3795) 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/)

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] (703-53-3795) 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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	7/15-6/16	7/16-6/17	7/17-6/18	7/18-6/19	7/19-6/20	7/20-6/21
B.S.	33	28	19	22	15	20
Masters	23	29	19	23	10	11
PhD	9	10	8	15	8	7

Number of Graduates

Graduate Student Enrollment: 11 Masters/ 57 Ph.D.
ABET Accreditation: Nuclear Engineering

Nuclear Science and Engineering Faculty

Paul P. H. Wilson, Professor and Department Head (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: https://directory.engr.wisc.edu/ep/Faculty/Wilson_Paul/

Mark Anderson, Assistant Professor (608-263-2802) [manderson@engr.wisc.edu] Ph.D., University of Wisconsin, Madison, 1998. Fundamental physics and applications relating to advanced energy utilization; energy extraction and energy production with focus on experimental thermal hydraulics for advanced nuclear; solar and waste heat recovery energy sources. Also Mechanical Engineering, Wisconsin Energy Institute. Website: https://directory.engr.wisc.edu/me/Faculty/Anderson_Mark/

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**.**

Jennifer Choy, Assistant Professor (608-263-6974)[Jennifer.choy@wisc.edu] Ph.D., Harvard University, 2013. Quantum engineering; atomic and optical physics; nanophotonics; development and characterization of solid-state defects; quantum sensing using atoms and defects in solids; inertial navigation and timekeeping. Website: https://directory.engr.wisc.edu/ep/Faculty/Choy_Jennifer/

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

Stephanie Diem, Assistant Professor (608-263-1414)[sjdiem@wisc.edu] Ph.D., Princeton University. Experimental plasma physics; Magnetically confined plasmas; Microwave heating and current drive; Electron Bernstein wave emission, heating and current drive; Understanding and controlling edge instabilities in plasmas. Website: https://directory.engr.wisc.edu/ep/Faculty/Diem_Stephanie/

Benedikt Geiger, Assistant Professor (608-262-3386)[benedict.geiger@wisc.edu] Ph.D., Ludwig-Maximilians University, 2013. The experimental investigation of turbulent particle and heat transport in present day devices with the aim to develop new turbulence-optimized stellarator experiments. Website: https://directory.engr.wisc.edu/ep/Faculty/Geiger_Benedikt/

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/

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

Benjamin Lindley, Assistant Professor (608-263-1946) (lindley2@wisc.edu) Ph.D., University of Cambridge, 2014. Design and analysis of advanced nuclear reactors, with emphasis on core design; Reactor physics and multiphysics methods development; Flexible operation of nuclear reactors: Integrated Energy Systems, cogeneration, load-following, advanced power conversion cycles; Market and economic context for advanced nuclear power; Fuel cycle analysis; Uncertainty quantification, reduced order modelling and data assimilation. Professional Engineer.
Website: https://directory.engr.wisc.edu/ep/Faculty/Lindley_Benjamin/

Oliver Schmitz, Professor (608-263-1547) (oschmitz@wisc.edu) Ph.D., 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

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/

Kumar Sridharan, Professor (608-263-4789)[kumar.sridharan@wisc.edu] Ph.D., University of Wisconsin-Madison, 1989. Nuclear reactor materials research and development; Irradiation effects in materials; Corrosion of materials; High temperature materials; Physical metallurgy and mechanical behavior of materials; Ion implantation and plasma-assisted thin film deposition of materials; Surface modifications and coatings including nanoscale processes and materials; Emerging and commercial surface engineering technologies; Wear and nanotribology of materials; Processing-structure-properties-performance relationships in materials; Conventional and advanced materials characterization and analysis techniques;

Materials applications, challenges, and solutions for a broad spectrum of industrial applications; Failure analysis. Website: https://directory.engr.wisc.edu/ep/Faculty/Sridharan_Kumar/
Yongfeng Zhang, Assistant Professor (608-890-3779)[yzhang2446@wisc.edu] Ph.D., Rensselaer Polytechnical Institute, 2009. Multiscale modeling and simulation of materials aging and degradation in extreme conditions: Irradiation effect, Mechanical degradation, Cossion and stress corrosion cracking. Website: https://directory.engr.wisc.edu/ep/Faculty/Zhang_Yongfeng/

Other 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 Emertus (608-265-2001) [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/

Curt A. Bronkhorst, Professor (608-890-2586) [cbronkhorst@wais.edu] Ph.D., Massachusetts Institute of Technology. Theoretical/computational mechanics of materials; computational plasticity; multi-scale material modeling; damage mechanics; single crystal plasticity; dynamic material behavior; structural phase transformation

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.

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 Emeritus (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/

Jennifer Franck, Assistant Professor (608-263-2562)[jafranck@wisc.edu] Ph.D., California Institute of Technology, 2009. Computational fluid dynamics; unsteady fluid mechanics; turbulent flows; wind and tidal energy; aerodynamics; flow control; propulsion; fluid-structure interaction.
Website: https://directory.engr.wisc.edu/ep/Faculty/Franck_Jennifer/

Gerald L. Kulcinski, Professor Emeritus (608-263-1601) [kulcinski@engr.wisc.edu] Ph.D., University of Wisconsin, Madison, 1965. Magnetic/inertial fusion reactor systems studies; radiation damage and nuclear materials; lunar mining of helium-3. Website: http://www.engr.wisc.edu/ep/faculty/

Franklin K Miller, Associate 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.
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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/

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Lawrence	W	Townsend	UNIVERSITY OF TENNESSEE, KNOXVILLE
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Kai		Vetter	UNIVERSITY OF CALIFORNIA-BERKELEY
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Zeyun		Wu	VIRGINIA COMMONWEALTH UNIVERSITY
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