NICP SANI 2023 Host Faculty List

2023/2/3

Massachusetts Institute of Technology — **Department of Nuclear Science and Engineering**

	Name	Research Fields
1	Anne White (Department Head)	Experimental plasma physics and diagnostics / Fusion systems
2	Benoit Forget	Monte Carlo transport methods / Deterministic transport methods / Multiphysics coupling / Uncertainty Quantification
3	Emilio Baglietto	Turbulence Modeling / Unsteady flow phenomena / Multiphase flow and boiling / Virtual Reactor Modeling
4	Matteo Bucci	Development of advanced diagnostic tools and techniques / Boiling heat transfer / Nanotechnologies for advanced heat transfer performance / Integration of sensors, simulations and machine learning tools for advanced health monitoring of complex systems
5	Jacopo Buongiorno	Nuclear Batteries / Study on the Future of Nuclear Energy in a Carbon Constrained World / The offshore floating nuclear power plant / Fundamentals of Boiling / Surface effects on boiling heat transfer / Nanofluids for Nuclear Applications / Ultra-low Thermal-Conductivity Materials for Cold-Water Wetsuits
6	Paola Cappellaro	Quantum Engineering / Control of quantum registers with NV centers in diamond / Diamond magnetometer and precision metrology / Quantum simulation and transport of quantum information
7	Areg Danagoulian	1. Verification of nuclear disarmament treaties via resonant phenomena and physical cryptography. 2. Multiple Monoenergetic Gamma Radiography and other methodologies for cargo screening
8	Jack Hare	Pulsed power for High Energy Density Laboratory Astrophysics / Magnetic Reconnection / Magnetohydrodynamic Turbulence
9	Zachary Hartwig	Intermediate energy proton irradiation of materials / High-field superconducting magnet technology
10	Ian H. Hutchinson	- Fusion Energy: Toroidal magnetic confinement experiments. Tokamak control. - Plasma Physics: MHD equilibrium and stability, divertor plasma phenomena. - Interaction of flowing plasma with absorbing bodies such as probes, dust particles, space-craft, or moons. - Plasma measurements. The second edition of my book Principles of Plasma Diagnostics was published in 2002. - Plasma Physics and Controlled Fusion: I am an International Advisor and former Editor in Chief of this journal, one of the top three Plasma Physics journals in the world. - Physical Review E: I am plasma section sub-editor of this famous American Physical Society journal.
11	Alan Jasanoff	Pushing the frontiers of MRI / Beyond blood flow / The next generation of contrast agents
12	R. Scott Kemp	The Electrical Grid as a Weapon of Mass Destruction / Hypersonic Weapons / Detection and Prevention of Foreign Bioweapons Programs / Radiation Fingerprinting for Nuclear Archeology / Detection of Clandestine Nuclear Facilities / Strategic Stability and Space-Based Radar / K-transform Tomography / Physical Cryptographic Warhead Verification for Nuclear Disarmament
13	Richard K. Lester	Energy Systems Innovation and Policy / Innovation and Creativity / Local Innovation Systems
14	Ju Li	Overcoming Timescale Challenges in Atomistic Simulations / Energy Storage and Conversion / Materials in Extreme Environments and Far from Equilibrium
15	Mingda Li	The research focus of Mingda and his group (Quantum Measurement Group) is to design novel materials characterization methods and to augment existing characterization methods to probe key properties of quantum materials that were either considered not measurable or not readily measurable with existing technique and analysis methods.
16	Nuno F. Loureiro	MAGNETIC RECONNECTION / CONFINEMENT AND TRANSPORT IN FUSION PLASMAS /
17	Koroush Shirvan	Development of Advanced Fuels / Small Modular Reactor Optimization / Advanced Data Analytics
18	Michael Short	The Development of Fouling Resistant Materials / In-Situ Mesoscale Nuclear Materials Science with Transient Grating Spectroscopy (TGS) / The Stored Energy Fingerprints of Radiation Damage
19	Haruko Murakami Wainwright	Integrated Environmental Monitoring at Nuclear Contaminated Sites / Nuclear Waste Disposal / Environmental Resilience in Nuclear Energy
20	Dennis G. Whyte	- Magnetic Fusion Energy: Boundary plasma physics, advanced plasma confinement regimes in tokamaks, plasma diagnostics, mitigation of disruption damages - Plasma-Surface Interactions: basic physics of plasma-material interfaces, dynamic measurement techniques for material evolution under plasma bombardment, implications of plasma-surface interactions in magnetic fusion reactors - Accelerators and Surface Analysis: low-energy nuclear scattering techniques for material analysis and damage, development of in-situ surface diagnostic methods for magnetic fusion
21	Bilge Yildiz	The science and technology of materials development for energy conversion applications in harsh environments
22	BorisKhaykovich	Molecular structure of molten salts / Neutron metal guides manufactured by replication / Wolter-mirrors based Neutron microscope

North Carolina State University — **Department of Nuclear Engineering**

	Name	Research Fields
1	Jason Hou	multi-physics reactor simulation, advanced reactors, fuel cycle analysis, uncertainty quantification, machine learning in engineering applications, and nuclear power plant simulator
2	Xu Wu	Scientific Machine Learning, Calibration, Validation and Uncertainty Quantification
3	Igor A. Bolotnov	Thermal hydraulics, High resolution simulations of two-phase flows with interface captiring methods, simulations of boiling flows
4	Mohamed Bourham	Plasma-matter interaction, plasma propulsion and thrusters, fusion engineering, plasma surface modification, particle accelerators and electron beam irradiation systems, x-ray sources for medical and screening imaging, materials synthesis and coatings, shielding and radiation attenuation studies, nuclear and mixed waste disposal, drycasks and high-level waste packaging studies.
5	Robert B. Hayes	Health Physics, Nuclear Waste Management, Nuclear Nonproliferation, Nuclear Forensics, Nuclear Criticality Safety, Radiation Shielding, Radiation Detection, Novel Nuclear Reactor Designs and Radiological Air Monitoring
6	Mihai A. Diaconeasa	Theories, applications, and simulation-based techniques in risk sciences such as traditional and dynamic probabilistic risk assessment, reliability analysis, resilient systems design, probabilistic physics of failure modeling, and Bayesian inference
7	Benjamin Beeler	Computational Nuclear Materials Science: atomistic modeling; multiscale modeling, advanced reactor nuclear fuels, molten salts, advanced cladding materials, density functional theory, molecular dynamics
8	Jacob Eapen	Materials theory (phonons, liquids and disordered materials) and multiscale modeling (atomistic, mesoscale), nuclear and energy materials (high performance alloys, graphite, SiC composites, molten salts, metal hydrides, superionic conductors, nuclear fuel)

University of Michigan — **Nuclear Engineering & Radiological Sciences**

	Name	Research Fields
1	Fei Gao	- Fundamental understanding of ion-solid interaction and radiation effects in ceramics and reactor materials, interfacial and nanostructure evolution of semiconductors, radiation detector materials, and development and application of multi-scale computer simulation for materials modeling. - Multi-scale computer simulations of microstructure evolution of solids under irradiation employing various computational methods, including density functional theory (DFT), ab initio molecular dynamics, time-dependent DFT, and tight-binding calculations, molecular dynamics simulations, long-time dynamics, kinetic Monte Carlo, and cluster dynamics. - Degradation of spent nuclear fuel canisters - Swift heavy ion damage in materials - Ceramics for nuclear waste forms, fuels and fusion reactor applications - Radiation response and signal generation in detector materials
2	Igor Jovanovic	Radiation detection, lasers and optics
3	Xiaodong Sun	- Thermal-hydraulics and reactor safety - Two-phase flow experimentation and modeling - Interfacial structure characterization - Thermal-hydraulics in advanced high-temperature reactors (gas-cooled, fluoride salt cooled, or liquid metal cooled) - High-temperature compact heat exchangers
4	Aditi Verma	- How can a fundamental understanding of design be used to improve design practice, design tools, and engineering pedagogy? - How can design processes be made more open and participatory such that epistemic plurality and inclusivity are achieved as part of the design process? - How can insights from design research be applied to the designs of policies and institutions for the governance — both innovation and regulation — of nuclear technologies?
5	Brendan Kochunas	Dr. Kochunas' research focus is on the next generation of numerical methods and parallel algorithms for high fidelity computational reactor physics. His areas of expertise include neutron transport, nuclide transmutation, multi-physics, parallel programming, and HPC architectures. During his time as a PhD student he initiated development of the MPACT code that became the main deterministic neutronics tool within the CASL (Consortium for Advanced Simulation of Light Water Reactors) project and subsequently within VERA (Virtual Environment for Reactor Applications). MPACT was not only born out of his PhD research but has also become a central research tool in the work of more than 14 other PhD students in the NERS department.
6	Brian Kiedrowski	General-purpose Monte Carlo and deterministic particle transport methods and software development. Specific areas include nuclear criticality, critical experiment design, sensitivity/uncertainty, adjoint and hybrid methods, time-dependent transport, and kinetics.
7	Majdi Radaideh	AIMS lab focuses on the intersection between reactor design, nuclear multiphysics modeling and simulation, advanced computational methods, and machine learning algorithms to drive advanced reactor research and improve the sustainability of the current reactor fleet.

University of Wisconsin-Madison — **Engineering Physics Department**

	Name	Research Fields
1	Paul Wilson	Computational methods for simulating complex nuclear energy systems
2	Adrien Couet	Nuclear Materials Irradiation and Corrosion
3	Ben Lindley	Reactor physics, advanced reactor design, integrated energy systems, safety analysis
4	Kumar Sridharan	Materials processing testing and analysis
5	Yongfeng Zhang	Computational Nuclear Materials
6	Juliana Pacheco Duarte	Experimental and Computational thermal-hydraulics and safety
7	Stephanie Diem	Experimental plasma physics
8	Benedikt Geiger	Experimental plasma physics
9	Oliver Schmitz	Experimental plasma physics
10	Carl Sovinec	Computational plasma physics
11	Chris Hegna	Plasma theory and computation

Texas A&M University — **Department of Nuclear Engineering**

	Name	Research Fields
1	Sunil Chirayath	Advanced Nuclear Reactor Safeguards
2	John Ford	radiation safety; radiation detection or medical/research applications of radioisotopes; space radiation environment and countermeasures
3	Karen Kirkland	steam/water two-phase flow experiments, reactor safety systems, power engineering
4	Jean Ragusa	application of machine learning or digital twins

University of California, Berkeley — **Department of Nuclear Engineering**

	Name	Research Fields
1	Massimiliano Fratoni	Advanced nuclear reactors design / Uncertainty quantification and sensitivity analysis / Multi-physics modeling and simulation / Accident tolerant fuel / Advanced fuel cycles analysis / Geological repository and far-field criticality / Fusion blanket design
2	Jasmina Vujic	Advanced nuclear Reactor Physics/Design, Transport theory modeling and simulation, Application of radiation in medical diagnostics and therapy, Non-proliferation