

Department of Nuclear Engineering

Nuclear engineering is concerned with the engineering aspects of the control, release, and utilization of nuclear energy from both fission and fusion nuclear reactors. Nuclear reactors serve many functions: they serve as heat sources for electric power plants and are used in the production of radioactive isotopes for a variety of peaceful applications. Nuclear methods are applied in medical diagnosis and treatment, scientific research, and the search for new resources. The nuclear engineering program educates individuals in scientific and engineering principles essential for effective and productive contributions in industrial, university and government service. The Department of Nuclear Engineering has a national graduate ranking of #3 among all nuclear engineering programs. The undergraduate program continues to be highly respected by the nuclear industry.

Scholarships and Awards

Several special scholarships exist for NC State nuclear engineering students, including the Duke Energy, Institute for Nuclear Power Operations, American Nuclear Society, U.S. Department of Energy and the U.S. Nuclear Regulatory Commission scholarships. A special department fund supports scholarships for exceptional upperclassmen. NC State nuclear engineering students have received special recognition awards at the Undergraduate Research Symposium and have gained national recognition by several times receiving the Student Design Award of the American Nuclear Society. NC State nuclear engineering students are also frequent recipients of nationally awarded fellowships.

Facilities

Facilities for nuclear education include a nuclear research reactor (PULSTAR), which can be operated at a steady state power of 1 MW; radiation detection laboratories; nuclear materials laboratory; thermal hydraulic laboratory; prompt gamma facility; neutron activation analysis laboratory; radio-chemistry laboratories; nuclear simulation laboratory; neutron radiography unit; positron facility; ultra cold neutron source; neutron diffractometer; numerous computer facilities including, departmental computer workstations, College of Engineering EOS engineering workstations, microcomputers; reactor simulation laboratory; plasma generation and diagnostics laboratory, atmospheric plasma science laboratory, and plasma launchers laboratory.

Mission

The Department of Nuclear Engineering has four primary missions:

1. Provide a quality education at both the undergraduate and graduate levels to students who desire to pursue careers in nuclear science and engineering.
2. Develop research programs in areas of emphasis related to applications of nuclear science and engineering.
3. Assist industries and government in North Carolina, nationally and internationally in their efforts to apply these nuclear technologies to the betterment of the economy and the environment - in a safe, effective, and innovative manner.
4. Enhance, promote, and utilize the PULSTAR research reactor and associated facilities in an exemplary manner, leading to national

recognition as a premier 1 MW Nuclear Reactor Program dedicated to research, teaching, and extension.

Program Educational Objectives

Consistent with the Department of Nuclear Engineering's mission, the department has developed the following objectives for undergraduate education.

The Nuclear Engineering program is preparing its graduates for:

1. A track record of solving technical challenges facing the field of nuclear engineering through the detailed process of engineering design and the advance of nuclear engineering practice and research;
2. A reputation of adhering to the highest professional standards in the field, holding both the societal and environmental impact of their field's practices in the highest regard;
3. Written and oral communication skills that are highly effective in a diverse, cross-disciplinary, and global community of colleagues and stakeholders; and
4. The professional responsibility of continued self-improvement and education through professional licensing, graduate and professional education, and continued lifelong learning.

Contact

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Nuclear Engineering website (<http://www.ne.ncsu.edu>)

Faculty

Department Head

Steven Shannon, *Interim Department Head, Professor*

Professors

Dmitriy Anistratov

Maria Avramova

Yousry Azmy, *Distinguished Professor*

Igor Bolotnov, *Director of Graduate Program*

Mohamed Bourham, *Alumni Distinguished Graduate Professor*

Nam Dinh

Jacob Eapen, *Director of Nuclear Engineering Undergraduate Program*

John Gilligan, *Executive Associate Dean of the College of Engineering, Director of the Nuclear Energy University Program (NEUP) Integration Office for the US Department of Energy*

Ayman Hawari, *Distinguished Professor, Director of Nuclear Reactor Program*

Kostadin Ivanov, *Distinguished Professor*

Djamel Kaoumi

John Mattingly, *University Faculty Scholar*

Korukonda Murty, *Progress Energy Distinguished Professor*

Abderrafi Ougouag, *INL Joint Faculty Appointment with NCSU*

Ge Yang

Research Professor

Scott Palmtag

Associate Professors

Rob Hayes, *Joint Faculty Appointment with SRNL*

Lingfeng He, *Joint Faculty Appointment with INL*

Jason Hou

Katharina Stapelmann

Assistant Professors

Alexander Bataller

Benjamin Beeler, *Joint Faculty Appointment with INL*

Mihai A. Diaconeasa, *Associate Department Head*

Wen Jiang, *Joint Faculty Appointment with INL*

Elizabeth Kautz, *Joint Faculty Appointment with PNNL*

Florian M. Laggner

Amanda Lietz

Xu Wu

Teaching Associate Professor

John Zino

Teaching Assistant Professor

Zeinab Alsmadi

Extension Assistant Professor

Lisa M. Marshall, *Director of Outreach, Retention & Engagement*

Emeritus Faculty

J. Michael Doster, *Professor Emeritus*

Paul Turinsky, *Professor Emeritus, Member of National Academy of Engineering*

Plans

- Health Physics (Minor) (<http://catalog.ncsu.edu/undergraduate/engineering/nuclear/health-physics-minor/>)
- Nuclear Engineering (BS) (<http://catalog.ncsu.edu/undergraduate/engineering/nuclear/nuclear-engineering-bs/>)
- Nuclear Engineering (BS): Nuclear Fuels and Materials (<http://catalog.ncsu.edu/undergraduate/engineering/nuclear/nuclear-engineering-bs-nuclear-fuels-materials-concentration/>)
- Nuclear Engineering (BS): Plasma Sciences and Fusion Energy (<http://catalog.ncsu.edu/undergraduate/engineering/nuclear/nuclear-engineering-bs-plasma-sciences-fusion-energy-concentration/>)
- Nuclear Engineering (BS): Radiological Engineering (<http://catalog.ncsu.edu/undergraduate/engineering/nuclear/nuclear-engineering-bs-radiological-engineering-concentration/>)
- Nuclear Engineering (Minor) (<http://catalog.ncsu.edu/undergraduate/engineering/nuclear/nuclear-engineering-minor/>)