



NSE

SCIENCE. SYSTEMS. SOCIETY.

Foundations and Frontiers

A New Strategy for the MIT Department of Nuclear Science and Engineering

December 2021



Our vision is a sustainable future where nuclear science and technology are leveraged for the benefit of humankind and the planet.

Our mission is to develop the next generation of leaders of the global nuclear community, advance basic research, provide technical leadership on energy and non-energy applications of nuclear technology, and inform public discussion about nuclear science and technology, in order to address global grand challenges.

MIT Department of Nuclear Science and Engineering



Foundations and Frontiers

A New Strategy for the MIT Department of Nuclear Science and Engineering

OVERVIEW

December 2021

Prepared by the faculty and senior research staff of the MIT Department of Nuclear Science and Engineering*

*This plan reflects the work of the entire NSE faculty and senior research staff, with input from staff and students. A core working group consisting of Profs. Anne White (chair), Jacopo Buongiorno, Paola Cappellaro, Ben Forget (co-chair), Scott Kemp, Ju Li, Nuno Loureiro, and Mike Short was responsible for gathering data and drafting early drafts of the report. The entire faculty developed the final report collaboratively at our Fall 2021 Faculty Retreat.

With this plan, the **MIT Department of Nuclear Science and Engineering** puts forward a bold, new vision for a sustainable future where nuclear science and technology are appropriately used for the benefit of humankind and the planet.

The objective of the plan is to strengthen foundations and expand frontiers in our field, and is built around three strategic pillars:

- **Pursuing basic research** that has the potential to transform nuclear science, open new paths to exploration, and expand security and policy horizons.
- **Leveraging NSE's excellence** to advance nuclear energy so that it can become the backbone of a global clean energy system that will enable mitigation of and adaptation to climate change.
- **Establishing Quantum Engineering as an application area** in the Department that spans all three intellectual commons and will drive new research directions and course offerings.

Our new plan

- **Reaffirms our motto:** Science, Systems, Society and advocates to continue this as a framework for our educational and research programs.
- **Promotes instructional innovation** in the Department's undergraduate and graduate degree programs as well as increasing NSE's academic impact at the Institute by seeking ways to offer more educational opportunities for all students at MIT to learn about how nuclear science and engineering can be used to address global grand challenges.
- **Strengthens educational partnerships**, including participation in the Schwarzman College of Computing Common Ground and in the Leaders for Global Operations Program with MIT Sloan. We also seek to collaborate closely with partners at MIT to help develop coordinated Institute-wide thrusts in Quantum Engineering, Simulation, and Information Science.
- **Commits to community building**, including, expanding professional development opportunities for everyone in the department; pursuing coordinated activities to sustain excellence in mentoring in NSE; implementing a DEI plan that will help the Department continue to attract and retain the best students, staff, and faculty from around the country and the world.
- **Charts a path to growth** in the number of faculty and senior research staff in the department over the next decade.

Implementation of this plan will help position the Department at the international forefront of nuclear research and education. Our faculty, graduates, and researchers will be key technology and policy leaders working to combat climate change with clean and secure energy, to end nuclear threats, and to enable basic scientific discovery.