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SCIENCE. SYSTEMS. SOCIETY.

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

OVERVIEW

December 2010

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Nuclear Science and Engineering

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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Prepared by the faculty and senior research staff of the MIT Department of Nuclear Science and Engineering¹

¹ *This plan reflects the work of the entire NSE faculty and senior research staff. A core working group consisting of Profs. Richard Lester (chair), Jacopo Buongiorno, and Dennis Whyte was responsible for drafting the report.*

OVERVIEW

This plan charts a new course for the MIT Department of Nuclear Science and Engineering. The objective is to sustain and strengthen the Department's position at the international forefront of nuclear research and education over the coming decade.

The plan:

- **redefines** the core of the nuclear science and engineering discipline;
- **commits** the Department to the pursuit of new knowledge and advanced technologies for the next phase of nuclear energy development;
- **identifies** new cross-cutting research thrusts that will enlarge the common areas of the Department and enable more collaboration between its different parts;
- **recommends** the formation of a new interdepartmental center for research on materials in extreme environments, as part of a broader NSE strategy to build stronger collaborations with other MIT departments;
- **advocates** a 'science-systems-society' framework for our educational programs, and urges future innovation in our undergraduate and graduate curricula along these lines;
- **proposes** a new educational and research focus on nuclear security and the control of nuclear materials, to be pursued as a multidisciplinary collaboration;
- **describes** a new initiative, targeted at emerging nuclear energy nations, to provide executive-level leadership education in the strategies, operational practices, and technologies required to develop a successful nuclear energy program;
- **requires** an immediate start on a program to rebuild the Department's faculty, backed up by a comprehensive approach to faculty development.

Implementation of this plan will position the Department as a leading contributor to the innovations needed for a major global expansion of nuclear energy and to the development of the next generation of leaders of the nuclear energy enterprise, while also laying the foundation for new applications of nuclear and radiation science and technology.

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