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February 2, 2004

Massachusetts Institute of Technology

Professor Kenneth Oye, Department of Political Science, Center for International Studies, and Engineering Systems Division (ESD)

Professor Daniel Hastings, Technology and Policy Program in the Engineering Systems Division and Co-Director, Engineering Systems Division

Professor Merritt Roe Smith, Science, Technology and Society Program

Professor Dava Newman, Technology and Policy Program in the Engineering Systems Division

For more information, contact Sarah Anderson at sarahwa@mit.edu; 617-253-8306

MIT WINS NSF GRANT ON EFFECTS OF EMERGING TECHNOLOGIES

CAMBRIDGE, MASSACHUSETTS -- The National Science Foundation has awarded MIT \$2.9 million for a multidisciplinary program on assessing effects of emerging technologies.

"MIT is especially proud to receive this award to support an innovative graduate program to train scholars to assess the economic, security, environmental and ethical consequences of emerging technologies," said Charles M. Vest, President of MIT. "This program will help MIT meet our responsibility to better understand and shape the consequences of the very technologies that MIT plays a role in developing."

The five year award is under the NSF Integrative Graduate Education and Research Training program (IGERT). The program will be led by four Principal Investigators, Daniel Hastings and Dava Newman of the Technology and Policy Program in the Engineering Systems Division; Kenneth Oye of the Department of Political Science, the Engineering Systems Division, and the Center for International Studies; and Merritt Roe Smith of the Science, Technology and Society Program.

The MIT program is organized around multidisciplinary panels that will focus sequentially on nano technologies, ubiquitous computing, and genetic engineering, with a fourth technology to be selected. Panels will be composed of scientists and engineers with insights into directions of technological change, engineers with insights into potential applications of technologies, and social scientists and humanists with expertise on potential effects on economy, security, environment and society. Before turning to the emerging technologies of the present, each panel will begin by critically examining past efforts to anticipate effects of technological change. Looking back on past assessment failures and successes before looking ahead will serve as a check on hubris and as an exercise in calibration.

To improve responses to emerging technologies, the panels will engage early and explicitly with the pervasive uncertainty that is typically under-recognized in technology assessment exercises. For example, first, scientific and policy spheres typically come together after lines of conflict are drawn. Creators of technologies focus on immediate issues of development and application, while policy analysts assess the broader implications of technological change only after controversy has flared. By contrast, this program will appraise knowledge when options are greater, interests are less entrenched, and policies are not yet locked into place.

Second, decision makers typically base strategies on unstated expectations regarding the nature and effects of technological change. Because forecasting errors are endemic, analysts often rely on implicit assumptions to reduce their vulnerability to criticism. By contrast, this program will explicitly identify areas of uncertainty about effects of emerging technologies and will develop strategies to mitigate uncertainty.

“This program promotes well reasoned multidisciplinary collaboration,” observed Phillip Khoury, Dean of Humanities, Arts and Social Sciences. “Technologists, humanists and social scientists will join in identifying uncertainty about the nature and effects of emerging technologies and in developing strategies to cope with uncertainty associated with technological change.”

The panels will recommend actions appropriate to expected consequences, lines of research to reduce expected sources of uncertainty, and reforms to improve the capacity of policies and institutions to adapt in the face of irreducible uncertainty. The active participation of government, business, and NGOs will be an integral element of the project, serving to check academic blindness, to enrich graduate education, and to engage the world beyond the academy. Senior staff from the Departments of State and Defense, EPA, Goldman Sachs, Ford Motor, AFL-CIO, Environmental Defense, and the United Nations have expressed interest in participating in panels and associated research groups. The program will work with these public and private organizations to anticipate and respond to the implications of emerging technologies.

The program will feature graduate training on analysis of technological change and associated security, economic, environmental and societal effects. “Engineering systems are often very complex and their analysis typically requires multiple perspectives. Consequently, many of today’s most pressing technological issues would profit from this cross-School collaboration,” said Thomas Magnanti, MIT Dean of Engineering. Graduate students will be drawn from the Technology and Policy Program, the Department of Political Science, and the Science, Technology and Society Program. The program will include:

- *integrated curriculum* with three new core courses to develop competencies in evaluating economic, security, environmental, societal, and ethical consequences of technical change;
- *multidisciplinary panels* described above, with panels developing methods used in training students to respond to emerging technologies and shaping faculty-student research on critical areas of uncertainty;
- *IGERT seminars* to extend and reinforce the effect of panels and core courses with sustained intensive interaction among students, faculty and staff.

Students from MIT and elsewhere will be eligible to apply, and will be admitted through one of the three participating degree granting programs. The NSF award will allow the program to provide tuition and stipends to successful applicants, with student support to start in fall of academic year 2004-2005. The Program seeks a diverse community and strongly encourages applications from women and underrepresented minorities. Inquiries should be directed to Sarah Anderson, MIT Center for International Studies, sarahwa@mit.edu, 617.253.8306.

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