

Provost

During academic year 2010–2011 MIT continued to develop new initiatives in education and research, many with international dimensions, while maintaining an aim toward developing the best academic opportunities for our students and faculty both at home and abroad. The year marked the opening of two major new campus facilities devoted to management and to cancer research, respectively. Several faculty-led working groups and committees submitted reports this year that promise to have significant, positive impact on various aspects of Institute life. This past year also marked the Institute's 150th anniversary, which was recognized by a series of special events, ranging from academic symposia to arts festivals and community-wide social activities. This report attempts to describe some of the noteworthy events and accomplishments that took place across the Institute during the past year, even as the Institute took time to celebrate and reflect on its achievements over the past century-and-a-half.

People

Eric Grimson was appointed chancellor of MIT, effective March 1, 2011. Professor Grimson, previously head of the Department of Electrical Engineering and Computer Science, succeeded Philip Clay PhD '75, who had served as chancellor since 2001. Professor Clay is returning to the Department of Urban Studies and Planning and also is continuing his service to the Institute as senior advisor to President Hockfield.

In fall 2010, Subra Suresh, Vannevar Bush professor of engineering, stepped down as dean of the School of Engineering after being named director of the National Science Foundation. Professor Suresh had served as dean since 2007. Cynthia Barnhart SM '85, PhD '88, Ford professor of engineering, was immediately appointed acting dean of the School of Engineering, which was in addition to her role as associate dean of engineering for academic affairs. In February 2011, Ian Waitz, Jerome C. Hunsaker professor of aeronautics and astronautics and head of the Department of Aeronautics and Astronautics, was appointed as the 16th dean of the School of Engineering.

In May 2011, it was announced that Theresa Stone would step down in fall 2011 as MIT's executive vice president and treasurer, a position she has held since 2007. It was noted that she will continue to remain involved with MIT as a committed volunteer. The following month, Israel Ruiz, vice president for finance since 2007, was nominated by the Executive Committee of the MIT Corporation to be the next executive vice president and treasurer. The confirmation of his appointment by the full Corporation is expected in fall 2011.

Samuel Allen SM '71, PhD '75, the POSCO professor of physical metallurgy in the Department of Materials Science and Engineering, became the new chair of the MIT Faculty in July 2011, succeeding Thomas Kochan, George M. Bunker professor of management, who completed a very productive two-year term as faculty chair.

Institute Professors John Deutch and Peter Diamond retired at the end of the academic year.

We were greatly saddened this year by the deaths of professor James Elliot of the Department of Earth, Atmospheric and Planetary Sciences, and professor emeritus Abraham Siegel, a former dean of the Sloan School of Management.

Academic Programs and Activities

Many new developments took place in the academic areas during AY2011, with several of these reflecting the Institute's continuing involvement in international collaborations; some of these activities are described below. Please refer to the separate reports of individual academic units for detailed information about these and other programs.

MIT's Center for Transportation and Logistics began a formal partnership in March 2011 with the Government of Malaysia to establish a global center for supply chain education and research. This collaboration will focus on the building and development of the Malaysia Institute for Supply Chain Innovation (MISI), which, in part, will feature graduate degree programs modeled after MIT's Supply Chain Management Program. The creation of MISI will thereby extend the MIT-founded network of centers known as the MIT Global SCALE (Supply Chain and Logistics Excellence) Network into Southeast Asia, where Malaysia is the largest center for international trade and manufacturing.

In April 2011 MIT expanded its formal relationships with China by completing two agreements involving universities there; they include: a Letter of Intent to encourage collaboration between MIT and Shanghai Jiao Tong University, focusing on such areas as energy and the environment; and a Memorandum of Understanding that establishes a fellowship program with the China Scholarship Council to sponsor students from China to study at MIT. Both agreements are seen as part of China's larger efforts to form more extensive connections with the U.S. in research and education. These latest initiatives continue a long tradition of relationships between MIT and Chinese scholars and students.

In June 2011, MIT signed a preliminary agreement with the Skolkovo Foundation, a nonprofit organization sponsored by the Russian Federation, to create the Skolkovo Institute of Science and Technology (SIST) in Skolkovo, Russia. The agreement follows a year in which the two parties evaluated options for collaboration in education and research based in Russia. This most recent agreement represents the intent of MIT and the Skolkovo Foundation to undertake a three-year collaboration, with a definitive agreement anticipated in fall 2011. The educational and research elements of the collaboration are expected to focus on four distinct areas of science and technology—energy, biomedicine, information, and space—as well as on the development of a center at SIST devoted to entrepreneurship and innovation. In addition to providing MIT students and faculty with wide opportunities for collaboration with Russian counterparts, the agreement with Skolkovo promises to form an important element in MIT's global outreach.

Also in June, as part of a forum organized by the MIT-France Program, MIT extended its collaborative activities with France by announcing a series of new joint initiatives focused on energy and the environment. The major new activity involves a joint international laboratory dedicated to multi-scale materials science for energy and

the environment, which will be located at MIT and cosponsored by France's national scientific research center. MIT also entered an agreement with Electricité de France, the world's largest utility company, to explore potential collaborations in energy-related research and development. In addition to these activities, the related areas of climate change and biofuels were also discussed as possible areas of collaboration involving French and MIT researchers and students.

Over the past year, MIT's collaboration with the newly formed Singapore University of Technology and Design (SUTD) that began in 2010 has seen considerable accomplishments in both its education and research components. The development of the SUTD undergraduate curriculum has made significant progress, with formal descriptions for the required undergraduate courses now in place. Faculty recruitment is proceeding on schedule, with a goal of 50 faculty in place by the start of SUTD's first semester in May 2012. In addition, an MIT-SUTD dual master's program and an SUTD-MIT postdoctoral fellows program were designed and established to bring graduate-level resources to SUTD. On the research side, faculty associated with the SUTD International Design Centre (IDC) have initiated research projects at both MIT and SUTD, with MIT's principal investigators having begun their required residencies in Singapore. An IDC scientific advisory board composed of five prominent researchers from outside universities has been established. In several ongoing research projects, the Institute has started to see the kind of productive collaboration between the two universities that had been envisioned by the partnership.

Beginning in September 2011, the MIT Sloan School of Management will begin a partnership with the Faculty of Management at Sabanci University in Turkey. Under this partnership, the Sloan School will host visits from MBA students and faculty from Sabanci University, and will share experience in various areas of academic administration relevant to management education. This engagement will not only provide Sloan faculty and students with exposure to a wider range of global developments and challenges related to management, but also broaden the school's connections with the worldwide academic community.

Following the discussions of the Institute-wide Planning Task Force (see the Council, Committee, and Task Force Activities section below), the Institute began to explore three broad educational possibilities. The new Educational Opportunities Study Group has been examining possible new opportunities for the residential campus, including summer educational offerings and so-called "3 + 2" programs, whereby students spend three years at another institution followed by two years at MIT. A new MIT-Online Study Group has been exploring the feasibility of extending the Institute's educational reach, domestically and globally, by the possible use of online resources, potentially offering different levels of course certification to a range of nonresident students. Finally, the standing MIT Council on Educational Technology has been studying ways to integrate online and other technologically enabled methods into the residential campus and the traditional classroom with the aim of expanding student learning opportunities. Preliminary reports from all three groups are being reviewed by the Provost's Office.

In December 2010, the Faculty voted to approve a new joint undergraduate degree in Computer Science and Molecular Biology. This interdisciplinary program, which combines just over half the requirements of the computer science and biology undergraduate majors, reflects one of the fastest growing areas of intellectual interest and career opportunity. The new degree is expected to prepare students for careers in emerging areas at the interface of biology and engineering, such as pharmaceuticals, the emerging field of computational molecular biology, or medicine, and for graduate work in computer science, biology, or computational biology.

This past year, the MIT OpenCourseWare website, which provides free worldwide access to MIT educational materials, reached a milestone of 2,000 individual courses included on the site. The number of distinct courses listed has steadily increased each year since the launch of the OpenCourseWare site in 2002. Course materials typically include syllabi, lecture notes, assignments, and exams. They can be accessed for a variety of educational purposes by faculty, students, and independent learners throughout the world. It is estimated that 70 million individuals have visited the site to date.

The Karl Taylor Compton Lecture was delivered in March by Janet Napolitano, secretary of the US Department of Homeland Security. The Compton Lecture series was established in 1957 to honor the late Karl Taylor Compton, who served as president of MIT from 1930 to 1948 and as chairman of the Corporation from 1948 to 1954.

Facilities

Two new major buildings were completed this past year, and another neared completion, contributing to the renewal of the Institute's physical environment.

The new Sloan School of Management building, which houses the Joan and William A. Porter 1967 Center for Management Education, opened at the start of the academic year. This new facility now serves as the physical and intellectual center of the school, accommodating its entire faculty in one location and promoting an environment of teamwork, discussion, and interaction outside the classroom.

Also opening in fall 2010 was the David H. Koch Institute for Integrative Cancer Research, a pioneering research facility that brings together biological investigation and engineering technology to unravel the complexities of cancer and bring new discoveries to patients. The Koch Institute represents the epitome of interdisciplinary collaboration on campus, promising to transform the nature of cancer research.

Maseeh Hall, newly named for Fariborz Maseeh ScD '90 and the largest undergraduate dormitory on campus, is scheduled to open in fall 2011, following extensive renovations. The dormitory was formerly known as Ashdown House.

This past year the Institute also put forward a comprehensive campus planning process known as MIT 2030, which is intended to guide the renovation of existing Institute facilities and the construction of new buildings in the coming decades. MIT 2030 is designed as a flexible and responsive process. It draws on input from faculty and students, as well as from alumni and donors, in order to provide the best physical environment for MIT's research, educational, and student life activities.

Council, Committee, and Task Force Activities

Reports were received this year from a number of councils and committees that were focused on issues of particular importance to the MIT community.

The MIT Greater China Strategy Working Group issued its final report in August 2010, which presented a comprehensive set of recommendations for expanding MIT's engagement with Greater China in the coming decades. The working group consisted of faculty from all five schools who have research interests in China and are scholars of Chinese culture and society. Their report acknowledges the long-standing ties that MIT has cultivated with China in areas of research and education. It describes the growing importance of China as a collaborator in solving some of the most challenging global problems, as well as indicates how China is an important continuing source of student and faculty talent. The report makes several specific recommendations related to strengthening the Institute's involvement with China, such as raising the awareness of China as MIT prepares students for global careers; promoting collaborations between our faculty, research staff, and students and Chinese counterparts; exploring the establishment of a few special relationships with Chinese academic institutions; and considering the development of an MIT-China innovation hub that combines research, education, and innovation.

A report on the Arts at MIT, produced by the Office of the Associate Provost in collaboration with the Creative Arts Council, was presented to the Faculty in February 2011. The report, which was released in conjunction with the Festival of Art, Science and Technology in celebration of MIT's 150th anniversary, provides a comprehensive assessment of the accomplishments and goals of arts activities at the Institute. It is the first report of this nature since an earlier report was released in 1987. The 2011 report observes that the arts have traditionally formed a core component of an MIT education, and that the Institute must continually strengthen its ability to provide its students with the experiences that they seek in art, design, and performance. Consistent with our academic culture, the report asserts that MIT should continue to encourage an arts program that promotes cross-disciplinary creativity and innovation. This should be done by strengthening research and education, which exist at the intersections of art, science, and technology.

A new report on the status of women faculty in science and engineering at MIT was released in March 2011. The report, which was commissioned as part of the Institute's 150th anniversary, reflects separate faculty-led studies in the Schools of Science and Engineering. While uncovering some issues that still need to be addressed in order to improve the recruitment, retention, and equity of woman faculty at the Institute, the report concludes that the number of woman faculty in science and engineering at MIT has doubled in the last decade. These women have an increasingly positive professional experience at MIT, with women in both science and engineering holding more senior-level administrative positions. This indicates significant progress compared with the environment described in the 1999 and 2002 reports on this issue, which had indicated that women faculty at MIT often felt professionally marginalized, a situation that reflected access to fewer resources and exclusion from administrative decision processes. While the improvement in the overall job satisfaction of women faculty at MIT is very

encouraging, the report reminds us that issues that can negatively impact the careers of women in science and engineering still persist, and that the MIT central administration must continue its efforts, working with women faculty in these areas.

Following the submission in late 2009 of a final report by the Institute-wide Planning Task Force, a final letter was sent to the MIT community in spring 2011 reporting on the disposition of the more than 200 ideas that had been generated by the numerous working groups of the task force. These ideas focused on common goals of budgetary savings and operational efficiency. In all, 77% of these ideas were acted upon, following a careful assessment of each idea's viability and potential impact. The result was important cost savings that helped the Institute to reach its budgetary goals in FY2011 and going forward. Moreover, the task force identified several clusters of ideas that merit further study related to long-term impact, including e-learning opportunities, expanding the educational use of campus facilities, and measuring the way campus space is used. These and other ideas continue to be studied, assuring that the impact of the task force on the Institute's quality of life will extend well into future years.

A status update on the efforts being made to increase the diversity of the MIT faculty was provided by the Provost's Office in June 2011, focusing on the many initiatives being taken by the school deans to promote a strong culture of inclusion at the Institute aimed at retaining underrepresented minority faculty. This update follows up on recommendations from the Report of the Initiative on Faculty Race and Diversity that was completed in early 2010. The school initiatives range from strengthening the mechanics of recruitment efforts at the department level in order to broaden the potential pool of minority candidates, to establishing formal mentoring programs in each school to advise junior faculty members. The ongoing commitment to these efforts by all levels of the Institute will help to ensure our continuing progress in this area.

Faculty

Twenty faculty members retired from MIT in 2010–2011. Several of these were participants in the Faculty Renewal Program, which enables eligible senior faculty members to retire voluntarily with a choice of retirement incentives. The last retirements under this three-year program will occur in 2012.

Faculty recruitment continued at a strong pace this past year. A total of 37 new faculty members (30 men, 7 women, and 7 members of underrepresented minority groups) began their MIT appointments during 2010–2011. Also this year, 27 faculty members were awarded tenure within MIT, including eight women and one member of an underrepresented minority group. These promotions to tenure were effective July 2011.

The James R. Killian, Jr., Faculty Achievement Award is the highest honor bestowed by the MIT faculty on one of its own members. It was established in 1971 "to recognize extraordinary professional accomplishments by full-time members of the MIT faculty." The Killian Award for 2010–2011 was presented to Ronald Rivest, Andrew and Erna Viterbi Professor in the Department of Electrical Engineering and Computer Science. In May, it was announced that JoAnne Stubbe, the Novartis Professor of Chemistry and Biology, was selected as the Killian Award recipient for 2011–2012.

The Harold E. Edgerton Faculty Achievement Award is the highest honor bestowed by the MIT faculty on one of its own junior faculty members. The Edgerton Award, a tribute to the late beloved inventor and photographer “Doc” Edgerton, recognizes exceptional distinction in teaching and research. The 2011 Edgerton Award recognized two outstanding young faculty members: Jonathan Kelner, the Kokusai Denshin Denwa assistant professor of mathematics, and Rebecca Saxe, assistant professor in the Department of Brain and Cognitive Sciences.

Four faculty members were appointed as Margaret MacVicar Faculty Fellows this year in recognition of their outstanding contributions to the quality of undergraduate education at MIT. These awardees were: Bishwapriya Sanyal, Department of Urban Studies and Planning; Christopher Schuh, Department of Materials Science and Engineering; and George Verghese and Patrick Winston, both of the Department of Electrical Engineering and Computer Science. MacVicar Faculty Fellows are appointed for 10-year terms. These additions bring the total number of active fellows to 42, with 43 emeritus fellows at MIT, who together form a small academy of scholars committed to excellent teaching and innovation in education.

The Dr. Martin Luther King, Jr. Visiting Professor Program was established in 1995 to recognize the many contributions of outstanding minority scholars in the academy, as well as to enhance their scholarship through intellectual interactions with MIT peers and enrich the intellectual life of MIT through their participation in MIT research and academic programs. The 2010–2011 Dr. Martin Luther King, Jr. visiting professors were: S. James Gates, Physics; Reuben A. Buford May, Anthropology; Isaac Mbiti, Economics; Juana Mendenhall, Chemistry; and Donna J. Nelson, Chemical Engineering. In addition, two visiting scholars were sponsored by the program: Donal Fox, Music and Theater Arts; and Hector Hugo Hernandez, Civil and Environmental Engineering.

The following represent some of the numerous faculty who were honored with outside awards or appointments this past year:

Peter Diamond, Institute Professor, was awarded the Nobel Prize in Economic Sciences.

Nergis Mavalvala, professor of physics, was the recipient of a MacArthur Fellowship.

Susan Lindquist, professor of biology, was awarded the National Medal of Science.

David Bartel, professor of biology, was elected to the National Academy of Sciences.

Elected this year to the National Academy of Engineering were: Michael Cima, professor of materials science and engineering; Linda Griffith, professor of biological engineering and mechanical engineering; and Amedeo Odoni, professor of aeronautics and astronautics and of civil and environmental engineering.

Roger Kamm, professor of biological and mechanical engineering, was elected to the Institute of Medicine.

Robert Langer, Institute Professor, was selected to receive the Priestly Medal, the American Chemical Society's most prestigious prize.

Jay Scheib, professor of theater arts, was awarded a Guggenheim Fellowship.

Graduate Student Fellowships

The Presidential Graduate Fellowship Program provides full financial support to many of the Institute's most promising first-year graduate students. In AY2011, this program awarded a total of 100 fellowships over a wide range of MIT's academic departments. Following is a list of existing fellowships that are named for individual and corporate donors, some indicating specific areas of support that have been designated by the donor.

Akamai Technologies, Inc. (Mathematics and Electrical Engineering and Computer Science)

Agencourt Bioscience Corp. /Alnylam Pharmaceuticals

Homer A. Burnell (Architecture and Urban Planning)

Richard A. Denton

Morton E. Goulder (1942)

Herbert and Dorothy Grier

Robert T. Haslam (Chemistry and Chemical Engineering)

Irwin Mark Jacobs and Joan Klein Jacobs

J. Kenneth Jamieson

Grayce B. Kerr Fund in honor of Charles M. Vest

The Kurtz Family Foundation in honor of Charles M. Vest

James A. Lash

William M. Layson (Physics)

Edward H. Linde (Civil and Environmental Engineering)

Curtis Marble

Samuel H. and Luleta Maslak

Momenta Pharmaceuticals

Neurometrix, Inc.

The Picower Foundation in honor of Norman B. Leventhal

Charles A. Piper

Praecis Pharmaceuticals, Inc. (Biology and the School of Science)

Walter A. Rosenblith

Kenan Sahin (Humanities, Arts, and Social Sciences)

Henry E. Singleton (Brain and Cognitive Sciences)

Stata Family Presidential Fellowship Fund
 Craig and Rose Tedman for Robert M. Rose
 Edward Clark Walsh (Chemical Engineering)

In addition, the Lemelson Foundation provided funding for eight underrepresented minority students with interests in engineering innovation; these fellowships were intended for incoming students. The School of Engineering designates the Lemelson Foundation Fellowships as part of the Presidential Fellowship Program. Also, five students (one in each school) held the Provost's Women and Minority Fellowships.

In order to build community among the fellows, the Society of Presidential Fellows hosted several events during the academic year, including beginning- and end-of-year receptions, and a lecture and dinner series co-sponsored by the Sidney-Pacific Graduate Residence.

Fundraising for the support of the Presidential Fellowship Program continued to be a high priority of the Institute.

Finances

MIT tuition was increased by 3.8% to \$38,940 in AY2011. Approximately 62% of all undergraduates received need-based MIT scholarships this year. MIT remains committed to a policy of need-blind admissions and to meeting the full financial need of all undergraduates it admits. Again this past year, MIT's total financial aid commitment increased at a higher rate than rising tuition.

A two-year series of budget reductions necessitated by the decrease in the Institute's endowment due to the 2008 global economic downturn was completed in 2011. These reductions, which totaled approximately \$120 million, enabled the Institute to conclude FY2011 with a balanced budget and to approach the coming years from a position of financial strength and stability. As mentioned earlier in this report, the work of the Institute-wide Planning Task Force helped to secure our ability to maintain budget flexibility and continue to support strategic academic initiatives in the years ahead.

The market value of investments in the Institute's endowment as of June 30, 2011 is approximately \$9.8 billion, representing an increase of nearly 17% above the June 30, 2010 value of \$8.4 billion.

Research

Expenditures on sponsored research conducted on campus totaled \$660.8 million in AY2011, representing an increase of 5.5% from the 2010 volume of \$626.6 million.

The federal government continues to be the largest sponsor of campus research funding, accounting for approximately 71% of the total volume. The National Institutes of Health, part of the Department of Health and Human Services, is the single largest sponsor of campus research with an approximate 23% share of total research expenditures, reflecting the continuing strength of research activities in the life sciences and neuroscience, and the collaboration of these disciplines with areas of engineering. The Department of

Defense accounted for approximately 16% of total research expenditures, followed by industrial sponsors (15%), the Department of Energy (14%) and the National Science Foundation (11%).

Lincoln Laboratory research volume was \$806 million in AY2011, an increase of 7% over the 2010 volume of \$753 million.

This report marks the completion of my sixth year as provost.

L. Rafael Reif

Provost

Fariborz Maseeh Professor of Emerging Technology