

Provost

MIT's activities in academic areas continued to thrive in AY2014, with several new initiatives in research and education. The year was also marked by a number of key leadership transitions. This report describes some of the prominent events and accomplishments in academic areas that took place at the Institute during the past year.

People

Chris A. Kaiser stepped down as provost in October 2013 and returned to research and teaching in the Department of Biology. Martin Schmidt, who had served as associate provost since 2008, was named acting provost in November and then appointed provost in February. Professor Schmidt began his faculty career in the Department of Electrical Engineering and Computer Science immediately after receiving his PhD in the same department in 1988.

In October 2013, W. Eric Grimson, who had served as chancellor since 2011, assumed the new role of chancellor for academic advancement. He will be a central advisor to MIT's president on the upcoming capital campaign's shape and strategy.

Cynthia Barnhart succeeded Eric Grimson as chancellor in February 2014. A member of the Department of Civil and Environmental Engineering, with a joint appointment in the Engineering Systems Division, Professor Barnhart had served as associate dean of engineering since 2007 and was also acting dean of engineering during AY2011. She received her PhD in transportation at MIT.

In November 2013, Marc Kastner stepped down from his position as dean of the School of Science after being nominated by President Obama to head the US Department of Energy's Office of Science. Professor Kastner, who is the Donner Professor of Physics and a former head of the physics department, had served as dean since 2007.

In June, Michael Sipser was appointed to succeed Marc Kastner as dean of the School of Science, having served as interim dean since December 2013. Professor Sipser, the Barton L. Weller Professor of Mathematics, had headed the Department of Mathematics since 2004.

In January, Adèle Naudé Santos announced her decision to step down as dean of the School of Architecture and Planning at the end of the 2013–2014 academic year, after completing 10 years in this position. Professor Santos returned to her position as a faculty member in both the Department of Architecture and the Department of Urban Studies and Planning. Effective July 1, 2014, Mark Jarzombek was named interim dean of Architecture and Planning. Professor Jarzombek, who received his PhD in History of Architecture from MIT, had been associate dean of the School of Architecture and Planning since 2007. A search for a permanent dean is expected to conclude in fall 2014.

Jeffrey Newton retired in January 2014 as vice president for resource development, a position he had held since 2007. A search for his successor is expected to continue into the fall of 2014.

Daniel Hastings was appointed to a three-year term as director of the Singapore–MIT Alliance for Research and Technology in January. He had served for more than seven years as dean of undergraduate education.

In April, Karen Gleason succeeded Martin Schmidt as associate provost, with oversight of space planning, allocation, and renovations across the Institute, and additional responsibility for supporting the provost's goal of strengthening MIT's industrial engagements. Professor Gleason, a member of the Chemical Engineering faculty who earned her undergraduate degree at MIT, previously served as associate dean of engineering for research.

Alison Alden, who had served as vice president for human resources since 2007, retired in spring 2014. A search for her successor is under way and expected to continue into fall 2014.

We were deeply saddened this year by the deaths of Robert Alberty, professor emeritus of chemistry and former dean of the School of Science; Pauline Maier, professor of history; James Roberge, professor of electrical engineering; Seth Teller, professor of computer science and engineering; and Ann Wolpert, director of libraries. These individuals will be greatly missed by the MIT community.

Academic Programs and Activities

A variety of new programs arose in AY2014, and at the same time, several existing programs experienced an expansion of activities. A small sample of these activities is described below. Please refer to the separate reports of individual academic areas for detailed information.

In August 2013, the Institute launched the Center for Neurobiological Engineering, an initiative designed to connect the efforts of researchers in several areas of MIT that are focused on brain science. One of the new center's goals is to foster the exchange of ideas related to brain research that may lead to greater understanding of neurological and psychiatric disorders. The center, which is jointly administered by the departments of Biological Engineering and Brain and Cognitive Sciences, will introduce a neuroengineering curriculum for graduate students interested in collaborating at the boundaries of neuroscience and engineering.

In September, MIT's Biomanufacturing Research Program (BioMAN) was awarded a \$10.4 million grant from the Defense Advanced Research Projects agency (DARPA) to develop devices and techniques for the rapid manufacturing of biologic medicines. This DARPA-sponsored research is aimed at shortening the timescale of producing biologics to meet specific battlefield threats and medical needs. It is part of BioMAN's mission to contribute to the improvement of global health through advances in the manufacture and delivery of high-quality biopharmaceuticals.

In October, MIT president Rafael Reif announced the creation of an MIT Innovation Initiative that is aimed at finding ways to strengthen innovation and production systems in service to society. Fiona Murray, the Alvin J. Siteman professor of entrepreneurship,

and Vladimir Bulović, the Fariborz Maseeh professor of emerging technology, were named as co-leaders of the new initiative. President Reif charged the initiative with identifying ways to leverage MIT's wide-ranging strengths in research toward accelerating the application of technological innovation to solving real-world problems. To that end, the initiative plans to focus on engaging five major stakeholders in the innovation ecosystem: innovators, entrepreneurs, large corporations, risk capital providers, and policy makers.

In January 2014, MIT and Harvard University released a series of working papers reporting on experience so far with a number of online courses offered by edX, the online learning initiative that was begun in 2012 under the joint leadership of the two universities. The collaborative efforts that led to the papers focused on part of edX's mission "to research how students learn and how technologies can facilitate effective teaching both on-campus and online." The papers analyzed large sets of data drawn from the online courses and also relied on interviews with course instructors to gain understanding of the educational profiles of students who take edX courses, behavioral patterns related to course registrations, the level of students' engagement with different parts of the available courseware, and student attrition. These studies are expected to help form the basic foundations for future research in the science of learning.

In March, MIT hosted a day-long workshop, co-sponsored by the White House Office of Science and Technology Policy, on privacy issues related to so-called big data. The conference brought together computer scientists and others from academia and industry who shared ideas about the technical challenges of defining and protecting the privacy of individuals whose information is included in very large data sets. One local example of this challenge is how to protect the privacy of MITx students while simultaneously analyzing these students' interactions with digital courses in order to acquire valuable insights about learning behaviors.

In May, MIT announced the establishment of an Environment Initiative that is aimed at promoting cross-disciplinary research and education related to the environment, with an overarching goal of contributing to a sustainable human environment. This effort will encourage collaborative research and also will engage the many areas of ongoing environment-related work at MIT. Susan Solomon, the Ellen Swallow Richards professor of atmospheric chemistry and climate, was named as the initiative's founding director. The announcement of the Environment Initiative closely followed the creation of the Abdul Latif Jameel World Water and Food Security Laboratory, made possible by a gift provided by Mohammed Abdul Latif Jameel '78. This new laboratory, which will focus largely on solutions to worldwide water and food scarcity and will form a major component of the Environment Initiative, is headed by professor John Lienhard, the Abdul Latif Jameel professor of water and food.

A report recommending the formation of a new academic entity at MIT that would be focused on complex and sociotechnical systems, information and decision systems, and statistics was submitted to the provost in May. The proposed new organization would incorporate many of the people and programs of the Engineering Systems Division and the Laboratory for Information and Decision Systems. It would also include a significant

new initiative in statistics and, potentially, other related programs and research groups. The new entity would house cross-disciplinary research and educational activities designed to advance MIT's leadership in these critical areas. Immediately after receiving the report, the provost invited MIT community input on the report's recommendations; next steps regarding the creation of this new entity will be announced late in 2014.

Campus Renewal

In October 2013, MIT opened its newest child-care facility, the David H. Koch Childcare Center. The 14,000 square-foot facility, located in West Campus on Vassar Street, doubled the Institute's capacity to provide daycare for the preschool children of faculty, staff, graduate students, and post-doctoral associates.

In April 2014, the Institute announced plans for the construction of a 200,000-square-foot building to house state-of-the-art facilities that will support research in nanoscale materials and processes—the Nano-Materials, Structures, and Systems Laboratory (nMaSS) (also referred to as MIT.nano). This facility is expected eventually to support the work of 2,000 MIT researchers, bringing together many related research activities that currently take place in different areas of the campus. Preparation of the building site began in summer 2014, with construction expected to begin in late 2015. Occupancy of the new facility is planned for 2018.

Major renovations to the Sloan Building (E52) continued during the past year and are planned to reach completion in 2016. The Sloan Building will provide fully renovated space for the Department of Economics and for portions of the Sloan School of Management. Similarly, extensive renovations proceeded this year in Building 2 in the Main Group. The Mathematics Department will reoccupy this space upon the renovations' planned completion in 2016.

Construction continued in 2013–2014 on a major research facility for the Novartis Institutes of BioMedical Research on land that the company has leased from MIT at the intersection of Massachusetts Avenue and Albany Street. This new facility, which should be completed in 2015, will contribute to an existing environment of interdisciplinary partnerships, collaborations, and information exchange in the area of life sciences.

Committee Activities

In October, an Institute-wide Task Force on the Future of MIT Education submitted a preliminary report. The task force sought to better understand the educational resource needs at the Institute in the context of the changing ways that students and instructors interact. The report examines data relevant to the focus areas of the three working groups within the task force: MIT education and facilities for the future; the future global implications of edX and the opportunities it creates; and a new financial model for education. It also identifies a range of opportunities within the Institute's educational ecosystem that should be further explored. A final phase of the report should be released in late summer 2014 and is expected to provide practical recommendations for improving the education of MIT's students.

Also in October, the Institute's East Campus Steering Committee selected an urban design team, consisting of urban planners and landscape architects, including specialists in environmental design and urban transportation, to help advance plans for the development of MIT-owned property in the East Campus/Kendall Square area. The team has been commissioned to recommend a long-range plan for academic, residential, and commercial uses of land in Kendall Square that will serve the best interests of the Institute while also contributing to an urban environment that links an important sector of the MIT campus to the Cambridge community.

The Graduate Student Housing Working Group, which included faculty, students, and staff from a variety of departments, submitted its final report in June. The report recommends the addition of new housing to accommodate 500 to 600 graduate students to satisfy current unmet needs. The report recommends that these new housing units be configured in ways that flexibly accommodate both married and unmarried students as well as families. Both East Campus and West Campus planning efforts will be asked to consider possible options for locating new graduate housing facilities in those areas, and these discussions will continue into 2014 and 2015.

Faculty

Twenty-two faculty members retired from MIT in AY2014, while faculty recruitment continued at a strong pace. A total of 50 new faculty members (35 men and 15 women, including three members of underrepresented minority groups) began their MIT appointments during AY2014. Also this year, 24 faculty members, including six women, were awarded tenure within MIT. These promotions went into effect as of July 2014.

The James R. Killian, Jr. Faculty Achievement Award is the highest honor bestowed by the MIT faculty on one of its own members. The award was established in 1971 to recognize extraordinary professional accomplishments by full-time members of the MIT faculty. In May, it was announced that Sallie "Penny" Chisholm, the Lee and Geraldine Martin professor of environmental studies, who holds appointments in both the Department of Civil and Environmental Engineering and the Department of Biology, was selected as the Killian Award recipient for 2014.

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 2014 Edgerton Award was presented to Nickolai Zeldovich, who is an associate professor in the Department of Electrical Engineering and Computer Science.

Five 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. The awardees are Jacopo Buongiorno, an associate professor of nuclear science and engineering; Tomas Lozano-Perez, the School of Engineering Professor of Teaching Excellence in the Department of Electrical Engineering and Computer Science; John Ochsendorf, the Class of 1942 professor of architecture, with a joint appointment in the Department of Civil and Environmental Engineering; Heather Anne Paxson, an associate

professor of anthropology; and Kristala L. J. Prather, the Theodore T. Miller associate professor of chemical engineering. MacVicar Faculty Fellows are appointed for 10-year terms. These additions bring the total number of active fellows to 41, along with 55 emeritus fellows remaining at MIT, who together form a cohort 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 Institute, 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. In AY2014, the Dr. Martin Luther King, Jr. visiting professors were Modupe Akinola, Management; Erika Camacho, Mathematics; Christopher Rose, Electrical Engineering and Computer Science; Jason K. Sello, Biology; and Stephen Wirkus, Mathematics. In addition, six visiting scholars were sponsored by the program: Sophia Cisneros, Physics; Ta-Nehisi Coates, Writing; Karilyn Crockett, Urban Studies and Planning; Julio D'Arcy, Chemical Engineering; Miloon Kothari, Urban Studies and Planning; and Chanda Prescod-Weinstein, Physics.

The following represent a sample of the many faculty members who were honored with outside awards or appointments this past year:

Four faculty members were elected to the National Academy of Sciences: Daron Acemoglu, professor of economics; Emery Brown, professor of medical engineering; Alan Grossman, professor of biology; and Timothy Grove, professor of geology.

Elected this year to the National Academy of Engineering were Sandy Pentland, professor of media arts and sciences, and Ian Waitz, professor of aeronautics and astronautics and dean of the School of Engineering.

Dina Katabi, professor of computer science and engineering, and Sara Seager, professor of physics and planetary science, were awarded MacArthur Fellowships.

Alan Guth, professor of physics, was awarded the Kavli Prize in Astrophysics.

Institute Professor Robert Langer was honored with both the Breakthrough Prize in Life Sciences and the Kyoto Prize, Japan's highest private award for global achievement.

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 AY2014, 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 indicate specific areas of support that have been designated by the donor.

Akamai Technologies, Inc. (mathematics, electrical engineering and computer science)

Agencourt Bioscience Corp. /Alnylam Pharmaceuticals

Homer A. Burnell (architecture, urban studies and planning)
Richard A. Denton
Morton E. Goulder (1942)
Herbert and Dorothy Grier
Robert T. Haslam (chemistry, 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)
Liberty Mutual Foundation
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, 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)

Also, five students (one in each school) held Provost's Women and Minority Fellowships, which are considered to be a part of the Presidential Graduate Fellowship Program.

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 Graduate Fellowship Program.

To build community among the fellows, the Society of Presidential Fellows hosted a lecture and dinner series co-sponsored by the Sidney-Pacific Graduate Residence. Fundraising for the support of the Presidential Graduate Fellowship Program continued to be a high priority of the Institute.

Finances

MIT tuition was increased by 3.4% to \$43,210 in AY2014. Approximately 56% 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. There was a budgeted decrease in the Institute's undergraduate enrollment by 40 students in AY2014, as a result of the closure of the Bexley Hall residence.

In fiscal year 2014, \$10 million was made available for new academic and administrative programs, double the amount that had been made available in previous years. Because of an operating surplus at the end of the fiscal year, the Institute also was able to add funds to a reserve that is used for infrastructure renewal such as capital projects, building repair and maintenance, and information technology modernization, and for the support of budget flexibility and strategic initiatives in future years.

The market value of investments in the Institute's endowment as of June 30, 2014, was \$12.4 billion, representing an increase of 13.8% above the June 30, 2013, value of \$10.9 billion.

Research

Expenditures on sponsored research conducted on campus totaled \$678.4 million in AY2014, representing a slight increase of 0.6% above the 2013 volume of \$674.3 million. The federal government continues to be the largest sponsor of campus research funding, accounting for approximately 68% of the total volume. The Department of Defense is the single largest sponsor of campus research, with an approximate 18% share of total research expenditures. The National Institutes of Health, part of the Department of Health and Human Services, accounted for approximately 17% of total research expenditures, followed by industrial sponsors (16%), the Department of Energy (13%), and the National Science Foundation (12%).

Lincoln Laboratory research volume was \$811 million in AY2014, a decrease of 9% from the 2013 volume of \$884 million. This decrease in part reflects accelerated funding of research at the laboratory during AY2013.

Martin A. Schmidt

Provost