

## Provost

MIT continued to strengthen and expand its activities in the academic areas in 2015–2016, with several new research efforts and educational initiatives emerging during the year. Campus renewal activities also proceeded in key areas. The year was marked as well by two celebratory events that reminded us of our community connections and our history: in April, more than 40,000 people visited the MIT campus to participate in activities at the Institute’s first Open House since 2011, and in May, the Institute celebrated Moving Day, commemorating the 100th anniversary of the relocation of the MIT campus from Boston to Cambridge.

This report describes some of the prominent events and accomplishments in the academic and related areas that took place across the Institute during the past year.

## People

In July 2015, Amy Brand PhD ’89 began as director of the MIT Press, succeeding Ellen Faran, who stepped down in spring 2015. Dr. Brand has extensive experience in publishing and scholarly communications, including prior service as an editor at the MIT Press.

In October 2015, John E. Fernandez, professor of building technology in the Department of Architecture, was named the new director of MIT’s Environmental Solutions Initiative, an Institute-wide activity that began in 2014. He succeeded Susan Solomon, Ellen Swallow Richards Professor in the Department of Earth, Atmospheric and Planetary Sciences, who had served as the Initiative’s founding director.

Dr. Cecelia Warpinski Stuopis ’90 joined MIT in winter 2015 as director of MIT Medical, succeeding Dr. William Kettyle, who retired after having led MIT Medical since 2000. Dr. Stuopis had most recently been vice president and executive medical director for accountable care at the Dartmouth-Hitchcock health system in New Hampshire.

As part of MIT’s increasing efforts in the science and scholarship of learning, Professor Sanjay Sarma, who had been dean of digital learning, assumed expanded responsibilities in February as vice president for open learning.

In May 2016, Judy “JJ” Jackson was appointed to the new position of MIT’s diversity and inclusion officer. Jackson had previously worked at MIT from 1989–2000 in a variety of administrative roles. Most recently, she had been vice president for institutional diversity and associate professor at the University of Kentucky

In June 2016, Christine Ortiz stepped down from her position as dean for graduate education, which she had held for six years, in order to pursue new interests in university education. Chancellor Cynthia Barnhart announced her intention to consult broadly with the MIT community regarding the transition of leadership in the Graduate Education office.

Suzy Nelson began as vice president for student life on July 1, 2016, coming to MIT from Colgate University, where she had been vice president and dean of the college. Dr. Nelson succeeds Costantino (Chris) Colombo, who retired in 2016 after seven years of service as dean for student life.

Also in July 2016, Lesley Millar-Nicholson became the new director of the Technology Licensing Office (TLO), succeeding Lita Nelsen, who retired in spring 2016 after 30 years of service in the TLO, including 23 years as director. Millar-Nicholson previously was the director of the Office of Technology Management at the University of Illinois at Urbana-Champaign.

We were deeply saddened by the deaths last year of Stanford Anderson, professor of history and architecture; Frank Perkins, professor emeritus of civil and environmental engineering and former associate provost and dean for graduate education; Lester Thurow, professor emeritus of management and economics and former dean of the Sloan School of Management; and John Wyatt, professor of electrical engineering.

### Academic Programs and Activities

New activities in the academic areas continued to emerge throughout the year, reflecting the Institute's goals of continually improving its educational programs and engaging nationally and globally to foster innovative research. A small sample of these activities is described below. Please refer to the separate reports of individual academic areas for detailed information about these and other programs.

In July 2015, MIT became a key member of the American Institute for Manufacturing Integrated Photonics (AIM Photonics), a new public-private consortium devoted to strengthening US capabilities in integrated photonic technology by bringing together researchers from academia, government, and industry. This technology integrates light-based communications and computation with more traditional electronic systems, regarded as a key approach to realizing advances in computing speed and efficiency. In particular, MIT faculty will lead efforts in technological innovation in silicon photonics as well as a program in education and workforce development. AIM Photonics is supported by a combination of federal funds and contributions from state and local governments, manufacturing companies, and academic and non-profit institutions.

In October 2015, MIT announced a five-year plan aimed at addressing climate change. This initiative—described in a report entitled [“A Plan for Action on Climate Change”](#)—emerged following more than a year of discussions within the MIT community on climate change issues, spearheaded by MIT's Vice President for Research Maria Zuber. The report recommends that MIT take a more pro-active, public leadership role in bringing meaningful action to the climate change arena, while drawing on the expertise of diverse areas of science, engineering, and policy across the MIT community, including its alumni. The plan's goals for direct action include the development of an improved understanding of climate change and practical solutions to combat it; the acceleration of progress on low-carbon technologies, in part building on the work of the MIT Energy Initiative; increasing educational opportunities, including the creation of an Environment and Sustainability degree option; expanding knowledge-sharing tools,

such as short course, seminars, and on-line communication tools; and reducing carbon emissions on the MIT campus.

During 2015–2016 the Faculty approved the creation of the following new degrees:

- In the Sloan School of Management, SB degrees in management, business analytics, and finance. These degrees will replace the existing SB degree in management science, which will be gradually phased out. The new degrees are intended in part to provide undergraduates in management with a broader choice of majors.
- Also in the Sloan School, a Master of Business Analytics (MBAn) degree. This is a specialized master's program designed to combine advanced scholarship in applied mathematics, operations research, computer science, statistics and other related areas of data science to address problems in business.
- In the Institute for Data, Systems, and Society (IDSS), a PhD in social and engineering systems. This new program is intended to attract students with an interest in addressing complex social problems, within a unique framework of analytics, quantitative methods, and social sciences.
- Also in IDSS, a minor in statistics and data science, focused on training in statistics, probability and computation, leading to data analysis.
- A minor in computer science, offered by the Department of Electrical Engineering and Computer Science, which will provide students with a strong background in the fundamentals of programming, algorithms, and discrete mathematics.
- A minor in design, in the Department of Architecture, providing instruction in the conceptual foundations, core principles and skills of design in studio settings.
- A minor in entrepreneurship and Innovation, offered jointly by the School of Engineering and the Sloan School of Management, providing students with the practical knowledge and skills to navigate the innovation economy.

All of the above new degree programs are expected to enroll their first students in fall 2016.

In February 2016, the Institute announced several new initiatives related to the recommendations of the 2014 report of the Institute-wide Task Force on the Future of Education:

- The MIT Integrated Learning Initiative, drawing from research in cognitive psychology, neuroscience, design, economics, and other disciplines to better understand how people learn most effectively, for the benefit of both students on campus as well as distance learners.
- The MITx Digital Learning Lab, composed of 16 MIT lecturers and postdoctoral researchers charged with collaborating with faculty who choose to build digital content into their course offerings.

- The MIT pK-12 Action Group, charged with supporting and integrating the more than 100 current and developing pre-kindergarten through 12th grade learning in science, technology, engineering, and math.
- The Digital Learning Solutions team, with a goal of strengthening the Institute's digital strategies related to our offerings in continuing education, in order to better address the needs of corporate executives and other professionals.

All of these efforts are intended to enhance the quality of MIT's residential education and to maximize the benefits to off-campus learners who use our online educational resources.

In April 2016, an MIT report on online education was presented at a forum sponsored by the National Academy of Sciences. Titled "Online Education: A Catalyst for Higher Education Reforms", the report examines ways in which the future of higher education might be shaped by advances in online learning technology. The report's lead authors are Sanjay Sarma, professor of mechanical engineering and dean for digital learning, and Karen Willcox, professor of aeronautics and astronautics. The report makes four primary recommendations: increased interdisciplinary collaboration of researchers, such as education experts, neuroscientists and social scientists, among others, to better understand how learning takes place; viewing online learning as a support structure to be integrated with in-person learning, rather than as a replacement for it; the development of a new, skilled workforce dedicated to the design of digital learning methods and tools; and the encouragement of high-level institutional and organizational change needed to support the transformations brought about by online learning activities.

In June 2016, MIT marked the launch of its new Hong Kong Innovation Node, serving as a means for MIT students, faculty and alumni to form stronger connections with the Hong Kong region's rapidly-expanding innovation culture. This program, managed by the MIT Innovation Initiative, builds on the Institute's history of educational and research collaborations in this part of the world and signifies its commitment to establish a long-term presence in Hong Kong and a gateway for MIT in China. In particular, the program will encourage students to form international teams with counterparts in Hong Kong to study best practices for bringing innovation to real-world application. The faculty director of the Hong Kong Innovation node is Charlie Sodini, the Clarence J. LeBel Professor of Electrical Engineering.

Also this year MIT announced the creation of a new "Makerspace" to be housed on campus, a resource intended to provide students with increased hands-on learning opportunities that enable the delivery of new technologies and other innovations to the marketplace. While adding significantly to the inventory of makerspace facilities that already exist across the campus, this new space, whose exact location is still to be determined, will also serve as the Institute's physical and virtual connection point with the Hong Kong Innovation Node. The new facility is made possible by the generous support of the Victor and William Fung Foundation.

## Campus Renewal

Following the demolition of Building 12 in early summer 2015, construction began on the new 200,000-square-foot building that will house MIT.nano, a state-of-the-art facility that will support research in nanoscale materials and processes. The new building is expected eventually to support the work of 2,000 MIT researchers, bringing together numerous research activities related to nanotechnology that currently take place in different areas of the campus. Occupancy of the new facility is planned for 2018.

An extensively upgraded Building E52 was re-opened in January and officially dedicated in March, marking the completion of a two-and-a-half year renovation project. The original Sloan Building, now christened the Morris (SB '52, SM '53, ME '55) and Sophie Chang Building, houses the Economics Department as well as administrative offices for many of the Sloan School of Management's academic programs and student services. A new, glass-enclosed seventh floor addition is part of a new event space for the use of the MIT community, the Samberg Conference Center, in honor of Arthur Samberg '62 and Rebecca Samberg. The building was re-designed partly in recognition of the Art Deco style that characterized the original building. Interior pedestrian bridges connect to buildings E40, E51, E62, and E60.

In May 2016, MIT's Kendall Square Initiative, a mixed-use development project that features the construction of six new buildings on Institute-owned property in the East Campus/Kendall Square area, gained the unanimous approval of the City of Cambridge Planning Board, marking the culmination of a six-year regulatory process and a series of discussions, public hearings and planning efforts within the MIT and Cambridge communities. The new development, which will include research and innovation facilities, a major new graduate residence hall, both affordable and market-rate residential units, and a variety of retail spaces, will be constructed over the next decade. One of the new venues will house the MIT Museum, part of an intention to design the area as a public gateway to the MIT campus. The project aims to ensure a strong sense of connection among all of the new buildings and also between the campus and the Cambridge community. Each new building will be required to undergo a design review by the City of Cambridge prior to construction.

A major renovation of Building 9 began in June 2016 and is expected to conclude by the beginning of September 2016. The renovated space will house the new [Samuel Tak Lee MIT Real Estate Entrepreneurship Lab](#), which will focus on educating a new generation of socially-responsible entrepreneurs and academics within the field of urban development and real estate. Building 9 currently houses both the Department of Urban Studies & Planning and the MIT Center for Real Estate. In addition to energy-efficiency and accessibility upgrades and overall modernization of both classroom and office spaces, the centerpiece of the new configuration will be an interactive "city arena" on the second floor, where students, faculty, and guests will be able to work together in an interactive, flexible work-space supported by state-of-the-art communications and presentation technology.

## Faculty

Sixteen faculty members retired from MIT in 2015–2016, while faculty recruitment continued at a strong pace. A total of 46 new faculty members (32 men and 14 women, including seven members of underrepresented minority groups) began their MIT appointments during 2015–2016. Also this year, 19 faculty members, including five women, were awarded tenure within MIT. These promotions to tenure were effective July 2016.

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 Eric Lander, professor of biology and founding director of the Broad Institute of Harvard and MIT, was selected as the Killian Award recipient for 2016–2017.

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 2016 Edgerton Award was presented jointly to Katharina Ribbeck, Eugene Bell Career Development Professor of Tissue Engineering in the Department of Biological Engineering; and to Jesse Thaler, associate professor in the Department of Physics.

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. The awardees are: Srinivas Devadas, Edwin Sibley Webster Professor of Electrical Engineering and Computer Science; Jeffrey Grossman, professor of materials science and engineering; Michael Sipser, dean of the School of Science and professor of mathematics; and Patricia Tang, associate professor of music and theater arts. MacVicar Faculty Fellows are appointed for 10-year terms. These additions bring the total number of active fellows to 43, along with 58 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 Professors and Scholars Program was established in 1995 to recognize the many contributions of outstanding minority scholars, as well as to enhance their scholarship through intellectual interactions with MIT peers and enrich the intellectual life of the Institute through their participation in MIT research and academic programs. The 2015-2016 MLK visiting professors were: Baratunde Cola, visiting associate professor, mechanical engineering; LaShanda Korley, visiting associate professor, chemistry; Israel Ncube, visiting professor, institute for medical engineering and science; and Jacquelyn Taylor, visiting associate professor, biology. In addition, one MLK visiting scholar was sponsored by the program: Kenneth Reeves, urban studies and planning.

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

Four faculty members were elected to the National Academy of Sciences: Arup Chakraborty, Robert T. Haslam Professor of Chemical Engineering and director of the Institute for Medical Engineering and Science; Nancy Lynch, NEC Professor of Software Science and Engineering in the Department of Electrical Engineering and Computer Science; Hidde Ploegh, professor of biology and member of the Whitehead Institute for Biomedical Research; and David Sabatini, professor of biology and member of the Whitehead Institute.

Elected this year to the National Academy of Engineering were: Charles E. Leiserson, Edwin Sibley Webster Professor in the Department of Electrical Engineering and Computer Science; Emanuel M. Sachs, professor in the Department of Mechanical Engineering; and Grant Stokes, head of the Space Systems and Technology Division at the MIT Lincoln Laboratory.

Seven individuals at MIT were elected to the American Academy of Arts and Sciences: Andrea Louise Campbell, Arthur and Ruth Sloan Professor of Political Science and head of the Department of Political Science; Victor Chernozhukov, professor of economics; Pavel Etingof, professor of mathematics; John Gabrieli, Grover M. Hermann Professor in Health Sciences and Technology; Jacqueline Hewitt, professor of physics and director of the Kavli Institute for Astrophysics and Space Research; Vann McGee, professor of philosophy; and Robert Brian Millard '73, chair of the MIT Corporation.

Four faculty were elected to the American Association for the Advancement of Science: Karl Berggren, professor of electrical engineering; Edmund Bertschinger, professor of physics and Institute community and equity officer; Gerald Fink, professor of genetics; and Victor Zue, Delta Electronics Professor of Electrical Engineering and Computer Science

Edward Boyden, associate professor of media arts and sciences, biological engineering, and brain and cognitive Sciences, won a Breakthrough Prize in Life Sciences.

Rainer Weiss, professor emeritus of physics, was awarded the Kavli Prize in Astrophysics, a Special Breakthrough Prize in Fundamental Physics, the 2016 Gruber Prize in Cosmology, as well as the Shaw Prize in Astronomy.

Heidi Williams, the Class of 1957 Assistant Professor in Economics, won a MacArthur Fellowship.

Feng Zhang, the W. M. Keck Career Development Associate Professor in Brain and Cognitive Sciences and in Biological Engineering, was a recipient of the Canada Gairdner International Award, and also was named a Tang Prize Laureate in Biopharmaceutical Science.

Maria Zuber, vice president for research and E.A. Griswold Professor of Geophysics, was elected chair of the National Science Board.

## 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 AY2016, this program awarded a total of 113 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.

- Edward A. Abdun-Nur '24
- Akamai Technologies, Inc. (Mathematics and Electrical Engineering and Computer Science)
- Agencourt Bioscience Corp. /Alynlam Pharmaceuticals
- Ashar Aziz (1981)
- 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)
- Heising-Simons Foundation
- 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 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)
- David S.Y. (1962) and Harold Wong

Also, four students 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 seven 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.

In order to build community among the fellows, the Society of Presidential Fellows hosted a lecture and dinner series cosponsored 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 \$46,400 in AY2016. MIT remains committed to a policy of need-blind admissions and to meeting the full financial need of all undergraduates it admits. Approximately 56% of all undergraduates received need-based MIT scholarship aid this year. The undergraduate financial aid budget was increased by 9% in fiscal 2016 to help offset the increase in tuition and a decrease in the student self-help expectation. The graduate financial aid budget was increased by 6% to address increased support for Teaching Assistants. The Institute's undergraduate enrollment was 4,527 in 2015–2016, an increase of 15 students from 2014–2015, while graduate student enrollment decreased by three to 6,804.

Ten million dollars was made available in FY2016 for new academic (\$7M) and administrative (\$3M) programs, similar to the previous year's allocation. 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, 2016 was \$13.2 billion, representing decrease of 2.2% below the June 30, 2015 value of \$13.5 billion.

## Research

Expenditures on sponsored research conducted on campus totaled \$728.1 million in AY2016, representing an increase of 4.5% above the 2015 volume of \$696.9 million.

The federal government continues to be the largest sponsor of campus research funding, accounting for approximately 65.5% of the total volume. The Department of Defense is the single largest sponsor of campus research with an approximate 18.1% share of total research expenditures. Industrial sponsors accounted for approximately 17.6% of total research expenditures, followed by the National Institutes of Health and other agencies within the Department of Health and Human Services (15.6%), the Department of Energy (11.6%), private foundations and nonprofit organizations (11.5%), and the National Science Foundation (11.3%).

Lincoln Laboratory research volume was \$927 million in AY2016, an increase of 4.2% above the 2015 volume of \$890 million.

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