

Provost

Last year's report by [the Office of the Provost](#) described the onset of Covid-19 in spring 2020 and the extraordinary and unprecedented challenges it presented to our academic environment. While some of the pandemic's effects receded by late 2020, allowing a partial and carefully managed return of our students to campus, in-person interactions throughout the Institute's community remained quite limited, with online teaching still widely in effect, and most faculty and staff working remotely. As they did last year, the people of the MIT community—students, faculty, and staff—worked in harmony and with extraordinary dedication and innovation to allow our teaching, research, and administrative activities to move forward and thrive, despite the compromises that Covid-19 has imposed.

This report provides highlights of the numerous achievements and notable activities connected with the academic programs of the Institute during FY2021 as we moved toward a redefining of normal operations.

People

Nergis Mavalvala, the Curtis and Kathleen Marble Professor of Astrophysics, became dean of MIT's School of Science effective September 1, 2020. She succeeded Michael Sipser, who returned to the faculty as the Donner Professor of Mathematics after six years of service as dean.

Glen Shor was appointed executive vice president and treasurer in October 2020, having served as vice president for finance since 2015.

In February 2021, Katherine "Katie" Hammer joined MIT as vice president for finance. She was most recently the chief deputy CFO for the City of Detroit and also served in public finance roles for the City of Boston and the Commonwealth of Massachusetts.

Krystyn Van Vliet expanded her responsibilities in April 2021 to serve as associate vice president for research in addition to her role as associate provost. In her duties within the Office of the Vice President for Research, Professor Van Vliet oversees Research Administration Services, Research Development, Research Facilities, and related areas of research administration systems and reporting.

Associate Provost Tim Jamison also expanded his duties in April, assuming oversight of campus space assignments and renovations. Professor Jamison now co-leads the Renovations Subcommittee of the Committee for Renovation and Space Planning. He continues to provide leadership on faculty professional development and works with senior MIT leaders to ensure equitable practices during the faculty hiring, promotion, and tenure processes.

In May, Catherine Williams joined the Provost's office as director of communications. Prior to coming to MIT, she served in the Massachusetts House Speaker's office as the primary media and public relations contact.

Also in May, Arup K. Chakraborty and Paula Hammond were named Institute Professors, the highest honor bestowed upon MIT faculty members. Professor Chakraborty is a professor of chemical engineering and also holds faculty appointments in chemistry and physics. He was a founding director of the Institute for Medical Engineering and Science. Professor Hammond is the head of the Department of Chemical Engineering and a member of the Koch Institute of Integrative Cancer Research.

That same month, Cynthia Barnhart announced her plan to step down from her role as chancellor and return to the faculty on July 1, following seven years in that position. In June, it was announced that the next chancellor would be Melissa Nobles, effective August 2021. Professor Nobles, a political scientist, had served as dean of the School of Humanities, Arts, and Social Sciences (SHASS) since 2015.

In August, Agustín Rayo, a professor of philosophy, was appointed interim dean of SHASS. A faculty advisory committee was appointed by the provost and asked to submit a report in fall 2021 to help select the school's next dean.

We were greatly saddened by the deaths this past year of Angelika Amon, professor of biology; Paul LaGace, professor of aeronautics and astronautics; and Daniel Wang, Institute Professor.

Academic Programs and Activities

New activities in academic areas continued to emerge throughout the year, serving the Institute's goals of continually improving its educational programs and fostering pathbreaking and innovative research. Descriptions of three examples of notable activities follow below. Please refer to the separate reports of individual academic areas for detailed information about these and other programs.

MIT Stephen A. Schwarzman College of Computing

In August 2020, the Schwarzman College of Computing announced its plan to focus on six distinct areas of scholarship that will serve as a framework for faculty hiring in the coming years, specifically for 25 new positions designed to be shared between the college and other departments and schools.

The areas of focus are the following:

- Social, Economic, and Ethical Implications of Computing and Networks— Associated schools: SHASS and MIT Sloan School of Management
- Computing and Natural Intelligence: Cognition, Perception, and Language— Associated schools: School of Science, SHASS, and School of Architecture and Planning (SA+P)
- Computing in Health and Life Sciences— Associated schools: School of Engineering, School of Science, and MIT Sloan School of Management
- Computing for Health of the Planet— Associated schools: School of Engineering, School of Science, and SA+P

- Computing and Human Experience— Associated schools: SHASS and SA+P
- Quantum Computing— Associated schools: School of Engineering and School of Science

These areas reflect the growing impact of computing technology on a wide range of academic disciplines, as well as on the critical challenges and opportunities facing society at large.

MIT's Climate Action Plan

In May 2021, MIT announced an ambitious 10-year program to address climate change: Fast Forward: MIT's Climate Action Plan for the Decade. This plan builds on the Institute's original program on the climate crisis that began in 2015 by intensifying efforts toward breakthrough solutions to climate-related global challenges. Its comprehensive agenda includes expanding education about climate change both within MIT and in a public-facing way and fostering collaborative efforts among academic researchers, outside companies, and policymakers. Key is the Institute's commitment of at least 20 upcoming new faculty appointments to areas of scholarship that have a climate focus.

The plan has a local priority as well. While the MIT campus has worked successfully to reduce its carbon footprint significantly since 2015, MIT now commits to net-zero direct carbon emissions by 2026.

2U Acquires edX

In June it was announced that edX, the open online platform for university-level instruction co-founded by MIT and Harvard University in 2012, would be acquired by the publicly traded education technology company 2U. Under the terms of this agreement, edX will be reorganized as a public benefit company under the auspices of 2U. Financial proceeds from the transaction will be used to form a nonprofit entity to be led by MIT and Harvard and intended to explore the next generation of online education. In part, this new effort will focus on overcoming inequities associated with online learning, by exploring how to use artificial intelligence to improve personalized learning by adapting to the style and needs of individual learners.

Going forward, MIT faculty may choose to continue to offer their courses through the new edX managed by 2U or to move them to a new platform managed by MIT's Office of Digital Learning, called MITx Online.

Since its inception nine years ago, edX has engaged 160 partner institutions, reached more than 39 million learners, and exceeded 110 million course enrollments, contributing to the extraordinary development of the global market for online learning of college-level content.

Notable Committees

In response to the Covid-19 pandemic, in spring 2020 President Rafael Reif called for the formation of Task Force 2021 and Beyond, an Institute-wide effort charged with using lessons learned during the pandemic restrictions to explore constructive changes to the

ways the MIT community carries out its missions in research, teaching, and learning. The task force—comprised of more than 200 members of the MIT community, including students, faculty, and staff and assigned to 11 distinct working groups—worked throughout the 2021 academic year with the aim of producing a comprehensive report by early fall 2021. The work has taken place in two phases. The first phase resulted in the generation of 50 ideas designed to “reimagine and reposition the Institute for the post-Covid world.” The second phase, launched in March 2021, involved the creation of 16 Refinement and Implementation Committees (RICs) charged with refining and in some cases merging the 50 ideas and proposing implementation actions plans to move them forward.

The RICs cover a wide range of Institute activities and operations, including academic programs and student mentoring; student funding; career support for postdocs, researchers, and instructors; modernization of administrative systems; and reimagining work spaces and new ways of working. These areas reflect the intention not only to adapt to the emerging “new normal” conditions related to the pandemic but also to address longer-standing issues that have taken on new urgency in the past year. As part of a larger societal picture, this effort will devote attention to integrating many of these activities and operations with our obligation to strengthen social equity and civic responsibility by promoting a diverse and welcoming campus environment.

The Ad Hoc Faculty Committee on Guidelines for Outside Engagements, chaired by Professor Tavneet Suri, and the Ad Hoc Committee to Review MIT Gift Processes, chaired by Professor Peter Fisher, issued their final reports in fall 2020. These complementary committees had been charged, respectively, with defining a set of values and principles to guide the assessment of outside engagements—including grants, gifts, and other relationships—and with reviewing MIT’s current processes for soliciting, processing, and accepting gifts to the Institute. Following deliberations by an ad hoc group charged by President Reif to advise him on next steps in consideration of the committees’ recommendations, it was announced in May that the Interim Gift Acceptance Committee, formed as a result of the recommendations of the Gift Processes Committee and chaired by the provost, would proceed under a six-month “experiment” to expand its membership and adjust certain of its processes. In fall 2021, President Reif is expected to convene the group to assess the results of the experiment and recommend plans for the longer term.

Campus Renewal

The following is a description of some of the most prominent campus renewal projects completed or underway in the past year.

Expanded On-Campus Student Housing

As part of the Institute’s effort to expand on-campus residence capacity for undergraduate and graduate students, two new buildings were opened this year:

- New Vassar—a new 450-bed undergraduate living community on Vassar Street on the site of the former West Garage—opened to students in January 2021. Building W46 houses a mix of first-year and upper-level students within clusters, each encompassing single and double rooms, a study room, and a lounge space.

- The Graduate Tower at Site 4—a 454-apartment unit on Main Street in Kendall Square composed of one- and two-bedroom apartments designed for families with children and efficiency units for single students—also opened in January. Building E37 includes a childcare facility as well as several communal areas for both adults and children.

Kendall Square Initiative

Following some delays due to Covid-19, construction neared completion at the sites of Buildings E37 and E38 in Kendall Square as part of the Institute’s long-term, mixed-use development project in that area of campus. Along with the new graduate tower noted above, these fully renovated buildings will house a new MIT Welcome Center, the MIT Admissions Office, the MIT Press Bookstore, and the Institute’s new Innovation Headquarters that will include several entrepreneurial support organizations serving the MIT community. All are expected to take residence at this site in fall 2021. The MIT Museum will relocate to this address in spring 2022. The site will also include ground floor retail establishments and various industrial research activities.

Hayden Library Renovation

A newly renovated Hayden Library and Building 14 courtyard are expected to open to the MIT community in August 2021. Following a temporary closure at the end of 2019 to accommodate construction, the first two floors of the library are being upgraded to provide an expansion of study spaces for individuals and groups, flexible teaching and event space, and a new café. The center courtyard will be revitalized with the installation of a woodland garden bordered by paved walkways and seating areas among trees and other plants.

Schwarzman College of Computing

Construction began on a new building on Vassar Street to house the MIT Schwarzman College of Computing near the central MIT campus. Building 45, which replaces Building 44, will contain approximately 189,000 gross square feet and include office and research space for roughly 25 faculty groups and related activities. It is expected to be completed in 2023.

New Music Building

Construction began on a new building dedicated to music on the site of a parking lot adjacent to Kresge Auditorium on the west side of campus. The new facility, Building W8, will provide state-of-the-art spaces for music instruction, rehearsal, and performance as well as spaces for technically advanced research and production labs. The new facility is targeted for completion in 2024.

Faculty

Twenty-one faculty members retired from MIT in academic year 2021, while faculty recruitment continued at a strong pace. A total of 33 new faculty members (12 women and 21 men, including five members of underrepresented minority groups) began their MIT appointments during this academic year. Also this year, 15 faculty members (10 men, 5 women) were awarded tenure within MIT, effective July 2021.

Professors Desirée Plata, the Gilbert W. Winslow (1937) Career Development Associate Professor in Civil Engineering, and Justin Steil, the Class of 1942 Career Development Associate Professor of Law and Urban Planning, were named recipients of the 2020–2021 Harold E. Edgerton Faculty Achievement Award. The award is the highest honor bestowed by the MIT faculty on its junior faculty members and recognizes exceptional distinction in teaching and research. It is a tribute to the late beloved MIT Institute Professor, inventor, and photographer “Doc” Edgerton. The award’s selection committee chose to recognize both faculty members for their accomplishments that address critical societal challenges in environmental sustainability and social justice.

The James R. Killian, Jr. Faculty Achievement Award, established in 1971 “to recognize extraordinary professional accomplishments by full-time members of the MIT faculty,” is the highest honor bestowed by the MIT faculty on one of its own members. In May, it was announced that Robert Merton, the Sloan School of Management Distinguished Professor of Finance at the MIT Sloan School of Management, was selected as the Killian Award recipient for 2021–2022. The award citation describes Professor Merton as “one of the founding architects of modern finance theory,” whose work has “become an integral part of the global financial system.”

Four faculty members were appointed Margaret MacVicar Faculty Fellows in recognition of their outstanding contributions to the quality of undergraduate education at MIT. The 2021 awardees are Claude E. Shannon Professor of Mathematics Larry Guth; Associate Professor of Materials Science and Engineering Elsa Olivetti; Class of ’42 Associate Professor of Nuclear Science and Engineering Michael Short; and David H. Koch Professor in Science and Professor of Biological Engineering Michael Yaffe. MacVicar Faculty Fellows are appointed for 10-year terms. These awardees bring the total number of active fellows to almost 40, along with approximately 50 emeritus fellows remaining at MIT, who together form a cohort of scholars committed to excellent teaching and innovation in education that has thrived since the program’s inception in 1992.

The Dr. Martin Luther King, Jr. Visiting Professors and Scholars Program was established in 1995 to recognize the many contributions of outstanding minority scholars in the academy, as well as to both 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. There were eight 2020–2021 MLK Visiting Professors and Scholars:

- Moya Bailey, a visiting professor hosted by the MIT Program in Women’s and Gender Studies, joined from the Department of Cultures, Societies, and Global Studies and Women’s, Gender, and Sexuality Studies at Northeastern University.
- Jamie Macbeth joined the Computer Science and Artificial Intelligence Laboratory as a member of the Genesis group, a research team focused on building computer systems and computational models of human intelligence based on humans’ capability for understanding natural language.
- Ben McDonald, appointed as a postdoc in the Department of Chemistry, focuses his research on developing designer polymers for chemical warfare-responsive membranes and surfactants to control the function of dynamic, complex soft colloids.

- Luis Gilberto Murillo-Urrutia, a research fellow hosted by the Environmental Solutions Initiative, joined from the Center for Latin America and Latino Studies at American University.
- Patricia Saulis, a visiting professor hosted by Comparative Media Studies/ Writing, is a Wolastoqey (Maliseet) from Wolastoq Negotkuk (Tobique First Nation in New Brunswick, Canada) and executive director of the Maliseet Nation Conservation Council.
- Thomas Searles, a visiting professor hosted by the Department of Physics, is an associate professor of physics with tenure at Howard University.
- Charles Senteio, an assistant professor in library and information science in the Rutgers University School of Communication and Information, joined the MIT Sloan School of Management's Operations Management Group.
- Valencia Joyner Koomson, hosted by the Department of Electrical Engineering and Computer Science (EECS) and an associate professor at Tufts University, will begin her appointment in January 2021.

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

Five faculty members were elected to the National Academy of Sciences in 2021: Daniel Freedman, professor emeritus in the departments of Mathematics and Physics; Robert Guy Griffin, the Arthur Amos Noyes Professor of Chemistry; Larry Guth, the Claude Shannon Professor of Mathematics; Stephen Morris, the Peter A. Diamond Professor of Economics; and Gigliola Staffilani, the Abby Rockefeller Mauzé Professor of Mathematics.

Four researchers were elected this year to the National Academy of Engineering: William T. Freeman, the Thomas and Gerd Perkins Professor in the Department of Electrical Engineering and Computer Science; Jonathan Patrick How, the Richard Cockburn Maclaurin Professor in the Department of Aeronautics and Astronautics; Marija Ilic, senior research scientist in the Laboratory for Information and Decision Systems; and David Perreault, the Joseph F. and Nancy P. Keithley Professor of Electrical Engineering in EECS.

Five faculty members were elected to the American Academy of Arts and Sciences: Linda Griffith, the School of Engineering Professor of Teaching Innovation, Biological Engineering, and Mechanical Engineering; Muriel Médard, the Cecil H. Green Professor in the Department of Electrical Engineering; Leona Samson, professor of biological engineering and biology; Scott Sheffield, the Leighton Family Professor in the Department of Mathematics; and Li-Huei Tsai, the Picower Professor in the Department of Brain and Cognitive Sciences.

Professor Griffith and Feng Zhang, the Patricia and James Poitras '63 Professor in Neuroscience (departments of Brain and Cognitive Sciences and Biological Engineering), were elected to the National Academy of Medicine.

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 AY2020, this program awarded a total of 109 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./Alnylam Pharmaceuticals
- Ashar Aziz (1981)
- Homer A. Burnell (Architecture and Urban Planning)
- Richard A. Denton
- Martin Deutsch
- 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

Five 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 11 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 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.

Diversity, Inclusion, and Community

Stemming from President Reif's announcement of a commitment to a coordinated effort to strengthen racial equity and inclusion in all areas of the Institute, several initiatives were put in motion in the past year, each designed to develop and encourage activities that strengthen the diversity of our community.

The first draft of MIT's Five-Year Strategic Action Plan for Diversity, Equity, and Inclusion was issued in March 2021. The plan is intended to reflect our collective aspirations to be a welcoming and inclusive environment for all members of our community in living, learning, working, and conducting research. The plan was developed under the guidance of the Institute Community and Equity Office (ICEO) and with the contributions of a strategic action steering team composed of students, faculty, postdocs, and administrators who bring a wide range of experience in diversity and inclusion efforts.

With funding from the Provost's Office, the Institute will make a combination of immediate investments in anti-racist research at MIT totaling \$1 million and seek additional sources of funding (an additional \$200,000 was raised in FY2021). The goal is to seed new research, amplify existing research, create links between related efforts across MIT, and establish connections with research at other institutions.

In December 2020, Chancellor Cynthia Barnhart and Provost Martin Schmidt asked Department of Aeronautics and Astronautics Head Daniel E. Hastings and MIT Libraries Deputy Director Tracy Gabridge to co-chair an Institute-wide committee to develop a statement of shared values for MIT, with input and guidance to be sought from students, staff, postdocs, faculty, and alumni. The committee was asked to develop a statement that speaks to the Institute's distinctive character and culture and aims at fostering a unified sense of purpose among all members of the MIT community as we pursue our common mission. The committee is expected to issue a draft report in late summer 2021.

In summer 2021, the Institute completed the hiring of an assistant dean for diversity, equity and inclusion in each of MIT's five schools and the College of Computing. These senior staff appointments represent new positions dedicated to fostering a welcoming and inclusive community across all academic areas of the Institute. They result from the February 2020 recommendations of the MIT working groups charged with implementing the findings of the [National Academies of Science, Engineering, and Medicine's report](#) on sexual and gender harassment of women in academia. The six new assistant deans will tailor their efforts to the particular cultures of their academic areas and will also work collaboratively on issues of common concerns and in close coordination with ICEO.

Tuition, Student Enrollments, and Institute Finances

MIT tuition remained at \$53,450 in AY2021, with no increase from the prior year. The Institute remains committed to a policy of need-blind admissions and to meeting the full financial need of all undergraduates it admits through a combination of scholarship aid, student employment, and loans. Approximately 60% of all undergraduates received need-based MIT scholarship aid this year, at an average award of \$45,146, with all awards totaling \$127.6 million. Nearly 30% of undergraduates attended tuition-free, based on family income levels. Fully 82% of undergraduates who graduated from MIT in 2021 had no student debt.

The Institute's undergraduate enrollment in AY2021 was 4,361, a decrease of 169 students from AY2020, while graduate student enrollment decreased by 97 to 6,893. These changes, especially in the case of undergraduates, resulted from an increased number of students deciding to take a leave of absence due to Covid-19.

The impacts of Covid-19 on the Institute's operating budget were significant, with unbudgeted expenses related to the safety and support of our community totaling \$207 million for fiscal year 2021. In anticipation of these costs, the Institute froze the distribution of income from endowed funds at 2020 levels; implemented a salary freeze for most categories of MIT employees; and required budget reductions at a level of 3% generally across all academic areas, with no funds available for special projects. These conditions resulted in a shortfall in the FY2021 general Institute budget (the central, unrestricted sources of funds) of \$146.1 million. No funds were added to the Institute's financial flexibility reserve at the close of the fiscal year.

The market value of investments in the Institute's endowment as of June 30, 2021 was \$27.4 billion, representing an increase of 49.0% over the June 30, 2020 value of \$18.4 billion. This unusually strong gain in resources will enable the Institute to address a range of funding priorities beginning in fiscal year 2023 and moving ahead.

The Campaign for a Better World, a major fundraising effort formally launched in 2011, officially concluded in June 2021, having raised \$6.24 billion to support the Institute's work. The campaign's original goal of \$5 billion was increased to \$6 billion in 2019.

Research

Expenditures on sponsored research conducted on campus totaled \$739.8 million in FY2021, representing a decrease of 2.9% over FY2020's \$762.0 million.

The federal government continues to be the largest sponsor of campus research funding, accounting for approximately 61% of the total volume. Industrial entities continued for the fifth straight year to represent the single largest sponsor of campus research, with an approximate 22.0% share of total research expenditures. The National Institutes of Health and other agencies within the Department of Health and Human Services accounted for approximately 18.3% of total research expenditures, followed by the Department of Defense (16.9%), private foundations and nonprofit organizations (11.4%), the National Science Foundation (10.0%), and the Department of Energy (9.7%).

Lincoln Laboratory research volume was \$1,109.2 million in FY2021, a decrease of 0.6% over the 2020 volume of \$1,115.8 million.

Martin A. Schmidt
Provost