Institutional Self-Study

Prepared for the New England Commission of Higher Education

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The Massachusetts Institute of Technology

Cambridge, Massachusetts

Workroom materials are available only to the members of the evaluation team.

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INTRODUCTION

Self-assessment and peer review are ingrained in MIT's commitment to excellence. Since 1875, the Institute's academic programs and other major units have undergone regular, systematic evaluation through a robust visiting committee structure. The visiting committees surface strengths, weaknesses, challenges, and opportunities, and influence MIT's direction both locally and holistically. The Reaccreditation Steering Committee approached this comprehensive review as an opportunity to examine how MIT has changed over the last decade, to think critically about the present, and to imagine possibilities for the future.

Although the Institute began laying the groundwork for this self-study early in 2017, the process didn't officially launch until December of that year, when MIT charged nine planning groups corresponding to the nine standards for accreditation. Within the span of six days, three key activities focused the Institute's attention on the task at hand. First, the Academic Council—MIT's senior leadership and the elected chair of the faculty—began a discussion about accreditation, especially in the context of the areas for emphasis identified during the last comprehensive and interim reviews. Second, two members of the steering committee and the director of institutional research (IR) convened the members of the planning groups for an orientation to the accreditation process. Finally, MIT President L. Rafael Reif welcomed New England Commission of Higher Education (NECHE) President Barbara Brittingham to campus to begin a discussion about the self-study process and MIT's goals for the effort.

The self-study benefited from broad community engagement, as the planning groups—whose rosters included officers, faculty, staff, and, in the case of Standard 5, students—began meeting at the start of 2018. They first developed individual comprehensive outlines to ensure coverage of the various points in each standard. After Academic Council review, the groups began shaping their outlines and developing narratives, focusing on key activities that demonstrate MIT's evolution over the last decade. The staff to the steering committee worked closely with the planning groups to coordinate, integrate, and shape the material into a cohesive draft in a single voice.

Early in the process, two members of the steering committee met with the Faculty Policy Committee, a standing committee of the faculty that provides guidance and support to the other standing faculty committees, to brief the faculty on accreditation.

In March 2019, MIT hosted evaluation team lead Dr. Jean-Lou Chameau and Dr. Brittingham for a daylong preliminary visit, scheduling meetings with members of the steering committee and others. Around the same time, the Institute published a draft of the self-study on MIT News and in the MIT Daily, a daily newsletter that reaches the entire community, and invited comment.[1] The vice president and secretary of the Corporation also shared the draft with the Executive Committee of the MIT Corporation, MIT's board of trustees, for review and input. Separately, the president and chair of the faculty distributed the draft to the entire faculty in advance of a discussion about reaccreditation at an Institute Faculty Meeting. Finally, MIT invited public comments to the Commission via an ad in *The Tech*, MIT's oldest and largest newspaper.[2]

[1] http://news.mit.edu/2019/draft-self-study-report-comment-0411

[2] https://thetech.com/issues/139/14/pdf

As with all data-informed efforts at MIT, IR's contributions were essential.[3] Under the direction of Lydia Snover, IR staff completed the Data First forms, served on planning groups, reviewed drafts, and fact-checked the narrative to ensure that the report's claims are accurate and well supported. In consultation with NECHE, IR tailored the E-Series forms to highlight the comprehensive data MIT gathers as part of the visiting committee process. IR also engaged leadership in the academic departments to collect additional information about student achievement and assessment, and curated the material in the workroom.[4]

With NECHE approval, MIT incorporated the description, appraisal, and projection of key activities into a single framework to more fully tell MIT's story. This approach is intended to highlight the centrality of appraisal and projection in the Institute's initiatives.

President Reif chairs the Reaccreditation Steering Committee, whose membership also includes Chancellor Cynthia Barnhart, Vice President and Secretary of the Corporation Suzanne Glassburn, Executive Vice President and Treasurer Israel Ruiz, Vice President for Open Learning Sanjay Sarma, Provost Martin Schmidt, Vice President for Research Maria Zuber, and Special Advisor to the Vice President Aaron Weinberger (staff).

The steering committee assigned a staff member to coordinate the efforts of each planning group. These colleagues served as project managers, organizing the groups' work, running the meetings, gathering data, and writing the drafts. Their contributions and leadership were invaluable. The steering committee wishes to express its gratitude to those staff: Robin Elices, executive director, Office of the Executive Vice President and Treasurer; Bob Ferrara, senior director for strategic planning and alumni relations, Division of Student Life (retired); Elizabeth Green, senior director for employee development and assessment, Division of Student Life; Tami Kaplan, faculty governance administrator, Office of the President; Jessica Landry, program and policy administrator, Office of Graduate Education; Kimberly Mancino, director of reference publications, Office of the Vice President for Communications; Lisa Nold, writer/editor, Office of the President; Janet Rankin, director, Teaching + Learning Laboratory; and Aaron Weinberger.

[3] Institutional Research prefers the term "data-informed" to "data-driven." Data are an important factor in the Institute's decision making, but hardly the only one.

[4] Materials in the confidential online workroom are available only to members of the evaluation team.

INSTITUTIONAL OVERVIEW

Two primary themes emerged during early discussions and iterations of the self-study outline. First, over the last 10 years, MIT's educational model has evolved considerably, becoming more holistic and expanding beyond the confines of the formal curriculum to identify desired outcomes and the experiences that produce those outcomes. As a result, an MIT education is more interdisciplinary, more experiential, more digital, more computational, and more flexible than ever before. Furthermore, the Institute assesses its educational model in more rigorous ways, and, with ongoing work to improve the first-year undergraduate experience and examine the makeup of the General Institute Requirements, these trends are likely to continue and even accelerate.

Second, making a better world means making a better MIT. As the Institute aspires to solve complex problems in the United States and around the world, it has taken important steps to strengthen its own community and its home in Cambridge. "A better MIT" includes the changes to the educational model noted above but also a revitalization of the MIT campus, efforts to make the Institute more inclusive and welcoming, and significant attention to the student experience—in dining, physical spaces, and student support and well-being, with an integration of academic, physical, and emotional health.

On October 15, 2018, when President Reif announced the launch of the MIT Stephen A. Schwarzman College of Computing,[5] a third theme emerged. The college represents a fundamental reshaping of MIT—the Institute's most significant restructuring in nearly 70 years. Its opening in September 2019 has implications that span the nine standards, from planning and evaluation to the academic program to institutional resources. In that sense, the timing of the self-study proved helpful, providing another lens through which to consider the steps MIT leadership must take to prepare for the college's opening.

In addition to surfacing these three themes, the self-study addresses areas the Commission identified for special emphasis following MIT's 2009 comprehensive review and the 2014 interim report (Table 1).[6,7]

Table 1. Areas for emphasis identified by the Commission on Institutions of Higher Education

Year and point	Area for emphasis	Standard(s)
2009 point 1	Develop and implement a sustainable approach to reducing its deferred maintenance.	Standards 5 and 7
2009 point 2	Achieve its goals to increase student satisfaction with their dining options.	Standard 5
2009 point 3	Strengthen its understanding of what and how students are learning with respect to program- and Institute-wide goals.	Standard 8
2014 point 1	Continue to assess institutional effectiveness, especially as it relates to educational innovation and student learning outcomes.	Standards 6 and 8

[5] Frequently referred to as "the college" throughout this report

[6] https://accreditation.mit.edu/sites/default/files/images/2009-letter.pdf

[7] https://accreditation.mit.edu/sites/default/files/images/2014-Acceptance.pdf

Year and point	Area for emphasis	Standard(s)
2014 point 2	Identify and implement priorities from the Task Force on the Future of MIT Education.	Standards 4 and 6
2014 point 3	Achieve its goals to strengthen its urban community context, including the Kendall Square and City of Cambridge projects.	Standard 7
2014 point 4	Continue to achieve its goals for the diversity of faculty and staff.	Standards 6 and 7

STANDARD 1: MISSION AND PURPOSE

> *The mission of MIT is to advance knowledge and educate students in science, technology, and other areas of scholarship that will best serve the nation and the world in the 21st century.*
>
> *The Institute is committed to generating, disseminating, and preserving knowledge, and to working with others to bring this knowledge to bear on the world's great challenges. MIT is dedicated to providing its students with an education that combines rigorous academic study and the excitement of discovery with the support and intellectual stimulation of a diverse campus community. We seek to develop in each member of the MIT community the ability and passion to work wisely, creatively, and effectively for the betterment of humankind.*[8]

Although MIT's formal mission statement is only two decades old, the Institute's guiding principles date back to its start. William Barton Rogers founded MIT in 1861 deliberately to accelerate the nation's industrial revolution. A deep commitment to application—not just generating and advancing knowledge but using it to solve problems—is ingrained in the Institute's approach to activities in education, research, and innovation. Rogers's espousal of experimental and experiential learning is reflected in MIT's original charter, which defined the Institute's purpose as "…aiding generally, by suitable means, the advancement, development, and practical application of science in connection with arts, agriculture, manufactures, and commerce…"[9] It is also reflected in MIT's motto, *mens et manus* (or "mind and hand"), its curriculum, and a range of other activities, as described throughout this self-study.

Rogers recognized the power of technology to do good in the world as well as its potential for harm, advocating for the importance of responsible stewardship. As MIT's 2006 report of the Task Force on the Undergraduate Educational Commons explains, Rogers "hoped that the Institute's graduates would not only find new, efficient ways to manufacture the goods that stoked a new industrial order but also would take the lead in helping society guide technology toward its more beneficial application."[10]

Rogers's insistence on the "beneficial application" of technology in service to society remains key to MIT's pursuits, from the Inclusive Innovation Challenge, a competition that rewards solutions that create economic opportunity for workers, to the Institute's groundbreaking D-Lab, which leverages technology to solve global poverty challenges, to the recently launched MIT Stephen A. Schwarzman College of Computing, whose charge includes the advancement of pioneering work on the ethical use and societal impact of artificial intelligence.

Service also appears in the Institute's communications about itself. For instance, as described in Standard 7, in May 2016 MIT launched the public phase of a major, ongoing capital campaign. In his remarks over the last three years, President Reif has framed the effort as a campaign from—rather than for—MIT. In many ways, the campaign performs the function of any institution's campaign: It focuses MIT's fundraising activities to support priorities like basic research, financial aid, and physical infrastructure. But the phrasing emphasizes an outward orientation, with the campaign's ultimate goal

[8] https://web.mit.edu/facts/mission.html

[9] https://corporation.mit.edu/sites/default/files/images/charter.pdf

[10] http://web.mit.edu/committees/edcommons/documents/tf_full_report.pdf

to magnify MIT's capacity to serve the nation and the world. And so, in considering a theme for the campaign, one option emerged as a clear favorite: the MIT Campaign for a Better World.[11]

Similarly, MIT initiatives often invoke the Institute's mind-and-hand ethos. As part of the 2016 celebration of the Institute's 100th year in Cambridge, MIT hosted the Mind and Hand Pageant on Killian Court, where thousands of faculty, students, staff, alumni, and friends gathered, in part, for a debate about whether MIT's most essential quality is its commitment to theory or practice—*mens* or *manus*. The pageant surfaced a third quality—heart—as central to MIT's mission. That quality appears in the name of one of MIT's most important new efforts, MindHandHeart, an initiative focused on the health and well-being of the Institute community, as described in Standard 5.

President Reif also refers to the mission frequently in his written messages to the community and beyond. In January 2017, in the wake of the first federal travel ban targeting seven predominantly Muslim countries, President Reif wrote, "Together, through teaching, research, and innovation, MIT's magnificently global, absolutely American community pursues its mission of service to the nation and the world."[12] And in a 2017 op-ed arguing for a whole-society effort to respond to growing concerns about the impact of technology on jobs, he wrote, "As president of an institute with 'technology' in its name and national service in its mission, I take these concerns seriously."[13]

From explicit statements online and in print, to its curriculum, communications, initiatives, and other activities, MIT reminds its community of its mission and purpose every day.

To respond to new challenges and opportunities both internally and externally, MIT periodically undertakes a comprehensive review of its mission. The first notable review was completed in 1949, when the Committee on Educational Survey ("the Lewis Committee") reported on its efforts "to reexamine the principles of education that had served as a guide to academic policy at MIT for almost ninety years, and to determine whether they are applicable to the conditions of a new era emerging from social upheaval and the disasters of war."[14] And in 1996, President Charles M. Vest charged the Task Force on Student Life and Learning "to undertake a comprehensive review of the Institute's educational mission and its implementation."[15]

Most recently, President Reif established the Task Force on the Future of MIT Education to review the Institute's mission in light of advances in digital learning. In submitting its recommendations in 2014, the task force emphasized the importance of comprehensive institutional review: "To remain on the cutting edge of research and education, and to maintain its position as one of the world's premier research institutions, MIT must continually evaluate its strengths and weaknesses with regard to the shifting global, technology, economic, and political landscape."[16] The task force's work, recommendations, and impact are detailed throughout this report.

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[11] https://betterworld.mit.edu

[12] http://president.mit.edu/speeches-writing/best-serve-nation-and-world

[13] https://www.bostonglobe.com/opinion/2017/11/10/transformative-automation-coming-the-impact/az0qppTvsUu5VUKJyQvoSN/story.html

[14] https://libraries.mit.edu/mithistory/institute/committees/committee-on-educational-survey/

[15] https://facultygovernance.mit.edu/sites/default/files/reports/1998-09_TaskForceonStudentLifeandLearningReport.pdf

[16] http://web.mit.edu/future-report/TaskForceFinal_July28.pdf

STANDARD 2: PLANNING AND EVALUATION

MIT engages in comprehensive planning and evaluation at multiple levels of its operation on an ongoing basis. These efforts extend from budget management and the oversight of departments and schools by visiting committees to the execution of multiyear Institute-wide task forces and initiatives, as well as issue-focused committees, forums, and related activities. By way of this rigorous self-examination, MIT identifies needs, defines problems, and develops solutions across all areas of its operations. When appropriate, it makes highly calculated adjustments to its educational and research-driven efforts to meet the pressing needs of the historical moment. In this way, MIT has remained adaptive over its 158-year history of educating its students and advancing knowledge in service to the nation and the world.

Departmental planning and evaluation

The Institute conducts long-term strategic planning related to its academic programs and carefully monitors and evaluates performance and growth. This oversight extends across all academic departments and to the many related programs and activities administered in the schools. MIT evaluates and guides this growth through a number of mechanisms, including department and school planning efforts, budgeting, and visiting committee activities.

The planning process begins annually when each department submits a budget document that defines the department's short- and medium-term plans and resource needs. The process is data-informed and reflects the priorities of all disciplines a department represents. The relevant school dean reviews and integrates the departments' documents into a prioritized, school-wide budget plan. The provost then reviews the plans more holistically and designates annual academic budget allocations based upon available resources and Institute priorities. In pursuit of its mission, MIT supports all academic departments, laboratories, and centers with outstanding promise and clear operational needs. The strength of MIT's academic programs—and of the programs' connections to alumni, industry partners, and friends—has made it possible for many units to cultivate their own endowed and expendable financial resources to supplement Institute funding.

Lincoln Laboratory, a federally funded research and development center MIT operates in Lexington, Massachusetts, is an exception to this planning and resource allocation design, as its planning and oversight are independent from MIT's campus-based planning. Lincoln Laboratory is funded by the U.S. Department of Defense and is subject to a separate set of budgetary and personnel-planning requirements that form the basis of its regular program reviews. MIT's vice president for research is responsible for general oversight and participates in meetings of the Lincoln Laboratory Steering Committee and the annual planning retreat. An advisory board also meets on a semiannual basis to review Lincoln Laboratory activity and advise on strategic plans and direction. The provost appoints the advisory board, whose membership includes former military personnel, MIT faculty, and representatives from industry and academia.

Beyond the department-level planning and allocation activities described above, the Academic Council plays an important role in Institute-wide planning, meeting weekly during the academic year to confer on matters of Institute policy and engage in strategic planning. The Academic Council, chaired by the president, comprises the Institute's senior leadership and the elected chair of the faculty.

Visiting committees

As described in Standard 3, MIT's visiting committee structure is vital in helping to address current and anticipated challenges at the department level. Since 1875, visiting committees have focused leadership's attention on opportunities for action, advising the Institute's governing board, the MIT Corporation, on the performance and direction of MIT's departments from an external perspective. Every two years, following a visit, the relevant committee chair submits a written report to the department head, Institute leadership, and MIT Corporation. The report addresses a broad range of issues, including faculty diversity and tenure proportions, undergraduate and graduate enrollments, student-teacher ratios, degrees awarded, research expenditures, funding, and the curriculum. Though the value of the visiting committee structure is often most appreciated in individual units (the visiting committee's impact on the Department of Chemistry, for example, is detailed in Standard 3), the committees also provide strategic direction and surface common themes that sometimes spur Institute-wide action.

It is instructive, for instance, to consider the visiting committees' role in informing the new MIT Stephen A. Schwarzman College of Computing. A close examination of committee recommendations over the last four years demonstrates not only the Institute's commitment to the visiting committee process but also an eagerness to evaluate, synthesize, and act on the recommendations at the department level and at MIT more broadly. The college's priorities—to foster breakthroughs in computing and artificial intelligence (AI), deliver computing tools to researchers in every field, and advance scholarship on AI's ethical use and societal impact—emerged during numerous visiting committee discussions. Indeed, the committees' advice was often similar: be aware of the rapid rate at which computing fields are advancing; find ways to collaborate with entities involved in the development of tools that can benefit a discipline; and account for the ethical challenges that may arise from the sudden growth and increased presence of AI and other computing technologies.

What follows is a sampling of feedback provided by visiting committees that highlighted the growing importance of computing in diverse fields across the Institute. These examples underscore the role department-level evaluation plays in crystallizing Institute-wide opportunities, and the centrality of assessment in informing action. All cited visiting committee reports can be found in the workroom.

In 2017, the visiting committee for the Department of Economics urged the department to pay attention to the potential effect of AI and machine learning on human labor:

> For example, one of the biggest questions in economics today is whether advancements in artificial intelligence and machine learning will permanently reduce the demand for human labor? It is hard to imagine an Institute better positioned to address this than MIT. These types of complementarities could distinguish MIT Economics in new and innovative ways over the long term.

As far back as 2015, the visiting committee for Aeronautics and Astronautics (AeroAstro) encouraged the department to "include computer science and communications as a more integral component of the curriculum." In its 2017 report, the department's visiting committee emphasized the danger of bias in computing and the steps AeroAstro might take to mitigate it:

> Most technical leadership is in near-denial about the challenges ahead for discrimination through automation and artificial intelligence/machine learning.… Realities of human bias will remain a significant challenge for the robustness, applicability, and fairness of these technologies.… Expand both basic knowledge of options already available today to help researchers and overall consciousness so teams get started with prioritizing consideration of these challenges – start iterating, measuring and continuously evolving to mitigate algorithmic bias. AeroAstro could play a leadership role.

The visiting committee for Music and Theater Arts (MTA) seized on the potential of computing to expand and distinguish the department. From its 2016 report:

> What separates MIT MTA's potential from the eight other elite universities in this field is an emphasis on a potent combination of musicianship, coding, and design. Since coding and engineering are two of MIT's core strengths, it is MTA's safe assumption that the potential exists for a cross-disciplinary program that truly combines these with "arts practice."

The visiting committee saw "a large strategic opportunity for MTA in excelling at music technology" and encouraged advancement in this realm. The MTA interim report for 2017 (submitted in January 2018) picked up on this theme, noting the popularity of newly added music technology classes "with demand still exceeding supply by large margins." In its latest report, in October 2018—written shortly after the college announcement—the visiting committee expressed great enthusiasm for the college. Committee members commented that the new entity answers many of their long-held questions about MTA's strategic direction and represents a critical change at a defining moment:

> This is a highly timely, fertile, well-resourced moment – building on MIT's unique structure – to establish global leadership in invoking "computation" for shaping the humanity of our students from across MIT, and within MTA.

The report concludes: "In the words of an MTA Visiting Committee member, 'MTA is shovel-ready for [the] College of Computing and an MIT early win.'"

The visiting committee for the Department of Political Science also reported on efforts "to create new centers of learning" in the department at the time of its 2018 interim report. This included the launch of a new course titled "Machine Learning and Data Science in Politics" to "capitalize on the unique interests and skills of the MIT undergraduate population." This effort—launched prior to the announcement of the college—will no doubt grow more robust, along with other political science endeavors, in partnership with the new entity.

The visiting committee for the Department of Brain and Cognitive Sciences (BCS) also encouraged a strategic and integrative approach toward computing in its 2017 report:

> …there is a significantly larger opportunity for MIT to build upon the science of natural intelligence in the brain as the basis for next-generation artificial intelligence (AI) technologies.… The visiting committee believes this is an imperative that MIT cannot afford to ignore and we urge BCS and the Institute leadership to think big in this area

> and aim for raising significant funding support and building out a centralized critical mass of faculty and supporting engineers focused on this major opportunity.

As noted in Standard 4, in spring 2019 the faculty voted to approve an undergraduate degree program in computation and cognition, offered jointly by BCS and the Department of Electrical Engineering and Computer Science. The new major, designed to educate students about how neural circuits and networks process information that leads to intelligent behavior and how this understanding can be replicated in machines, advances the visiting committee's recommendation. The college's opening presents an opportunity to further develop this line of inquiry.

On a related note, in its 2018 interim report, the BCS visiting committee commented on the promise of the MIT Quest for Intelligence, which launched in March 2018 with two key components: "The Core," which advances the science of human and machine intelligence by cross-pollinating ideas, sparking new collaborations, and engaging underlying questions around ethics and societal impact; and "The Bridge," which provides custom-built AI tools for MIT researchers in every discipline. The effort, which draws on MIT's strengths in the fields of human and machine intelligence, aims to answer the important questions of how human intelligence works in engineering terms, and how to build wiser and more useful machines that benefit society. According to the BCS visiting committee, The Core, in particular, is "highly aligned with one of the key forward-looking research directions of BCS."

Finally, the visiting committee for the MIT Sloan School of Management identified the importance of large data sets and centralized computing resources as critical to the advancement of research. From its 2018 report:

> While the faculty were generally happy, the younger faculty expressed a concern about their access to large data sets, which are becoming both larger and more critical to their research, and the computing power to analyze them. The faculty expressed the view that peers at other institutions had greater and more centrally-organized resources. This is an issue for the MIT administration to address.

The input from various visiting committees over the course of several years was key to spurring action toward a college of computing. Feedback from visiting committees helped to identify a need and an opportunity. The college's development and purpose are explored later in this standard and elsewhere in the self-study.

Institute-wide planning and evaluation

Planning and evaluation efforts in MIT's departments, labs, and centers are inherently collaborative. Sometimes, to respond to existential challenges or to seize emerging opportunities, the Institute initiates large-scale, campus-wide efforts. These activities provide a platform for examining complex issues with broad implications and formulating recommendations for action. Standard 6 describes an Institute-wide plan to shape MIT's strategy to respond to the growing threat of climate change, and Standard 7 details a strategic planning effort initiated by the MIT Libraries. The Institute-wide planning and evaluation activities in four distinct areas are described here, namely: the future of computing; support for the campus community; global engagement; and the future of MIT education. These examples demonstrate that, although MIT as an institution has no single strategic plan, a commitment to the process of strategic planning is woven into the Institute's fabric.

The future of computing

One of the most powerful examples of MIT's adaptable approach to academic planning is the recent formation of the MIT Stephen A. Schwarzman College of Computing. The college, which represents the most profound restructuring of MIT since the early 1950s, emerged from highly focused and deliberative analysis by the Executive Committee of the MIT Corporation, the central administration, the faculty, and leaders from all five MIT schools. It responds to the rapid development of computing tools, and will give faculty and students in every MIT field access to a shared structure for collaborative education, research, and innovation in computing and AI. In this regard, the college will serve as a connector across the Institute, helping students and researchers develop expertise in their academic discipline as well as in computing. Moreover, it will intellectually equip students to advance computing wisely and humanely to make a better world.

Looking at the many advances in computing today, it is clear that the technologies that are emerging hold great promise to help humanity learn more and waste less. They may also help people live longer. Yet as computing enables the advancement of research and the discovery of positive solutions, it has the potential for grave societal implications as well. Certain jobs and industries may disappear, and, if AI is misused, it may cause ethical strains and present threats to individual privacy rights and even national security. A commitment to address these issues is central to the college's mission.

Since its founding, MIT has positioned its students and faculty to solve the challenges of the day. At the same time, echoing William Barton Rogers, it has maintained a deep commitment to the responsible stewardship of technology. From the creation of the MIT Radiation Laboratory to support the U.S. war effort during World War II to the establishment of the MIT Energy Initiative to advance clean solutions to the world's energy challenges, MIT prides itself on its ability to adapt and respond to the needs of the nation and the world. In this particular historical moment, the Institute identified the immediate implications of computing, and AI in particular, changing course to prepare its community for the opportunities and challenges ahead. As President Reif noted at the time of the announcement:

> Computing is no longer the domain of the experts alone. It's everywhere, and it needs to be understood and mastered by almost everyone. In that context, for a host of reasons, society is uneasy about technology—and at MIT, that's a signal we must take very seriously.… Technological advancements must go hand in hand with the development of ethical guidelines that anticipate the risks of such enormously powerful innovations. This is why we must make sure that the leaders we graduate offer the world not only technological wizardry but also human wisdom—the cultural, ethical, and historical consciousness to use technology for the common good.[17]

With a $1 billion founding commitment, the college represents a strategic and immediate response to the promise and dangers that computing presents, adding new, integrated curricular and degree programs to nearly every field at MIT and equipping students to become "bilingual" researchers and learners, equally fluent in computing and their own disciplines. It will also provide a powerful underpinning for research and thought on relevant matters of policy and ethics so that students have a path toward the responsible use and stewardship of new technologies and a clear understanding of the public interest.

[17] http://news.mit.edu/2018/mit-reshapes-itself-stephen-schwarzman-college-of-computing-1015

With the college, the Institute seeks to lead in the advancement of ethics and discovery in AI, but there are additional important—and student-focused—reasons to take this significant step. As noted in Standard 3, about 40% of MIT undergraduates major either in computer science alone or in joint programs combining computer science with another field. MIT has already developed undergraduate majors that pair computer science with fields like economics, biology, mathematics, and urban planning; the new college will bring other academic disciplines into the fold. More important, the shared structure will raise the bar for innovation and learning by fostering breakthroughs in computing and AI that are informed by other disciplines, and, conversely, deliver the power of AI tools to researchers in every field. In naming this groundbreaking, cross-Institute effort a college, MIT is underscoring its role as the connective tissue for the Institute's five schools. In this regard, it will be a unique Institute organization with cross-cutting academics and research at the heart of its mission.

Because MIT students are members of the department that is home to their academic program, students in programs that will be subsumed under the new college will automatically become students in the college as well. Through the college's connective design, students from MIT's five schools who belong to departments or programs outside of the college will have access to the college's faculty, courses, and facilities so they can directly participate in collaborative education, research, and innovation in computing and integrate it into their respective fields of study.

The college will include a dedicated new building on campus, a new dean, and a near doubling of MIT's academic capability in computing. As noted in Standard 7, over the next five to seven years, MIT expects to add 50 faculty positions, representing a 5% overall increase in the size of the faculty. It is expected that 25 of these positions will be located fully within the new college; the other 25 will hold dual appointments between the college and academic departments in MIT's five schools. These positions represent key connectors between the new college and other academic fields. Within its domain, the college is expected to offer undergraduate research opportunities, graduate fellowships in ethics and AI, a seed grant program for faculty, and a fellowship program to attract distinguished individuals from other universities, governments, and industries. It will also provide shared computing resources, including infrastructure, instrumentation, and technical staffing in support of student learning.

The provost, in close consultation with the president, chair of the faculty, dean of the School of Engineering, and many others, is advancing this restructuring. MIT recently named Dr. Dan Huttenlocher the college's inaugural dean; he began his appointment in summer 2019. All things related to the college—reorganizing the affected units and developing connections between the college and all other MIT units, building a physical home, fundraising, hiring the faculty, and evolving the curriculum—sit squarely at the heart of MIT's priorities for the next comprehensive review cycle.

Support for the campus community

During this review period, MIT established two key positions to promote, coordinate, and support MIT activity in the areas of community, equity, inclusion, and diversity. First, in June 2013, President Reif announced the creation of the role of Institute community and equity officer (ICEO), as described in Standard 6. The ICEO advances MIT's commitment to diversity and inclusion by helping to develop new policies, cultivate dialogue, develop metrics, and organize on-campus events. In February 2015, the ICEO issued a report titled "Advancing a Respectful and Caring Community: Learning by Doing

at MIT," the result of an 18-month detailed investigation of the MIT community and its culture.[18] The report aimed to gain a better understanding of the factors in MIT's culture that support the Institute's mission and those that limit its success. It also provided recommendations for improvement. The Institute has acted on many of the report's recommendations, such as enhancing policies, expanding training, and publishing diversity and climate dashboards, but important work remains. To promote transparency and accountability, the ICEO publishes an online scorecard that tracks the completion rate for 177 recommendations collected from nine community-focused reports. As the site notes, "Collective awareness and collective action will help make a better MIT."[19]

Second, as noted in Standard 6, effective July 2019 the provost announced a new associate provost position to help advance the important and related work of supporting faculty, supporting departmental leadership, and advancing departments' efforts to create a more inclusive and diverse academic community. The ICEO and associate provost have seats on the Academic Council, ensuring that issues of community, equity, and inclusion remain central to discussions of Institute activity at the highest level.

Just as the ICEO and associate provost support a safe, respectful, and welcoming community, so too does MIT's Title IX and Bias Response Office (T9BR), which promotes an environment free from discrimination, including sexual harassment and sexual violence. The office provides resources for preventing and addressing discrimination, coordinates reporting options, and investigates student complaints. In 2013, MIT formed the Title IX & Bias Response Student Advisory Committee to further incorporate student perspectives into T9BR's education and outreach efforts, and advocate for inclusivity across campus. The committee has established subcommittees focused on institutional advocacy, events, grant management, and marketing. Standard 5 describes recent T9BR activities.

MIT also redoubled its commitment to student health during this reporting period. In response to extensive expert input, student feedback, surveys, and studies, MIT expanded and strengthened its mental health counseling and support services. The MindHandHeart Initiative, announced in September 2015, brings together a coalition of students, faculty, and staff with fresh insights, new ideas, and diverse perspectives to work collaboratively and strategically to strengthen the MIT community. It aims to build a healthy, resilient campus environment in which all members feel comfortable asking for help when they need it. As part of its efforts to promote student health, MIT also restructured its approach to student care at MIT Medical during this reporting period, expanding counseling and support options, improving web access for patients, and enhancing the coordination of services. These efforts are detailed in Standard 5.

Global engagement

MIT advances its mission through collaborations with individuals, universities, foundations, governments, companies, and other institutions around the world. Although MIT occasionally launches Institute-level international partnerships, it is individual faculty, students, and researchers who typically initiate educational and research activities abroad. In May 2015, the Institute appointed its first associate provost for international activities. Two years later, the associate provost published A Global Strategy for MIT, a comprehensive report that examined the role of international activities

[18] http://iceoreport.mit.edu/wp-content/uploads/ARCC_Feb13.pdf

[19] http://diversity.mit.edu/scorecard/

and engagements in sustaining MIT's excellence and leadership in education and research.[20] The report called on MIT to continue to streamline its international institution- and capacity-building approaches; strengthen the governance of, and operational support for, MIT's international activities; and provide an MIT-quality international educational experience to every undergraduate who wants one. It also identified eight core principles to guide the Institute's international engagements. The report emphasized that it is fundamental to MIT's mission to work across borders and collaborate with international partners to address the world's most difficult problems.

Critical to advancing the Institute's global strategy is a robust network of governance. When he was provost, President Reif established the International Advisory Committee (IAC) "to work with members of the faculty and administration to develop institutional strategies and policies that will assess and support MIT's burgeoning international activities and help ensure that they continue to advance our core missions of teaching, research, and service."[21] The associate provost recently reconstituted the IAC as a faculty-led standing committee that provides an independent voice in advising the senior administration on the Institute's major international engagements. The committee reviews proposals to undertake significant new international engagements and those up for renewal, assessing whether a given engagement advances MIT's core academic mission and advising on the right course of action. In cases where a matter of concern arises with any of its international programs or partners, MIT conducts a swift and thorough reassessment of the engagement in question, and changes course if necessary.

MIT has two additional standing bodies to help assess its global activities. First is the International Coordinating Committee (ICC), a team of professional staff who review the administrative aspects of an international project, including finance, legal, tax, export control, and operational matters. Its role is to guide faculty in planning, negotiating, and implementing all international activities. Projects with certain "elevated-risk" countries may undergo additional review. If the associate provost determines that significant risk remains after the ICC's review, he engages the Senior Risk Group (SRG), which comprises the associate provost, vice president for research, and vice president and general counsel, to decide whether a project should move forward. Based on evaluations of potential risk, and in consultation with experts at MIT and beyond as needed, the SRG reviews a project with the relevant principal investigator and makes a decision about approval.

While the ICC, IAC, and SRG play important roles in examining individual international activities, it became clear following a comprehensive review of MIT's engagements with Saudi entities conducted between October 2018 and February 2019 that the Institute would also benefit from a review and articulation of general guiding principles for engagement with countries with problematic political, human, and civil rights records. To that end, President Reif charged the faculty officers with forming an *ad hoc* interdisciplinary committee of faculty, staff, and students to consider issues related to international engagements in such countries. The committee is due to deliver a report, including guidelines, in fall 2019; it is expected that these findings will inform the work of the IAC and the SRG. As MIT continues to advance meaningful international collaborations in the years ahead, the committee's guiding principles will provide a valuable foundation for assessment.

[20] http://web.mit.edu/globalstrategy/A_Global_Strategy_For_MIT_May2017.pdf

[21] http://orgchart.mit.edu/node/6/letters_to_community/establishment-international-advisory-committee

The future of MIT education

As described in Standard 4, MIT has invested heavily in online educational resources to reshape learning on campus and reach learners around the world. In 2002, MIT introduced OpenCourseWare, a groundbreaking effort to publish virtually all Institute course content on the web free of charge. A decade later, in 2012, it introduced MITx, the Institute's portfolio of massive open online courses (MOOCs), followed shortly thereafter by the joint announcement with Harvard University of edX, a groundbreaking partnership in online education to enhance campus-based teaching and build a global community of online learners.

Spurred by these activities, and building on MIT's longstanding tradition of critical analysis in its educational model, in 2013 President Reif charged the Institute-wide Task Force on the Future of MIT Education to consider the Institute's educational future and the future of education more broadly. The task force's final report, published in July 2014, reflected 18 months of extensive research, community engagement, and analysis, and offered 16 recommendations for action. In releasing the report, President Reif suggested that higher education was at a crossroads:

> …the rising cost of education, combined with the transformative potential of online teaching and learning technologies, presents a long-term challenge that no university can afford to ignore. At MIT, we are choosing to meet this challenge directly by assessing the educational model that has served the Institute so well for so long. We are experimenting boldly with ideas to enhance the education we offer our own students and to lower the barriers to access for learners around the world.[22]

In broad terms, the report envisioned a future of education that is more global, more modular, and more flexible, and it recommends bold experimentation with new modes of learning. These recommendations are explored in detail in Standards 4 and 6.

Inspired and informed by the report's findings, MIT conducted an experiment in summer 2014, offering five subjects that explored new pedagogies in "blended" settings—which incorporate online and residential learning—and online-only settings. The data collected from these classes, which enrolled 129 MIT students, began the process of testing many of the report's recommendations. The task force's findings also catalyzed several efforts across the Institute to explore pressing matters in the evolution of higher education and technology. Among them was the MIT Online Education Policy Initiative, designed to understand the impacts of online learning on the higher education community from a policy perspective. The initiative's report, published in April 2016, focused attention in four areas to advance MIT's understanding of the opportunities and challenges in transforming education. These areas are interdisciplinary collaboration, online educational technologies, the profession of the learning engineer, and institutional and organizational change.[23]

The task force report deeply informed the direction of MIT Open Learning, the unit charged with coordinating and advancing the Institute's digital learning efforts. Open Learning's mission is to transform teaching and learning at MIT and around the globe through the innovative use of digital technologies. Led by educators, advisors, and technology innovators, it supports and empowers MIT

[22] http://president.mit.edu/speeches-writing/final-report-institute-wide-task-force-future-mit-education

[23] https://oepi.mit.edu/files/2016/09/MIT-Online-Education-Policy-Initiative-April-2016.pdf

faculty in reimagining and reinventing education in the digital age. Open Learning advances bold experimentation designed to enhance residential education; facilitates research into how people learn; provides platforms for technological advances in digital education; and partners with companies, universities, governments, and organizations that wish to develop new learning capabilities and enhance the competencies of their workforce, students, and citizens. Standard 6 describes the activities of the Office of Digital Learning, a key component of MIT Open Learning.

STANDARD 3: ORGANIZATION AND GOVERNANCE

As noted in Standard 2, about nine months before submitting this self-study, MIT announced the creation of the MIT Stephen A. Schwarzman College of Computing, which represents the Institute's most extensive reorganization in nearly 70 years. This standard addresses the college from a structural perspective and describes the Institute's organization and governance activities through four lenses—the senior leadership, board of trustees (the MIT Corporation), faculty, and students—with a focus on ongoing assessment.

The MIT Stephen A. Schwarzman College of Computing

Scheduled to open in September 2019, the college represents a $1 billion commitment to address the global opportunities and challenges presented by the prevalence of computing and the rise of artificial intelligence (AI). Although on par with the Institute's five schools in terms of stature, the college is intended to serve as the tissue that connects the schools, reorienting MIT to bring the power of computing and AI to all fields of study and allowing the future of computing and AI to be shaped by insights from all other disciplines.

Much about the college is currently undefined. As the chair of the faculty noted in late 2018, "The MIT Schwarzman College of Computing has now been created; it has not yet been designed."[24] To advance the college's design, the provost and chair of the faculty established a task force with five working groups, each with faculty representation from MIT's five schools as well as students and staff, to explore open issues related to the structure of the college, faculty appointments, curriculum and degrees, social implications and responsibilities of computing, and computing infrastructure.

The group discussing the college's structure examined fundamental issues of organization and governance. Among the questions it considered are:

- Should the college consist of traditionally defined academic units, such as departments, sections, or programs, or should the academic areas in the college be organized under alternative structures?
- How should the college's governance be structured?
- How should the college coordinate links and governance with and across the five schools? To what extent might members of the schools be involved with the college's governance?
- How should research activities in the college be organized and governed?

The working groups recently finished their deliberations, with ideas for how MIT might answer these questions beginning to emerge. The decisions the Institute and college leadership will make in the months ahead will shape the college for generations and define its place at MIT.

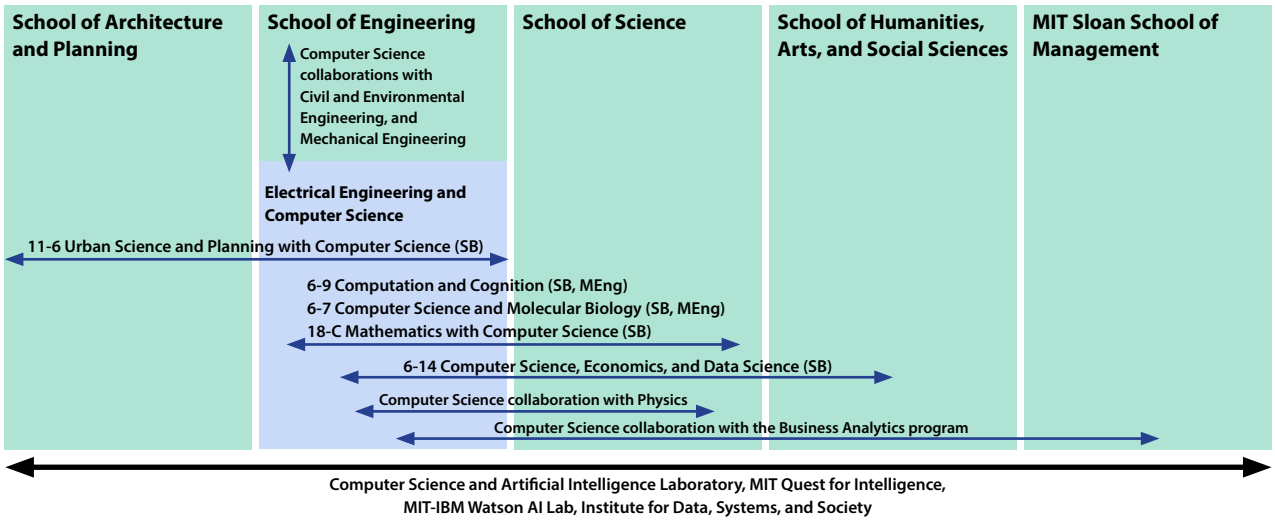
Standard 2 describes some of the long-term strategic planning that informed the college's creation, and Standard 7 addresses the college's resource implications—including 50 new faculty positions and a physical home on MIT's campus. Below is a summary of several of the internal factors that

[24] http://web.mit.edu/fnl/volume/312/silbey.html

influenced the administration's decision to pursue a college of computing and a sketch of the resulting organizational model.

Currently, computer science at MIT is centralized largely within the Department of Electrical Engineering and Computer Science (EECS), which resides in the School of Engineering and engages MIT's other departments through various joint majors, which are designated as "CS + [X]" (Figure 1).

Figure 1. The Department of Electrical Engineering and Computer Science (EECS) and its Institute-wide interdisciplinary engagement.



Note: The double arrows spanning the colored boxes represent joint majors and collaborations between the Department of Electrical Engineering and Computer Science and other departments. The double arrow below the colored boxes represents research efforts that span the entire Institute.

As described in Standard 4 and depicted in Figure 1, faculty champions in departments as diverse as Urban Studies and Planning, Economics, and Biology have sought, and gained, faculty approval to establish joint degree programs with EECS. These programs respond to faculty and student interest in education and research at the intersection of computer science and other disciplines.

Increased interest in computing presents both a challenge and an opportunity for change. The challenge is twofold. First, undergraduate enrollment in computer science–related majors has grown significantly, to about 40% during academic year 2017. That same year, 56% of MIT's undergraduates took a computer science class, and more than 90% of that year's graduating undergraduate class completed at least one computation subject during their time at MIT. Moreover, subjects with a focus on artificial intelligence have become the most popular on campus. MIT's computer science faculty simply do not have the capacity to keep up with the demand.

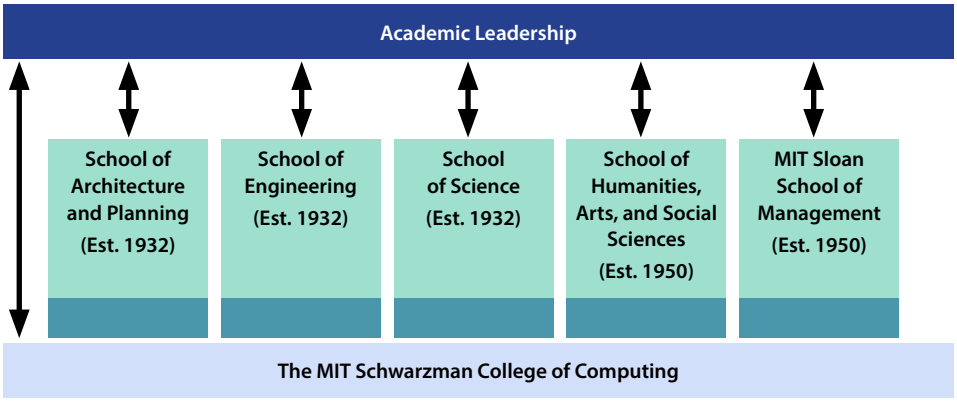
Second, because the teaching commitment has overwhelmed MIT's computer science faculty, many lack the time to pursue new lines of research. MIT's *mens et manus* ethos—pairing education and hands-on research—has defined the Institute since its founding and remains central to its capacity for impact. To keep faculty at the forefront of research in computer science, it is essential for the Institute to create the bandwidth to allow that to happen.

Why not simply add faculty to EECS rather than undertake such a significant organizational restructuring? The answer lies in the opportunity MIT hopes to seize with the college.

Student and faculty demand for computational tools in education and research extends far beyond EECS to every discipline in every department. Students who pursue computer science-related majors often do so not because they intend to pursue a career in computer science but because computing is increasingly relevant and applicable in their fields. Through joint degree programs, computing has spread to departments and majors across MIT, but not systematically and not strategically. Students interested in computer science continue to flock to EECS because the computing expertise they seek largely does not exist in their home departments. With the college, MIT aims to change that.

The college will connect computer science faculty working to advance research in the field to all of MIT's five schools and 31 academic units (Figure 2).

Figure 2. The position of the MIT Stephen A. Schwarzman College of Computing in relation to MIT's five schools and academic leadership.



Importantly, the college will facilitate bidirectional learning. Faculty will bring computing expertise to departments across MIT, but they will also bring expertise from the departments to those working in computing. By facilitating co-teaching and interdisciplinary research, the college will position MIT's faculty and students to work together to imagine entirely new fields of inquiry.

Senior leadership

President Reif's senior leadership team has undergone a number of changes since he took office in July 2012.[25] For instance, the president has established several new positions, including the vice chancellor for undergraduate and graduate education, a role that combines the positions of dean for undergraduate education and dean for graduate education. MIT now also has its first vice president for open learning, who is charged with integrating new models of online instruction into MIT's on-campus educational model; an Institute and community equity officer, who advances understanding, dialogue, and activity in areas related to community, equity, inclusion, and diversity; and a chancellor for academic advancement, who helps to connect and advance the Institute's academic and fundraising priorities.

[25] http://orgchart.mit.edu/senior-leadership

The incumbents of these positions serve on the Academic Council, chaired by the president, as do the Institute's other senior academic and administrative officers and the elected chair of the faculty.[26] The Academic Council meets every week during the academic year to consider a broad range of topics—from proposals for new academic degree programs to the performance of the endowment to student life issues to employment policies. To help keep the Academic Council abreast of activity at the board level and in the departments, the secretary of the Corporation regularly briefs council members following meetings of the Executive Committee and Corporation, and the school deans summarize the findings and recommendations of the Institute's 31 visiting committees.

In 2017, President Reif added the CEO of the MIT Alumni Association to the Academic Council to further align Institute leadership with alumni interests and priorities, and he recently welcomed the dean of the MIT Schwarzman College of Computing to the council as well.

The Deans' Group, which comprises a subset of Academic Council members, meets weekly to discuss academic and research issues that cut across the Institute, including teaching policies, faculty educational contributions, core requirements, student support, research administration, and international activities. Chaired by the provost, Deans' Group includes the chancellor, the school deans, the senior members of the provost's and chancellor's leadership teams, and the chair of the faculty.

The Academic Council has charged a standing subcommittee—the Academic Appointments Subgroup (AAS)—to review certain categories of faculty promotion and appointment cases. Final approval for cases that do not involve tenure rests with the AAS; final approval for cases that involve tenure rests with the Executive Committee of the MIT Corporation. The president has also appointed a number of standing Institute committees, which are responsible for policy development in areas as varied as animal care in laboratories, Commencement, diversity and inclusion, and renovation and space planning.[27] Each of the 36 standing Institute committees reports to a senior officer.

Board of trustees

The Corporation, MIT's board of trustees, holds a public trust: to see that the Institute adheres to the purposes for which it was chartered and that its financial resources meet current and future needs. The Corporation includes 70 distinguished leaders in science, engineering, industry, education, and public service, and, *ex officio*, the president, chairman, executive vice president and treasurer, secretary of the Corporation, president of the Alumni Association, and three representatives of the Commonwealth of Massachusetts. It also includes 35 emeritus members. Approximately 70% of the members of the Corporation are MIT alumni.[28]

The Corporation governs through its quarterly meetings and the work of its committees. It has delegated to committees most of the fiduciary oversight of MIT, reserving for itself only a few fundamental actions, such as the election of MIT's president and executive vice president and treasurer, the election of Corporation members, the approval of new types of academic degree programs (e.g., the

[26] http://orgchart.mit.edu/academic-council

[27] https://facultygovernance.mit.edu/committees-and-councils?field_committee_name_tid=All&field_committee_type_tid=25&combine_1

[28] http://corporation.mit.edu/membership

recent introduction of the Master of Applied Science, discussed in Standard 4), and the awarding of MIT degrees.

The Executive Committee—charged with "responsibility for overseeing the general administration and superintendence of all matters relating to the Institute"—has received the most substantial delegation of authority as the Corporation's principal governance committee. In practice, this oversight includes the scope and excellence of MIT's educational and research programs; the performance of the administration; financial planning, including the annual operating budget, tuition and financial aid, the capital budget, and debt policy; investment of the endowment and distribution from the endowment; construction, maintenance, and renovation of the campus physical plant; acquisition, development, and management of real estate; operating policies, systems, and controls; and operation of Lincoln Laboratory as a federally funded research and development center. As noted above, it also includes approval of promotions and appointments involving tenure decisions, which have long-term financial and strategic ramifications for the Institute's academic excellence. Furthermore, the Executive Committee is charged with coordinating and overseeing the functions of the MIT Investment Management Company board and "all of the other committees of the Corporation except the Membership Committee."[29]

In addition to performing these critical functions, the Executive Committee has in recent years become more of a partner to the administration in long-term strategic planning. Executive Committee members have contributed their expertise and perspectives to a broad range of issues that will shape the Institute's future, from international engagement to the local innovation ecosystem in Kendall Square to computing. As MIT continues to face complex challenges and identify strategic opportunities, the Executive Committee will remain a vital and valued partner to the administration.

In December 2013, for the first time in 15 years, the Executive Committee conducted a comprehensive review of the Bylaws of the MIT Corporation.[30] The review raised and addressed a number of questions, including:

- Do the bylaws sufficiently articulate the role of the Corporation and the Executive Committee?
- How does MIT ensure active governance oversight while also ensuring that the administration acts with authority and flexibility?
- Are the Corporation's committees structured and defined optimally?

Based on its review, the Executive Committee recommended the following changes to its bylaws, which the full Corporation unanimously approved in December 2013:

- Expand the scope of the Audit Committee, one of the standing committees of the Corporation, to include risk. The renamed Risk and Audit Committee has oversight responsibilities with respect to the quality and integrity of MIT's financial statements; its external and internal auditors; its tax filings and compliance with law, regulation, and standards of ethical behavior; and risk management as stated in the committee's charter.[31]

[29] https://corporation.mit.edu/bylaws/bylaws-section-14

[30] http://corporation.mit.edu/about-corporation/bylaws

[31] http://corporation.mit.edu/bylaws/bylaws-section-18

- Establish a Development Committee as one of the standing committees of the Corporation to position the Corporation as a partner to the administration in anticipation of the capital campaign.
- Revise the membership and leadership of the Executive Committee to:
    - Add two members, bringing its total to no fewer than seven nor more than 10 elected members serving staggered five-year terms plus, *ex officio*, the chair of the Corporation, MIT president, MIT executive vice president and treasurer, and MITIMCo board chair;
    - Institute term limits (two five-year terms) for members; and
    - Install the chair of the Corporation, rather than the president, as chair of the Executive Committee, bringing MIT's governance of its Executive Committee in line with the structure of peer boards.

Similarly, starting in September 2016 the Executive Committee began a process of self-evaluation, led by an outside consultant. The assessment included interviews with current committee members, former members, and senior officers of the MIT administration; moderated group discussion; an in-person report to the committee; and a written report, which was shared with the full committee. The evaluation was designed to encourage the Executive Committee to reflect on its current practices, procedures, and dynamics, as well as the substance of its work, with the intention of identifying the committee's strengths and opportunities for improvement.

The consultant's report in March 2017 sparked valuable dialogue and led to one structural change: the establishment of the Governance and Nomination Subcommittee (GNS) of the Executive Committee. Per its charter, approved by the Executive Committee in June 2017, the GNS "assists the Executive Committee in the fulfillment of its responsibilities to MIT by attending to the overall quality and governance performance of the Executive Committee. The subcommittee concerns itself with Executive Committee performance and effectiveness, membership and nomination, and leadership succession. The subcommittee also addresses the overall excellence of the MIT governance structure." The subcommittee's charter can be found in the workroom.

The subcommittee comprises four members: the chair of the Corporation and MIT president, *ex officio*, and two appointed members who are term members of the Executive Committee. It is explicitly charged to implement "a process by which it regularly assesses, discusses, and enhances the overall performance of the Executive Committee and Executive Committee members assess their performance." This spring, for the first time, the subcommittee chair initiated an Executive Committee self-assessment, surveying committee members, sharing a summary of her findings, and leading a discussion about the committee's performance and opportunities for improvement. The GNS chair will regularly lead this process of self-reflection.

Perhaps the Corporation's most powerful tool is its visiting committee structure, which directly engages the board in strengthening the Institute's core activities. As described in Standard 2, the visiting committees review the standards and operations of MIT's academic departments and other major activities by providing feedback and advice to the Executive Committee, the Corporation, and the MIT administration.

Approximately 400 distinguished scientists, engineers, scholars, entrepreneurs, executives, and educators serve on the Institute's 31 visiting committees.[32] Each committee is approved by the Corporation and typically includes five Corporation members appointed by the chair of the Corporation, one of whom chairs the committee, six alumni nominated by the MIT Alumni Association, and six members nominated by the MIT president. Although preparation for a visiting committee requires significant time and attention, the departments welcome the opportunity for assessment by an informed and invested body.

Each visiting committee meets on campus once every two years. Most convene for a day and a half of discussions, followed by a final half-day session to provide feedback to the president, provost, chair of the Corporation, and other senior administrators. Each committee chair prepares a written report that is distributed to the Corporation, senior administrators, and the appropriate department head. The Executive Committee reviews and votes to accept the reports before they are presented to the full Corporation. Each visiting committee chair routinely meets with the respective department head and submits an interim report halfway through the two-year review cycle.

The Institute's visiting committee structure is fundamental to the Institute's capacity for introspection and improvement. Standard 2 describes the critical role the visiting committees played in crystallizing the need for strategic action with regard to computing. The visiting committees help in many other ways. For instance, the visiting committee for the Department of Chemistry has, in its last several cycles, identified a lack of collegial and respectful behavior in the department. The 2014 visiting committee report noted, "The department has taken steps to correct the problem, including the recent creation of a faculty committee on student climate. However, the situation remains troubling with a climate that MIT would not wish and should not accept."

In the ensuing two years, although the department's new leadership (as of July 2015) had worked closely with the school dean and provost to address the problem, some troubling behavior continued. In summarizing its 2016 review, the visiting committee wrote, "Despite a number of positive actions and a demonstrated commitment to improvement on the part of the leadership, the climate in the department is not what MIT would want it to be, and it overwhelmed our discussions during our visit." That year, the visiting committee made four specific recommendations for action: present the results of the graduate student survey to the entire department; make mandatory the harassment prevention and implicit bias workshops that the department had begun developing; prepare and distribute a department code of conduct; and confront those most responsible for perpetuating the problematic behavior. In response, the provost initiated an effort to provide Chemistry and other departments with more tailored support.

As an important first step, the Title IX and Bias Response Office and the Violence Prevention and Response Office partnered with Chemistry's leadership to develop a workshop aimed at promoting an inclusive learning environment for the department's faculty, students, staff, and postdoctoral scholars. In late October 2018, the visiting committee returned to campus and discussed, among other topics, the state of the department's climate. The committee remarked that its concerns were "significantly addressed," noting the impact of the department's actions: "Faculty, postdocs, and students expressed support and satisfaction for the improved and improving department climate." MIT has applied lessons learned in Chemistry to support efforts in other academic units, including Chemical Engineering,

[32] http://corporation.mit.edu/committees/visiting-committees

Political Science, and Linguistics. In addition, the MindHandHeart initiative, described in Standard 5, is working with the Department of Chemistry on a new Department Support Project (DSP), an initiative designed to help academic departments address climate issues, share successes, and coordinate efforts to make MIT more welcoming and inclusive. See the workroom for the relevant visiting committee reports.

From helping senior leadership understand complex global forces in computing to focusing an individual department's attention on challenging interpersonal dynamics, the visiting committee structure is essential to making MIT go.

Faculty

MIT's faculty play a central role in the Institute's governance, especially with regard to the stewardship of academic and educational matters. The Rules and Regulations of the Faculty define the roles and responsibilities of the standing committees of the faculty; outline the faculty's legislative processes; and describe the faculty's role in matters related to the academic calendar, admissions, registration, grades, and degrees.[33]

The Institute's faculty meet on a monthly basis during the academic year, but most of its governance work occurs in its 11 standing committees, including the Faculty Policy Committee (FPC), which coordinates the work of the other faculty committees, providing guidance and direction.[34] In May 2013, the faculty approved the creation of a new standing committee—the Committee on Campus Planning—to advise the administration on campus planning issues, including but not limited to the future academic and research needs of the community. The chair of the Committee on Campus Planning meets regularly with the associate provost responsible for campus planning and the deputy executive vice president. To promote coordination, transparency, and ongoing communication, the chair also serves on the Institute-wide Building Committee and presents annually to the FPC.

As described in Standard 4, the General Institute Requirements (GIRs), which fall under the faculty's purview, have drawn increased attention in recent years. In June 2018, the faculty officers convened a full-day workshop of 100 faculty and staff to consider questions related to the curriculum, MIT's processes of learning, and transferable skills. The workshop surfaced three key themes:

- While the GIRs provide a common experience, they are not currently achieving the outcomes the faculty desire;
- As presently configured, the GIRs do not provide the guidance or materials with which to develop adequate accounts of what is more or less valuable in the world; and
- The faculty are interested in adaptation and experimentation.

Within one week of the workshop, but following a year-long, collaborative, and extensive study of the first year, Vice Chancellor for Undergraduate and Graduate Education Ian Waitz submitted to the Committee on the Undergraduate Program a proposal for an experiment that ultimately became the pass/no record grading experiment described in Standard 4. The committee continues to review proposals related to experimentation with regard to the GIRs.

[33] https://facultygovernance.mit.edu/rules-and-regulations

[34] https://facultygovernance.mit.edu/committees-and-councils

This activity, combined with the findings and recommendations of the Designing the First Year class, described in Standard 6, suggests an interest in an in-depth assessment of the GIRs in the years ahead. In fact, in spring 2019 the chair-elect of the faculty initiated such a review, an effort that will continue in the fall.

Students

Students have developed a robust system of self-governance through organizations like the Undergraduate Association and Graduate Student Council, and are an essential part of MIT's commitment to shared governance. They serve on the standing committees of the faculty and the standing Institute committees appointed by the president, and contribute to *ad hoc* efforts such as the presidential search process, various Institute task forces and working groups, and this self-study.

The visiting committee meetings include opportunities for members of the committees to meet with students, and students enjoy a formal link to the Corporation through the Corporation Joint Advisory Committee on Institute-Wide Affairs (CJAC), which includes six Corporation members, six students, and six members of the faculty.[35] CJAC is informative and advisory, not a governing committee, and its chair reports annually to the Corporation. The committee often takes actions that produce meaningful results. For instance, in academic year 2016 CJAC led an experiment called "X.ThG" (where "X" = the department, and "ThG" = graduate thesis), aimed at improving research advising through subject evaluations.[36] The committee's graduate student members worked with academic departments to gather and share targeted comments and longitudinal data about research advising relationships by graduate program. The Office of Graduate Education deemed the experiment a success and worked with CJAC and the students to make X.ThG available to all graduate programs.

Students also established a new line of communication with the president through the Presidential Advisory Cabinet (PAC), which President Reif formed immediately upon entering office. A cabinet of eight students—four undergraduate and four graduate—PAC meets with the president throughout the academic year to advise him on a range of topics related to academics, research, and student life. The president presents PAC with ideas for new endeavors and describes some of the challenges that he faces. In response, the students provide frank, unfiltered, confidential feedback. The president also invites the cabinet to surface issues of concern that might not otherwise reach him. PAC provides President Reif with invaluable insight into the student experience and allows students to contribute to Institute governance at the highest level. PAC's charge is available in the workroom.

[35] https://corporation.mit.edu/committees/additional-committees/corporation-joint-advisory-committee-institute-wide-affairs-cjac

[36] http://gsc.mit.edu/wp-content/uploads/2014/07/20161024_ThGsurvey_summary.pdf

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STANDARD 4: ACADEMIC PROGRAM

Over the last decade, MIT's academic program has evolved to include greater diversification in some areas and a narrower focus in others. These changes respond to technological innovations in teaching and learning, shifts in societal demand, and student and faculty interest. The result is an educational model that is more interdisciplinary, more experiential, more digital, more computational, and more flexible than ever before. These qualities are likely to become even further ingrained in the Institute's academic program in the years ahead.

For the sake of orientation, Table 2 presents the type, number, and distribution of the academic degree programs across and between MIT's five schools.

Table 2. The type, number, and distribution of MIT's academic degree programs

MIT school	Bachelor's	Engineer's	Master's	Doctorate
Architecture and Planning	3	n/a	9	7
Engineering	19	9	16	49
Humanities, Arts, and Social Sciences	17	n/a	4	8
Management	3	n/a	8	2
Science	8	n/a	7	27
Inter-School	5	n/a	6	11

A decade of change

MIT has a rich and lengthy tradition of interdisciplinary collaboration. During this review period, that tradition has grown even deeper. Over the last decade, MIT has established a record number of new undergraduate majors, many offered jointly by two departments or programs, often including Course 6 (Electrical Engineering and Computer Science).[37] Through these joint programs, faculty create new interdisciplinary pathways for teaching and exploration. The launch of the MIT Stephen A. Schwarzman College of Computing responds to and builds upon this activity. As described in Standards 2 and 3, the college aims to foster breakthroughs in computing, particularly artificial intelligence (AI), actively informed by the wisdom of other disciplines. Most distinctively, by adding new integrated curricula and degree programs in nearly every field, it will equip students to be as fluent in computing and AI as they are in their own disciplines, and prepare them to use these digital tools wisely and humanely to help make a better world. Although the college's full impact cannot yet be known, it will undoubtedly present opportunities to revise and further strengthen MIT's academic program.

At the same time, momentum is building to revisit the undergraduate General Institute Requirements (GIRs), designed to provide a common core of prerequisite knowledge and the foundation for a general, well-rounded MIT education. As described in Standard 6, the Office of the Vice Chancellor (OVC) is exploring opportunities to improve the experience of first-year undergraduates to make the first year more flexible, with greater opportunity for exploration. The GIRs in no way reflect the totality of the first-year experience, but they are inextricably linked. Faculty are also discussing the possibility of new GIRs, with computational thinking at the top of the list. In 2008 and 2009, the faculty extensively

[37] In addition to their proper names, MIT's academic departments are identified by numbers and are called Courses (for example, Civil and Environmental Engineering is Course 1; Mechanical Engineering is Course 2; and so on). For a full list of Courses, see http://mit.edu/education/schools-and-departments/.

debated several motions to revise the GIRs. In the end, they approved significant changes in the eight subjects that constitute the requirements' HASS components. However, with regard to the nine subjects in the science, mathematics, and engineering (SME) component, the faculty voted in favor of retaining the current requirements.

Course credit

To be recommended for the degree of Bachelor of Science (SB), a student must attend MIT for no fewer than three regular academic terms, typically including the term of graduation. A student must also satisfactorily complete a program of study approved in accordance with the faculty regulations, including 17 subjects that satisfy the GIRs and the departmental program of the course in which the degree is to be awarded. Completion of a program requires 180 to 198 units beyond the GIRs, including a minimum of 48 units of unrestricted electives. For the purpose of counting subjects, six-unit subjects count as half-subjects; subjects of nine to 15 units count as one subject; 18-unit subjects count as 1.5 subjects; and subjects of 21 to 24 units count as two subjects. Each program is designed to be completed with a normal academic load—the equivalent of eight to eight-and-a-half subjects each year—for a total of 32 to 34 subjects. Two standing committees of the faculty, the Committee on Curricula (CoC) and the Committee on the Undergraduate Program (CUP), closely monitor this design, review and approve any new or revised undergraduate degree programs, and ensure that a department clearly presents a program's required subjects and units via a detailed and publicly available degree chart.[38]

MIT uses a three-number scheme (3-0-9, for instance) to assign credit units for subjects, by which one credit unit is the equivalent of approximately 14 hours of work per term (or one hour of work per week for a subject offered over the course of a full term). The first number in the scheme represents the credit units assigned for lecture and recitation; the second represents the credit units assigned for laboratory, design, or fieldwork; and the third represents the credit units anticipated for outside preparation. The three numbers added together represent the total credit units for a subject (12 in the example above).

The CoC is responsible for approving the credit units—including distribution across lecture, laboratory, and preparation—assigned to each undergraduate-level subject. Likewise, the Committee on Graduate Programs (CGP) is responsible for approving the units for graduate-level subjects. Once approved, the committees continue to monitor changes to the subjects to ensure that the units remain consistent with the amount of effort required to successfully complete them.

There is an expectation that undergraduate students will earn approximately 48 credit units per term, 96 units per year, or a minimum of 360 units over four years. The number of credit units a student can attempt per term is not limited, except in the first year of undergraduate study, when it is limited to 54 in the fall term and 57 in the spring term. Students do not earn credit units in physical education subjects. The GIRs for an SB can account for 204 credit units, while the expectation is that a student will earn between 114 and 186 units in the major and between 48 and 138 in unrestricted electives.

MIT's credit unit structure provides great flexibility, with examples of subjects using almost every combination of lecture, lab, and preparation. The credit unit value of a subject varies according to the content. Some subjects carry a credit unit value as low as one, while others have a value as high as 42.

[38] http://catalog.mit.edu/degree-charts/

Recently, academic departments have been developing exploratory undergraduate subjects with low credit unit values to encourage students to explore different majors. For example, 3.001 Introduction to Materials Science and Engineering has a value of three credit units (2-0-1).

On the other end of the spectrum, there are subjects with very high credit unit values. Much of the core undergraduate curriculum in Aeronautics and Astronautics, for instance, is covered in Unified Engineering, which totals 48 credit units. This core is made up of four 12-unit subjects taken in pairs over two successive semesters. Design studios in the Department of Architecture also have large credit unit values, reflecting the expectation that students will spend significant time working on projects. 4.023 Architecture Design Studio I, for instance, is an undergraduate subject with 24 credit units (0-12-12).

Because of the flexibility MIT's credit unit methodology offers, it is much easier to assign value to subjects that are half-term modules or that are offered during the Institute's Independent Activities Period (IAP) in January. The Department of Mechanical Engineering offers several partial-term six-unit subjects at the undergraduate level, such as 2.05 Thermodynamics (3-0-3) and 2.00 Introduction to Design (2-2-2). The MIT Sloan School of Management has a number of six-unit graduate-level subjects that are half-term and/or offered during IAP. This approach introduces students to a number of different concepts in depth within a short period of time. Examples of such subjects include 15.322 Leading Organizations (3-0-3) and 15.339 Developing Leadership Capabilities (2-0-4).

Some subject listings have units arranged. In these cases, the instructor and student determine the number of credit units to reflect the amount of work expected. Graduate students who have completed their coursework typically register for research and a thesis. The credit units students earn for these subjects vary by department but usually range from 24 to 36 per term. A student who is registered for 36 credit units is generally considered to be full time.

MIT's academic departments may grant credit for courses taken at a transferring student's previous institution. There is no official conversion of MIT's credit units to the credit units awarded at other institutions. However, the Institute suggests the following calculation: three MIT units are approximately equal to one "semester hour" of credit. A 12-unit MIT subject translates to four semester hours or credits. Students who have completed at least two terms of study at an accredited college, university, technical institute, or community college by the time of their prospective enrollment may apply for transfer admission. MIT does not accept transfer applications from students who, at the time of MIT entry, will have finished less than one year or more than two-and-a-half years (i.e., five terms) of college. Undergraduate transfer students generally graduate under the requirements that apply to the class they join when they enter MIT.

Unlike in the graduate programs, described below, a student applies for undergraduate admission to MIT as a whole, not to a specific major or school. All first-year undergraduate students begin without a major. At the conclusion of the first year, students may choose any major without any additional requirements or admission procedures.

General Institute Requirements

Central to the Institute's undergraduate educational programs is a commitment to develop foundational knowledge as well as critical and constructive learning across the sciences, engineering, social sciences, and humanities. As the Subcommittee on the Educational Commons wrote in 2008:

> The GIRs provide the setting for *general education* at MIT, on which students depend as building blocks for their later lives as citizens, leaders, employees, parents, and other social roles they will embrace. The entire MIT faculty shares the responsibility of ensuring that GIR subjects provide a rich environment that supports a lifetime of learning and responsible citizenship. The GIRs also help to provide a common base of *prerequisite knowledge*, on which virtually all departments depend for the success of their majors. The entire MIT faculty shares the responsibility of ensuring that the pre-conditions are set so that GIR subjects are first-rate and suited for later use in majors. Not every subject contributes equally to general education and to *prerequisite knowledge*, but it is important to remember that GIR subjects, taken as a whole, address these two needs of the curriculum simultaneously.[39]

The following is an overview of key areas of emphasis:

Science requirement: MIT expects its graduates to have an understanding and appreciation of the basic concepts and methods of the physical and biological sciences. The science core includes two calculus subjects, two physics subjects, one biology subject, and one chemistry subject. The Rules and Regulations of the Faculty list the subjects that constitute the six core science subjects. Any proposed changes to the subjects that count toward these requirements undergo review by the CUP, CoC, and Faculty Policy Committee (FPC) before going to the faculty for a vote. Also included in the GIRs are two restricted electives in science and technology (REST) and the Institute laboratory requirement.[40,41] The CoC has responsibility for determining which subjects count toward fulfilling the REST and Institute laboratory requirements.

Humanities, arts, and social sciences requirement: MIT provides a substantial and varied program in the humanities, arts, and social sciences (HASS) that forms an essential part of the education of every undergraduate. The requirement helps students deepen their knowledge in cultural and disciplinary areas, and encourages them to develop sensibilities and skills vital to a productive and satisfying life. Every candidate for a bachelor's degree must complete a minimum of eight HASS subjects, including distribution and concentration components.[42] The CUP, through its permanent Subcommittee on the HASS Requirement (SHR), oversees the HASS requirement.

Communication requirement: Undergraduates must take four communication-intensive (CI) subjects: two in the humanities, arts, and social sciences (CI-H), and two in the student's major (CI-M). The subjects are integrated with both the HASS requirement and the requirements of the major program, allowing students to simultaneously fulfill the GIRs and their major requirements. The communication requirement is the only "paced" GIR: to ensure regular practice of communication skills, students are required to meet a minimum pace of one CI subject per year.[43] The CUP, through its permanent Subcommittee on the Communication Requirement (SOCR), oversees the communication requirement. At the curricular level, SOCR reviews proposals to add or modify subjects and programs.

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[39] https://facultygovernance.mit.edu/sites/default/files/meeting-enclosures/2008-11-19/Enclosure%20B%20-%20Motion%20to%20Revise%20the%20General%20Institute%20Requirements.pdf

[40] http://catalog.mit.edu/mit/undergraduate-education/general-institute-requirements/#restrequirementtext

[41] http://catalog.mit.edu/mit/undergraduate-education/general-institute-requirements/#laboratoryrequirementtext

[42] http://catalog.mit.edu/mit/undergraduate-education/general-institute-requirements/#hassrequirementtext

[43] https://registrar.mit.edu/registration-academics/academic-requirements/communication-requirement

It also oversees the overall health of the requirement. This takes several forms, from reviewing the student experience with the requirement to conducting an in-depth assessment of a program or other component of the requirement.

Physical education: The physical education requirement aims to provide undergraduates with the skills necessary to lead healthy, active lives, and to foster both personal growth and a sense of community through physical activity. Students must take four physical education courses and complete the swimming requirement by the end of their second year. The Department of Athletics, Physical Education, and Recreation oversees the physical education program and the swimming requirement. Individual academic departments are responsible for ensuring that their majors have completed the requirement. They do so by reviewing the Registrar's Office's degree audits, which detail the subjects students take and the requirements they complete.

Over the last decade, MIT has seen two notable revisions to the GIRs. First, MIT's 2009 self-study described changes to the HASS requirement the faculty had recently approved but that MIT had not yet implemented. Specifically, the faculty voted to revise the distribution requirement such that all undergraduates must complete one subject in each of three areas: humanities, arts, and social sciences. Over the past 10 years, this revision has been successfully implemented, starting with undergraduates entering in fall 2010. In summer 2016, once three cohorts of students had graduated with the revised requirement, the SHR began an analysis of student audits and enrollments to understand how students moved through the new requirement and identify areas that might need more in-depth review. The SHR determined that students are able to successfully complete the requirement and that the revised distribution has made advising more straightforward, with greater room for student choice. The SHR will continue to monitor the impact of the change to the requirement. The subcommittee has also undertaken a review of the concentration component of the HASS requirement, an aspect of the requirement that has remained constant. The review, expected to be completed by the end of 2019, will assess the overall health of the HASS concentrations and identify and share best practices for units offering them.

Second, in April 2017 the faculty approved a change to the Institute laboratory requirement to allow approved subjects of other than 12 and six units to be applied toward fulfilling the requirement. Since MIT introduced the Institute laboratory requirement in 1965, undergraduates have been able to satisfy the requirement with either a single 12-unit subject or six lab units each from two different subjects, rather than a specific number of subjects, lending itself to a modular approach. Making no changes to the overall requirement, the revised language allows for even greater modularity—and thus greater flexibility—by permitting additional combinations of subjects and encouraging undergraduates to satisfy at least a portion of the requirement in their first two years. In 2007, the Department of Chemistry implemented a modular structure into its Institute laboratory offering with great pedagogical success, suggesting that a modular structure can work well when designed appropriately. This structure served, in effect, as an unofficial pilot that the CUP referenced in approving the changes to the laboratory requirement. The findings of the FPC's Subcommittee on Sub-term Subjects, described below, provided additional support for this revision.

Throughout the GIRs' history, the faculty have taken steps to ensure that the requirements meet the needs of MIT's undergraduate students. As noted in Standard 3, the faculty officers have begun a conversation about the future of the GIRs with the faculty at large and with senior leadership. This

process of engagement has included presentations and open discussions at Institute faculty meetings and at a faculty retreat focused on the curriculum. A complication in considering revisions to the GIRs is that the current requirements account for about half of an MIT undergraduate degree program. Adding a new requirement would necessitate removing an existing one or reconfiguring existing requirements to accommodate an addition without increasing the required units. Moreover, any change would need to take into consideration the impact of advanced placement courses, advanced standing exams, and transfer credit, all of which allow students who enroll in science and engineering SB programs—nearly 94% of all undergraduates—to place out of specific SME requirements. Any change to the GIRs would need to carefully and thoughtfully address the needs of all students, those who place out of some of the requirements and those who do not.

In recent years, several potential areas for new GIRs have emerged, including statistics, ethics, and computational thinking, the last of which the faculty have discussed at least as far back as the 2006 Report of the Task Force on the Undergraduate Educational Commons.[44] In 2016, the chair of the faculty and the dean for undergraduate education convened a five-school faculty working group to study the role of computational thinking in undergraduate education and consider whether formal exposure to algorithmic or computational thinking should be required of all MIT undergraduates.[45] In its 2017 report, the Working Group on Computational Thinking argued that computational thinking should:

> …play an explicit role in the formal education of all undergraduate students at MIT. Computational thinking provides a distinct type of rigorous thought of important intellectual value; it requires and develops important modes of communication; it acknowledges the need to understand the transformational impact of computation in other disciplines; and it creates opportunities and access for our students and graduates.… The working group believes that just as every student learns critical thinking and inductive and deductive reasoning as pathways to analysis, understanding and discovery through their humanities, arts and social science subjects and through the current science General Institute Requirements, so too should every student learn computational thinking.[46]

The report recommended that MIT explore how such a requirement could be introduced, with particular regard to the impact on the overall course load, urging leadership to "connect computational thinking to domain-specific contexts across different intellectual disciplines."

In spring 2017, the CUP began extensive deliberations to consider how best to proceed. In academic year 2018, in addition to internal committee discussions, the committee chair led a discussion at an Institute faculty meeting, engaging faculty more broadly in considering scenarios for potential change. With no clear consensus, however, and notably with the upcoming opening of the college, the CUP has put these discussions on hold so that any next steps can be considered within the context of a more

[44] http://web.mit.edu/committees/edcommons/documents/tf_full_report.pdf

[45] The working group defined "computational thinking" as "…more than learning the syntax of a computer language. We want students to develop skills and modes of thinking so that they can construct or recognize useful, well written algorithms, can implement them, and can use them to model physical, biological, or social systems."

[46] https://facultygovernance.mit.edu/sites/default/files/reports/2017-01_computational_thinking_requirement_FINAL_CLEAN.pdf

comprehensive review of the GIRs. As noted in Standard 3, in spring 2019 the chair-elect of the faculty initiated such a review, an effort that will continue in the fall.

Undergraduate degree programs

Between 2009 and spring 2019, the MIT faculty approved 13 new undergraduate majors, compared to six between 1999 and 2009.[47] Five of the 13 are joint majors offered by two departments; in four of these, Electrical Engineering and Computer Science (EECS) is one of the departments. The new programs jointly offered with EECS are Computer Science and Molecular Biology; Computer Science, Economics, and Data Science; Urban Science and Planning with Computer Science; and Computation and Cognition. Three of the new undergraduate degree programs—in Aeronautics and Astronautics, Chemical Engineering, and Nuclear Science and Engineering—are designed to offer undergraduates flexibility within the context of a particular discipline.

It is worth noting that, while new areas of study have emerged at the intersections of disciplines, some of the new majors, including the redesigned Course 15 (Management) majors, have become more focused. In 2015, following an in-depth review by the MIT Sloan School of Management's Undergraduate Education Committee, the faculty voted to replace the SB in Management Science with three distinct SB programs: Management, Business Analytics, and Finance. The review highlighted a continuing decline in enrollment in the major and a concern that the major was overly broad in its requirements with insufficient general flexibility. The committee felt that the undergraduate population would be better served by offering three majors: one focused on business analytics, one on finance, and one providing a more general foundation of business subjects for student exploration.

These competing trends in undergraduate majors—increasing interdisciplinarity in some areas, and a narrowing focus in others—extends to minors as well. Minors consist of five to seven subjects, with a typical program comprising six. A student may earn no more than two minors. The objective of a minor is to provide a depth of understanding and expertise in an area outside of, or complementary to, a student's major. Students who successfully complete a minor have their field of study listed on their transcripts as part of their Bachelor of Science degrees, giving public recognition to this focused work. MIT has launched 12 new minors since 2009, five of the interdisciplinary variety, compared to eight total new minors during the decade prior. Several—including polymers and soft matter—have more of a niche focus than MIT's minors have traditionally seen. A list of majors and minors MIT has created over the last decade and a list of all current majors and minors can be found in the workroom.

MIT has also experienced a sharp increase in the number of undergraduates majoring in Course 6 alone (i.e., not double majoring)—from 601 in fall 2009 to 1,148 in fall 2018—a shift that is especially pronounced in Course 6-3, Computer Science and Engineering, whose single majors increased from 217 in fall 2009 to 733 in fall 2018. The number of single majors in Course 6-2, Electrical Engineering and Computer Science, increased more modestly, from 288 in fall 2009 to 357 in fall 2018; those in Course 6-1, Electrical Science and Engineering, declined from 96 in fall 2009 to 58 in fall 2018 (Table 3).

[47] One of these six, Course 8-B, was subsequently removed and changed to a flexible option within the SB in Course 8 (Physics).

Table 3. Undergraduates majoring in Course 6 (Electrical Engineering and Computer Science), fall 2009 and fall 2018

Major	Single majors, fall 2009	Single majors, fall 2018	Double majors/double degrees, fall 2009	Double majors/double degrees, fall 2018
6-1*	96	58	11	7
6-2**	288	357	28	22
6-3†	217	733	36	79
Total	**601**	**1,148**	**75**	**108**

* 6-1 = Electrical Science and Engineering
** 6-2 = Electrical Engineering and Computer Science
† 6-3 = Computer Science and Engineering

A spike in interest in computer science—in Course 6 and across the Institute—informed the process of faculty engagement that ended with the launch of the MIT Stephen A. Schwarzman College of Computing. This narrative is explored in detail in Standards 2 and 3.

Spurred largely by the increase in Course 6 majors, in academic year 2017 the CUP convened the Study Group on Undergraduate Majors Selection to explore and analyze trends in undergraduate major selection and enrollments at MIT, taking into account trends at peer institutions. The CUP also asked the study group to examine the contributing factors, both internal to MIT and external, for the shifts; the effects and implications for MIT's students, faculty, and the Institute as a whole; and the ways in which MIT's departments, schools, programs, and offices have responded. The aim was to catalog initiatives underway, share best practices, and imagine possible actions for the future. At the time of this self-study, the group is finalizing its report to the CUP, but the data it collected are already having an impact on campus.

The study group sought to understand why so many undergraduates who had not identified EECS as their planned major when they applied to MIT ended up majoring in it. What are the factors that influence students' decisions to change direction when they arrive on campus? To try to answer this question, the study group surveyed 250 first-year undergraduate students at five points in the year. It wanted to see longitudinally what students were experiencing and thinking as they considered their options for a major. Thirty-two of the 250 students also participated in two interviews (one in the fall, one in the spring) to provide deeper insight. The data collected as part of this study provide a control group for an experimental grading policy for first-year students the CUP approved in the summer of 2018, described below.

Curricular experimentation

Experimentation plays an important role in informing faculty conversation about the future of the GIRs. In the summer of 2018, the OVC proposed to the CUP an experiment designed to assess the strengths and weaknesses of options for enabling greater exploration of fields and majors during the first year. The experiment builds on the inputs from a few sources—the June 2018 faculty workshop, described in Standard 3; the spring 2018 Designing the First Year Experience class, described in Standard 6; and the Study Group on Undergraduate Majors Selection, detailed above. Although the study group's work was ongoing at the time the CUP approved the experiment, its findings provided great insight into the paths students take when choosing a major and the changes they say would have improved the process. Notably, the experiment builds on the working group's finding that 77% of 2017

first-year undergraduate students indicated that a pass/no record (P/NR) grading option in the science core GIRs would have improved the major selection process for them more than any other option they were asked to consider.[48,49] As the OVC's proposal to the CUP notes, "We have an opportunity, using the 2021 student cohort from the CUP Study Group on Undergraduate Majors as a control, to experiment and collect evidence to better inform decisions about long-term policy change. This is particularly important while broader discussions of the structure of the GIRs are being initiated and are ongoing." The proposal is available in the workroom.

The experiment, approved in August 2018, allowed first-year students entering in fall 2018 to designate up to three SME GIRs to be graded on a P/NR basis after their first term. (Under regular MIT policy, all subjects are graded P/NR during the first semester of the first year, the only time this grading policy is in effect.) Typically, first-year students take many science core GIRs during their first year, leaving little room for classes that would enable greater exploration of majors and minors. The team leading a study of the experiment hypothesizes that the grading flexibility will encourage students to delay one or more science core GIRs until later in their academic program, allowing students more freedom to take classes to explore majors and minors. The study team further hypothesizes that expanded opportunities for major exploration enabled by increased curricular flexibility will lead to increased confidence in students' initial choices and to greater satisfaction with their choice of major (i.e., fewer students saying that, if they had to do it again, they would have picked a different major). This approach may also diversify and improve the undergraduate experience as a whole, encouraging students to engage in a wider range of academic opportunities. Ultimately, the goal is to increase overall satisfaction with the undergraduate experience at MIT, improving academic performance and reducing stress.

The OVC is responsible for executing and assessing the experiment, and reporting periodically about its impact to the CUP. This assessment includes the following:

- Collecting and sharing data through ongoing or existing surveys;
- Conducting integrated analysis and assessments that aggregate and synthesize the data developed after the fall 2018 semester early in the spring 2019 semester, and late in the spring 2019 semester to inform consideration of subsequent experiments or actions; and
- Reporting annually to the CUP and the MIT faculty more broadly as the OVC tracks the Classes of 2021, 2022, and 2023.

This is a long-term experiment, with conclusive results still four or five years away. Initial results—based on class enrollments, surveys, and in-person interviews—suggest the experimental grading policy, in conjunction with a change in messaging to encourage first-year students to explore, has sparked changes in both behavior and perceptions. Of note, only approximately 44% of the students in the Class of 2022 took three or four GIRs during their first semester, compared to approximately 77% in the previous year's class. In sum, first-year students took 538 fewer science core GIRs, meaning that roughly every other student took one fewer science core GIR. In place of those GIRs, students

[48] The science core for the experiment refers subjects 3.091, 5.111, or 5.112; 7.01n; 8.01n; 8.02n; 18.01n; and 18.02n, described in the MIT Bulletin: http://catalog.mit.edu/mit/undergraduate-education/general-institute-requirements/#sciencerequirementtext.

[49] Students were asked, "To what extent would the following changes have improved the choice of major process for you?" There was a list of possible changes, and students ranked each on a scale of 1 to 5. Seventy-seven percent of students replied 4 or 5, where 5 is "to a great extent" and 1 is "not at all." This was the highest percentage for any of the changes included in the survey.

took a wide range of other classes. Seventy-five percent of those other classes were in 190 subjects that departments explicitly identified as good for exploration. Compared to the prior year, first-year students registered for 15% more distinct subjects, an increase from 278 to 320 subjects. Moreover, in response to a survey question that asked first-year students to identify the qualities they feel are most important in choosing their classes for fall 2018, respondents rated the chance to explore a major or to learn new and interesting material more highly than the previous year's class. Respondents rated the opportunity to take subjects to fulfill requirements as less important. In addition, preliminary data from interviews indicate that first-year students were considering opportunities for exploration beyond taking classes, such as undergraduate research projects in departments or labs.

Looking ahead, MIT will conduct a second phase of the experiment for the undergraduate class entering in September 2019. Based on the findings of phase one, in April 2019 the CUP approved an experiment to continue to assess the strengths and weaknesses of options for enabling greater exploration of fields and majors during the first year. The experimental policy for phase two integrates GIR P/NR deferral, creates room for first-year discovery and related opportunities outside the regular credit limits, and replaces early sophomore standing with changes to credit limits and access to advice in prospective majors for all first-year students. Under the experiment, the following adjustments to the regular rules will apply to first-year students entering in fall 2019:

- Students will be eligible to designate up to three science core GIRs to be graded P/NR after their first term. Other regular MIT grading policies, including first-year grading, remain in effect.
- Students will be eligible in both the fall and spring semesters of the first-year to take up to nine units of subjects beyond the regular credit limit for discovery-focused subjects and related approved exceptions.
- The fall credit limit will be 48 units (plus nine units of discovery-focused subjects and related exceptions); the spring credit limit will be 60 units (plus nine units of discovery-focused subjects and related exceptions).
- Early sophomore standing will not be offered to students in this cohort.

As was the case for phase one, the OVC will execute and assess the experiment, and will report periodically to the CUP and the faculty as a whole during academic year 2020 and beyond.

Curricular modularity and sub-term subjects

The 2014 report of the Task Force on the Future of MIT Education, described in Standard 2, encouraged increased exploration of curricular modularity, which the task force defined as "breaking a subject into learning units or modules, which can be studied in sequence or separately."[50] Based on feedback from students and faculty, the task force identified strong interest in a modular approach, especially enabled by digital learning. In fact, MIT's curriculum has been increasing in modularity for some time, a trend that only intensified in the years following the report's release. Between 2010 and 2018, the number of sub-term subjects (that is, those shorter in duration than full-term subjects and typically valued at less than nine credit hours) more than doubled as a percentage of all subjects offered, as shown in Table 4.

[50] http://web.mit.edu/future-report/TaskForceFinal_July28.pdf

Table 4. Numbers of full-term and sub-term subjects, and sub-term subjects' percentage of total number of subjects, academic years 2010, 2014, and 2018

Term	Full-term subjects (no.)	Sub-term subjects (no.)	Sub-term subjects (%)
AY2010	1,996	86	4%
AY2014	2,058	123	6%
AY2018	2,028	200	10%

Recognizing this trend and the inadequacy of existing policies to address the increase in sub-term subjects, in 2015 the FPC charged a subcommittee to evaluate the scope of these offerings and the motivations behind them; their intended and potential growth; and the impact on students, faculty, and the curriculum. After completing its review, the Subcommittee on Sub-term Subjects recommended that MIT revise the academic calendar to include half-term subjects (those that span six to seven weeks in length and that start either at the beginning of the term or during its midpoint) as distinct from full-term subjects.[51] It also recommended that MIT introduce half-term add and drop dates and a final exam period for subjects held during the first half of a semester. The faculty approved the changes in March 2017, implementing them for academic year 2018. The FPC will conduct an assessment of the new half-term academic calendar after several years. One issue in particular the FPC will explore is the length of time permitted for final exams in half-term subjects in the first half of each semester. Currently, these exams must be held during a class period; initial indications are that this may not be realistic for some subjects.

Administration of graduate programs

In 2017, MIT integrated the Office of the Dean for Undergraduate Education and the Office of the Dean for Graduate Education under the newly created position of vice chancellor for undergraduate and graduate education. The vice chancellor works alongside students, faculty, and staff from across the Institute to enhance the undergraduate and graduate academic experiences by catalyzing and leading institutional efforts to improve residential education.

To ensure academic coordination and cohesion, the vice chancellor regularly convenes the departments' undergraduate and graduate academic officers. With a centralized, Institute-wide core curriculum, coordination at the undergraduate level is fairly straightforward. At the graduate level, which has a more diffuse administrative structure, the vice chancellor relies largely on the Office of Graduate Education (formerly the Office of the Dean for Graduate Education) to provide Institute-wide support for the graduate community, advocating broadly for graduate education and working collaboratively across the Institute with administrative offices, schools, academic departments, faculty, students, and committees.

The vice chancellor convenes the Graduate Academic Performance Group (GAPG), which operates under the authority of the CGP, a standing committee of the faculty. The GAPG reviews the academic records of all graduate students at the end of each of MIT's four terms (fall, Independent Activities Period, spring, and summer), giving particular attention to students with cumulatively low grades. Academic departments also often recommend cases to the GAPG for action. Unless the group feels there are extenuating circumstances, it may recommend that students not making satisfactory progress be denied permission to continue or that they be warned that, without significant improvement the

[51] https://facultygovernance.mit.edu/sites/default/files/reports/2016-10_FPC_Sub-term_Subjects_Subcommittee_Final_Report.pdf

following term, they may be refused further registration. Departmental graduate committees may recommend that the GAPG allow a student to pursue a less-advanced degree.

The CGP, in addition to overseeing the GAPG, reviews and approves new graduate programs and major changes to existing programs. Since 2009, the CGP's charge has been expanded to include engagement in other aspects of academic life that affect graduate students. For example, in recent years the CGP has been key in the decision-making process regarding changes to graduate-level policies and practices, including the following:

- In academic year 2014, the CGP completed a review of MIT's two-level system for designating graduate subjects. Historically, the MIT Bulletin has classified some graduate subjects as G-level, denoting a subject approved for graduate credit, and others as H-level, suggesting a higher-level subject approved for a graduate degree. A precise, quantitative, and Institute-wide definition to differentiate the two types of subjects did not exist, despite an attempt to add clarity to the terms in 2012. With feedback from the graduate programs, the CGP recommended that MIT remove the distinction, leaving one level of classification for graduate subjects, a change the faculty approved in April 2014.
- In academic year 2017, the CGP discussed and approved a proposal to permit advanced standing credit, previously available only to undergraduates, for graduate students, with eligibility determined at the department level. This change applies in several different scenarios. For example, a department whose graduate students can satisfy a department requirement with performance in a subject or on a standalone exam may wish to grant advanced-standing credit for the former on the basis of the latter. Or a department that offers a blended master's degree program, where some of the learning occurs online and some in person, may grant advanced standing credit to students who have completed the requisite online courses and proctored exams. On the CGP's recommendation, the faculty approved the change to the Rules and Regulations of the Faculty in November 2016.

To ensure that MIT remains competitive in attracting and retaining graduate student talent, it occasionally undertakes a comprehensive review of its policies and practices with regard to graduate tuition. A 2006 committee review of graduate funding spurred changes that strengthened MIT's commitment to fundraising for graduate student support, especially for first-year students, and reduced tuition charges for nonresident students. In the spirit of periodic review, in 2016 the provost charged a group of faculty, graduate students, and staff to revisit the topic and assess MIT's model for graduate tuition in the current higher education landscape. Specifically, he asked the group to:

- Assess MIT's competitiveness in terms of total cost to research assistants for the duration of their doctoral studies;
- Review existing tuition models, including all-but-dissertation, nonresident status, terminal graduate registration, and related reduced-tuition models at peer institutions;
- Review MIT's use of nonresident status and whether it is consistent with the original intention of the policy;
- Determine the impact on the trend toward foundation support with underrecovery; and
- Review cohort data on doctoral time to degree and consider the impact of tuition models on doctoral time to degree.

The group submitted a draft report summarizing its findings and recommendations, and briefed the Institute's academic leadership, the FPC, and the CGP. Among its key findings were the following:

- MIT and peer tuition costs are similar during early years of graduate tenure; however, due to the lack of a reduced all-but-dissertation tuition status, MIT costs are significantly higher in later years.
- Unlike at MIT, where the five schools individually address tuition shortfalls for National Science Foundation Graduate Fellowships, peer institutions cover the shortfall centrally.
- Students do not consistently use the Institute's nonresident tuition status appropriately.

The provost is currently discussing the report with the school deans and will soon determine a course of action aimed at ensuring the Institute's continued competitiveness with regard to graduate student funding. With concerns about declining federal support for scientific research, MIT will continue to evaluate its funding model for graduate students during the next review period.

Graduate degree programs

For more than a century, MIT's graduate programs have fostered collaborative environments for advanced study by students and faculty working together to extend the boundaries of knowledge. Graduate students may pursue work leading to any of the following degrees: doctor of philosophy (PhD); doctor of science (ScD); engineer's degrees;[52] master of science (SM); master of architecture (MArch); master of applied science (MASc); master of business administration (MBA); master of business analytics (MBAn); master in city planning (MCP); master of engineering (MEng); and master of finance (MFin). MIT requires a thesis for the SM, MArch, MCP, PhD, and ScD degrees. The thesis process directly assesses students on their mastery of the material and their ability to conduct original research. In many graduate departments and programs, MIT expects students to publish in peer-reviewed journals and present the results of their research at national and international conferences.

Graduate students enroll in specific degree programs which, in some cases, may be interdisciplinary rather than departmental.[53] For example, the interdisciplinary graduate program in Computational and Systems Biology is a degree-granting program with its own admissions process and a degree list independent of an academic department. Programs are not limited to subjects offered in a single department. Graduate students may choose subjects and research programs from several departments with the approval of their faculty advisors, who promote the overall program's integration and balance with respect to a student's major field of study. In interdisciplinary programs, students may have the option to arrange collaborative thesis projects with joint supervision by faculty members with different areas of expertise.

Mirroring the phenomenon at the undergraduate level, MIT's graduate programs have grown increasingly interdisciplinary over the last decade, with two new interdisciplinary master of engineering programs, two new interdisciplinary PhD programs, and two new interdisciplinary concentrations available to PhD students in various departments. Both the new MEng programs and one of the PhD

[52] The program for an engineer's degree requires more advanced and broader competence in engineering and science subjects than for the master's degree but with less emphasis on original research than a doctoral program. In general, the engineer's degree requires two academic years beyond an undergraduate degree. The list of engineer's degrees awarded at MIT can be found at http://catalog.mit.edu/mit/graduate-education/general-degree-requirements/#engineersdegreetext.

[53] https://gradadmissions.mit.edu/programs

programs involve computing. Two of the concentrations (biophysics and statistics) are available to students not just in two different departments, but in different schools: the Schools of Engineering and Science in the case of biophysics; and the Schools of Engineering; Science; and Humanities, Arts, and Social Sciences (SHASS) in the case of statistics. The list of graduate programs MIT established between 2009 and 2019 can be found in the workroom.

There have been two major structural changes in graduate programs during this review period. In fall 2010, the MIT Sloan School of Management launched the MIT Sloan Executive MBA (EMBA) program, intended for mid-career students. The EMBA is a 20-month program that meets on campus on Fridays and Saturdays every three weeks. It also meets for four one-week, on-campus modules and a one-week international project trip. The program covers the same material as the Sloan Fellows program and is aimed at a similar audience. It serves to expand MIT's executive and professional offerings, but with a very different structure. It has been successful in attracting qualified students, accepting 34% of applicants, as compared to over 40% on average for similar executive programs, and achieving a 94% yield, indicating the success of the program in meeting the demand for a high-quality, executive-level MBA education. It has developed a reputation as one of the most diverse, experienced, selective, and rigorous such programs in the world, and was ranked the top EMBA program in the country in 2018 by the *Financial Times*.[54]

In addition to admissions data and rankings, EMBA administrators measure the program's success through metrics related to completion rate, employment, and student satisfaction. Of the 716 students in the EMBA classes of 2012 through 2018, 709 (99%) graduated within the program's expected 20 months. Of the seven who did not graduate with their initial cohort, four returned from a leave of absence to graduate with a different class.

The results of the end-of-program survey of the Class of 2018 suggest high student satisfaction with their EMBA experience. For example, on a five-point scale, respondents on average rated their satisfaction with the program at 4.66. The statement "The material covered in the program so far will be very useful to me in my work, now or in the future" drew an average agreement rating of 4.75. And, on average, students rated the program 4.78 when asked how likely they are to recommend it to friends or colleagues. Sloan will continue to run, assess, and enhance the EMBA program in the years ahead.

Second, and most significant to MIT's graduate education programs more broadly, is the advent of blended master's programs that combine online courses with a residential learning experience. These programs integrate the MITx MicroMasters credential program, described in Standard 6, with a one-semester, on-campus program that culminates in a master's degree. MIT launched the MITx MicroMasters credential program in fall 2015 with the goal of giving learners around the world an opportunity not only to earn a non-degreed professional credential online but also a clear pathway to an on-campus master's degree program. The following MIT programs currently consider applications from students who have successfully completed the relevant MicroMasters credential:

- Master of Applied Science in Data, Economics, and Development Policy in the Department of Economics, which offers an MITx MicroMasters credential in Data, Economics, and Development Policy;

[54] https://rankings.ft.com/exportranking/executive-mba-ranking-2018/pdf

- Master of Applied Science in Supply Chain Management/Master of Engineering (blended tracks) in Supply Chain Management in the Center for Transportation and Logistics, which offers an MITx MicroMasters credential in Supply Chain Management; and
- Master of Engineering in Advanced Manufacturing and Design in the Department of Mechanical Engineering, which offers an MITx MicroMasters credential in Principles of Manufacturing.

Other such programs are under development.

These blended degree programs required the creation of a new degree type—Master of Applied Science (MASc)—to be used for one-year professional master's degrees with no thesis. This type of master's degree program is becoming more common, with the Master of Finance and Master of Business Analytics degrees approved in 2008 and 2016, respectively. With the introduction of the MASc degree type in 2017, the faculty and, importantly, the Corporation are no longer required to formally approve a new degree type for each new one-year professional master's program without a thesis.

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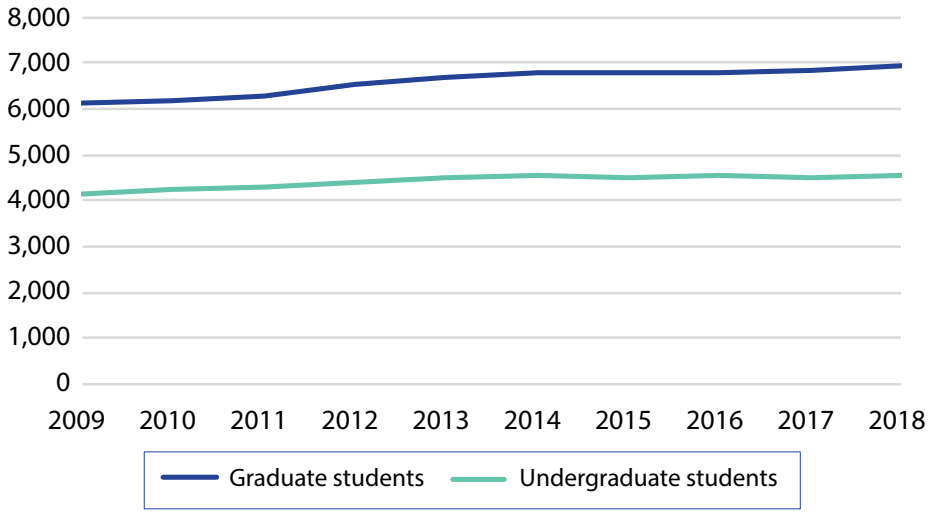
STANDARD 5: STUDENTS

This Standard highlights MIT's activity—both progress made and work that remains—in five priority areas: access and equity, the co-curricular experience, student well-being, physical spaces, and dining. Undergraduate and graduate students served on the Standard 5 planning group and provided valuable insights into each priority.

As noted in the Data First forms, in academic year 2018, 11,466 students were enrolled at MIT. Of the 4,547 undergraduate students, 4,510 were enrolled full time; of the 6,919 graduate students, 6,671 were enrolled full time. MIT's undergraduate and graduate enrollment figures have remained relatively flat over the last decade (Figure 3).

Figure 3. Undergraduate and graduate student enrollment, academic years 2009 to 2018.



Looking ahead, the impact of the MIT Stephen A. Schwarzman College of Computing on undergraduate enrollment is unclear. MIT expects, however, that the Institute's population of graduate students will naturally grow with the addition of 50 new faculty positions.

Access and equity

MIT is proud to be one of five schools in the United States that practices need-blind admissions and need-based financial aid and that meets the full demonstrated need of every admitted undergraduate student, including international and transfer students and students admitted from the waitlist. Need-blind admissions at MIT means that, in the admissions process, applicants are not given an advantage if they require less financial aid, nor are they disadvantaged if they require more. Over the last decade, MIT has taken important steps to strengthen its commitment to need-blind admissions, finding new ways to increase access for students, especially those from underrepresented backgrounds.

For entry year 2019, MIT offered admission to 1,427 first-year undergraduate students from a pool of 21,312 applicants (a rate of 6.7%), with more than 78% of those offered admission choosing to enroll, the highest yield in the Institute's history. Of those who enrolled in 2019, the mean SAT evidence-based reading and writing score was 745, and the mean SAT mathematics score was 789. The enrolling

first-year undergraduate class was 48% female, 64% students of color (identified in whole or part as African American, Asian American, Latinx,[55] or Native American), and 19% first generation to college.

The Enrollment Management Group, which takes input from the faculty Committee on Undergraduate Admissions and Financial Aid (CUAFA), sets and reviews undergraduate admissions policies and procedures to ensure alignment with the Institute's mission. The mission of MIT's Office of Admissions is to enroll "a talented and diverse undergraduate student body composed of some of the world's most intelligent and creative individuals interested in an education centered on science and technology. The students we enroll add to a vibrant campus community and will become the leaders and innovators of our global society. We uphold a commitment to meritocracy and fair access to our admissions process for students from all backgrounds."[56] To this end, the Institute reviews all applicants on an individual basis, rather than through direct peer comparisons within a particular geographic region or high school.

In 2016, following a review of the Office of Admissions and Student Financial Services (SFS), traditionally two distinct functions with two separate leaders, MIT shifted SFS under the purview of the dean of admissions to allow for greater synergy between the offices. This change has promoted improved collaboration and cohesion as MIT works to ensure effective communication with admitted undergraduate students about the cost of education and the financial resources available to them.

The Office of Admissions continually assesses its admission standards and practices to ensure that selection criteria are correlated with student success measures. The office examines faculty surveys and student award data to identify exemplary students, and data from the Committee on Academic Performance to identify qualities of students who struggle to meet academic expectations. The office also examines MIT GPA and graduation rates, using the data in feedback loops to determine whether certain criteria in the admissions process need to be adjusted.

In 2015, CUAFA reaffirmed MIT's commitment to a diverse student body as critical to the Institute's educational mission, publishing a statement that reads, in part:

> Our students' success depends on their exposure to many viewpoints and their ability to trust peers to provide both support and criticism. Moreover, the experience of working with a diverse set of peers at MIT prepares our students to work effectively in the world outside MIT: It opens their minds and attunes them to the variety of strengths and the variety of concerns of others. Diversity of viewpoints is derived from a diversity of backgrounds and experiences along many dimensions, among which are gender, race, ethnicity, culture, and socio-economic background.[57]

The Office of Admissions emphasizes increasing the socioeconomic diversity of the undergraduate student body, focusing on students from lower socioeconomic backgrounds (such as those eligible for federal Pell Grants, including 19% of the 2018 entering class) and partnering with QuestBridge, a national nonprofit that connects exceptional, low-income youth with top colleges and universities. Based on a study by the Equality of Opportunity Project, MIT enrolls the highest percentage of students from the bottom fifth of incomes among the "Ivy plus" schools and, of more than 2,000

[55] The gender-neutral term for a person of Latin American origin or descent

[56] https://mitadmissions.org/apply/process/the-mitadmissions-mission/

[57] http://mitadmissions.org/pages/cuafa-diversity-statement

colleges, enrolls the twelfth-highest percentage of students from the bottom fifth of family incomes as children who moved into the top fifth of incomes as adults. [58,59]

In recent years—particularly since 2015—the Institute has made significant strides to strengthen its commitment to affordability and financial aid. Of note:

- MIT will commit $136.3 million for financial aid in academic year 2020. The net cost for an average MIT student receiving need-based aid will be $22,500, a 29% reduction compared to 2000, when the net cost was $31,860 when converted to current year dollars.
- In academic year 2018, MIT provided more than 58% of undergraduates with need-based financial aid. While the total cost of attendance was $67,430, the average net price for all first-year undergraduates was $36,410, and only $17,148 for grant-aided matriculants.
- The Institute continues to drive down student debt. The number of seniors graduating with debt has dropped from 511 (49%) in 2008 to 297 (28%) in 2018. The median debt (in constant 2018 dollars) for those who borrow has fallen slightly from $15,188 in 2008 to $14,840 in 2018, despite increases in the cost of attendance.
- With new financial aid enhancements, tuition is effectively free for low-income families. For academic year 2019, an MIT scholarship, federal or state grant, or outside scholarship fund covered all tuition for families who earn less than $90,000 a year with typical assets. More than 30% of MIT students fall into this tuition-free category. In academic year 2017, MIT eliminated home equity for all families in determining need.
- Over the past decade, MIT has steadily lowered the amount it expects students to provide through self-help. In academic year 2018, the Institute reduced the self-help expectation for all financial aid recipients from $5,500 to $3,400.

In recent years, MIT has improved its communications regarding financial aid and affordability, publishing and distributing a targeted brochure to prospective low-income undergraduate students, and redesigning the financial aid and billing booklet it sends to admitted first-year students. In 2018, the Office of Admissions and SFS enhanced their websites to include additional statistics and online tools, and sharpened messaging to more effectively communicate MIT's affordability to all prospective first-year students, particularly those from lower-income families. MIT also joined MyinTuition, a cost estimator which provides a prospective student a quick estimate of the cost of attending MIT based on answers to six questions.

At the graduate level, although admissions is managed by the academic departments, the Office of Graduate Education (OGE) plays a critical role in coordinating student outreach, recruitment, admissions, and retention. The office facilitates or administers several initiatives that increase the Institute's ability to attract and retain talent, with a particular focus on underrepresented and underserved populations. These include the following:

[58] "Ivy plus" includes the Ivy-league schools, as well as Duke, MIT, Stanford, and the University of Chicago.

[59] http://www.equality-of-opportunity.org/college

- GradCatalyst, a workshop that teaches underrepresented minority (URM) and underserved underclassmen how to plan their undergraduate trajectories to become strong graduate school candidates. In addition to helping students individually, GradCatalyst develops and strengthens relationships with minority-serving institutions and academic support programs, helping to increase MIT's URM applicant pool. In academic years 2017 and 2018, the OGE engaged 275 URM underclassmen over the course of 13 sessions.
- The MIT Summer Research Program (MSRP General), a nine-week, fully funded summer program that brings together a talented pool of URM and underserved students to engage in on-campus research led by dedicated MIT faculty, postdoctoral fellows, and graduate students. Since the program's inception in 1986, the OGE has hosted 824 MSRP General interns who conducted research in 25 departments across MIT's five schools mentored by more than 380 MIT faculty. In the most recent MSRP General alumni review, 89% of respondents reported going on to pursue an advanced degree. Among them, 23% are currently enrolled in a graduate program at MIT or have earned a graduate degree from MIT.
- CONVERGE: MIT Graduate Preview Weekend, an initiative that aims to increase the presence of URM and underserved students in MIT's graduate programs. This initiative, which targets prospective graduate URM students, provides an opportunity for potential applicants to learn about the graduate admissions process and programs.

In 2015, with support from the Alfred P. Sloan Foundation, MIT established a University Center of Exemplary Mentoring (UCEM), which engages four departments in MIT's School of Engineering—Biological Engineering, Chemical Engineering, Electrical Engineering and Computer Science, and Mechanical Engineering—to effectively promote the recruitment, retention, and professional development of URM graduate students, with the aim of increasing the number of URM doctoral recipients who become faculty in science, technology, engineering, and mathematics. The UCEM Sloan Scholarship includes a $40,000 award distributed over five years of a student's graduate study, with participating departments guaranteeing a full funding package that includes tuition, a monthly living stipend, and annual medical insurance. Now in its fourth year, the MIT UCEM program has 46 doctoral students (with 10 graduates), and hopes to extend invitations to 12 newly admitted URM graduate students for fall 2019.

The OGE also distributes funds for nine-month Diversity Tuition Fellowships to departments to enhance the recruitment of URM applicants. The office expects participating department to provide stipends and encourages them to provide health insurance as well. In fiscal year 2018, this fellowship program provided support totaling $3.2 million for 60 students studying in 23 MIT departments and programs.

Over the last decade, the number of URM students applying to, admitted to, and enrolled in MIT's graduate programs has increased significantly (Table 5).

Table 5. Underrepresented minority (URM) graduate student application, admission, and enrollment data, entry years 2008 and 2018

	No. Applicants			No. Admits			No. Enrolled (% yield)		
URM students	**2008**	**2018**	**% change**	**2008**	**2018**	**% change**	**2008**	**2018**	**% change**
Master's programs									
URM students	311	785	152%	135	240	78%	96 (71%)	161 (67%)	68%
Black and African American students	107	305	185%	46	96	109%	36 (78%)	70 (73%)	94%
Doctoral programs									
URM students	396	898	127%	77	128	66%	43 (56%)	61 (48%)	42%
Black and African American students	103	286	178%	17	43	153%	6 (35%)	18 (42%)	200%
Total URM students	**707**	**1,683**	**138%**	**212**	**368**	**74%**	**139 (66%)**	**222 (60%)**	**60%**

MIT has also taken steps to offer increased support to graduate students with families and to students with disabilities. In fall 2018, MIT implemented a new graduate student parental leave policy for all graduate students who become parents, making birth and non-birth parents eligible for one month of parental leave.[60] Graduate students who give birth are eligible for up to two months of childbirth accommodation. The Student Disability Services Office, integrated with the Assistive Technology and Usability Lab in 2018, has shown dramatic increases in utilization of the accommodation and now sees about 500 students per year.

In fall 2015, as students on college and university campuses across the country expressed concern about their institutions' commitment to the values of diversity, inclusion, and equity, President Reif initiated a meeting with MIT's Black Students' Union and Black Graduate Student Association. Hearing reports of unrest elsewhere, he wanted to understand what life at MIT is like for the Institute's Black students. At the end of the meeting, he asked the students to send him suggestions to make MIT more welcoming and inclusive to all members of the community. The students formulated two sets of recommendations—one from the undergraduate student perspective, the other from the graduate student perspective—that they presented to President Reif and Institute leadership at a December 2015 meeting of the Academic Council. The students' recommendations can be found in the workroom.

After the Academic Council meeting, President Reif charged a newly established Academic Council Working Group on Community and Inclusion to review the students' recommendations—and others submitted by faculty, staff, and students from across campus—and develop a strategy for action. In total, the working group assessed 90 recommendations to make MIT a more welcoming and caring community. The working group, which includes MIT officers, faculty, students, and staff, continues to shepherd the recommendations, critically assessing each and working with senior leadership to implement change. Among the actions the group initiated are the following:

- Every academic department articulated and posted online a formal statement affirming its commitment to student health, diversity, and inclusion.[61]

[60] https://oge.mit.edu/gpp/registration/changes/childbirth-accommodation-parental-leave/

[61] http://diversity.mit.edu/departmental-statements/

- In October 2016, MIT hired a new chief of Student Mental Health and Counseling and associate medical director at MIT Medical who specializes in multicultural psychology and trauma. MIT Medical also hired three clinicians with expertise in race-based trauma. Student Mental Health and Counseling took a number of additional steps, including introducing anti-oppression training for staff; establishing a multicultural competency counseling team; programming a workshop series about the imposter phenomenon; and scheduling a biweekly event called Let's Chat@OME, which allows students to drop in to the Office of Minority Education and talk with mental health and counseling staff.
- The Office of Multicultural Programs and the OGE reviewed and revised their orientation programs for undergraduate and graduate students. As a result, all incoming first-year students now participate in a two-hour program on diversity and inclusion facilitated by a national speaker and trained conversation leaders. In fall 2016, MIT also introduced a revised graduate student orientation, which includes a dedicated networking reception for URM students to meet senior leaders, faculty, and returning graduate students, and to learn about campus resources.
- MIT launched a pilot program to create four all-gender bathrooms in the campus's Main Group buildings; bathrooms are already all-gender in many residence halls.
- MIT created a data-informed online diversity dashboard to increase transparency with regard to staff, faculty, and student diversity. Moreover, the Office of the Registrar now publishes MIT's undergraduate and graduate URM enrollments by course and year.
- During the 2016 application cycle, the OGE implemented an expanded fee waiver policy to remove potential financial barriers for applicants who may not have considered MIT. The expanded policy targets a wider group of potential applicants, including members of diverse populations, the U.S. armed forces, and those with financial hardships. Between fall 2016 and fall 2018, graduate application fee waiver requests increased by 130%, from 334 to 767.

The co-curricular experience

MIT encourages all of its students to participate in activities outside the classroom to complement their academics. Structured experiential learning opportunities enable students to master classroom concepts, effectively manage complexity and ambiguity, understand and value different perspectives, and build skills required for employment now and in the future. Students, in fact, come to MIT expressly to take advantage of the Institute's experiential learning opportunities. By the time of graduation, 91% of undergraduates will participate in at least one Undergraduate Research Opportunity Project (described in Standard 6), more than 50% will engage in a meaningful global opportunity, and 83% will participate in at least one internship.

MIT athletics also play an important role in a student's holistic education. With 33 varsity sports, MIT has one of the broadest intercollegiate athletics programs in the world. Approximately 25% of undergraduates participate in varsity athletics, and MIT student athletes have earned 295 Academic All-America citations, the most for any Division III program in the nation. The Department of Athletics, Physical Education, and Recreation (DAPER), which falls under the purview of the Division of Student Life (DSL), undergoes a biennial visiting committee review. The DAPER visiting committee helps leadership assess the strength of the department's programs and advance a wide range of priorities,

from developing student leadership skills to improving the department's physical infrastructure to supporting health and wellness initiatives.

One form of co-curricular experience at MIT is shared governance. This is perhaps most evident in the Institute's approach to housing. The Undergraduate Association and Graduate Student Council are active in all student-related governance matters. Each of MIT's eight graduate and 10 undergraduate residence halls also has an executive council, with all undergraduate residences organized under the Dormitory Council (DormCon). There are four governing councils for the 38 undergraduate living groups in the fraternity, sorority, and independent living group (FSILG) community: the Interfraternity Council, Panhellenic Association, Living Group Council, and Multicultural Greek Council. FSILG governance also involves the alumni corporations who own the vast majority of FSILG properties.

Such active student interest and participation in housing governance present important opportunities to build community, offer support, and foster personal and academic development. For example, MIT offers leadership education to executive board officers in both undergraduate and graduate residence halls. Over the last three years, the FSILG office in the DSL coordinated emerging leader retreats and officer transition retreats, and staff in DSL's Residential Education Office are working with a team of upper-level students and leadership educators to develop a new initiative to provide foundational leadership knowledge and skills to first-year students. MIT has also developed a Resident Peer Mentor (RPM) program, a peer-to-peer support effort that engages first-year students in targeted mentorship by trained upper-level students to further all residents' holistic development and well-being. The program emphasizes developing skills such as introspective values recognition, exploration of identity, social engagement and responsibility, and ethical leadership. Since its inception in 2016, RPM has grown from a pilot of four residence halls to include nine communities reaching nearly 900 students. Over the next several years, MIT will continue to strengthen the program throughout its undergraduate residence halls to increase its support for first-year students.

There have been notable changes to MIT housing in recent years. For instance, a 2013 engineering study of Bexley Hall, an apartment building that housed more than 100 students, uncovered severe water infiltration and structural damage that would have made repair considerably more expensive than new construction. Following a process to consider the Institute's options for Bexley's future, MIT leadership made the decision to close the building due to safety concerns, ultimately replacing it with a public park in 2015.

In addition, in June 2016 Institute leadership alerted residents of Senior House, which housed students from all undergraduate years, about a plan to leverage MIT's tradition of shared governance to address academic, health, and well-being issues in the house. In a letter to Senior House residents announcing a "turnaround" process and a moratorium on placing first-year students in the residence, President Reif, Chancellor Cynthia Barnhart, Provost Martin Schmidt, and Vice President for Research Maria Zuber wrote, "We see a vital need to act based on [graduation rate] data alone. However, the seriousness of the situation is further underscored by our significant concerns about issues of illegal drug use in Senior House."

The turnaround process engaged residents, faculty, administrators, and Senior House alumni via a committee charged with building and maintaining a dialogue and a partnership between the administration and the Senior House community. The committee developed and implemented

strategies to provide enhanced in-residence support and resources. However, despite initial progress in the first half of academic year 2017, the administration learned in spring 2017 that unsafe and illegal activity occurred in Senior House during the turnaround, prompting a disciplinary review and ultimately a decision to convert the house into a graduate student residence. Throughout the turnaround and decision-making process, Chancellor Barnhart communicated regularly with the Senior House community and MIT more broadly, as appropriate.[62]

Shared governance is also central to an ongoing review of MIT's undergraduate room assignment and move-in process. This review involves the Office of the Chancellor, DSL, Housing & Residential Services (HRS), and heads of house (the faculty and their spouses or partners who live in and lead a residence hall's house team). It also engages student leaders, including house presidents and room assignment chairs (RACs), the upper-level student residents who make individual room assignments. In the current undergraduate system, first-year students complete a questionnaire and rank order their residence hall choices during the summer before arriving at MIT. HRS assigns first-year students to their halls, and then RACs devote time and effort over the summer placing first-year students into, in effect, temporary room assignments. Throughout the summer and upon arrival to campus, first-year students are told in most residence halls that they should not unpack because their room assignments may change. For first-year students who are required to move, a residence hall may hold an in-house lottery or, in some cases, a mutual selection process. Through mutual selection, first-year students indicate a room and floor preference, and upper-level students decide which first-year students will be placed on each floor.

Inherent in the current process is a sense of rejection for some incoming students who are not selected by a living community they wish to join. At the start of their MIT experience, students may also experience stress and a lack of personal agency that accompany forced moves. MIT's Corporation, through the DSL's visiting committee, along with students, faculty, staff, and parents have expressed concern with the current process.

In response, Chancellor Barnhart and Suzy Nelson, whom MIT appointed vice president and dean for student life in 2016, initiated a collaborative effort in fall 2018 that engaged heads of house, DormCon, and other student leaders and MIT community members to consider ways to improve MIT's approach to first-year housing assignments. They asked each house to participate in a design exercise that adheres to two requirements: upper-level students will not select the students who will live on their floor, entry, or community; and new students will not be forced to move from the room assigned to them over the summer. Students were also encouraged to put forward additional ideas for improvements unrelated to the exercise's two constraints. Early in the spring 2019 semester, student leaders attended a workshop to present and discuss their draft designs. Following the workshop, Chancellor Barnhart and Dean Nelson held individual house meetings with student leaders, heads of house, and other house team members to discuss and refine the ideas students generated.

In May 2019, Chancellor Barnhart and Dean Nelson wrote to the student community to describe the outcomes of the exercise. They noted that each house is finalizing an action implementation plan for fall 2019 move-in, and shared a high-level overview of the plans. The DSL will work with all houses to measure the effectiveness of their individual strategies for room assignments beginning in the fall, and will partner with DormCon to update an existing housing survey to assess whether the changes have the desired outcomes. The DSL visiting committee will also play an important role in monitoring

[62] http://chancellor.mit.edu/sh-decision-process

the impact of MIT's new room assignment policies on incoming first-year students. Ultimately, all of MIT—the administration, faculty, staff, parents, and, most importantly, students—are committed to advancing room assignment practices that balance students' preferences with community priorities in a welcoming, respectful, and supportive way. Achieving that goal will remain a central priority for DSL leadership.

Student well-being

MIT has taken steps to understand and respond to increasingly complex student health and well-being issues, particularly in the areas of sexual assault and mental health, leveraging insights gained from data and community dialogue to develop new policies, resources, and programs. These efforts have lowered barriers to students seeking help and created a more integrated and coordinated web of student support.

In spring 2014, MIT administered the Community Attitudes on Sexual Assault (CASA) survey to all students to gain solid, baseline data about the prevalence of sexual assault on campus, attitudes about it, and obstacles to progress toward reducing and preventing it. The survey launched on April 27, two days before the White House Task Force called on all U.S. colleges and universities to survey their students on these matters. The national conversation on campus sexual assaults has focused on the widely cited statistic that about 19% of undergraduate women experience rape or sexual assault under conditions of force, threat of physical harm, or incapacitation. By that definition, for those undergraduate women who responded to the CASA survey, the Institute's comparable figure was nearly 17%.

Since the survey's release, MIT has added staff, expanded education and community outreach initiatives, and updated policies and procedures to prevent and respond to sexual misconduct. The Title IX and Bias Response and Violence Prevention and Response offices have added education, prevention, community outreach, and investigatory specialists to their teams, enabling the Institute to educate more people about how to prevent sexual misconduct and how to respond effectively when incidents occur. These offices have also bolstered peer-to-peer support resources and programs, including the following:

- As described in Standard 9, MIT established the standing Institute Committee on Sexual Misconduct Prevention and Response to oversee an Institute-wide approach to prevent and respond to sexual misconduct and other forms of gender-based discrimination.[63]
- Since 2015, nearly 3,000 fraternity members and other undergraduates have taken part in Party-Safe Plus training, which teaches students how to host parties responsibly; it also includes lessons in bystander intervention.
- In 2016 and 2017, more than 1,200 sorority members completed Sorority Trainings Addressing Risk (STAR), which focuses in part on sexual assault awareness and intervention.
- Since 2015, 70 student educators in Pleasure@MIT, a student group that promotes healthy relationships with the goal of eliminating sexual violence at MIT, have conducted workshops about healthy, respectful relationships in more than 21 residence halls and fraternities, sororities, and independent living groups (FSILGs), reaching more than 1,000 students.

Similarly, MIT has implemented a number of important changes to its policies and procedures around sexual misconduct. These include the following:

[63] https://facultygovernance.mit.edu/committee/committee-sexual-misconduct-prevention-and-response

- All incoming students are now required to complete online training about how to define sexual misconduct, how to prevent it, and how to help someone affected by it. In 2018, the Institute extended this training requirement to all faculty and staff, and achieved nearly 100% participation.
- MIT developed a policy on consensual sexual or romantic relationships in the workplace or academic environment and, beginning in academic year 2018, required online training for all faculty and staff.[64]
- In collaboration with students, faculty, and staff, the Title IX and Bias Response Office updated MIT's sexual misconduct policy to consistently define sexual harassment for all students, faculty, and staff. [65] The new policy, effective spring 2017, also clearly defines important related terms and provides examples and explanations of inappropriate behavior.
- The Title IX and Bias Response Office launched a new online reporting form aimed at lowering barriers to reporting an incident or seeking help.[66]
- The Committee on Discipline adopted new rules in academic year 2016 for addressing complaints of sexual misconduct to make the process more accessible, effective, and fair.

In spring 2019, in partnership with the Association of American Universities (AAU), the Institute again surveyed all students about sexual misconduct to measure and respond to shifts in attitudes, behaviors, and culture since the 2014 survey. Thirty-two other public and private research universities are participating in the survey. MIT is currently reviewing the results, to be released to the community in fall 2019.

MIT is also taking steps to advance the recommendations of a report of the National Academies of Sciences, Engineering, and Medicine on the sexual harassment of women in academia, co-chaired by MIT Institute Professor Sheila Widnall.[67] The committee that produced the report found that between 20% and 50% of female students and more than 50% of female faculty and staff experienced sexually harassing behavior while in academia. In response, President Reif has established a presidential advisory board of senior leaders and four working groups of faculty, students, postdoctoral scholars, and staff to respond to the report's recommendations and help advance MIT's efforts to prevent and address sexual misconduct. The Institute will continue to seek new opportunities to evaluate and enhance the effectiveness of its sexual assault education and prevention work in the years ahead.

MIT has taken a similar approach to mental health on campus, working to build a healthier, stronger community through structural change, expanded and coordinated resources and services, clearer policies, and the launch of a culture-shaping initiative, described below, aimed at changing attitudes and behaviors. In 2016, MIT appointed a new dean of student support and well-being, and, that same year, realigned key student support services in the DSL to create the Coordination, Assistance, Response, and Education (CARE) Team. CARE serves as a critical safety net for students experiencing crisis, connecting them and their families with support resources during well-being checks, hospitalizations, discharge, and other emergency and recovery situations.

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[64] https://policies.mit.edu/policies-procedures/90-relations-and-responsibilities-within-mit-community/95-consensual-sexual-or

[65] https://handbook.mit.edu/sexual-misconduct

[66] https://cm.maxient.com/reportingform.php?MassInstofTech&layout_id=5

[67] https://www.nap.edu/read/24994/chapter/1

The DSL also took steps to strengthen student support in the residential communities. In 2012, the division introduced assistant directors for undergraduate residential life/area directors (ADs) to all undergraduate residence halls, bolstering the existing house structure of live-in faculty heads of house along with graduate residential advisors (formerly, graduate resident tutors), who are available to clusters of 30 to 40 students for academic and personal support. ADs are likewise available to help individual students and assist the heads of house with programming and community-building efforts. The DSL piloted the Student Support Services (S3) Connector program in 2017, placing S3 deans in residential communities to hold recurring office hours. Utilization and focus group data suggest that the program meets student needs and enhances the support network within the residential communities. Additionally, graduate resident advisors now support students living in residence halls and FSILGs.

MIT has taken several further steps to enhance its support for students. For instance, it increased the number of staff in Graduate Personal Support, a function administered by the Office of Graduate Education. It also created print guidelines and online trainings to help faculty recognize and support undergraduate and graduate students in distress. And it added a new module called "Student Support" to the MIT Mobile app. The Student Support module provides contact information for 24/7 emergency support services, links to non-emergency resources, and an "I need help with…" feature with options for specific scenarios, from "getting food because I'm often hungry" to "taking a break away from MIT." MIT Medical's Student Mental Health and Counseling Services has expanded its drop-in hours for students, added student support group programming to better serve underrepresented students, and launched weekend counseling programs. In March 2016, the Committee on Academic Performance updated its policies to increase transparency, clarity, and collaboration with students regarding leaves of absence, and in August 2016 the DSL expanded the Good Samaritan Amnesty Policy to cover students and student organizations seeking medical help for emergencies involving alcohol and prohibited substances.

Under the authority of the Executive Committee of the MIT Corporation, the MIT Medical Management Board assists and provides advice on the operation of the MIT Medical Department. It also carries out, on behalf of the Institute, the regulatory oversight responsibilities pertaining to MIT Medical under Massachusetts state law and regulation. The MIT Medical Management Board is a standing Institute committee that reports to the executive vice president and treasurer. Each year, the medical director reports to the Executive Committee about the department's performance. The director's report focuses largely on assessment of the department's services and enhancements designed to support the MIT community, the students in particular.

Perhaps the most significant step MIT has taken to address student mental health issues in recent years is the launch of an Institute-wide initiative called MindHandHeart (MHH), announced in September 2015. MHH is a coalition of students, faculty, and staff with fresh insights, new ideas, and diverse perspectives working collaboratively and strategically to strengthen the fabric of the MIT community. Guided in part by the Jed Foundation Campus Program, MHH leverages four primary channels to help make MIT's *cor* (heart) as central to its mission as *mens et manus* (mind and hand):

- MHH's Innovation Fund provides funding and mentorship to seed initiatives that advance novel approaches to well-being.
- MHH's volunteer coalition engages the community in problem-solving activities and brings together voices from across campus to promote mental health and wellness. In academic years

2017 and 2018, MHH sponsored 160 community events that engaged more than 6,000 MIT community members on issues including resiliency, self-care, life skills, and diversity and inclusion.

- MHH identifies and nurtures strategic partnerships in departments, labs, centers, and administrative offices to enhance mental health, wellness, and community-building programming across campus.
- As noted in Standard 3, the MHH Department Support Project (DSP) links data with action aimed at improving the workplace climate in academic departments and associated research units. As part of this project, Institutional Research (IR) prepares custom reports for each department that draw on a series of five surveys from the past six years. These reports present analysis of various aspects of the department climate while also providing context in the form of demographic comparisons (gender, ethnicity, sexuality, and disability status) within the department and comparisons with peer departments and trends over time. IR provides separate reports with these metrics about faculty, staff, undergraduate students, graduate students, and postdoctoral scholars. DSP staff discuss the reports with department leaders and work with them to identify areas for improvement. The departments are expected to develop action plans, with DSP staff connecting the departments with the resources they need for implementation. The departments monitor changes through the results of biennial surveys.

While addressing the complex issues of mental health and sexual misconduct takes time, early feedback suggests the Institute's efforts are having an impact. According to the 2017 MIT Student Quality of Life Survey—administered to all MIT students, with 45% of undergraduates and 39% of graduate students responding—79% of respondents reported knowing where to go if they need professional help for their mental or emotional health. Moreover, about 75% of undergraduate students reported visiting S3 at least once during their time at MIT. Students are also increasingly coming forward to seek support or to report unwanted sexual behavior to the Title IX and Bias Response and Violence Prevention and Response offices, and students reported witnessing increased respect in interactions between their peers. In 2015, 80% of undergraduates who responded to the Undergraduate Enrolled Student Survey (59% of all undergraduates) agreed with the statement "Students at MIT treat one another with respect."[68] In the 2017 Student Quality of Life Survey, nearly 90% of undergraduates and graduate students who responded agreed with the statement.[69]

Physical spaces

Recognizing the important living and learning opportunities that residential and other community spaces offer students on campus, MIT has made a significant investment in improving the physical spaces where students live, work, and play outside of academic learning spaces. As described in Standard 7, MIT has undertaken an extensive and collaborative process to develop short- and long-term plans to address deferred maintenance and modernize the campus's facilities. Guided by MIT 2030—a flexible framework that helps the Institute make thoughtful, well-informed choices about its physical development and renewal— the DSL, Department of Facilities, and Office of Campus Planning developed a plan for the renewal of student housing that aligns with broader campus goals to

[68] https://static1.squarespace.com/static/5b63672bcef372eea958d8a5/t/5be0d0330e2e7251ab8bd56f/1541460020803/ESS2015-UG-Overall-20150329.pdf

[69] http://ir.mit.edu/student-quality-of-life-survey-2017

reduce the Institute's deferred maintenance.[70] The plan includes factors like financial forecasts for major renovations and new construction, routine maintenance plans, and timelines for major and minor improvements.

In 2015, a partial renovation of the undergraduate residence hall New House uncovered building deficiencies; a subsequent feasibility study by the Office of Campus Planning determined that the building required a full renovation. As MIT began to formulate a plan for a full house renovation and the construction of a new undergraduate residence, Dean Nelson formed a committee of students, faculty, and staff to partner with the administration to develop academic, social, and dining ideals for the Institute's undergraduate residences. The resulting Architectural Principles for Undergraduate Residence Halls, published in October 2016, serve as a critical roadmap in guiding renovation and new construction and imagining programmatic features within a residence, including makerspaces, entryways, staff spaces, and sustainability.[71]

In fall 2016, MIT began a six-month design process for New House, and renovation began at the end of the spring 2017 semester. Newly reopened in fall 2018, New House maintains its original 288-bed count and more effectively meets the needs of today's students. As MIT developed plans for New House, it also began planning the design and construction of a new undergraduate residence hall on Vassar Street. Currently under construction, this new west campus residence will serve as home to 450 undergraduate residents. The residence hall's design—inspired by the 2016 architectural principles—includes rooms arranged in clusters of 35 to 38 students in a mix of singles and doubles with shared community spaces, such as lounges and study rooms. Students, faculty, and staff played an important role throughout the building's design process. The new Vassar Street residence hall is expected to open in fall 2020.

The tightening local real estate market has limited the availability of affordable off-campus housing options close to campus. This development has directly affected graduate students, leading to increased demand for on-campus housing options. In spring 2013, the provost charged the faculty-led *ad hoc* Graduate Housing Working Group to assess MIT's graduate student housing needs and offer recommendations to meet them. The group analyzed reports and data, consulted broadly with the MIT and Cambridge communities, and reviewed the experiences of peer institutions. The resulting Clay Report recommended that MIT increase its graduate housing stock to accommodate 500 to 600 additional students.[72] In advance of the report's release, Institute leadership determined that MIT's Kendall Square Initiative—described in Standard 7—could accommodate half that figure through a graduate residential tower (now known as "Site 4") currently under construction.

Site 4 will incorporate two existing buildings on Main Street and will include a residential tower with 454 units of graduate student housing. It will also house a childcare center and ground-floor retail, and will provide a new home for the Office of Admissions and the MIT Innovation Initiative, an Institute-wide effort to strengthen the vibrant culture and programming of innovation and principled entrepreneurship activities. With student input, the building has been designed for both single students and students with families, including one- and two-bedroom apartments. Shared amenities such as a playroom, family lounge, terrace, and multipurpose rooms will provide space for community building and residential

[70] http://mit.edu/mit2030/

[71] https://studentlife.mit.edu/sites/default/files/Documents/ArchPrinciplesDoc-FINAL.pdf

[72] http://orgchart.mit.edu/sites/default/files/reports/20140603_Provost_GradHousingFinal.pdf

support. Once Site 4 opens in fall 2020, MIT will begin a process to close the Eastgate Apartments, a high-rise building housing graduate student families that is in need of repair.

In 2017, in response to graduate student concerns about the state of campus facilities and the scarcity of affordable off-campus options, Chancellor Barnhart charged a new *ad hoc* Graduate Housing Working Group to assess how housing availability and student needs had changed since the Clay Report three years earlier.[73] The working group considered options for matching student demand with different housing types, amenities, locations, and costs associated with bringing new beds online. Ultimately, in response to the group's recommendations, MIT committed to add at least 950 beds to the academic year 2017 graduate housing inventory and to conduct a rigorous assessment of housing needs every three years and an annual review of progress.[74] To ensure these efforts do not lose momentum, the DSL's Housing & Residential Services (HRS) convened a Graduate Housing Implementation Group of faculty, staff, and students to advance the report's recommendations. The implementation group developed and launched several pilot programs in time for the fall 2018 graduate housing selection process. Among them, MIT permitted student couples to live in residences traditionally reserved for single students and made it easier for students to choose their own roommates. As the group's work continues, HRS and the Graduate Housing Implementation Group will document annual progress and share their findings with the Offices of the Chancellor and Vice Chancellor and with the DSL.

Given the ever-tightening local housing market and anticipated growth in the graduate student population once the MIT Stephen A. Schwarzman College of Computing opens, graduate student housing will remain an area of intense focus during the next review period. Continuous assessment of MIT's graduate student housing stock will be critical.

MIT's commitment to addressing deferred maintenance in student residences extends beyond the undergraduate and graduate halls. The Institute's FSILGs—a vital part of student life—have also drawn increased attention in recent years. Typically located off-campus, the FSILGs are responsible for their own maintenance and upkeep, a practice that has raised concerns about disparity in accommodations from house to house. Leveraging separate efforts to reduce deferred maintenance in student housing, MIT undertook an FSILG facilities assessment, completed in June 2018, of 34 off-campus fraternity, sorority, and independent living group facilities.[75] The assessment examined all aspects of FSILG housing, from infrastructure to funding for maintenance and repair. It identified system-wide issues that need attention (e.g., property management, security, maintenance, and housekeeping) and location-specific issues. MIT is now working with each organization to develop customized plans that respond to the findings in the individual reports in order to support current and future residents.

Dining

In response to the Commission's feedback following MIT's last comprehensive review, the Institute has critically assessed student dining and made important gains that connect food accessibility and security with student health, wellness, and success.

[73] http://chancellor.mit.edu/gradhousingworkgroup

[74] http://orgchart.mit.edu/sites/default/files/reports/20180808-Chancellor-MIT-VC-Housing-Report.pdf

[75] http://ailg.mit.edu/fsilg-facilities-assessment

In spring 2016, Chancellor Barnhart tasked a Dining Data Review Working Group of students and staff with reviewing existing data and collecting new data on MIT's food and dining program, and writing a summary of findings to inform future discussions on enhancements to MIT's dining program.[76] Over the next six months, the group examined data from a number of sources, including MIT Dining's billing and point-of-sale systems, student surveys, focus groups, and a benchmark study of more than 20 similar institutions. Data revealed a need to increase flexibility and options and improve quality without substantially increasing cost, while preserving the dining program's positive aspects, including student-staff connections and opportunities for socializing and community building. The DSL published a website[77] to share the group's findings and provide updates.

This effort laid the groundwork for Dining 2.0, a plan to provide MIT's students with a first-rate residential and retail dining experience. MIT's vision for Dining 2.0 includes improving food quality and service, emphasizing nutrition and education, expanding special event programming, and benchmarking. The Institute is working to integrate two major service providers into a network of two dozen food operators across campus. Dining 2.0 also empowers the dining team to provide high-quality, coordinated service delivery, broad menu offerings, and focused marketing outreach. Meal plans now include both traditional and block meals for weekly or semester-long flexibility. Every meal plan also provides dining dollars that students can use on campus and at more than 30 off-campus vendors, a feature especially valuable between semesters and on holidays, when few on-campus dining locations are open.

In fall 2017, in response to data showing that 2% to 8% of MIT graduate students and as many as 13% of undergraduates surveyed do not have enough to eat, the DSL established the Food Insecurity Solutions Working Group to review data and explore options to ensure that every MIT student is food secure. Following publication of the group's report,[78] MIT took a number of steps to address this complex problem. In September 2018, the Institute opened TechMart, an at-cost grocery pilot that offers students approximately 125 staple items and meal kits. The program pairs groceries with cooking, nutrition, and budgeting classes to help educate students holistically. MIT has also built on the success of its SwipeShare program, which gives students the option of donating up to six meal swipes per semester from their plans to students in need, and started an emergency grant program for students experiencing financial hardship. The DSL has developed a comprehensive plan for monitoring the impact of these initiatives, including asking questions about food insecurity on upcoming campus-wide surveys, tracking utilization data, and administering program-specific satisfaction surveys. Data will inform future MIT initiatives and policies.

To ensure the ongoing assessment and effectiveness of MIT's new dining program, the DSL has established a number of key performance indicators, including overall satisfaction, customer service, food quality, food variety, sustainability, facilities, and social engagement. To gather baseline data, MIT Dining conducts monthly surveys that ask participants to rate their most recent campus dining experience. Students have expressed satisfaction with customer service, quality of food, and hours of operation, but noted room for improvement in the variety of menus and speed of service. Initial results indicate overall residential satisfaction at 74%, retail dining at 60%, Lobdell retail dining at 80%, and

[76] https://studentlife.mit.edu/sites/default/files/Documents/Dining%20Data%20Review_Summary%20of%20Findings_Final%20Version.pdf

[77] https://studentlife.mit.edu/about/goals-mission-and-organization/meet-suzy-nelson/key-matters/food-and-dining-review

[78] http://studentlife.mit.edu/sites/default/files/Documents/FISWGReport.pdf

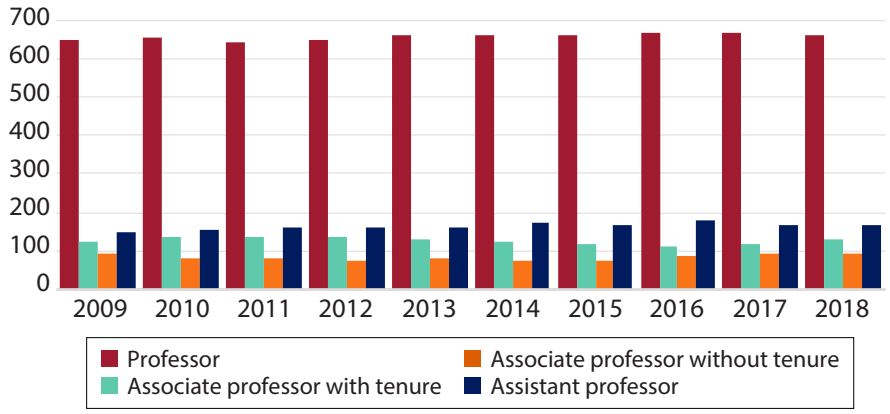
Stratton Student Center first-floor retail dining at 74%. MIT's goal is to exceed 80% in all areas. The Institute will soon roll out a separate survey assessment that asks participants about their experiences across all of MIT Dining.

Finally, the DSL is working to implement a visiting committee–type structure as a way to introduce annual assessment of MIT's dining program by external dining directors, chefs, and administrators in 10 areas: marketing programs, operational controls, menu management, purchasing, food safety, service management, safety and security, facilities management, technology, and sustainability. The division will base its benchmarking and performance on the National Association of College and University Food Services standards.

STANDARD 6: TEACHING, LEARNING, AND SCHOLARSHIP

MIT's faculty advance the Institute's commitment to *mens et manus*, or "mind and hand," leveraging scholarship to power MIT's teaching and learning activities. As noted in the Data First forms, in academic year 2018, MIT employed 1,047 faculty, nearly all of whom (1,037) were employed full-time. About two-thirds (662) were full professors. The rest were associate professors (219) and assistant professors (166). As noted in Figure 4, the size of the faculty and its makeup by rank have remained flat over the last decade.

Figure 4. Faculty by rank, academic years 2009 to 2018.



That will soon change. With the launch of the MIT Stephen A. Schwarzman College of Computing, MIT will create 50 new faculty positions located both within the college and jointly with other departments across MIT—nearly doubling MIT's academic capacity in computing and artificial intelligence. These positions, to be added over the next five to seven years, will include faculty with expertise in both computing and non-computing disciplines, fostering a sense of collaboration and opening new pathways for interdisciplinary teaching and scholarship between the college and MIT's other academic units.

In 2013, President Reif charged the Task Force on the Future of MIT Education, described in Standard 2, with "experimenting with ideas that would both enhance the education of our own students on our own campus and that would allow us to offer some version of our educational experience to learners around the world."[79] Over the ensuing 18 months, the task force worked to understand the changing nature of higher education and articulate a vision for MIT's educational future, a comprehensive strategic planning process that laid the groundwork for many of the experiments, initiatives, and other activities described in this standard.

Faculty and academic staff

MIT has a single faculty that teaches and advises students, conducts research, and participates in the governance of the Institute in service to MIT's mission. The Institute is committed to attracting and retaining faculty of the highest quality in all academic fields by following rigorous search and hiring processes; setting clear expectations for academic achievement; articulating a single standard of excellence for promotion and tenure; promoting professional and personal development; and

[79] http://president.mit.edu/speeches-writing/presidential-charge-task-force-mit-education

understanding the context of the broader competitive university environment. MIT fosters a culture that values academic openness, freedom, creativity, innovation, and collaboration.

Faculty appointments are based in MIT's 31 academic units across its five schools. On behalf of departments, school deans may petition the provost for an increase in faculty slot allocations in cases of demonstrated need or special opportunity, although the distribution of the faculty among schools remains fairly constant.

Appointments to the MIT faculty are made at the ranks of assistant professor, associate professor without tenure, associate professor with tenure, and professor. In the Department of Athletics, Physical Education, and Recreation, non-tenure-track appointments are made at the ranks of assistant professor/coach, associate professor/coach, and associate professor/senior coach. Most appointments are based in a single department; however, faculty may hold a joint or dual appointment with another department. Many faculty also maintain formal affiliations with interdepartmental laboratories or centers that serve as bases of organized research activities. These interdisciplinary and cross-cutting arrangements, common at MIT, reflect the Institute's culture of encouraging scholarship across boundaries. In rare cases where a faculty member may hold an additional appointment at another institution, the faculty member's obligations to each institution are clearly defined by a formal agreement and are periodically reviewed.

The Institute appoints several types of non-tenure-track academic instructional staff who complement the efforts of the faculty or meet unfilled or temporary needs. Non-tenure-track instructional staff include lecturers, senior lecturers, adjunct professors, professors of the practice, visiting professors and lecturers, professors post-tenure, instructors, technical instructors, and graduate student teaching assistants (TAs). In fall 2018, MIT employed about 1,105 non-tenure-track instructional staff (not including TAs). Forty percent were employed full time. The average time at MIT for members of the instructional staff (excluding visitors) is slightly less than nine years. About 700 graduate students hold TA appointments, and MIT's 1,500 postdoctoral scholars play an important role in advancing the Institute's educational mission, working with and instructing undergraduate and graduate researchers in the lab. The average length of a postdoctoral appointment is about two years.

Appointments to the ranks of adjunct professor, professor of the practice, adjunct associate professor, and associate professor of the practice are limited to 10% of the full-time faculty in each department of the School of Architecture and Planning and to 5% of the full-time faculty in each department in the other schools. Otherwise, academic departments have the discretion to appoint the types and numbers of instructional staff they deem necessary to fulfill their curricular obligations. While appointments to other instructional positions are not formally limited by central policy, deans typically monitor the numbers of such appointments in their schools to ensure an appropriate balance with regular faculty appointments in a given department. The MIT Teaching + Learning Laboratory (TLL), described in Standard 8, provides support to instructional staff as well as to graduate students and postdoctoral scholars who wish to improve their teaching skills. TA evaluation occurs via subject evaluations and faculty feedback on performance. Upon request, the TLL provides formative feedback based on classroom observations.

Faculty search plans originate within an academic department and require the approval of the appropriate school dean. The Faculty Search Committee Handbook provides detailed guidelines about the search process, with all new appointments subject to the Affirmative Action Serious Search policy,

except in rare cases when the provost may grant an exception for good cause.[80,81] Eighty-two percent of MIT's faculty are hired in the tenure-track junior ranks, usually as assistant professors. Faculty hires are based on teaching and research priorities largely determined at the department level, with the consultation and approval of the school dean. The Institute provides new faculty with guidance about teaching and student advising assignments and other department-based service activities as appropriate to their rank, with information on resources available for the support of their scholarly research. MIT monitors the salaries of the faculty and instructional staff annually, using comparative data from other members of the Association of American Universities.

Promotion to successive professorial ranks involves an increasing measure of participation and review by appropriate department-, school-, and Institute-level councils, with all decisions involving tenure requiring approval of the Executive Committee of the MIT Corporation. Decisions take into account internal and external assessments of a candidate's research accomplishments and professional promise, as well as evaluations of teaching performance and other institutional or professional contributions. The Institute has in place policies that mandate promotion to certain ranks, as well as tenure reviews, based on a faculty member's years of service and age. It also has in place clear policies and processes for reviewing a decision not to promote or award tenure.[82] When necessary, MIT provides a one-year notice of the nonrenewal of an appointment.

The Institute recognizes its obligation to encourage faculty to pursue research activities that hold the greatest promise for intellectual advancement. These activities range from individual projects to large-scale, collaborative, interdepartmental, and sometimes international endeavors. Peer-reviewed research accomplishments form a basis for reviewing the qualifications of prospective faculty appointees and for evaluations related to promotion and tenure decisions.

MIT provides its faculty with the infrastructure and support necessary to conduct research, much of it through contracts, grants, and other arrangements with government, industry, foundations, and private donors. The Office of Sponsored Programs and other offices reporting to the vice president for research provide central support related to the administration of sponsored research programs, and assist faculty, other principal investigators, and their local administrators in managing and identifying resources for individual sponsored projects. In addition, a Research Council—chaired by the vice president for research and including the heads of the largest cross-disciplinary research laboratories and centers—addresses research policy and administration issues. The Office of Resource Development also works with faculty to generate proposals for foundation or other private support.

Beyond teaching and research, faculty are expected to participate periodically in governance activities, both in their home departments and sometimes at the Institute level. These duties typically involve service on *ad hoc* committees related to personnel searches, reviews of academic programs or of administrative procedures related to faculty, or similar tasks; or participation on standing committees that address issues including the curriculum, campus planning, admissions and financial aid, intellectual property, and international activities. Many faculty also participate in student life activities, whether through committees that shape policy related to student life or as heads of undergraduate or graduate residence halls. MIT considers these activities to be critical service responsibilities and an

[80] https://facultygovernance.mit.edu/sites/default/files/reports/2002-01_Faculty_Search_Committee_Handbook.pdf

[81] https://policies.mit.edu/employment-policy-manual/20-hiring-policies/22-affirmative-action-serious-search-policy-and

[82] https://policies.mit.edu/policies-procedures/30-faculty-appointment-promotion-and-tenure-guidelines/33-review-decision-not

important opportunity to help to shape and improve the Institute's environment in ways that may influence a faculty member's own professional development. Since 2016, the provost has hosted a workshop for newly tenured professors to guide the faculty's integration into Institute life. At the event, school deans and other senior officers provide information about balancing the demands of professional and personal life, and describe their own career paths leading to academic administration for those who may be interested in this type of professional development.

The Institute allows faculty to devote an average of one day per week during the academic year to outside professional activities, such as consulting, membership on an outside corporate board or government advisory committee, or other professional service, which may be paid or unpaid. Faculty report their outside professional activities annually through their department heads and deans. Procedures are in place to examine any activities that may appear to conflict with the faculty's primary obligations to the Institute.

Faculty renewal remains an ongoing priority. There is broad consensus about the importance of enabling academic departments to undergo continual intellectual renewal through the recruitment of new faculty. Departments and schools negotiate individual retirement arrangements with their faculty that conform to general guidelines maintained by the Office of the Provost. These arrangements typically provide faculty with options regarding the phasing down of teaching or research activities leading to retirement, as well as the opportunity for part-time professional engagement after retirement. In 2017, MIT renamed the title "professor without tenure, retired" to "professor, post-tenure" for faculty who retire from a tenured appointment and perform compensated teaching, research, or service after retirement, subject to the approval of the relevant school dean. Such appointments are normally limited to a five-year term but may be renewed thereafter on an annual basis.

Appointment to professor emeritus remains an option for retired faculty with no further compensated activities. In addition, MIT maintains a pre-retirement option for faculty who wish to reduce their effort in the years leading to retirement. Under this option, faculty of a certain age may choose to work at half-time effort for up to five years in return for an agreement to relinquish tenure at the end of this period. The Institute will continue to identify the best incentives and methods to ease senior faculty's transition to retirement, thereby providing opportunities for academic departments to recruit junior faculty into tenure-track positions.

Faculty diversity

MIT is committed to cultivating a faculty that is diverse in race, nationality, socioeconomic background, gender expression and identity, sexual orientation, religion, ability, and intellectual conviction. The Institute's Equal Opportunity/Affirmative Action Policy and Affirmative Action Serious Search Policy define MIT's commitment to the principles of equal opportunity in education and employment.[83,84] In addition, the Institute maintains the practice of documenting affirming actions and good faith efforts to reduce underrepresentation and underutilization of minorities, women, individuals with disabilities, and veterans.

[83] https://policies.mit.edu/policies-procedures/70-general-employment-policies/71-nondiscrimination-and-non-retaliation#7.1.3

[84] https://policies.mit.edu/policies-procedures/70-general-employment-policies/71-nondiscrimination-and-non-retaliation#7.1.4

The provost provides resources to academic units to hire women and underrepresented minority (URM) faculty and reports annually on the recruitment and retention of URM faculty and graduate students, as required by a 2004 faculty resolution.[85] The provost regularly asks the school deans to evaluate and report on the success of programs designed to support faculty diversity and inclusion goals. In 2019, the provost established a Faculty Gender Equity Committee within each school to report annually on the status and experience of women faculty in their respective schools, specifically regarding equitable treatment in promotions, compensation, support, duties, and other aspects of faculty life.

In response to the 2010 Report on the Initiative for Faculty Race and Diversity—a faculty-led effort that investigated whether and how race and ethnic identity affect MIT's ability to recruit and retain minority faculty—MIT began a process to catalog and share best practices, launching or strengthening programs to advance the report's recommendations.[86] The Institute Community and Equity Office (ICEO) was created in 2013 to promote community, equity, inclusion, and diversity throughout MIT and oversees several programs specific to faculty diversity. Chief among these is the MLK Visiting Professor/Scholar Program, which aims to enhance and recognize outstanding scholars of color by increasing their presence at MIT. The program invites individuals of any URM group, with an emphasis on African Americans, to join MIT for at least one academic term. It enriches the Institute's intellectual life by engaging the scholars in community, research, and academic programs. Among the program's 20 scholars since 2014 is Professor Anita Hill, a prominent lawyer and civil-rights advocate, who led MIT's Gender/Race Imperative, an ongoing series of events exploring Title IX and promoting equity in science, technology, engineering, and mathematics fields.

Separately, the ICEO develops and facilitates trainings on bias and related topics, and engages the community broadly at events and in discussions of issues related to equity, diversity, and inclusion. In response to a recommendation by the Black Graduate Student Association (BGSA), the Academic Council—MIT's senior leadership and the elected chair of the faculty—underwent training for implicit bias, as did staff in several academic and administrative offices. Standard 5 details additional steps MIT has taken in response to the BGSA recommendations.

At the urging of the Black Students' Union, by the end of 2017 all academic departments and several non-academic units had articulated and publicly posted formal statements affirming their commitment to diversity and inclusion.[87] The Department of Electrical Engineering and Computer Science (EECS) statement, for instance, provides a vision, definition of values, call to action, and promise to take an active role in making the department welcoming and inclusive to everyone.[88] Similarly, the Physics Department's statement articulates a commitment to well-being, respect, inclusion, collaboration, and mentorship, noting, "A diversity of identities and experiences is essential to bringing broad perspectives to our department and academic mission. It is our responsibility to ensure that these diverse voices are included and heard."[89]

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[85] https://facultygovernance.mit.edu/sites/default/files/meeting-enclosures/2004-05-19/Enclosure%20E%20-%20Resolution%20Concerning%20Underrepresented%20Minority%20Faculty%20and%20Graduate%20Student%20Recruitment%20and%20Retention.pdf

[86] http://web.mit.edu/provost/raceinitiative/report.pdf

[87] http://diversity.mit.edu/departmental-statements/

[88] http://www.eecs.mit.edu/diversity/

[89] http://web.mit.edu/physics/about/values.html

With an eye toward expanding the pipeline of qualified women candidates, the Office of Graduate Education has developed Path of Professorship, an annual workshop for graduate and postdoctoral women at MIT considering a tenure-track position in science, engineering, or technology. The program helps participants develop skills and strategies for success in their academic careers, with deans and department heads providing insights about networking, negotiating, and advancing in their fields.

The Institute also built on the success of a joint effort between the Departments of Aeronautics and Astronautics (AeroAstro) and Earth, Atmospheric, and Planetary Sciences that brings together women graduate students and postdoctoral scholars interested in an academic career in science or engineering for two days of mentoring, scientific interaction, and discussion. Women in Aerospace, launched in 2008, serves as the basis for a similar program called Rising Stars, which the Department of Electrical Engineering and Computer Science started in 2012. Rising Stars has doubled in attendance since its founding, with more than 30% of its alumni now holding faculty positions (including four at MIT), and another 20% working in industry. The majority of the program's other participants are still students or postdoctoral scholars. Similar programs have launched across MIT—in Chemical Engineering, Physics, Mechanical Engineering, Nuclear Science and Engineering, and Civil and Environmental Engineering—and even beyond, with Stanford University, Carnegie Mellon University, and University of California, Berkeley hosting workshops in recent years.

All of MIT's schools have established committees that focus on developing women in the faculty. In addition, with financial support from the provost and administrative support from the ICEO, the Office of the Chair of the Faculty reintroduced a regular dinner gathering for all MIT women faculty to promote a sense of community and create a forum for discussion. Coordination of this ongoing series is likely to shift to the Office of the Provost.

Between 2009 and 2018, the faculty as a whole grew by 38 members, with increases of 2%, 3%, and 1% in MIT's women, URM, and international faculty populations, respectively (Table 6).

Table 6. The number and percentage of women, underrepresented minority (URM), and international faculty in 2009, 2014, and 2018

	2009		2014		2018	
Faculty subgroup	**No.**	**%**	**No.**	**%**	**No.**	**%**
Women	198	20%	225	22%	239	23%
URM	65	6%	75	7%	83	8%
International	426	42%	430	42%	455	43%

To help with assessment and promote transparency, MIT now publishes an online diversity dashboard, which allows a user to review trends in faculty diversity historically and by faculty rank.

In May 2019, to help advance the important and related work of supporting faculty, supporting departmental leadership, and advancing departments' efforts to create a more inclusive and diverse academic community, the provost announced the creation of a new associate provost position. Professor Timothy Jamison, head of the Department of Chemistry, assumed the role in July 2019, and will work with senior leaders, deans, and others to ensure equitable practices during faculty hiring, promotion, tenure, and review processes. He will also support the efforts of MIT's departments, the five schools, and the college to foster diversity, inclusion, equity, a positive climate, and a sense of community.

In effect, Professor Jamison will be asked to extend the improvements he led in the Department of Chemistry, as described in Standard 3, to make all of MIT more welcoming.

Digital learning

The Report of the Task Force on the Future of MIT Education has informed MIT's teaching and learning activities over the last five years, as faculty continue to find creative opportunities to improve MIT's on-campus educational experience and open critical new pathways to learning. The task force responded to the potential of digital technology to reimagine how MIT educates its own students and how it engages a world of learners. Its impetus was largely the launch in late 2011 of MITx, the Institute's portfolio of massive open online courses (MOOCs), and five months later the founding of the online learning platform edX with Harvard University.

In 2012, MIT introduced Residential MITx, an online learning system based on open edX, which offers a platform for authoring and distributing online course content, including several dozen types of sophisticated auto-graded problems, segmented videos with brief active-learning elements interspersed, text, assessments, and interactive elements. Ninety-nine percent of current MIT undergraduates have taken at least one class that uses Residential MITx. During academic year 2019, 79 on-campus subjects taught by 107 faculty in 16 departments used the platform, often with the support of members of the Digital Learning Lab (DLL), which plays a central role in much of what MITx does.

With more than 20 members—disciplinary experts with deep pedagogical knowledge and rich edX experience embedded within academic units—the DLL partners with MIT faculty to develop MOOCs and digital learning tools to enhance the learning of students at MIT and around the world. Individual academic units identify, appoint, house, and mentor their DLL members. On a biweekly basis, the Office of Digital Learning (ODL) convenes the DLL team—DLL scientists, often appointed as lecturers within their departments, and DLL fellows, often appointed as postdoctoral scholars—to share experiences and learn from each other, forming a vibrant community of practice. The DLL scientists are experienced subject matter experts who are also well-versed in teaching and learning methods, as well as in education, research, and technology. They serve as leaders in their departments in developing innovative digital learning content and tools that faculty use on campus and in their MOOCs, and work with faculty and DLL scientists on digital learning projects, either within a department or within an MITx MicroMasters program, described below. Of the 102 MOOCs that MITx ran during academic year 2019, 60 were developed and/or managed by course teams that included members of the DLL. These colleagues also conduct educational research and present their work at national or international conferences in support of the MITx mission to promote education through digital learning. The DLL structure empowers specialists to advance teaching and learning in their individual academic units, while creating opportunities to convene, share, and multiply educational innovations. Simply put, the structure is a key driver of innovation in digital learning at MIT.

Residential MITx offers innovative options for faculty to use in their subjects. For instance, a faculty member might leverage videos and self-graded problems to "flip" the classroom, asking students to view segmented lecture-style video content at their own pace and on their own time while demonstrating basic understanding by answering self-graded problems online. This approach carves out valuable in-class time for active discussion, hands-on instruction, problem solving, case studies, and lab work, with faculty finding new opportunities to challenge students to apply their knowledge at a deeper, more active level. Faculty also use the technology that powers the sophisticated self-graded problem types in

MITx MOOCs to give students immediate feedback as they work through their assignments. Problem sets have long been an integral part of the learning process at MIT, but feedback has traditionally reached students days after they complete an assignment. With Residential MITx, students see and learn from their mistakes instantaneously.

Professor Lorna Gibson, of the Department of Materials Science and Engineering, has transformed the department's Mechanical Behavior of Materials subject by bringing together many of these elements. The class has been fully "flipped," with students viewing lecture videos prior to class, allowing them to spend face-to-face time in discussion and problem solving. Professor Gibson added questions to the course evaluation deliberately aimed at understanding the impact of the innovations she introduced. The students reported that they liked the immediate feedback digital tools offered (6.9 positive rating on a seven-point scale) and felt they learned the material more effectively via the combination of segmented lecture videos and in-class discussion (6.4/7). Overall, the flipped format produced significant learning gains, accelerated learning, and enhanced student satisfaction. Professor Gibson also noted that the model makes in-person class time more meaningful and brings the class's problem sets in sync with the lecture material.

Similarly, the Office of Minority Education (OME) has leveraged MITx to enhance one of its longest standing and most successful programs: Interphase EDGE, a two-year scholar enrichment initiative designed to help ease incoming students' transition to MIT. Among the program's activities is a seven-week summer session for incoming first-year undergraduates. In summer 2018, the OME and ODL began a collaboration that paired Interphase instructors, who are not MIT faculty, with DLL scientists, equipping the instructors with elements from the corresponding MITx MOOCs to use in their teaching. This approach exposed incoming students to MIT's pedagogical model before the rest of the incoming class arrived on campus. The pilot began slowly, integrating MITx content into Physics I and Calculus. The offices are working together in summer 2019 to strengthen the collaboration with the hope of expansion in the years ahead. Ultimately, MIT aims to flip the Interphase EDGE classroom to give instructors the freedom to use class time for active learning and group problem solving.

The rich and growing range of self-graded problem types on Residential MITx supports sophisticated testing and student assessment. Far beyond multiple choice, these problem types enable, for example, complex formula response (the platform checks the correctness of the formula a student submits), custom Python code graders (the platform runs and grades computer code), a custom sketch grader (the student sketches a curve and the platform grades multiple qualitative attributes, testing understanding), and auto-graded drag-and-drop problems (open-ended questions students use to demonstrate their learning of sophisticated concepts, logic, and proofs). The ODL has compiled and posted to its website more than 50 mini case studies to help faculty share the digital learning innovations they introduce in their classes as a way to communicate best practices and empower others to advance their own educational innovations.[90]

As of July 2019, MITx had built 176 MOOCs—modules corresponding to more than 120 semester-long on-campus MIT courses—from 23 departments in all five schools, and has run them a total of 583 times on edX. There is considerable variation in the design and structure of MITx MOOCs, but typical elements include sequences of video segments separated by short online exercises as well as auto-graded online assessments from among several dozen problem types of growing sophistication, many of them

[90] https://openlearning.mit.edu/campus/digital-innovations

developed at MIT. More than 3.8 million unique learners have enrolled 8.2 million times in MITx courses, with enrollment necessary to see the content of a course. Anyone in the world can explore and learn from MITx MOOCs for free. Those who wish to earn an MITx certificate must verify their identity and pay a small fee. As of July 2019, MITx had awarded 195,000 certificates on edX.

The openness of MITx MOOCs flows from the same vision that continues to inspire MIT's OpenCourseWare (OCW), which allows anyone to learn from and reuse course material from the Institute. Launched in 2002, OCW features material from more than 2,500 MIT courses and supplementary resources; to date, the site has been visited more than 300 million times, a number that grows by about two million per month. Its YouTube channel, which features videos from more than 200 courses, has two million subscribers. In 2013, MIT launched OCW Educator to help education professionals navigate the vast library of openly licensed teaching materials the Institute makes available on OCW. MIT's dean for digital learning is responsible for the ongoing stewardship of OCW, MITx, Residential MITx, and MITx MicroMasters efforts.

The MIT faculty who develop MOOCs do so with the support of MITx and a course team, including project managers and educational technologists with expertise in the use of the edX platform, as well as video, intellectual property, and accessibility experts. Course teams are subject matter experts, and include members of the DLL and postdoctoral scholars or TAs who devote a fraction of their time to a project.

MIT Open Learning and the MITx Faculty Advisory Committee (MITx FAC) offer two types of grants to faculty who wish to develop digital teaching methods. The Express Exploration Grant is for targeted innovations on the edX platform to be used at MIT and offered globally, and the MITx Modules Grant is for module offerings on the edX platform to be used at MIT and offered globally. MITx FAC provides strategic advice and guidance for MITx and plays a critical role in the grant process, reviewing, assessing, and ranking the proposals and making funding recommendations. The committee helps MITx build a portfolio of offerings that represent a broad cross-section of the best of MIT, with a diverse representation of disciplines, subjects, levels, and faculty. MITx has now built MOOCs based on many first-year subjects, many advanced undergraduate- or master's-level subjects, and some signature PhD-level subjects. The committee helps MITx identify, support, and share innovative approaches to education at MIT, endorsing proposals that advance digital learning for MIT's on-campus students and helping faculty pursue their research goals. It also reviews all MITx MicroMasters proposals.

In fall 2015, MIT announced a new academic and professional credential, the MITx MicroMasters, which responds to a burgeoning demand for new skills and opportunities for lifelong learning. A MicroMasters is a coherent suite of master's-level MOOCs that provides learners in workplaces around the world a boost to their education, helping them advance in their careers and, perhaps, accelerate the completion of a professional master's degree at MIT or elsewhere. The content of a MicroMasters corresponds to about a semester of study for a full-time, on-campus master's student. Learners around the world take the online courses for free. In order to earn a MicroMasters credential, a learner pays a modest fee and completes a proctored exam.

MicroMasters credential holders may apply to MIT to complete the corresponding graduate degree program on campus. If admitted, they may count the graduate-level MIT credit they earned online toward the degree, typically allowing them to earn a professional master's degree with one fewer

semester spent at MIT than those enrolled in the traditional residential program. Only a small fraction of MicroMasters recipients go this route, since many learners' ultimate goal is not to earn a degree, but rather to acquire the knowledge and skills they need to develop as professionals. As of July 2019, 27 universities in 18 countries on six continents offered admitted MicroMasters recipients an accelerated pathway to 86 different master's degrees. This pathway to a degree at MIT or elsewhere adds credibility to the MicroMasters and can help a credential holder develop both personally and professionally.

More than 1,800 learners from around the world have earned MITx MicroMasters credentials from the first three programs, Supply Chain Management; Data, Economics, and Development Policy; and Principles of Manufacturing. In addition to those two, in spring 2019, MIT ran MicroMasters programs in Principles of Manufacturing, and Statistics and Data Science. MITx is currently working with faculty at the MIT Sloan School of Management to develop a new MicroMasters in Finance. From among the first 600 recipients of the MITx MicroMasters in Supply Chain Management—the inaugural MicroMasters program—40 were admitted to MIT and completed their master's degree in June 2018. The academic performance and self-reported satisfaction with the experience of those students were at least as strong as that of the students who entered the master's program in the traditional fashion.

A faculty member and a research scientist in MIT's Comparative Media Studies/Writing Program have submitted a research study for publication in which they examine the two groups of students who completed their master's in supply chain management in June 2018. About half (42 students) completed a traditional, fully residential program starting in September 2017; the other 40 students arrived at MIT in January 2018 after completing their MicroMasters over the preceding two years. The report, based on data from the online courses, surveys, interviews, and focus groups, describes and assesses the students' professional trajectories, preparation, goals, performance, experiences, and outcomes. The authors find that the cohort of students who came to MIT after completing their MicroMasters were typically well-educated mid-career professionals looking for more flexible alternatives to traditional graduate programs. Few were thinking of pursuing a master's degree at the time they began the MicroMasters coursework, which they were typically attracted to because of its direct relevance to challenges they were addressing in their jobs.

The study—"Evaluating Access, Quality, and Inverted Admissions in MOOC-Based Blended Degree Pathways: A Study of the MIT Supply Chain Management MicroMasters"[91]—found that, relative to all MicroMasters learners, success in the online courses of those who later came to MIT was correlated with high levels of prior formal education and with effective use of self-regulated learning strategies. Successful MicroMasters learners spent more hours online per course and were more likely to participate in the course forums and revisit previously watched videos and previously completed assignments, testing their knowledge as they learned. The MicroMasters attracts and selects a cohort of students who would not otherwise have come to MIT, who arrive with work experience and prior formal education, and who have the ability and discipline to excel in five rigorous MITx online courses.

Enrolled MIT students with a MicroMasters were more likely than the traditional residential students to arrive on campus planning to return to their previous companies after finishing their master's. When surveyed later in the semester, 100% of these students agreed or strongly agreed that they felt academically prepared for the on-campus courses they took at MIT. In interviews, they described the

[91] https://osf.io/preprints/socarxiv/8nbsz/

online classes as potentially superior to on-campus classes in some ways, and at the same time described the ways in which their time in residence at MIT added value to their prior online learning experiences, in particular via their experiences working with other students. Moreover, these students had somewhat higher GPAs in their on-campus coursework than students in the traditional, fully residential master's program who took the same classes (4.86 vs. 4.75). They were also somewhat more likely to report feeling a sense of belonging at MIT (88% vs. 78%) and seeing themselves as a part of a larger MIT community (78% vs. 62%). Many who came to MIT after completing a MicroMasters reported feeling a sense of connection to MIT that began when they were taking the online classes. All 82 students are now proud MIT alumni.

Reimagining the undergraduate first year

In charging the Office of the Vice Chancellor (OVC) in April 2017, the chancellor stressed the importance of "engaging with students and departments to develop and pursue a roadmap for enhancing the first-year student academic experience."[92] To this end, the OVC assembled a first-year experience core team to develop measurable, realistic, specific, and student-centered outcomes for MIT's first-year undergraduate students. The team focused on outcomes at three key stages: a student's transition to MIT, a student's acquisition and application of social and intellectual knowledge and skills, and a student's reflection on the first year and plans for the future. Through this exercise, the team articulated a range of goals, from engaging with faculty in shaping a student's education to identifying connections between foundational concepts and real-world application to exploring possible majors to participating in discipline- and career-related activities.[93]

These desired outcomes laid the framework for an effort the OVC launched in summer 2017 to develop a design-intensive, team-based, project-focused subject called Designing the First Year. Offered in spring 2018 and taught by experts in education, design, management, and project engineering, the subject exposed about 50 undergraduate and graduate students to the design process by using the first year at MIT as the system of study. Students conceptualized, framed, researched, formulated, and proposed designs to alter and improve the Institute's undergraduate first-year experience within and beyond the classroom. Using methods from across MIT's schools, the class provided experience in a full cycle of observation, framing, concept generation, design, and validation. Students conducted a stakeholder needs assessment and formulated and analyzed the impact of potential curricular and co-curricular changes. They were graded based on a final report and presentation. Those who completed the subject earned 12 units that could be applied toward MIT's design minor and to the General Institute Requirements (GIRs).

Working in teams, students examined the first year through a number of lenses, including research, major exploration, student activities, advising, and the GIRs, ultimately articulating two fundamental recommendations for change:

- Create more opportunities for academic exploration during the first year. Students recommended relaxing the time constraints on the GIRs to enable students to explore more options for their majors.

[92] http://orgchart.mit.edu/node/5/letters_to_community/our-new-vice-chancellor

[93] https://sites.google.com/view/mitfyebb/desiredoutcomes

- Alter the first-year advising system to support major exploration and help first-year students acclimate to the academic rigors and co-curricular landscape of MIT.

Students presented their findings and recommendations at an Institute faculty meeting and to the Academic Council and MIT Corporation, engaging leadership at the highest level in reimagining the first-year experience. The subject sparked the pass/no record experiment described in Standard 4, intended to offer the Class of 2022 room for exploration in the GIRs, and started a campus-wide conversation about MIT's vision for the first year. To build on this momentum, MIT offered a three-credit follow-up subject during Independent Activities Period in January 2019. The subject, Designing the First-Year Experience: Fun-Sized, identified additional potential changes to the first-year experience to be tested with the full Class of 2023, or "blue-sky" ideas to be tested with smaller groups of students. This activity will continue to inform the broader discussion about the future of the GIRs that is expected to intensify in the years ahead. It will also shape MIT's ongoing efforts to study and enhance the first-year undergraduate experience, a key priority that will continue well into the next review cycle.

Advising

In an environment as academically rigorous as MIT, the Institute remains committed to providing helpful, relevant, supportive, and holistic advising, mentorship, and professional development opportunities to its students. Among the OVC's top priorities is enhancing "academic advising in the first year and beyond for both undergraduate and graduate students in partnership with MindHandHeart [described in Standard 5], faculty, and academic departments."[94] These efforts are detailed below.

Although all first-year undergraduate students are paired with an advisor, the advisor is usually, though not always, a member of the faculty. The Office of the First Year (OFY) oversees 190 associate advisors who work alongside faculty advisors to help incoming students navigate their transition to MIT. Associate advisors are upper-level students committed to enhancing the first-year experience by providing high-quality advising with regard to class selection, time management skills, and Institute resources. They host academic activities and co-facilitate events with the Division of Student Life's resident peer mentors in the residence halls. With faculty advisors, they encourage students to challenge themselves and pursue intellectual exploration. In spring 2019, associate advisors hosted a series of programs to expose first-year students to MIT's majors, providing a critical opportunity for self-discovery.

MIT has taken steps to diversify the advising experience and offer additional opportunities for mentorship during a student's first year on campus. Beginning with the incoming Class of 2023, the OFY will pilot a formalized advising network with 100 to 150 first-year students. Each student's network will include a faculty advisor, a staff advisor in the OFY, and a student associate advisor. The staff advisor will be responsible for coordinating the student's network, registering the student for classes, connecting the student with on-campus resources, and making sure that members of the network fulfill their roles. The faculty advisor will focus on developmental advising, helping the student set goals for the first year and beyond, explore possible majors and careers, and adjust to life at MIT. The faculty advisor will also serve as a mentor, with a focus on interests and values, wellness, reflection, resilience, and the integration of academic and co-curricular experiences. The student associate advisor will provide perspective about the first-year experience. MIT designed this revised model to

[94] https://ovc.mit.edu/strategic-priorities/goals/

leverage faculty members' wisdom and experience, as well as staff members' deep knowledge of MIT's curriculum, community, and systems.

The OFY will also oversee a centralized advising strategy through trainings for faculty and student associate advisors. It will provide faculty and students with an advising roadmap, including first-year goals, for both fall and spring with guidelines about meeting frequency and expectations, and it will institutionalize assessment practices with assistance from the TLL. Importantly, the OFY will be positioned to intervene if relationships within the network are not working as expected.

Undergraduate students typically declare a major at the end of their first year or in the fall of their sophomore year; responsibility for advising them then shifts to their home department. Each department has a process for ensuring effective undergraduate advising. With slight variations, each department communicates with its new and current students and faculty advisors, and engages them throughout the year.

At the graduate level, academic departments take the lead from the start of a student's MIT experience. Ongoing assessment of graduate advising occurs through the biennial visiting committee process and regular surveys of graduate students. The surveys produce critical data that MIT Institutional Research shares with the provost, school deans, and department heads to paint a clear picture of a department's strengths or weaknesses in advising, and to understand the effectiveness of a department's advising program in relation to other MIT departments. In some cases, departments invite graduate students to answer questions about their advising experiences confidentially through an end-of-term evaluation of their thesis subject, an effort described in Standard 3.

Combined data from exit surveys of doctoral students between 2013 and 2018 highlight the need for improved advising for graduate students. Although 83% of survey respondents rated their overall program quality as excellent or very good, only 58% rated the quality of academic advising and guidance as such, and only 60% considered the relationship between faculty and graduate students as excellent or very good. MIT has developed materials and programming to give students and faculty the resources they need to build an excellent advisor-advisee relationship based on respectful and open communication, clear expectations, and integrity. Working closely with the Graduate Student Council (GSC) and the Committee on Graduate Programs, the OGE developed and maintains "Best Practices in Graduate Student Advising," a document that lays out the fundamental principles for graduate students and their faculty advisors.[95] Every incoming graduate student receives the document during orientation.

To promote excellence in advising, the OVC and OGE have also launched Committed to Caring, a program that recognizes faculty who cultivate a positive and supportive environment for their graduate students, promote the importance of professional development and advancement, and provide critical opportunities for networking. Student advisees nominate their faculty advisors for recognition; to date, the program has honored 48 faculty across 16 departments. Moreover, the OGE publishes a series of mentoring guideposts, common themes or characteristics drawn from the nominations, as a way to communicate best practices in mentoring across the Institute. In 2018, MIT held its first event to celebrate the Committed to Caring faculty honorees and draw attention to this vital Institute program.

[95] https://oge.mit.edu/gpp/roles/

Still, critical work remains to enhance advising for graduate students. The OVC, partnering with the DSL and GSC, has identified advising as one of the key areas of focus as part of its Graduate Student Roadmap.[96] To advance the priority, the OVC has identified partners in GradSAGE, a student advisory group to the dean of engineering. GradSAGE recently launched a pilot that asked faculty to create advising philosophy statements as a first step in transparency and setting expectations for the advisor-advisee relationship. EECS and AeroAstro have signed on to the pilot and have taken additional steps to improve advising for their graduate students. For instance, AeroAstro is piloting a program to provide transitional funding for students switching advisors, a practice that has proven successful in the School of Science. EECS has also implemented a Professional Perspective requirement that encourages students to participate in professional development beyond their department. More broadly, the School of Engineering is looking to launch school-wide training for junior faculty on mentoring graduate students in partnership with the MindHandHeart program (described in Standard 5), the TLL, OGE, and OVC. Finally, the chancellor and provost have established a working group on academic and organizational relationships, a faculty-led effort that will consider the power dynamics of the advisor-student relationship.

At both the undergraduate and graduate levels, MIT will continue to pilot, assess, and refine initiatives aimed at improving advising in the years ahead.

Experiential learning

In July 2018, driven by MIT's commitment to *mens et manus*, the OVC reconfigured the Office of Experiential Learning (OEL) to promote hands-on educational experiences, both inside and outside the classroom. The OEL exposes students to new cultures and different ways of thinking and solving problems, thereby broadening their communications skills and helping them develop a better sense of themselves. At MIT, experiential learning combines five elements that together amplify and accelerate student learning and development: hands-on application; meaningful intensity and duration; serious connections to academic content and expert guidance; structured student reflection and formal evaluation and assessment; and real-world context and consequences. The office aims to bring together people from across and beyond the Institute with a common mission; understand the impact of experiential learning on student outcomes, including personal attitudes and values, mastery of disciplinary concepts, and career choices; identify and develop new systems, policies, practices, and initiatives; measure and increase student engagement in experiential learning; better manage related risks, such as international and domestic travel, and working with vulnerable populations; and support and encourage the participation and inclusion of diverse groups of students and faculty.

The OEL brings together heretofore disparate experiential learning opportunities—in global education, undergraduate research, making, international development, and public service—creating a centralized resource to help students work (and faculty teach) beyond the confines of the classroom. It creates opportunities for students to interact with communities near and far, and makes space for collaboration, compassion, and reflection. Working closely with the TLL, the OEL leadership is laying the foundation for ongoing data collection, analysis, assessment, and evaluation of the office's programs. The OEL is working to build customized evaluation capacity within individual programs and create shared assessment strategies and tools that will paint a comprehensive picture of experiential learning across the Institute. It is also inventorying and analyzing existing data (Institute-wide and program-

[96] https://ovc.mit.edu/strategic-priorities/graduate-student-roadmap/

specific) to craft a more consistent and unified evaluation approach that can accomplish two goals: measure, compare, and improve the educational benefits of a diverse suite of experiential learning programs; and help students make more intentional choices about experiential learning opportunities that enhance their traditional coursework and support their career aspirations.

Experiential learning for MIT's undergraduate students often begins in the lab. Teaching and research at the Institute are inseparable, a link embodied and reinforced by the Undergraduate Research Opportunities Program (UROP). Administered by the OEL, UROP offers opportunities for undergraduate students to engage with faculty as junior colleagues in the research enterprise. When it launched 50 years ago, UROP was the first collegiate hands-on problem-solving program of its kind; it has since inspired similar programs across the country. UROP provides undergraduate students an opportunity to gain practical experience by working alongside faculty and senior researchers in every MIT department, as well as in interdisciplinary labs and centers, to develop project plans, write proposals, conduct research, analyze data, and present and publish results. Ninety-one percent of undergraduates participate in at least one UROP, with 53% of MIT's faculty active as UROP mentors. An assessment of UROP is detailed in Standard 8.

Prior to the creation of the OVC in 2017, the Visiting Committee for the Dean for Undergraduate Education provided valuable counsel on all matters under the dean's purview. Since oversight of graduate education was largely delegated to the academic units, there was no visiting committee analog for the dean for graduate education. In spring 2018, following the visiting committee's first meeting with Vice Chancellor for Undergraduate and Graduate Education Ian Waitz, the Corporation renamed the committee and expanded its scope to encompass graduate education. The newly coined Visiting Committee for Undergraduate and Graduate Education now advises the Institute on matters pertaining to undergraduate and graduate education, and those that touch MIT's educational model more broadly, including the programs the OEL administers.

Building on the success of UROP, in 2012 EECS launched SuperUROP, a year-long research program now open to juniors and seniors in the School of Engineering and the School of Humanities, Arts, and Social Sciences. Through SuperUROP, students select a research project and conduct background research; explore current research topics in their degree field; learn industry-strength design methodologies; write research papers that undergo peer review; and present their research to various stakeholders. The program gives students the time, training, resources, and guidance they need to pursue deep scientific and engineering inquiry, and provides access to graduate-level facilities. It includes a two-semester course on undergraduate research and at least 10 hours a week in the lab. Often these year-long projects evolve into graduate theses, startup plans, or industry positions. Between the program's launch and spring term 2019, 819 students participated. Assessment is ingrained in the SuperUROP model. The program's administrators hold student forums and gather qualitative feedback through surveys, inputs that have spurred important changes. For instance, based on student feedback, SuperUROP now limits the number of students per supervisor to three to enable more time for student-supervisor interaction. It has also introduced the concept of an electronic lab notebook to provide more visibility to the teaching staff in the weekly progress of the research component.

As vital as the OEL is in coordinating and supporting experiential learning, MIT's dedication to mind and hand extends to educational activities beyond the OEL's purview. Three such activities are described below.

First, MIT's pioneering experiential international learning program, MIT International Science and Technology Initiatives (MISTI), matches students with tailored internship, research, and teaching opportunities abroad. MISTI works with MIT students, faculty, and international partners and sponsors to build strong intercultural connections, advance research with global implications, and help students develop as leaders. The program allows students to hone practical intercultural skills through hands-on experience working alongside international colleagues. To prepare for their experiences abroad, MISTI students must complete coursework in the language, culture, history, and politics of their host country, and participate in a series of location-specific training modules covering topics that include cross-cultural communication, current events, technology and innovation in the host country, navigating the workplace, logistics, and safety.

At the time of MIT's 2009 self-study, MISTI comprised nine country programs; today it spans all continents, and its 27 country programs engage more than 1,100 students per year. The program's rapid expansion has facilitated an increase in the number of students taking advantage of these profound international learning experiences. Of the seniors surveyed in 2009, 36% reported having some kind of international educational experience before graduating. In 2018, that figure jumped to 54%, with nearly 72% of those students taking part in a MISTI program. Additionally, 40% of graduating master's students responding to a 2018 survey reported having an educational experience abroad, with 41% of them involved in a MISTI program. Among the 2018 graduating students, 94% of undergraduate students and 93% of master's students who participated in MISTI were satisfied or very satisfied with their experience.[97]

MISTI also operates Global Startup Labs, a program that brings together teams of three or four undergraduate and graduate students in EECS and the MIT Sloan School of Management to work together to develop curriculum materials, software technologies, platforms, and networks that enable undergraduate students in emerging regions to innovate in information and communication technologies. MISTI also operates Global Teaching Labs (GTL), which matches MIT students with foreign high school hosts for three weeks in January. Through GTL, students learn about teaching materials, platforms, and communication techniques, and the education system and culture of their host country. They then prepare tailored courses in science, technology, engineering, and math subjects that complement the school's curriculum and highlight MIT's hands-on approach to learning.

Standard 8 details a TLL assessment that ultimately led to the expansion of the GTL program. MISTI conducts ongoing learning outcomes assessment by means of a survey distributed to all summer internship and International Activities Period (IAP) GTL participants at the beginning and end of their programs. By comparing the results of these surveys, MISTI has observed statistically significant gains in students' ability to communicate in a different culture and language, identify mentors outside the U.S., demonstrate understanding of a host country's cultural norms and industry trends, and adapt to new situations. In administering the survey both to internship and GTL participants, the relative

[97] https://static1.squarespace.com/static/5b63672bcef372eea958d8a5/t/5bff147e1ae6cfb7775d0210/1543443584681/GSS-2018-Overall.pdf

value of each program is gauged in terms of educational outcomes. As a result, MISTI leadership has determined that continuation of the newer, more experimental GTL program is warranted.

MISTI offers a program for MIT faculty that encourages scientific collaboration with faculty and researchers abroad. Through MISTI Global Seed Funds, MIT faculty can secure grant funding for travel and meeting costs for projects they lead jointly with their counterparts in other countries. The program typically receives about 250 proposals and distributes around $2 million to about 100 projects annually. These projects often lead to jointly published research papers, subsequent grants, and continued collaboration between the teams. Most projects involve undergraduate and graduate students from MIT and the partner school.

Faculty oversight is critical in advancing MISTI's mission. Each MISTI program has one or more faculty directors who are responsible for the academic quality of the program. There are currently 35 MISTI country program faculty directors and one overall MISTI faculty director. The MISTI Global Seed Funds Advisory Board, which includes six faculty, meets annually to advise on the quality of the MISTI Global Seed Funds program and other MISTI matters.

Second, the MIT Beaver Works Center facilitates project-based learning by building partnerships between faculty and students at MIT and practicing engineers at Lincoln Laboratory, a leading federally funded research and development center operated by MIT and located in Lexington, Massachusetts. Launched in 2013, Beaver Works promotes collaborative research on matters of global security and supports rapid fabrication of prototype systems. Lincoln Laboratory staff provide mentoring and instruction to MIT undergraduates, helping students understand the complexities of a problem, formulate solutions, and integrate those solutions into larger architectures. The initiative's signature collaboration is a capstone project in a subject such as unmanned aerial vehicles, small satellites, autonomous underwater systems, energy systems, cybersecurity, communications, big data analytics, and advanced devices. The dean of the School of Engineering and the director of Lincoln Laboratory evaluate the MIT Beaver Works Center's programs and initiatives annually. The review assesses current and future capstone and research projects; IAP courses; and new initiatives such as the Beaver Works Summer Institute, a four-week science, technology, engineering, and math program at MIT for rising high school seniors.

Using newly renovated space on campus, Beaver Works plans to expand its programs, with a focus on autonomous systems. Its approach to project-based learning and engineering design is energized by new collaborations with MIT organizations, including the MIT Assistive Technologies Club, which develops technologies to help people with disabilities. The program will also continue to expand in critical areas, such as humanitarian assistance and disaster relief projects and green technologies. Lincoln Laboratory leadership also recently completed a study of opportunities to expand science at the laboratory, which would logically include science projects at Beaver Works. The partnership between MIT and Lincoln Laboratory will continue to grow through IAP courses, mentoring, and research opportunities at the laboratory. Beaver Works will also facilitate Lincoln Laboratory staff involvement in new project-based learning initiatives at MIT, such as the New Engineering Education Transformation (described below), and by offering project-based learning opportunities to high school and middle school students nationally and internationally through the Beaver Works Summer Institute initiative.

Finally, perhaps the most significant recent application of experiential learning—with ramifications for undergraduate engineering education at MIT and around the world—is the New Engineering

Education Transformation (NEET) pilot for students in the School of Engineering. Launched in 2017, NEET emerged following a process to engage students, faculty, alumni, industry leaders, and thought leaders, and an environmental scan to understand the current landscape of global engineering education and how it is likely to change.[98] NEET is a project-centric academic program with formalized collaboration across departments that allows students to choose a sequence of explicitly interdepartmental projects in their sophomore, junior, and senior years, while continuing to learn fundamentals in their home department. Reflecting a fundamental rethinking of how MIT educates the engineers of the future, five fundamental principles guide the program:

1. Education should focus on preparing MIT's students to develop the new machines and systems they will build in the middle of the 21st century in order to address critical societal challenges.
2. MIT should help students prepare to be makers or discoverers, teaching engineering fundamentals as a foundation for careers in research and practice.
3. MIT should build its education around the way its students best learn, engaging them in their learning and implementing pilots to understand the desirable balance of classroom, project, and digital learning.
4. Given the speed of scientific and technological development, MIT should teach students how to more effectively think and learn by themselves.
5. MIT should be prepared to embark on bold change, with a widespread impact at MIT and potentially, globally, and in keeping with MIT's established principles.

NEET groups students within five cross-departmental "threads"—Advanced Materials Machines, Autonomous Machines, Digital Cities, Living Machines, and Renewable Energy Machines—touching all eight of the School of Engineering's departments. The threads were selected and designed to provide students with the skills likely to be in demand when they graduate. Those who complete a thread earn a NEET certificate in addition to an SB degree from their home department. Although focused on engineering education, NEET has fostered collaboration with faculty in other MIT schools to develop pilot modules in ethics education, critical thinking, creative thinking, and self-learning. Faculty experts in the Department of Linguistics and Philosophy; the Program in Science, Technology, and Society; and the Department of Architecture; and senior staff at the MIT Libraries lead the pilot projects. In NEET's first two academic years, it attracted 131 voluntary enrollments, making it the fourth largest academic cohort on campus.[99]

Assessment and evaluation are ingrained in NEET's educational model, with a focus on three common themes:

- Student feedback, measured by enrollment, completion, and qualitative inputs;
- Student academic performance and job placement, as compared to non-NEET students; and
- Sustainability and added value of the program compared to traditional academic offerings.

Assessment and evaluation experts in the TLL, working with NEET faculty, are developing a rubric to assess students' adoption of the 11 NEET "ways of thinking," cognitive approaches NEET has

[98] http://neet.mit.edu/wp-content/uploads/2018/03/MIT_NEET_GlobalStateEngineeringEducation2018.pdf

[99] If NEET were a major, it would have the fourth highest enrollment, after Courses 6, 2, and 18.

identified as critical in successful technical professionals. Incorporated into the program's curriculum, the ways of thinking include making, discovering, interpersonal skills, personal skills and attitudes, creative thinking, systems thinking, critical and metacognitive thinking, analytical thinking, computational thinking, experimentation, and humanism. The rubric will double as a best practice in teaching and student assessment and an essential source of data for evaluation. Instructional staff for the project classes will assess students using the ways-of-thinking rubric, and students will use it for self-assessment at the end of the semester.

Major Institute-wide research efforts

MIT's 2009 self-study described two successful Institute-wide efforts that leverage expertise from across MIT's five schools to advance solutions to the complex challenges of energy and cancer. The MIT Energy Initiative and the David H. Koch Institute for Integrative Cancer Research remain vibrant centers for interdisciplinary activity. In fact, they have given Institute leadership a roadmap to launch new cross-cutting research enterprises, including the three described below.

First, to promote new partnerships with regional academic medical centers and industry, MIT established the Institute for Medical Engineering and Science (IMES) in 2012. Since its launch, IMES has advanced efforts at the convergence of engineering, science, and medicine, pioneering novel research paradigms and developing graduate curricula to educate new generations of leaders in medicine. Its research is directed by five "grand challenges": make diagnosis cost-effective; enable systematic design of vaccines and therapies; translate neuroscience to the clinic; enable remote monitoring of chronic and post-acute-care patients; and develop accurate diagnostic tools and therapies for cardiovascular diseases. IMES has established strategic partnerships, including with Boston-area teaching hospitals, and has become the new home for MIT's Center for Microbiome Informatics and Therapeutics, Clinical Research Center, Medical Electronic Device Realization Center, and the Harvard-MIT Program in Health Sciences and Technology. A new visiting committee assesses IMES on an ongoing basis, providing feedback that has already influenced several positive changes. For instance, based on a visiting committee recommendation, IMES developed a strategic plan in 2017 for the first time. Also, visiting committee feedback has spurred action to promote diversity and inclusion, including establishing a formal diversity and inclusion statement; charging a working group of students, faculty, and staff to recommend specific actions to recruit and retain more diverse populations; and committing to support and build on the success of the Rising Stars in Biomedical symposium, which brings outstanding female graduate students and postdoctoral scholars to MIT.

Second, launched in 2014, the Environmental Solutions Initiative (ESI) is a campus-wide effort to promote transformative, cross-disciplinary research relating to the environment. ESI has four program areas of focus: nature-based solutions for climate change; mining and the environment; plastics and the environment; and future cities. Through research, education, and convening activities, ESI focuses the MIT community on advancing solutions to global issues of the environment, climate change in particular. With its new Climate Portal, it also facilitates communication about climate across MIT and provides a publicly accessible platform for learning and engagement.[100] To expose undergraduate students to concepts and problems related to the environment, climate, and sustainability, ESI is partnering with faculty across all four GIR disciplines (chemistry, biology, math, and physics) to develop climate- and environment-themed resources that faculty can incorporate into their classes

[100] https://climate.mit.edu/science-action

and problem sets. ESI has also led the development of an undergraduate minor in environment and sustainability.

ESI addresses interdisciplinary challenges in physical and social sciences, engineering, and urban planning and policy, and plays a vital role in advancing the recommendations of MIT's Plan for Action on Climate Change (commonly referred to as the climate action plan, or CAP).[101] In October 2015, after a yearlong conversation within the MIT community, President Reif released the CAP, a five-year plan that seeks to marshal MIT's strengths in the global effort to fight climate change. The vice president for research oversees the plan's implementation and chairs the Climate Action Advisory Committee, which includes representatives from more than a dozen MIT units with climate-related responsibilities. The plan groups activity in five pillars:

- Improve our understanding of climate change and advance novel mitigation and adaptation solutions;
- Accelerate progress toward low- and zero-carbon energy technologies;
- Educate a new generation of climate, energy, and environmental innovators;
- Share what MIT knows and is learning about climate with the broader world; and
- Use the MIT community and campus as a test bed for change.

To that last point, the CAP set a goal to reduce campus emissions by at least 32% by 2030. As of 2018, MIT had reduced its net contributions to greenhouse gas emissions by 20% against a 2014 baseline, almost two-thirds of the way toward the goal. Actual campus emissions were a modest 4% below the baseline, ticking up in 2018 due chiefly to a colder-than-average winter. The balance of reductions are attributed to MIT's partnership in Summit Farms, a 650-acre megawatt solar farm in North Carolina. In 2016, MIT, Boston Medical Center, and Post Office Square Redevelopment Corporation formed an alliance to buy electricity from a large solar power installation. MIT's purchase of power from the facility's 255,000 solar panels is equivalent to 40% of the Institute's electricity use. Its purchase of 44 megawatts is among the largest publicly announced purchases of solar energy by any American college or university, and the largest among academic institutions in the eastern United States. The construction of Summit Farms and its resulting solar energy generation had the additional benefit of retiring dirtier coal-fired energy from that region's electric grid.

In academic year 2020, MIT will present a series of six climate symposia that will draw upon key lessons learned from the plan and set the stage for actions going forward. In late 2020, MIT will take stock of and communicate the progress it has made in addressing the urgent global challenge of climate change and decide on next steps.

Finally, in July 2015 MIT launched the Institute for Data, Systems, and Society (IDSS) to address societal challenges using analytical tools from statistics, information, and decision systems. IDSS research is rooted in three core disciplines: statistics and data science, information and decision theory, and human and institutional behavior. Its researchers span all three disciplines, yielding a novel, multifaceted understanding of research problems, and working in a broad range of applications, including energy systems, finance, health care, social networks, and urban systems. The institute's

[101] http://web.mit.edu/climateaction/ClimateChangeStatement-2015Oct21.pdf

rigorous computational and analytical approach to complex systems is anchored in the Laboratory for Information and Decision Systems (LIDS), IDSS's backbone, in effect. MIT's longest-running research lab, LIDS is a global leader in information and decision sciences. Its research cuts across core engineering disciplines, building foundational knowledge for research and applications that touch many different domains.

To support ongoing oversight and assessment, MIT established a new visiting committee for IDSS upon the institute's launch. As is the case with IMES, the IDSS visiting committee has already made important contributions to the institute's success. Following its December 2018 meeting, the IDSS visiting committee made recommendations to enhance the institute's academic programs, including working to position IDSS within the MIT Stephen A. Schwarzman College of Computing so that the institute's mission, expertise, and capabilities are fully embraced; continuing efforts to build statistics and data analytics into a top program; marketing the minor in statistics more broadly; and measuring diversity in the institute's various populations. Since the visit, IDSS leadership has taken steps to advance the visiting committee's recommendations, including serving on the College of Computing working groups; and strengthening statistics and data science programs at the small scale (increasing outreach about the minor in statistics), intermediate scale (preparing for the spring 2019 launch of an interdisciplinary doctoral program in statistics), and large scale (developing the MicroMasters in Statistics and Data Science). Additionally, the institute has committed to gather student diversity statistics on an ongoing and retroactive basis.

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STANDARD 7: INSTITUTIONAL RESOURCES

Following MIT's last comprehensive review, the Commission urged the Institute to develop and implement a sustainable approach to reducing its deferred maintenance. In response to the 2014 interim report, the Commission asked MIT to emphasize strengthening its urban community context, including the Kendall Square and City of Cambridge projects. Guided by the vision of MIT 2030—a flexible framework described in the 2009 report that helps leadership make thoughtful, well-informed choices about physical developments and renewal—the Institute has advanced both priorities. In fiscal year 2016, for the first time in decades, MIT reduced its deferred maintenance backlog, a trend that has continued. The Institute has also taken important steps to advance its Kendall Square Initiative, a decade-long plan to redevelop Kendall Square, with six sites slated for housing, retail, research and innovation space, commercial offices, academics, and vibrant open spaces. These activities are described below, as are the details of MIT's institutional resources—human, financial, physical, and technological.

Human resources

MIT's human resources function is centralized in the Human Resources Department (HR) and also distributed throughout the Institute's departments, labs, and centers. HR at MIT includes the key areas of benefits, compensation, employee and labor relations, and strategic talent management. The Institute is committed to furthering diversity and inclusion, broadening talent development programs, and strengthening fair and transparent processes for managing grievances, including those related to sexual harassment.

The Institute offers a comprehensive benefits package, which includes vacation, health insurance, retirement programs, and tuition assistance, for eligible employees, and extends many benefits, such as health insurance, to students and postdoctoral researchers. The Employee Benefits Oversight Committee (EBOC) is charged with providing integrated oversight of all employee benefits matters, including cost, funding, programs, competitiveness, employee benefit rate impacts, and benefits philosophy. The EBOC has recently approved a number of enhancements to the benefits portfolio, including expansion of paid parental leave to provide up to 20 days of paid leave to new parents, and the introduction of MyLife Services, a free 24/7 counseling, consultation, and work-life referral service for all MIT employees. Chaired by the vice president for human resources, the EBOC includes three standing subcommittees focused on employee health, work-life issues, and retirement.

As noted in the Data First forms, as of fiscal year 2018, MIT's workforce included 13,705 employees, with 1,661 instructional staff and 4,790 research staff. These numbers include personnel employed at Lincoln Laboratory, a federally funded research and development center MIT operates in Lexington, Massachusetts. The size of MIT's faculty has remained relatively constant for decades. However, with a commitment of 50 new lines as part of the launch of the MIT Stephen A. Schwarzman College of Computing, the size of the faculty is expected to increase to about 1,100 over the next five to seven years. Several peer institutions have also recently made a significant commitment of resources to computing. This movement in higher education will intensify competition for faculty and graduate students working in computing and those MIT calls "bilinguals," with interdisciplinary expertise in computing and another field. Increasing the size of MIT's on-campus community also raises questions about demand for local resources, most notably housing, in an already tight market. It will be critical for the Institute to address these constraints thoughtfully and proactively to continue to attract the world's finest talent to campus.

To support efforts to attract the best talent, MIT conducts an annual market analysis to determine competitive pay positioning for all benchmark jobs. MIT has also undertaken a compensation initiative, a multiphase, multiyear project implemented in April 2019. The initiative is an effort to create a single-pay structure to enable MIT to effectively recruit, retain, develop, and reward outstanding administrative and support staff, and to make better-informed pay decisions. It reflects MIT's commitment to providing equitable, consistent, and competitive pay for every one of its employees. An annual total compensation statement provides faculty and staff personalized details about their pay and the value of their MIT benefits, and displays projections of retirement income under a specified set of assumptions. Units conduct regular performance reviews in conjunction with the Institute's annual merit review process.

Every four years, MIT conducts a work-life survey to examine the work-life environment for faculty, instructional staff, researchers, postdoctoral scholars, administrative staff, support staff, and service staff. MIT's Council on Family and Work serves in an advisory capacity on family and work-related issues with regard to MIT's faculty, staff, and students, and makes periodic recommendations to the senior officers about actions to address work-life balance and quality-of-life matters.

MIT is committed to promoting an inclusive workplace that welcomes and supports people of varying backgrounds, viewpoints, experiences, talents, and ideas while creating an atmosphere of civility, collegiality, and mutual respect that stimulates and supports all employees. Through the Council on Staff Diversity and Inclusion, the Institute advances diversity and inclusion efforts and offers assistance in reaching the goals of affirmative action by growing a network of distributed leadership across campus. Advisory to the executive vice president and treasurer (EVPT) and vice president for human resources, the council is charged with encouraging and informing efforts to utilize the diversity of MIT's staff to advance the work of departments, laboratories, and centers (DLCs). Focusing diversity efforts in the DLCs encourages individual units to customize their activities in ways that account for local organizations and cultures. This approach takes a number of forms, including reflecting on practices and procedures that may unintentionally have a disparate impact on members of the department, identifying professional development opportunities, and focusing on recruiting and hiring.

HR has advanced a creative solution to monitor and document good-faith hiring practices through an online resource MIT developed called Enriching Diversity. The tool is an integrated platform that improves affirmative action planning and effectively integrates affirmative action data from multiple sources to support decision making beyond MIT's affirmative action requirements. It allows affirmative action administrators across campus to see their affirmative action results at a glance and download detailed reports; it also serves as a repository for a unit's action plans. HR professionals use the tool to monitor the diversity of the hiring process, which can inform decision making, such as continuing to recruit for an open requisition. When a department seeks approval to make an offer to its preferred candidate, the tool automates the compilation of data to support the case. HR will continue to add functionality over time, including a report to show where applicants learned of job openings and an assessment of the effectiveness of recruiting efforts, with the goal of creating a one-stop-shopping experience for recruiters across campus.

HR sponsors seven employee resource groups—African, Black, American, Caribbean; Asian Pacific American; Disabilities; Latino; LBGTQ; Millennials; and Women in Information Technology. These groups offer input regarding staff and community issues, needs, and policies to MIT leadership; provide

professional and personal development opportunities for participants; and foster a sense of belonging and commitment to the Institute. HR also offers customized programming to support diversity, equity, and inclusion at MIT. Topics include unconscious bias; intercultural communication; managing a diverse workforce; inclusive practices for all genders; disability awareness and etiquette; bystander intervention; and accessibility. The department collaborates with other diversity-, equity-, and inclusion-focused entities to support speakers, dialogue, and other learning events.

Financial resources

MIT has the financial strength to enable its core mission, the flexibility to pursue strategic initiatives, and the resiliency to respond to economic uncertainty amid pressure on federal research funding and volatile global events. The Institute closed fiscal year 2018 with net assets of $21.5 billion and net operating results of $49 million (see Appendix C).[102,103] Pooled investments produced a return of 13.5%. Operating results have been positive for 11 consecutive years, contributing to reserves and improved liquidity since 2008. The Institute attributes its sound financial standing to the generosity of donors and friends, robust performance of invested assets, and careful management of growth and investment in the years since the financial crisis. A focus on liquidity and flexibility, combined with the success of the MIT Campaign for a Better World, described below, have positioned the Institute to withstand future volatility in the current economic environment.

The MIT Investment Management Company (MITIMCo) manages the endowment and invested assets. Between fiscal years 2009 and 2018, the value of the endowment grew from $7.88 billion to $16.4 billion, with an endowment per student of $1.42 million. MIT's investment policy is based on the primary goal of generating high real rates of return without exceptional volatility. To reduce volatility, the Institute's portfolio is broadly diversified. The president of MITIMCo reports to the MIT president and to the MITIMCo Board of Directors. The Executive Committee of the MIT Corporation appoints the members of the board, which meets four times per year to review investment policy, performance, and asset allocation. The MIT Corporation and its committees review and provide guidance on strategic direction, approving annual budgets and exercising long-term fiduciary responsibility. The returns earned on investments enable a wide array of academic and research activities, improvements to campus infrastructure, and advances in education. As noted in Standard 5, MIT remains one of the few universities with the resources to sustain the level of student financial aid necessary to enable need-blind admissions.

As the Institute's chief financial officer, the EVPT has responsibility for overseeing MIT's administrative and financial functions. In close collaboration with the president, the MIT Corporation, and members of the Institute's senior leadership team, the EVPT ensures that MIT's financial, capital, and operational resources are optimally deployed in a manner that supports the Institute's academic mission of education and research. The EVPT is responsible for financial strategy development, operations and capital budget planning, debt issuance, and the integrity of financial information. The Budget and Finance Steering Group, co-chaired by the provost and the EVPT, meets monthly to review financial actuals against the budget and to monitor key metrics of the Institute's financial health. The provost

[102] https://vpf.mit.edu/sites/default/files/downloads/TreasurersReport/MITTreasurersReport2018.pdf

[103] MIT's audited financial statements for fiscal year 2019 will not be issued until September; the MIT Corporation will review and approve the statements in October.

and the EVPT oversee an extensive annual budget process for the Institute's academic, research, and administrative units to ensure proper and effective resourcing.

The vice president for finance leads the critical financial functions and administrative services in the areas of financing strategy, treasury (debt issuance and management of working capital), financial planning, annual budgeting, receipt and disbursement of funds, accounting, procurement, payroll, tax compliance, and asset management. The Office of the Vice President for Finance provides a range of services to the Institute, including financial reporting and analysis, expert advice and policy recommendations, oversight of protocols and systems for financial transactions, and assurance of compliance with financial rules and regulations.

The Corporation Development Committee is a volunteer committee that helps secure critical financial resources for the Institute in partnership with Resource Development and its Office of Leadership Giving. The vice president for resource development (VPRD) collaborates closely with the senior officers, the MIT Alumni Association, and volunteers to build philanthropic support for key academic and research priorities to meet the needs of students, support faculty creativity, and maintain the Institute's world-class facilities. The VPRD oversees the planning, development, and implementation of all aspects of MIT's fundraising activities, including communications to donors and prospects; prospect research; solicitation of foundation, corporate, and individual donors; gift planning; volunteer management; and donor stewardship.

In May 2016, MIT announced the official launch of the MIT Campaign for a Better World, with an ambitious goal of raising $5 billion to support MIT's activities in six priority areas:

- Discovery science: transforming the world through fundamental scientific research;
- Health of the planet: addressing critical environmental and sustainability challenges facing humankind;
- Human health: defining the future of health through advances from bench to bedside across a broad range of disciplines;
- Innovation and entrepreneurship: accelerating the journey from idea to impact;
- Teaching, learning, and living: reimagining education for the 21st century learner; and
- The MIT core: raising funds for flexible unrestricted use, capital projects, scholarships, and professorships to attract and provide extraordinary students and faculty with the resources and environment they need to thrive.

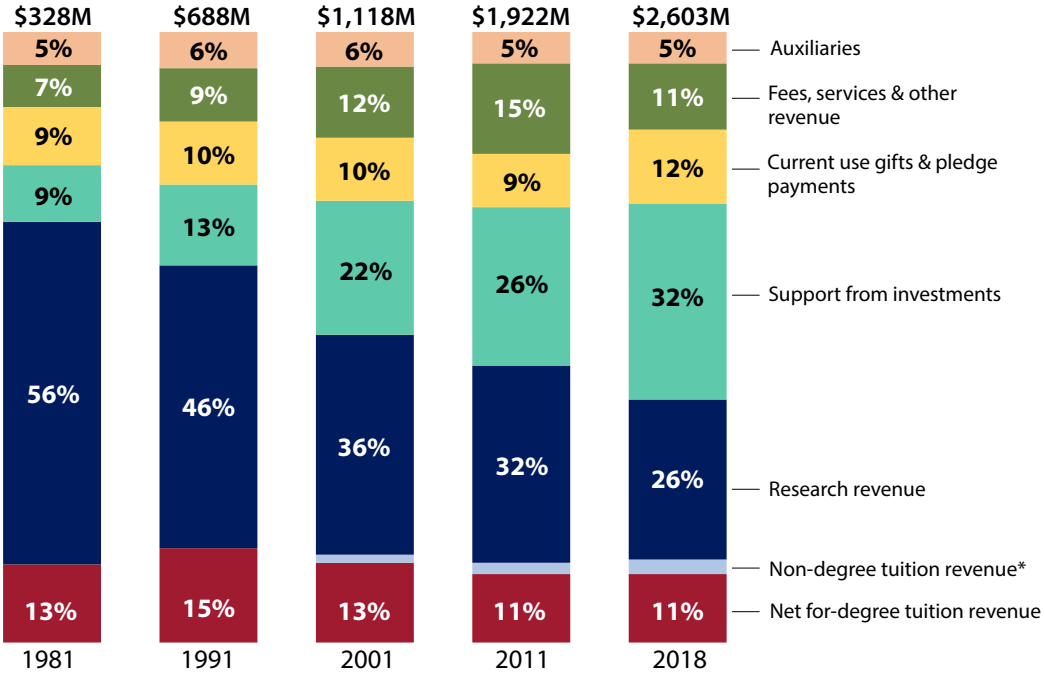
Building on the momentum sparked by the October 2018 announcement of the College of Computing, in December 2018 MIT increased the Campaign goal to $6 billion. As of the end of calendar year 2018, MIT had raised $4.96 billion, or 83% of this new goal.

The vice president for research (VPR) has overall responsibility for research administration and policy. The VPR oversees MIT Lincoln Laboratory and more than a dozen interdisciplinary research laboratories and centers. The VPR plays a central role in managing MIT's research relationships with the federal government and oversees the Institute's efforts to ensure the integrity of its research enterprise. Reporting to the VPR, the Office of Sponsored Programs (OSP) processes all federal and non-federal grant and contract applications, and manages resulting awards on behalf of the Institute.

The OSP approves and submits proposals to potential sponsors, develops policies and procedures to ensure compliance with government regulations, negotiates and accepts awards from sponsors, provides support to principal investigators in managing their awards, establishes sub-recipient agreements, negotiates facilities and administrative rates, and acts as the point of contact for Defense Contract Audit Agency and other audits of the research enterprise. In order to respond to increasing non-federal sources of research funding, a reorganization of the OSP and other research administration support organizations is underway. After a yearlong analysis studying structure and processes, and consulting broadly with faculty and staff, the new arrangement will be responsive to the differences between compliance-based federal and risk-based non-federal awards. It will also address both pre-award development and post-award management, with an emphasis on training and talent development of staff in support of faculty needs.

As a result of the growth of MIT's invested assets, support from investments now funds a larger share of Institute operations (Figure 5). This strength has been pivotal in furthering progress in research and education, including investments in financial aid and digital education. Campus research volume in fiscal year 2018 totaled $681.8 million, with an additional $981.3 million in research conducted at Lincoln Laboratory. In fiscal year 2018, 26% of MIT's campus revenue came from research, with 62% of this research volume funded by the federal government, down from 83% in 1981 (Figure 6). Non-federal sponsors funded 38% of research, up from 17% in 1981. The trend of decreasing federal volume is consistent with trends at MIT's peers.

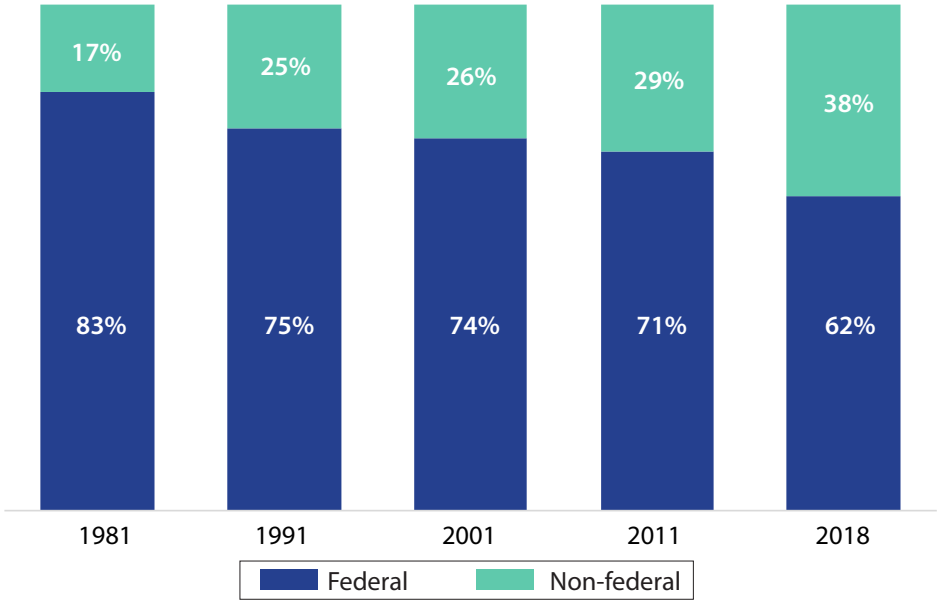
Figure 5. The evolving campus revenue mix since fiscal year 1981.



* Non-degree tuition revenue in 2001, 2011, and 2018 was 1%, 2%, and 2%, respectively.

Note: Figures in current dollars.

Figure 6. Campus research volume by federal and non-federal sponsor since fiscal year 1981.



MIT's robust financial results in recent years reflect the Institute's commitment to protecting its long-term future through sound planning. Following the successful completion of a number of significant infrastructure projects, MIT is preparing for a more paced level of investment in its campus gated by fundraising in the decade to come. In addition to planning for sustainable academic and capital investments, the Institute has developed its financial reserves in the event a financial downturn diminishes investment returns. MIT moves forward with the financial strength to successfully steward its core mission, the flexibility to enable strategic priorities, and the resiliency to withstand pressure on federal research funding and expected global financial volatility. While bolstered by the Campaign for a Better World, MIT remains focused on the importance of balancing the needs of today with the Institute's evolving needs of the future.

Campus facilities and the physical environment

MIT's campus includes 13 million gross square feet (gsf), an increase from 9.4 million gsf in 2000. The growth reflects the construction of new buildings, including the Ray and Maria Stata Center for Computer, Information and Intelligence Sciences; Media Lab Complex; Brain and Cognitive Sciences Complex; Koch Institute for Integrative Cancer Research; Ashdown House graduate residence; and a new home for the MIT Sloan School of Management. Since 2010, MIT has increased its focus on the renovation and renewal of aging structures. Addressing deferred maintenance remains a priority in MIT's overall campus renewal. As noted above, fiscal year 2016 was the first year in recent decades in which MIT reduced its campus-wide deferred maintenance, a trend that has continued. A combination of extensive renovations and system renewal projects benefiting more than 72 campus buildings contributed to this reduction. At the end of fiscal year 2018, MIT's total backlog of deferred maintenance was $1.5 billion, or $120 per square foot, down from a peak of $150 per square foot in fiscal year 2014.

Guiding campus renewal is the MIT Building Committee, a standing Institute committee co-chaired by the provost and EVPT. The committee's role is largely unchanged since its inception in 1949. It is responsible for long-range space planning and utilization and sets the Institute's land acquisition strategy. In conjunction with the Committee for Renovation and Space Planning, the Building

Committee provides oversight for all aspects of campus planning and stewardship to enable emerging research directions, changes in educational delivery, on-campus housing for undergraduates, affordable housing for graduate students, and enhancements to student life and learning. In addition to overseeing the long-range planning for MIT's campus environment and its facilities, the committee administers planning and construction for international collaborations. The Committee on Campus Planning, described in Standard 3, provides a formal link between the administration and faculty on campus planning matters.

MIT has recently opened several newly constructed and renovated buildings on campus, and committed to important building projects to advance the academic environment. Following years of planning, design, and construction, in June 2018, MIT.nano—a flexible research center for nanoscience and nanotechnology in the heart of campus supporting the work of 2,000 faculty and researchers—received its certificate of occupancy. When the 214,000-square-foot facility opened in the fall of that year, it more than doubled the Institute's shared fabrication and imaging capabilities. The largest, most sophisticated, and most accessible university research facility of its kind in the country, MIT.nano includes clean-room spaces, teaching labs, and a basement level dedicated to electron microscopes and other sensitive imaging and measurement tools.

On the west campus, MIT converted a former warehouse at 345 Vassar Street (W97) into a home for theater and performing arts, adding rehearsal space, costume and scene design shops, and a two-story theater performance space, a move that consolidated MIT's theater activities under one roof. In fall 2018, MIT announced plans to build a state-of-the-art music facility to meet the current and future needs of the music program and house a new performance space. The building's centerpiece, a purpose-built performance lab, will provide a uniquely flexible, large-scale space for experimenting with various formats, including the ability to stage unconventional music events and employ flexible seating. It will also include a recording studio, research rooms, practice rooms, and a music technology suite. Taken together, the theater and performing arts and music projects reflect the Institute's commitment to the arts as an integral mode of exploration and discovery.

MIT is committed to employing sustainable building practices in construction and renovation projects. In April 2018, the provost and EVPT released the Campus Sustainability Task Force's report, Pathway to Sustainability by MIT: Incubation, Transformation, and Mobilization.[104] The report presents a roadmap for sustainability leadership and calls on MIT to be:

- An exemplar that incorporates sustainability considerations into campus infrastructure, operations, student life, and daily decisions;
- A model of organizational transformation for sustainability leadership;
- A generator of meaningful new sustainability ideas and research, building on the Institute's history and current capacity for contributing solutions toward vital global needs and priorities;
- An innovator of deep educational experiences for the diverse communities on campus and beyond; and
- A thoughtful partner to the local and global communities in which MIT operates, a clearinghouse of good ideas, and a mobilizer of actors who can implement sustainability solutions.

[104] http://web.mit.edu/cstfreport/

Following the report's release, MIT held a campus-wide implementation design forum to engage the community in shaping an implementation plan, and has taken a number of steps in recent years to make the campus more sustainable. For instance, the Institute joined with Boston Medical Center and the Post Office Square Redevelopment Corporation to enable the Summit Farms solar plant in North Carolina, an effort described in Standard 6. At a regional energy conference, Boston's mayor highlighted the partnership as a model for organizations working to advance climate-change mitigation efforts. The Institute is also refurbishing its central utilities plant, with completion targeted for 2020. The upgraded cogeneration plant will position the Institute to explore emerging sustainability and efficiency measures, advancing MIT's commitment to reduce campus greenhouse gas emissions by at least 32% by 2030. Finally, to encourage faculty and staff to use mass transit rather than drive to campus, in September 2016 the Institute launched Access MIT, a program that provides all employees free subway and local bus passes, increased subsidies for parking at MBTA stations, and commuter rail tickets. At the same time, MIT shifted to pay-per-day parking at most lots in an effort to reduce the number of cars on campus.

As noted in Standard 5, MIT has taken important steps to improve and expand housing for graduate and undergraduate students, with a commitment to increase graduate student housing by 950 beds. Due to open in 2020, a new graduate student residence in Kendall Square will include 454 beds for graduate students and a childcare facility. This new building will net 250 new beds after the planned demolition of Eastgate, now an active graduate student residence. By the end of 2020, MIT will apply for a building permit to construct a separate residence hall expected to increase the graduate student housing stock by at least 500 beds, and will work to add 200 graduate student beds by converting existing beds or establishing new beds on MIT's campus or properties owned by the Institute. Separately, MIT is constructing a 450-bed undergraduate dormitory on the site of a former parking facility on Vassar Street.

In January 2017, MIT and the U.S. government signed an agreement authorizing the Institute to redevelop 14 acres of federally owned land in Kendall Square, currently home to the John A. Volpe National Transportation Systems Center. The only remaining undeveloped parcel of land in Kendall Square, the space presents a historic opportunity to advance MIT's Kendall Square Initiative, reshaping the area into a more vibrant mixed-use site that will advance MIT's mission and benefit the Cambridge community. As a condition of the transaction, MIT agreed to build a new facility to house the Volpe Center on approximately four acres of the parcel. Once that construction is complete, the Institute will purchase and redevelop the remaining 10 acres. MIT filed a zoning petition to enable the redevelopment plan in June 2017. In approving the petition in October of that year, the Cambridge City Council authorized MIT to advance a plan whose components include:

- Approximately 1.7 million square feet of commercial development, including retail and active street uses;
- Approximately 1,400 housing units, representing 40% of the development and including 280 permanently subsidized affordable units and 20 middle-income units;
- A minimum of 5% innovation space for entrepreneurship and incubator activity;
- Approximately 2.5 acres of open space on the MIT-owned land, which is a minimum of 25% of the site; and
- Retail and active street uses in a minimum of 65% of ground floors on the main street of the parcel.

While development of the Volpe parcel has not yet begun, MIT is actively developing six sites in Kendall Square.[105] Construction activities spanning the next decade will provide a mix of affordable and market-rate housing; more than 100,000 square feet of retail space, research facilities, and innovation space; and open spaces. Construction is underway on a new graduate housing tower and a separate building that will include housing, retail and office space, and a grocery market. Site 5, a 17-floor building to be constructed at 314 Main Street, will serve as a home to the MIT Museum, the MIT Press Bookstore, commercial laboratory space, and a café.

In addition to developing the east campus, MIT continues to advance a vision for the future of the west campus. A project currently in the planning stage, the Institute intends to transform the Metropolitan Storage Warehouse, a massive brick structure at the corner of Massachusetts Avenue and Vassar Street, into a new home for the School of Architecture and Planning and a campus-wide makerspace. The proposed renovations will preserve the structure's distinctive external features and create 200,000 square feet of state-of-the-art interior spaces, including classrooms, studios, workshops, galleries, and an auditorium.

In December 2018, MIT announced plans to develop a home for the College of Computing on the current site of Building 44. When completed in late 2022, the building will serve as an interdisciplinary hub for research and innovation in computer science, artificial intelligence, data science, and related fields, standing in close proximity to a cluster of computing and AI-focused departments, centers, and labs located in the immediate vicinity.

Information and technological resources

The MIT Libraries aspire to advance knowledge by providing a trusted foundation for the generation, dissemination, use, creative engagement with and preservation of information in support of MIT's mission. The Libraries maintain six primary locations across campus, each dedicated to a particular area of study: Barker Library (engineering), Dewey Library (management and social sciences), Hayden Library (humanities and sciences), Lewis Music Library, Rotch Library (architecture and planning), and the Institute Archives and Special Collections. While actively changing the nature of research libraries, the MIT Libraries also provide an array of core library services, enabling access to tens of millions of items, both physical and digital, and teaching more than 300 classes each year aimed at helping students navigate resources, manage data, and think critically as consumers and creators of information. The Libraries welcome over half a million visitors annually for quiet study, scholarly resources, collaboration, and community building, and perform periodic surveys to understand and respond to community needs.

In October 2015, the provost charged the director of libraries to convene and lead the *ad hoc* Task Force on the Future of Libraries. The task force sought broad input from the community and domain experts about how the Libraries ought to evolve to best advance the creation, dissemination, and preservation of knowledge—and to serve as a leader in the reinvention of research libraries more broadly. The task force report, issued in October 2016, offered a bold vision that reconceives the research library as an open, global platform.[106] Through the MIT Libraries, the Institute seeks to provide an interactive, responsive, and collaborative experience where resources, tools, services, spaces, and expertise accelerate the dissemination of scholarship. In building a library of the future, the task force urged leadership to

[105] https://capitalprojects.mit.edu/projects/kendall-square-initiative

[106] https://v3.pubpub.org/pub/future-of-libraries

reimagine and reinvigorate core library functions and library spaces to ensure the effectiveness of the new library model in serving the needs of MIT's community.

The task force report spurred a number of activities, including the pre-design phase of a renovation of Hayden Library, reorganizations across several strategic areas of focus, significant upgrades to technology infrastructure, expansion and enhancements in innovation in library instruction, improvements in the Libraries' discovery environment, and new collaborations across campus and beyond.

The task force urged MIT to review and strengthen the MIT Faculty Open Access policy, one of North America's first open access policies when the faculty approved it in 2009. The MIT Faculty Open Access Policy grants to MIT non-exclusive permission to make faculty scholarly articles openly available on MIT's institutional repository, called DSpace@MIT. As of April 2019, the MIT community had placed nearly 32,000 articles in the Institute's Open Access Collection, and users have downloaded the articles more than 12.2 million times. The Committee on the Library System, a standing committee of the faculty, monitors and upholds the MIT Faculty Open Access Policy.

In April 2017, MIT implemented a new "opt-in" open access license for all MIT authors, including students, postdoctoral scholars, and staff, providing them the ability to opt into an open access license that grants the Institute non-exclusive permission to make the author's scholarly articles available. In effect, the license allows the author to share scholarly work as needed for non-commercial purposes. In the spirit of ongoing assessment, in July 2017 the provost charged an Institute-wide task force with "identifying ways in which MIT's current open access policies and practices might be updated and revised in order to further the Institute's mission to disseminate the fruits of its research and scholarship as widely as possible."[107] The task force's first deliverable, a paper titled "Open Access at MIT and Beyond: A White Paper of the MIT Ad Hoc Task Force on Open Access to MIT's Research," examines efforts to make research and scholarship openly and freely available, providing a backdrop to the ongoing work of the task force.[108]

Information sharing, of course, also requires robust information technology resources. Information Systems and Technology (IS&T) supports MIT's administration, research, and education enterprise by providing information technology (IT) infrastructure and services, ranging from student and administrative systems to network operations and cloud services to security and customer support. Reporting to the provost and EVPT, the Information Technology Governance Committee sets priorities for IS&T investments and deploys resources for IS&T projects. It guides the creation and implementation of policies, guidelines, and standards pertaining to the use of IT at MIT. Related committees—including the Information Technology Policy Committee, Administrative Systems Steering Committee, Student Systems Steering Committee, Committee on Research Computing, and the IS&T Student Technology Advisory Board—guide this work in specific areas.

Over the past decade, MIT has worked to modernize technology systems while adopting cloud solutions, with attention to data integrity and security, disaster planning and recovery, and increased redundancy. IS&T has migrated 17 years of legacy SAP data to the SAP HANA cloud platform and moved the majority of its managed servers to the cloud, laying the groundwork for a new operating model for enterprise resource planning and data centers. It has also implemented a number of

[107] http://orgchart.mit.edu/node/6/letters_to_community/open-access-mit-and-beyond

[108] https://open-access.mit.edu/sites/default/files/20180917_Provost_OpenAccessTF_WhitePaper.pdf

cybersecurity enhancements designed to strengthen protections for the Institute's core administrative systems and modernized key administrative and student systems.

In April 2017, MIT began enhancements to its campus network, with a particular focus on upgrading the Institute to the next generation of Internet addressing. IS&T is now in the process of upgrading MIT's network equipment and architecture to enable support for IPv6 devices, hosts, and networks. The Institute also launched the Information Protection at MIT website to help community members protect Institute and personal data.[109] MIT plans to continue to migrate administrative and student systems to cloud-based platforms.

[109] https://infoprotect.mit.edu

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STANDARD 8: EDUCATIONAL EFFECTIVENESS

The most powerful currency at MIT is information. It helps the faculty and students understand a complex global problem like climate change or poverty, and it informs the design of an intervention or innovation to advance a solution. MIT's researchers ask hard questions, they form hypotheses, they conduct experiments, they analyze, they adapt, and then they do it all over again. A scientific approach to making a better world, of course, also applies to making a better MIT. The Institute's faculty and instructors—aided by learning experts and institutional researchers—use integrated assessment and evaluation practices to obtain essential, comprehensive, and longitudinal data about educational effectiveness across all disciplines. These data feed a continuous loop of assessment, analysis, and improvement with the goal of providing MIT's students with the finest educational experience on the planet.

Ongoing assessment produces ongoing change: the MIT of 2019 is intentionally different from that of 2009. During this review period, MIT has launched and institutionalized changes to its academic and co-curricular programs and to its organizational structure as a whole. These changes—informed by data and driven by a commitment to continuous improvement—have positioned MIT to address new challenges and seize new opportunities in service to the Institute's students, the nation, and the world.

Assessment resources

Two Institute offices play a vital role in measuring, understanding, and improving what and how students learn.

First, the MIT Teaching + Learning Laboratory (TLL) provides intellectual foundations for broader change efforts across MIT and supports teaching and learning at the subject, program, department, and school levels by:

- Translating research findings on student learning (cognitive and non-cognitive) from learning sciences, social psychology, and education literature to coach, teach, and advise others on curriculum design, teaching, and assessment practices; and designing new programs and launching new initiatives;
- Offering programs and services to support MIT's faculty and instructors, who routinely seek guidance on the adoption and implementation of evidence-based teaching practices;
- Building capacity for departments and other student-facing offices to train teaching staff on learning and teaching fundamentals;
- Designing and conducting research studies to inform Institute policies that affect student experiences and to assess and evaluate pedagogical and curricular experiments to support student learning;
- Building capacity for assessment and evaluation among individuals and departments across the Institute; and
- Working with key offices to develop and manage comprehensive data structures, processes, and policies.

Recent Institute-wide efforts include support for initiatives to enrich the first-year undergraduate experience (an activity explored in Standard 4); enhance graduate and undergraduate student advising; assess graduate students' professional development needs and provide appropriate professional development opportunities around teaching and learning; and re-examine and revise the processes by which MIT evaluates and rewards faculty contributions to teaching.

The TLL's assessment and evaluation work is part of a continuous cycle of data-informed improvement: informed changes are made, the impacts of those changes are assessed, and information from the assessments is used to make additional enhancements.

To support educational innovations and initiatives across the Institute, the TLL uses mixed-method designs that adhere to standards for educational research. The typical, full-scale assessment and evaluation process includes six components:

- Consultation with faculty, instructors, departments, programs, and others to establish the goals, intended learning outcomes, scope, and constraints of a study;
- Study design, accounting for instruments, methods, and specific timelines;
- Data collection;
- Data analysis;
- Reporting of findings; and
- Consultation with principal investigators to advise on next steps.

Depending on the interests and needs of the instructor or department, assessment and evaluation staff provide support for none, some, or all of the above components, with full-scale assessment projects sometimes extending over several years and often with multiple cohorts of participants.

Second, the Institutional Research (IR) section of the Office of the Provost provides analytical and research support to the provost, academic departments, and research laboratories and centers. One of its greatest contributions to educational effectiveness is survey data, collected through routine, targeted outreach. MIT's survey program consists of consortium projects with peer institutions that provide benchmark data, and local projects that allow MIT to delve into programs and opportunities unique to the Institute. The IR website provides an open book of project-related materials in an effort to be transparent to the community and to educational researchers.[110] Public materials include survey instruments, aggregate results, a question search tool, and a statement of confidentiality.

Below is a summary of MIT's approach to understanding and improving educational effectiveness at four levels: Institute, school and department, program, and subject. With concrete examples, we describe various benchmarking and assessment efforts to evaluate and advance the Institute's educational model.

[110] http://ir.mit.edu/surveys

Educational effectiveness at the Institute level

MIT tracks a number of traditional outcome measures, including graduation rate, debt upon graduation, and employment and salary at graduation. As noted in the Data First forms, MIT's Integrated Postsecondary Education Data System retention rate for students pursuing a bachelor's degree is 99%, with a six-year graduation rate of 94%, a 3% increase since 2015. As described in Standard 5, MIT's commitment to increasing its financial aid contributions has reduced student debt significantly over the last decade. The number of seniors graduating with debt has declined from 511 (49%) in 2008 to 297 (28%) in 2018. The median debt (in constant 2018 dollars) for those who borrow has fallen slightly, from $15,188 in 2008 to $14,840 in 2018, despite increases in the cost of attendance. At the same time, a 2018 survey of graduating students found that the approximate mean annual salary for those who started a job after completing an MIT bachelor's degree was $89,710, compared to $65,324 in 2008; the mean annual salary for those who started a job after completing an MIT master's degree was $127,978 in 2018, compared to $98,497 a decade prior.[111]

As encouraging as these data are, they only begin to tell the story of how MIT measures educational outcomes. Throughout this self-study, we describe various efforts to understand the Institute's effectiveness across a broad range of topics, and steps individuals and units take to respond to the feedback gleaned from those activities. MIT is attentive to the needs, concerns, opportunities, and challenges articulated by faculty and students and identified by evaluators. The Institute gathers evidence through external means like visiting committees, ABET accreditation, and employer engagement, and internally through assessments and self-studies of academic and co-curricular activities.

Though an indirect measure, assessing achievement after graduation can be an indication of the strengths and weaknesses of a student's educational experience. In an effort to systematically collect this information, the Institute uses a set of three projects: graduating student exit surveys, surveys of recent alumni, and surveys of alumni further removed from their student experience. MIT administers the Recent Alumni Survey every winter to graduates of all degree types from three academic years prior. The instrument adds a data point in time between MIT's immediate exit survey and its more in-depth alumni survey.

The undergraduate alumni survey, which MIT has administered every four years since 2005, is the best source of data about MIT's effectiveness in preparing students for their careers after graduation. The most recent iteration, administered in March 2017, invited alumni of the Class of 2006 to reflect on their undergraduate education and provide information about their career since leaving MIT.[112] The results of the survey indicate that MIT prepares its graduates to excel in a number of fields. Those who wish to continue their studies at the graduate level are also well prepared to do so. Seventy-four percent of undergraduate alumni respondents indicated that, in the decade since graduating from MIT, they have enrolled in a graduate or professional degree program. When asked how well MIT prepared them for their graduate or professional education, 85% reported that MIT prepared them "very well" or "more than adequately"; an additional 12% indicated that MIT prepared them "adequately."

[111] https://static1.squarespace.com/static/5b63672bcef372eea958d8a5/t/5be365f00ebbe8090d3ea0ba/1541629425184/GSS-2008-Overall.pdf

[112] http://ir.mit.edu/undergraduate-alumni-survey-2017

The responses to questions in the 2017 undergraduate alumni survey that ask about employment after MIT indicate that at the time of the survey (10 years after graduation) 75% of undergraduate alumni respondents are employed either full-time or part-time. An additional 9% are enrolled in an educational program, 4% are in the process of starting their own business, 2% are working on a personal project (such as a book or artistic endeavor), and only 1% are currently seeking employment. Among those respondents who are currently employed, 81% said that MIT prepared them "very well" or "more than adequately" for their current career, and an additional 16% indicated that they were "adequately" prepared. Eighty-nine percent reported being "generally satisfied" or "very satisfied" with their career thus far. Eighty-one percent reported being "very satisfied" or "generally satisfied" with their current work-life balance. Ninety-two percent reported being "very satisfied" or "generally satisfied" with their undergraduate education at MIT. Eighty-seven percent "probably would" or "definitely would" encourage a current high school senior who resembles them when they were a high school senior to attend MIT. When asked how well MIT prepared them for various tasks, respondents felt that, overall, MIT best prepared them to think analytically and logically.

MIT uses additional surveys to understand students' curricular and co-curricular experiences. These include the Survey of New Students, which solicits expectations of the college experience, secondary school experiences, degree goals, and career plans;[113] the Undergraduate Enrolled Student Survey, which asks students how their skills and abilities have changed since enrolling at MIT;[114] and the Student Quality of Life Survey, which gathers factors that affect a student's ability to have a fulfilling and productive academic and personal life.[115]

Surveys also play an important role in informing curricular and co-curricular experiments and innovations at the Institute level. For instance, in 2017 the Committee on the Undergraduate Program (CUP) charged a study group to investigate first-year undergraduate students' selection of majors, an effort described in Standard 4. The study group launched two fact-finding efforts: the Student Selection of Major Survey and the Qualitative Interview Study of First-Year Students' Selection of Major. The instruments uncovered important activities and perceptions that informed an experiment the CUP approved to allow first-year undergraduate students entering in fall 2018 more flexibility in the General Institute Requirements (GIRs) in an effort to encourage students to explore majors earlier in their MIT career. The Office of the Vice Chancellor (OVC) designed the experiment specifically to address the needs and concerns students identified in the study group's survey and interviews: greater opportunities for major exploration; more flexibility and relevance with respect to GIRs; and more effective, tailored, and targeted first-year advising opportunities. Standard 6 includes a description of the desired outcomes of the first year at MIT, and Standard 4 details the assessment of the experiment.[116]

Across schools and departments, MIT measures student learning in a number of ways. Many faculty believe that grades are the best indicator of student performance, and evidence shows that the MIT faculty take their grading responsibilities seriously. The Rules and Regulations of the Faculty have long prohibited grading on a curve, with clearly defined grading competencies. In spring 2019, to make the curve prohibition more explicit, the faculty revised MIT's regulation on grading. Until April 2019, Section 2.62 of the Rules and Regulations of the Faculty stated that grades "are not rigidly related to

[113] http://ir.mit.edu/survey-of-new-students/

[114] http://ir.mit.edu/undergraduate-enrolled-student-survey-ess/

[115] http://ir.mit.edu/student-quality-of-life/

[116] https://sites.google.com/view/mitfyebb/desiredoutcomes

any numerical scores or distribution function." With input from the CUP, Faculty Policy Committee, Committee on Curricula, Committee on Graduate Programs, and Committee on Academic Performance, the faculty officers proposed (and the faculty as a whole approved) the following revision:

> The grade for each student shall be determined independently of other students in the class, and shall be related to the student's mastery of the material based on the grade descriptions below. Grades may not be awarded according to a predetermined distribution of letter grades. For example, grades in a subject may not be allocated according to set proportions of A, B, C, D, etc.[117]

This revision reemphasizes to instructors the standardization of the Institute's grading criteria.

Letter grades are subject to periodic review to monitor for possible grade inflation. A recent analysis found that GPA for the graduating class has risen only 0.1 over the past 10 years, suggesting the Institute's approach to measuring learning through grading has remained relatively steady.

MIT utilizes several other summative measures of student learning. Of MIT's 53 undergraduate majors offered across 31 academic units, 31 require graduating seniors to complete a thesis, capstone project, internship, or research or design experience, while two others have optional thesis requirements. All of the engineering departments require some type of capstone experience. Most departments also track the achievements of their students' publications, presentations at conferences, and external honors and awards.

Educational effectiveness at the school and department levels

Schools and departments at MIT develop, assess, and update their learning outcomes based on a range of data. Departmental and programmatic outcomes evolve in response to the changing needs of the MIT community of learners and the literature on research-based best practices.

As described in Standards 2 and 3, the visiting committees play a vital role in promoting effectiveness. To support departments' self-studies in advance of visiting committees, IR compiles longitudinal data on student assessments and outcomes for each department, and distributes the data to the department to be visited, MIT's senior officers, the chair of the MIT Corporation, and the chair of the relevant visiting committee. Compilations include comparison data about other MIT departments and units; statements of student learning objectives; data from surveys (including the senior surveys, climate surveys, enrolled student surveys, and graduate student exit surveys); and various student outcome data, including post-graduate plans, top employers of graduates, doctoral time to degree, and a doctoral cohort analysis. An example of these reports can be found in the workroom, and program-specific data are presented in the E-series forms, Appendix B.

Individual departments often provide their visiting committees more in-depth analysis of these data, along with desired outcomes and statements of goals, during committee visits. Because each department has a biennial meeting with its visiting committee and an interim visit by the visiting committee chair, the committee plays an important role in ensuring action and accountability in educational effectiveness. For instance, the 2013 Economics visiting committee noted that the department's two

[117] https://facultygovernance.mit.edu/rules-and-regulations#2-60-grades

introductory courses (14.01 and 14.02) "would strongly benefit from a curriculum review to make them more relevant and to better introduce students to the field of economics and its potential.… In addition, consideration should be given to the quality and consistency of faculty staffing of these courses."

In 2014, partly in response to the visiting committee's report, the department initiated changes to the two subjects, assigning a senior member of the department's faculty to lead a comprehensive review of the classes and update the content. The department also enlisted staff in the TLL to video record teaching assistants' recitation sections and provide actionable feedback. The department assigned another senior faculty member as lead instructor of 14.02 in the spring of 2015. The professor worked with the TLL to examine, reflect on, and improve his teaching approach and effectiveness in the class. The TLL reviewed the professor's lecture materials, observed and video recorded his lectures, and worked collaboratively with him to develop a plan for action. The visiting committee's focus on educational effectiveness in Economics' introductory subjects—and the department's eagerness to respond—produced a positive result. In 2017, after the intervention, the visiting committee wrote, "The Introductory courses of 14.01 and 14.02 have been upgraded… These improvements in the undergraduate curriculum have resulted in higher student evaluations of undergraduate economics." The relevant Economics visiting committee reports can be found in the workroom.

ABET, which accredits 16 MIT undergraduate programs in the School of Engineering, a school whose enrollment accounts for 70% of MIT's undergraduate students, also factors heavily in the Institute's ongoing assessment of its academic programs.[118] ABET requires participating departments to identify learning objectives for every subject and department-level curriculum, and provide evidence that students are meeting those objectives. In advance of an ABET visit, each participating department compiles data about student assessment and outcomes, sharing it with the accreditors to demonstrate its commitment to continuous improvement of the curriculum, subject designs, and pedagogical choices. In addition to subject-level assessment data that departments gather for their self-studies, IR provides longitudinal data from surveys, including the senior survey and the graduating student survey.

ABET-accredited departments must list both educational objectives and student learning outcomes in their self-studies and on their websites. These include program educational objectives (PEOs), or goals departments establish for their graduates within a few years of graduation. PEOs for MIT graduates include completion or partial completion of graduate degrees, attainment of leadership roles in their fields, and founding of companies. Departments must also articulate the outcomes students should achieve by the time of graduation. These outcomes form the center of the ABET assessment cycle, driving data collection from assessments both direct (assignments, tests, rubrics) and indirect (surveys and reflective essays), and helping departments identify areas in need of improvement. ABET specifies the minimum set of learning outcomes, but departments can articulate additional or customized outcomes as long as they map to the ABET outcomes.[119]

IR has created an online platform that allows departments across the Institute to collect and consolidate student learning outcomes and related assessment data. At the start of each semester, instructors

[118] The Institutional Characteristics Form includes 18 entries for MIT's ABET-accredited programs. Two of the programs—Computer Science and Engineering, and Electrical Engineering and Computer Science—are accredited by two ABET commissions.

[119] https://www.abet.org/accreditation/accreditation-criteria/criteria-for-accrediting-engineering-programs-2018-2019/#outcomes

enter their desired learning outcomes into the application. They can also enter assignments (e.g., exams, projects, problem sets, labs, and papers) used to assess the outcomes. As the semester unfolds, instructors use the site's Recording Data page to facilitate the collection of direct assessment data. The application calculates the percentage of students who scored well enough on each assessment to demonstrate mastery of the associated learning outcome. In the Department of Civil and Environmental Engineering, for instance, department leadership has set an 80% attainment goal. When attainment of mastery of a particular learning outcome drops below 80%, the instructor is asked to consider what, if any, changes to the curriculum or pedagogy might be appropriate. Additional information about the application is available in the workroom.

Individual departments often develop tools to measure and assess learning outcomes locally. The Department of Aeronautics and Astronautics, for example, relies heavily on end-of-semester faculty reflective memos, which instructors use to promote continuous evaluation and improvement in the design and delivery of their subjects. At the end of each semester, the department asks lead instructors to reflect on the outcomes of each of their subjects and produce relevant written documentation. The documentation must address a number of questions, including:

- What are the learning objectives (expressed as measurable outcomes) for this subject?
- What teaching methods did you use, and what evidence indicates these methods were successful or not?
- How was each subject learning objective assessed, and what evidence indicates students achieved these outcomes?
- What did you learn about your teaching and assessment methods this semester?
- How do you use feedback from students and colleagues to improve your subject?
- What will you continue or change?
- What is the summary of your recommended actions?
- To whom have you forwarded this reflective memo?

The department places the memos in the relevant faculty member's file, and the department head uses them as part of the process for tenure and promotion and in annual performance evaluations.

In spring 2013, to prepare for MIT's fifth-year interim report, the Institute initiated a process to develop student learning goals in each academic department and graduate program. The then-dean for graduate education, in collaboration with the TLL, IR, and Committee on Graduate Programs, met with the heads of all of MIT's graduate programs to discuss the fundamentals and value of program learning objectives and assessment plans. As part of this exercise, the dean asked the graduate program heads to develop personalized plans with three primary components:

- Goals: How do you define a successful student?
- Data: How do you know if students meet your definition of success?
- Action: How do you use what you have learned?

To inform the departments' plans, leadership provided a number of data—both indirect (e.g., survey data, exit interviews, course evaluations, time-to-degree data, awards, and honors) and direct (e.g., grades, qualifying examination performance data, thesis examination grades, and research presentations). Following an iterative process, the departments and graduate programs submitted and published their final learning assessment plans in January 2014.

In February 2019, the OVC began a process to revisit the plans, engaging all graduate programs in reviewing and updating their respective goals, data, and actions. Building on a recent effort to define core graduate student competencies, the OVC urged program administrators to include professional skills in their goals and assessment plans to the extent that it makes sense for their programs. The 2019 exercise asked departments to document their program goals, the components that support the goals, and the information gathered and assessment methods used to measure achievement in relation to the goals. Departments were then asked to describe specific actions they have taken in response to the data they gathered to enhance their programs. As part of this process, the OVC urged department heads and graduate officers to ensure that their online and print materials reflect their latest goals for student learning. This process is ongoing. Once complete, departments will use the plans to communicate their programs' learning objectives to current and prospective students and measure student achievement. Additional information about the effort is available in the workroom.

Educational effectiveness at the program level

Just as learning occurs both inside and outside the classroom, so too do MIT's efforts to understand and improve learning outcomes. Below are three such activities—in research, global education, and student life—with examples of ongoing assessment in each.

As described in Standard 6, MIT's Undergraduate Research Opportunities Program (UROP), supports thousands of research projects across the Institute. Its goals are for students to:

- Build meaningful connections with faculty, researchers, graduate students, and other undergraduates who share similar research and career interests;
- Learn more about majors and minors and explore other fields of study;
- Gain knowledge and practical skills necessary for graduate school, health professions, or future careers;
- Apply classroom learning to real-world problems and research; and
- Contribute to research outcomes by co-authoring papers, preparing posters, attending conferences, patenting inventions, or launching startups.

To advance these goals, the program administers experience surveys. In the summer of 2013, with support from the TLL, UROP conducted a comprehensive survey to understand why students participate (or don't participate) in the program, to what extent students feel prepared in advance of their first UROP, how UROP can better support student needs, and how students rate the experience when measured against pre-articulated outcomes or consequences. This last data point, in particular, helped UROP leadership understand the qualities of the program that students found effective and identify areas for improvement. To address needs identified in the survey, MIT expanded programming

to help students better understand opportunities available to them through UROP. For example, the Office of Experiential Learning (OEL), which administers UROP, now:

- Offers workshops focused on finding UROPs within specific departments and disciplines;
- Partners with the Office of Minority Education to advertise UROP programming, offering targeted sessions for participants in Interphase Edge and Laureates & Leaders, programs that support MIT's underrepresented minority students;
- Hosts a UROP open house during orientation to promote networking; and
- Offers a four-day First-year Pre-Orientation Program (FPOP) called Discover UROP. MIT launched FPOP in 2014 to expose incoming first-year students to research projects by giving them opportunities to tour labs, hear directly from faculty, network with researchers, and meet other undergraduates engaged in research at MIT.

The survey findings are included in the workroom.

The TLL had planned a follow-up review of UROP to assess the impact of the changes, but postponed it to allow the recently established OEL, described in Standard 6, time to take shape. The OEL's structure presents an exciting opportunity for more comprehensive assessment of experiential learning across campus, with evaluation of MIT's synergistic and holistic experiential learning activities setting a foundation for ongoing data collection and analysis in the years ahead.

During this review period, MIT also conducted a comprehensive assessment of its signature global education program, MIT International Science and Technology Initiatives (MISTI), described in Standard 6. A TLL assessment and evaluation expert worked with MISTI faculty and program directors to create pre- and post-experience surveys to determine the extent to which the program's students develop in areas directly linked to the program's goals. These goals include creating international learning opportunities that increase students' ability to understand and address real-world problems, and promoting collaborations between MIT faculty and their counterparts abroad. MISTI gathered participant feedback in the following competencies:

- Language ability;
- Ability to integrate socially and professionally into the host country;
- Familiarity with political and social matters in the host country and relative to the U.S.;
- Cultural competency in the host country;
- Access to faculty or supervisors who can provide a professional recommendation in the U.S. versus outside the U.S.; and
- Confidence in one's field of study and in one's ability to adapt to new situations.

Interviews with program managers and MISTI alumni and staff helped align survey questions with the program's goals, with each program manager given the opportunity to add questions for that particular program. Data collected from the general survey helped MISTI further measure the effectiveness of its internship program and determine the extent to which the program met its intended outcomes. The process also helped leadership compare outcomes between MISTI's summer internships and Global Teaching Lab (GTL) program, run in the winter during MIT's Independent Activities Period. Analysis

of the survey responses from both groups underscored the strengths of each program. In particular, the analysis found significant gains among respondents' self-reported ability to communicate and navigate within their host country, a primary goal of the MISTI program. Additionally, the analysis indicated that respondents experienced significant gains in self-reported confidence with the subject knowledge and teaching ability, both primary goals of the GTL. Based on the information gathered during this study, MISTI has expanded the GTL program to include several additional countries and now sends more than 200 students abroad each year.

Separately, the Division of Student Life (DSL) is leading an effort to develop division-wide and program-specific learning outcomes for MIT's co-curricular activities. DSL staff have used learning outcomes to guide program and service design and assessment for a number of years, but without a shared division-wide vision for what students should be able to do or know as a result of their co-curricular college experience. Based on recommendations of the 2017 DSL visiting committee, which challenged the division to "define who we want our students to be as future adults," the vice president and dean for student life charged a division-wide task force in spring 2018 with developing a learning outcomes framework to guide the work of more than 400 DSL staff who educate, advise, support, and counsel students on a daily basis.

After reviewing literature, professional organization standards, MIT data, and models from other institutions, the DSL Learning Outcomes Task Force selected the Council for the Advancement of Standards in Higher Education (CAS) learning outcomes to ground the division's framework in theory and evidence-based best practices. The task force identified six domains for the DSL's work: advancing knowledge; cognitive complexity; self-awareness and development; interpersonal and engagement; and community, civic, and global engagement. In fall 2018, a working group began refining the domains through a collaborative review process with DSL staff, faculty and staff partners, students, and alumni. These discussions aimed to customize the CAS framework for MIT and the DSL, confirm that all DSL units see themselves in the model, and encourage future use of the model by involving as many stakeholders as possible in the planning process.

The working group is now developing a communication plan and professional development plan, as well as assessment tools and resources. This work continues in summer 2019, with the final product due to be rolled out to the division in the fall. As part of the roll-out process, DSL units will participate in mapping exercises that will enable staff to connect the learning outcomes to their daily work and map their program- and department-specific learning outcomes to the division-wide framework.

In sum, the development of a division-wide learning outcomes framework builds on the excellent work already underway in the DSL to promote student learning outside the classroom. The framework will further clarify the division's mission for supporting students and providing graduates with the tools they need to live healthy and purposeful lives, and will guide DSL staff in designing and assessing high-impact programs and services. Additional background about this effort appears in the workroom.

Educational effectiveness at the subject level

Although MIT is committed to measuring what and how students learn, the Institute does not approach subject-level assessment systematically. It makes teaching and learning resources available, but ultimately individual faculty and instructors, in consultation with their department heads, are responsible for ensuring the effectiveness of their subjects.

One way the Institute measures student satisfaction with their classes is through end-of-semester subject evaluations. The evaluations gather numeric responses, which are aggregated and made available to the MIT community online, and open-ended feedback, which is shared only with the instructor of record. The central subject-evaluation process is administered through the Registrar's Office, with more than 1,000 subjects evaluated each term. During academic year 2010, MIT switched from a paper-based process to an online system to provide consistency of data across academic units. Formative, mid-semester evaluations are encouraged, though not mandated. The TLL works with faculty and instructors upon request to develop specific and targeted formative evaluations. It also helps interpret responses and implement evidence-based pedagogical strategies to address issues the evaluations uncover.

Since 2002, the biennial senior survey has asked respondents to comment on the quality of instruction they experienced as undergraduates. Over the years, results have been stable, with roughly nine in 10 students reporting that they are satisfied or very satisfied with the quality of instruction they received at MIT. Periodically, MIT also asks for student feedback about the quality of instruction in various broad fields. The 2019 Enrolled Student Survey, administered quadrennially, asked undergraduate students to rate the quality of instruction in five broad fields. Thirty-eight percent of undergraduates responded, reporting being very or generally satisfied with the quality of instruction in the humanities and arts (94%), social science (93%), engineering (91%), natural sciences and math (88%), and premed (81%).[120]

As MIT pursues faculty-led initiatives to develop and implement innovative curricula, pedagogy, and educational technology, it also undertakes efforts to understand the effectiveness of those initiatives. All new or experimental subjects supported by MIT's curriculum-development funders, such as the d'Arbeloff Fund for Excellence in Undergraduate Education, Alumni Class Funds, and the MIT Council on Educational Technology, must submit desired learning outcomes and plans for measuring those outcomes. Since 2010, the TLL has provided substantive assessment and evaluation support for more than 50 projects in educational assessment. A full list of the projects is available in the workroom. Two examples of subject-level assessment are provided below.

First, from 2011 to 2015 a TLL assessment and evaluation expert worked with an instructor in the Department of Biological Engineering to assess learning in subject 20.020 Introduction to Biological Engineering Design Using Synthetic Biology, a project-based, mentored-inquiry class. In this experimental subject, first-year students and seniors work together in small teams to design biotechnology to address a real-world challenge of their choosing. Students gained familiarity with the tools and vocabulary for biodesign through hands-on experiences with synthetic biological systems and by collaboratively defining, presenting, and refining their ideas. A study of the class experience—including post-surveys and semi-structured interviews of two first-year cohorts and a retrospective survey of three first-year cohorts—found that students needed additional introductory content to understand some of the class's more advanced material. In response, the instructor changed the format and structure of the class's first two weeks to include introductory design modules taught in more detail.

A follow-up assessment found that the redesign not only helped students develop the skills they needed to excel in subject 20.020 but also to understand content in other MIT subjects and to more effectively

[120] http://ir.mit.edu/2019ess

read and extract information from scientific articles. In addition, after the introduction of new design modules, students described the class as valuable in helping them learn technical content and synthetic biology. The class redesign enabled students to make meaningful connections to scientific ideas and develop and advance personal and professional goals. Thanks to this work, the subject saw an overall subject rating increase of 21%, from 5.8 in 2010 to 7.0 on a seven-point scale in 2015.

Second, with a grant from a local educational foundation, the Mathematics Department rebuilt its basic probability and statistics subject. The subject provides practical foundations in probability and statistics, so critical to science and engineering today, in a hands-on way, over one semester. The department grasped the opportunity to radically reorient the course, both in its content and its pedagogy. The new syllabus includes work with real data sets, using professional-grade computer systems; a strong introduction to Baysian statistics; and a truly student-centered introduction to probability. The department replaced traditional lecture-based instruction with a flipped classroom model, introducing an online text written specifically for the course and questions that are automatically graded to test comprehension. For a classroom, the department chose a space designed by the Physics Department to facilitate a highly interactive educational experience. Students now work in groups, often at whiteboards, and faculty and teaching assistants circulate to provide insights as needed. Post-intervention interviews with both the students and instructors suggest a number of important gains, including the ability to cover additional material, more thorough learning, and a positive learning atmosphere.

STANDARD 9: INTEGRITY, TRANSPARENCY, AND PUBLIC DISCLOSURE

MIT publicly states its expectations regarding integrity, honesty, and ethical, respectful behavior via a number of policy-focused websites, including the Handbook on Academic Integrity,[121] Mind and Hand Book,[122] MIT Bulletin,[123] Rules and Regulations of the Faculty,[124] Policies and Procedures (P&P),[125] and Employment Policy Manual.[126] The websites of many MIT offices and committees—including the Committee on Discipline,[127] Technology Licensing Office,[128] Office of the General Counsel,[129] Office of Sponsored Programs,[130] Office of Student Conduct,[131] Title IX and Bias Response Office,[132] and Office of the Vice President for Finance[133]—also clearly and publicly present Institute policies. Senior leadership reinforces MIT's expectations about ethical behavior via regular communications to the Institute community. Sample correspondence can be found in the workroom.

MIT recently published two websites to organize Institute policies and make them easier to find and understand: a centralized MIT policies site, which provides a searchable home for P&P and the Employment Policy Manual, as well as links to other key policy resources;[134] and a new Vice President for Research site, which presents policies and procedures for research-focused topics like integrity and compliance, responsible and ethical conduct, conflict of interest, and outside professional activities.[135]

Policy review and enhancement

MIT assesses its institutional policies to ensure they remain current, accurate, consistent, and effective. It undertakes a comprehensive review of policies governing student behavior at least every five years, with a review of the Mind and Hand Book, the official guide to MIT's expectations of all students, conducted annually. Among the policies the Mind and Hand Book addresses are those related to student complaints and discipline.[136] Staff from the Offices of the President, Provost, General Counsel, and Human Resources approve small changes (e.g., clarifications and legal compliance revisions) to P&P, with more substantive changes requiring approval by the Academic Council.

In 2014, Chancellor Barnhart established two *ad hoc* bodies to examine and improve MIT's policies and processes to address sexual misconduct: the Education and Prevention Task Force, charged with recommending strategies to address gender-based violence at MIT;[137] and the Task Force on Institute Handling of Student Sexual Misconduct Complaints to evaluate and recommend changes to the process by which the Committee on

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[121] http://integrity.mit.edu/

[122] https://handbook.mit.edu/

[123] http://catalog.mit.edu/

[124] https://facultygovernance.mit.edu/

[125] https://policies.mit.edu/policies-procedures

[126] https://policies.mit.edu/employment-policy-manual

[127] https://cod.mit.edu/committee-discipline

[128] https://tlo.mit.edu/

[129] https://ogc.mit.edu/

[130] https://osp.mit.edu/

[131] https://studentlife.mit.edu/osc

[132] https://t9br.mit.edu/

[133] https://vpf.mit.edu

[134] https://policies.mit.edu

[135] http://research.mit.edu/research-policies-and-procedures/

[136] https://handbook.mit.edu/complaint-procedures

[137] https://orgchart.mit.edu/sites/default/files/reports/20150417-taskforce-gbv-education-prevention.pdf

Discipline (COD) adjudicates student sexual misconduct cases.[138] Following deliberations, the COD took steps to enhance the effectiveness and fairness of its rules and processes for reporting and reviewing alleged incidents.

The following year, MIT established the standing Institute Committee on Sexual Misconduct Prevention and Response to oversee an Institute-wide approach to prevent and respond to sexual misconduct and other forms of gender-based discrimination.[139] The committee led a community-based process to revise the Institute's sexual misconduct policy to provide a clear, consistent definition of sexual harassment that applies to all faculty, students, and staff, as well as concrete examples of inappropriate behavior. In November 2017, President Reif initiated a process to evaluate, improve, and more effectively communicate MIT's policies and practices regarding sexual misconduct to ensure consistency, balance, and transparency. These efforts spurred a number of changes, including updates to MIT's consensual relationships policy, mandatory sexual misconduct prevention and response training for all faculty and staff, and new student-focused well-being policies, as described in Standard 5.

The Institute has also improved its processes for addressing behavior-related concerns and complaints. For example, MIT established an anonymous reporting hotline, hosted and maintained by a third-party vendor and administered by the manager of institutional compliance, for complaints about wrongdoing and violations of Institute policy. And in spring 2019, the chancellor charged a working group to propose an enhanced model and process for handling sexual misconduct complaints against staff and faculty.

Transparency and public disclosure

Guided by a long-standing commitment to openness and accessibility, the Institute continues to find new ways to increase transparency about the composition of its community. As noted in Standard 5, MIT's Institutional Research (IR) website now offers an interactive diversity dashboard, which allows a user to view and sort demographic data about MIT's students, postdoctoral scholars, faculty, and staff communities using multiple variables. Through MIT's Common Data Set, the Institute regularly publishes data on undergraduate and graduate enrollment, financial aid, student life, and annual expenses.[140] IR also posts information about retention and graduation rates, student placement, and other indicators intended to help current and prospective undergraduate and graduate students and their families make informed decisions about their education.[141] In sharing this information, the Institute takes care to safeguard the privacy of individuals and publishes its privacy guidelines.

In addition to regular review by external visiting committees, many of MIT's academic programs undergo regular assessment through program-specific accreditation. For instance ABET accredits a number of the Institute's undergraduate engineering programs;[142] the American Chemical Society accredits the chemistry program;[143] the Association to Advance Collegiate Schools of Business accredits the MIT Sloan School of Management's business programs;[144] and the National Architectural Accrediting Board and the Planning Accreditation Board accredit the School of Architecture and Planning's master of architecture and master of city planning degree programs, respectively.[145,146] To promote transparency, MIT has a long tradition of making its accreditation materials publicly available. Recently, MIT published a new website for institutional accreditation, sharing self-studies,

[138] https://cod.mit.edu/taskforce

[139] https://facultygovernance.mit.edu/committee/committee-sexual-misconduct-prevention-and-response

[140] http://web.mit.edu/ir/cds/index.html

[141] http://web.mit.edu/ir/pop/students/index.html

[142] http://main.abet.org/aps/AccreditedProgramsDetails.aspx?OrganizationID=309&ProgramIDs=

[143] https://chemistry.mit.edu/academic-programs/undergraduate-programs/chemistry-major-chem-flex/

[144] https://www.aacsb.edu/accreditation/accredited-schools?F_Country=United+States

[145] https://www.naab.org/school-view/?record_id=20484

[146] http://www.planningaccreditationboard.org/index.php?id=30

interim reports, and relevant correspondence with the Commission on Institutions of Higher Education dating back 20 years.[147]

MIT regularly reviews its print and digital communications, addressing any discrepancies or errors quickly and effectively to ensure that all publications are complete, accurate, current, and accessible. For instance, a team charged with overseeing the MIT Bulletin, the Institute's course catalog, continually assesses and improves how the catalog describes the Institute's structure, academic offerings, and activities.[148] The Bulletin serves as the official source of information about MIT's academic programs and opportunities, and provides an overview of the student body, campus setting, support services, co-curricular and non-academic programs, and institutional learning and physical resources. A recent redesign of the catalog introduced a content management system and course and curricular program management modules to facilitate content review by faculty governance committees.

In 2018, MIT redesigned several major student-focused and community-facing websites, most notably the MIT homepage and the sites for the Office of Admissions, Student Financial Services, Registrar's Office, and MIT Libraries, with an emphasis on providing clearer, improved content to serve its audiences, simplified navigation, and enhanced search functionality. Admissions has made it a priority to present a clear, comprehensive story about the cost of an MIT education, publishing a net price calculator to help students and families estimate the cost of attendance.[149] The new sites meet Web Content Accessibility Guidelines 2.0 standards for accessibility.

MIT will continue to maintain the highest ethical standards in its teaching, research, and administration, seeking new opportunities to articulate its expectations internally to trustees, faculty, students, and staff, and externally to those interested in learning about or joining the Institute.

[147] https://accreditation.mit.edu

[148] http://catalog.mit.edu/

[149] https://mitadmissions.org/afford/

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