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.¹

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…” 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, but also 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.”³

Rogers’s insistence on the “beneficial application” of technology in service to society remains key to MIT’s pursuits, from the Inclusive Innovation Challenge,⁴ a competition that rewards solutions that create economic opportunity for workers, to the Institute’s groundbreaking D-Lab,⁵ which leverages technology to solve global poverty challenges, to the recently launched MIT Stephen A. Schwarzman College of Computing (“the college”), 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

¹ https://web.mit.edu/facts/mission.html
⁴ https://www.mitinclusiveinnovation.com/the-challenge/
⁵ https://d-lab.mit.edu/about
ultimate goal 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.⁶

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 that addresses student health and wellbeing, described at length 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 travel ban, he 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.” 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.”⁷

From explicit statements online and in print, to the curriculum, to 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 Commission”) 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.”⁸ And in 1996, President Chuck Vest charged the Task Force on Student Life and Learning “to undertake a comprehensive review of the Institute’s educational mission and its implementation,”⁹ an exercise that produced the mission statement that appears at the start of this Standard.

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.”¹⁰ We detail the task force’s work, recommendations, and impact throughout this report.

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⁶ [https://betterworld.mit.edu](https://betterworld.mit.edu)
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, the Institute 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. The Laboratory is funded by the US 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 activity and advise on strategic plans and directions. 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, 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. As noted in Standard 3,

11 MIT Institutional Research prefers the term “data-informed” to “data-driven.” Data are in important element in the Institute’s decision making, but hardly the only one.
Academic Council, chaired by the president, comprises the Institute’s senior leadership and the elected chair of the faculty.

*Visiting committees*

As noted 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, which is known as 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, and departmental funding. The value of the visiting committee structure is often most appreciated in MIT’s individual academic units – to demonstrate, we describe the impact of the visiting committee for the Department of Chemistry in Standard 3 – but the committees also provide strategic direction in several non-academic units 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 more holistically. The college’s priorities – 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 visiting committee discussions in distant corners of the Institute. 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 sample of feedback from visiting committees that identified the growing importance of these themes to a range of fields across the Institute. We provide these examples to underscore the role department-level evaluation plays in surfacing Institute-wide opportunity, and the importance of assessment in informing action. All cited visiting committee reports can be found in the [document repository](#).

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 address this risk:

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.

Likewise, but in another distant discipline, the visiting committee for Music and Theater Arts (MTA) pursued the theme of computing as a means of expansion and distinction over several years. 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 noted 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 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 launch in fall 2019 presents an exciting 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 strength 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 visiting committee input was only one data point in spurring action toward a college of computing, but it was an important one. Feedback from visiting committees helped to identify a need and an opportunity. We explore the college’s development and purpose 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. In Standard 6, we
describe an Institute-wide plan to shape MIT’s strategy to respond to the growing threat of climate change, and in Standard 7, we detail a strategic planning effort initiated by the MIT Libraries. Here we describe Institute-wide planning and evaluation activities in four distinct areas: the future of computing beyond the important contributions of the visiting committees, which we describe above; support for the campus community; global engagement; and the future of MIT education. With these examples, we hope to 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 advancement of AI and computing, and advances an Institute-wide priority. The college is MIT’s answer to a clarion call for action, as students in every MIT field will now have access to a shared structure for collaborative education, research, and innovation in computing and AI. In this regard, the college will serve as a bridge across the Institute, helping students and researchers develop expertise in their academic discipline as well as in computing. Moreover, the college will intellectually equip students to advance computing wisely and humanely to make a better world.

Looking at the many advances in computing unfolding today, it is clear that the technologies that are emerging from the discipline 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 will 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 (“RAD Lab”) to support the US 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, 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.  

With a $1 billion founding commitment, the MIT Stephen A. Schwarzman College of Computing represents a strategic and immediate response to the promise and dangers computing presents. It will add new, integrated curricular and degree programs to nearly every field at MIT and will equip 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.

As far back as 60 years ago, MIT explored questions about AI that spurred advances in fields such as cognitive science, linguistics, computational neuroscience, and robotics. The Institute seeks to lead in the advancement of ethics and discovery in AI, but there are additional important – and student-focused – reasons to fully integrate computing into its curricular offerings. 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 developed undergraduate majors that pair computer science with fields like economics, biology, mathematics, and urban planning; the college brings all 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 existing schools. It will be a unique organization with cross-cutting academics and research at the heart of its mission.

Since the MIT Corporation’s vote to ratify the new college in October 2018, leadership has held a number of community forums and launched a task force comprising five distinct working groups described in Standard 3. In other words, planning for the college’s fall 2019 opening is very much a work in progress. We expect, though, that several entities will move under its purview, including the Department of Electrical Engineering and Computer Science; the Computer Science and Artificial Intelligence Laboratory; the Institute for Data, Systems, and Society; and the MIT Quest for Intelligence. Other units may also join the college. Because MIT students are part of the department that is home to their academic program, students in programs that have been subsumed under the new college will automatically become students at the college as well. Vital to 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 bring it to 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 will add 50 faculty positions, representing a 5% overall increase in the size of the faculty. It is expected that 25 of these faculty positions will be located fully within the new college; the other 25 will hold “bridge” positions, or dual appointments between the college and the academic departments located in MIT’s five schools. The bridge positions represent key connectors between

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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.

Support for the campus community

The health and wellbeing of MIT’s community is paramount to the Institute's values and mission. During this reporting period, MIT advanced and fortified its strategic planning activity to respond to community needs, with a focus on students.

To promote, coordinate, and support MIT activity in the areas of community, equity, inclusion, and diversity for students, staff, and faculty, in June 2013 MIT created 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, cultivating dialogue, developing metrics, and organizing 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. 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 – enhancing policies, expanding training, and publishing diversity and climate dashboards, for instance – 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.” With a seat on Academic Council, the ICEO helps to ensure that issues of community and inclusion remain central to MIT’s development.

Just as the ICEO supports 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, coordinating reporting options, and investigating student complaints. In 2013, MIT formed the Title IX & Bias Response Student Advisory Committee to further incorporate student perspectives into the guidance process for T9BR’s education and outreach efforts. The committee advocates for inclusivity across campus and provides a means for undergraduate and graduate students to directly guide the office on these matters. In addition to the greater committee, there are four current sub-committees that respectively focus 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

14 http://diversity.mit.edu/scorecard/
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, and improving the coordination of resources. We detail these efforts in Standard 5.

Global engagement

The MIT mission is continuously revitalized through collaborations with individuals, universities, governments, 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 affairs in sustaining MIT’s excellence and leadership in education and research.\(^15\) The report called for 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. As 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.”\(^16\) The associate provost recently reconstituted the IAC as a faculty-led, standing committee that provides an independent faculty 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 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 of these projects, 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


\(^16\) [http://orgchart.mit.edu/node/6/letters_to_community/establishment-international-advisory-committee](http://orgchart.mit.edu/node/6/letters_to_community/establishment-international-advisory-committee)
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 an important role 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, this fall; it is expected that these findings will inform the work of the IAC and the SRG.

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.17

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

Inspired and informed by the report’s findings, MIT conducted an experiment in the summer of 2014, offering five subjects that explored new pedagogies in “blended” and online 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 (OEPI), 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 – interdisciplinary collaboration, online educational technologies, the profession of the learning engineer, and institutional and organizational change – to advance our understanding of the opportunities and challenges in transforming education.\(^{18}\)

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 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. In Standard 6, we describe 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 eight 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. As significant a change as the college represents, it is not the only noteworthy adjustment MIT has made to its organization and governance structure over the last decade. Below we address the college from a structural perspective and then describe the Institute 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.” 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 all 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 college 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 extend might members of the schools be involved with the college’s governance?
- How should research activities in the college be organized and governed?

As we write this report, the working groups have just recently finished their deliberations, with answers to these questions just beginning to emerge. The decisions Institute and college leadership makes 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 lines and a physical home on MIT’s campus. Here we summarize several of the internal factors that influenced

the administration’s decision to pursue a college of computing, and present a sketch of the organizational model that results.

Currently, computer science at MIT is centralized largely within the Department of Electrical Engineering and Computer Science (EECS), which sits in the School of Engineering and engages MIT’s other departments through various joint majors (CS + X).

![Diagram of MIT Schools and Interdisciplinary majors](image)

*Figure 1: The Department of Electrical Engineering’s pre-college placement in the School of Engineering and its Institute-wide engagement through interdisciplinary computer science majors. [ADD BCS, PENDING FACULTY APPROVAL.]*

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 intersections of computer science and other disciplines.

Increased interest in computing presents both a challenge and an opportunity for change. The challenge is two-fold: 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 90% enrolled in a class that involved computational thinking. 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 of the faculty are unable to find the time to pursue new lines of research. As described elsewhere in this report, 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 bandwidth.

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 MIT Schwarzman College of Computing.
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 other 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 MIT Schwarzman College of Computing, MIT aims to change that.

The college will build bridges from a core of computer science faculty working to advance research in the field to all of MIT’s five schools and 31 academic units.

![Figure 2: The position of the MIT Stephen A. Schwarzman College of Computing in relation to MIT’s five schools and academic leadership.](image)

Importantly, the college will facilitate bidirectional learning. “Bridge 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 in service to our community, the nation, and the world.

**Senior leadership**

President Reif’s senior leadership team[^20] has undergone a number of changes since he took office in July 2012. 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 (ICEO), who advances understanding, dialogue, and activity in areas related to community, equity, inclusion, and diversity;

[^20]: [http://orgchart.mit.edu/senior-leadership](http://orgchart.mit.edu/senior-leadership)
and a chancellor for academic advancement, who helps to connect and advance the Institute’s academic and fundraising priorities.

The incumbents of these positions serve on Academic Council,21 chaired by the president, as do the Institute’s other senior academic and administrative officers and the elected chair of the faculty. 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 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 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.

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 elected chair of the faculty.

Academic Council has charged a standing subcommittee – the Academic Appointments Subgroup – to review all proposals for faculty promotions and appointments that are not at the assistant professor level before submitting the cases to the Executive Committee of the MIT Corporation for final approval. The president has also appointed a number of standing Institute committees,22 which hold responsibility for policy development in areas as varied as animal care in laboratories, Commencement, diversity and inclusion, and renovation and space planning. 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 73 distinguished leaders23 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 37 emeritus members. Approximately 73% of the members of the Corporation are MIT alumni.

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

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21 http://orgchart.mit.edu/academic-council
22 https://facultygovernance.mit.edu/committees-and-councils?field_committee_name_tid=All&field_committee_type_tid=25&combine_1
23 http://corporation.mit.edu/membership
fundamental actions, such as the election of MIT’s president and executive vice president, the election of Corporation members, the approval of new types of academic degree programs (e.g., the recent introduction of the Master of Applied Science degree type, 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”24 – 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; operation of Lincoln Laboratory as a federally funded research and development center; and approval of promotions and appointments involving tenure decisions, which have long-term financial and strategic ramifications for the Institute’s academic excellence.

The Executive Committee is also responsible to “coordinate and oversee the functions” of the MIT Investment Management Company (MITIMCo) board and “all of the other committees of the Corporation except the Membership Committee.”

In December 2013, for the first time in 15 years, the Executive Committee conducted a comprehensive review of the Bylaws of the MIT Corporation.25 The review 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? And are the Corporation’s committees structured and defined optimally? Based on its review, the Executive Committee recommended to the Corporation the following changes to its bylaws:

- Expand the scope of the Audit Committee, one of the standing committees of the Corporation, to include risk. The newly named Risk and Audit Committee will undertake 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.
- Establish a Development Committee as one of the standing committees of the Corporation to position the Corporation as a partner to the administration as the launch of the capital campaign neared.
- Revise the membership and leadership of the Executive Committee to:
  - Add two members (bringing its total to 10 elected members serving staggered five-year terms) plus ex officio members;
  - 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.

24 https://corporation.mit.edu/bylaws/bylaws-section-14
25 http://corporation.mit.edu/about-corporation/bylaws
26 http://corporation.mit.edu/bylaws/bylaws-section-18
The full Corporation unanimously approved the proposed changes at its December 2013 meeting.

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 of the Executive Committee. Per its charter, approved by the Executive Committee in June 2017, the Governance and Nomination Subcommittee “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 document repository.

The subcommittee comprises four members: the Corporation chair 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 subcommittee chair will regularly lead this process of self-reflection. [WRITTEN FROM JULY 2019 PERSPECTIVE.]

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 review, 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. 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.

[27 http://corporation.mit.edu/committees/visiting-committees]
The visiting committees meet 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 notes, “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 actions the department took: “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, Political Science, and Linguistics. In addition, the MindHandHeart (MHH) 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 document repository 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 simply essential in making MIT work.
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\(^{28}\) 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.

The faculty gather for Institute faculty meetings on a monthly basis during the academic year, but most of the faculty’s 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.\(^{29}\) 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 and deputy executive vice president, serves on the Institute-wide Building Committee, and presents annually to the FPC to promote coordination and ongoing communication.

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
- There is enthusiasm for 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.

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. The faculty governance system, in consultation with the administration and student leadership, would lead such an effort.

\(^{28}\) https://facultygovernance.mit.edu/rules-and-regulations

\(^{29}\) https://facultygovernance.mit.edu/committees-and-councils
Students

While students have developed a robust system of self-governance through organizations like the Undergraduate Association and Graduate Student Council, they are an essential part of MIT’s commitment to shared governance. Students serve on the standing committees of the faculty and the standing Institute committees appointed by the president, and contribute to ad hoc efforts like the presidential search process, the Task Force on the Future of MIT Education, and this very 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),\(^{30}\) whose membership includes six Corporation members, six students, and six members of the faculty. 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”\(^{31}\) (where “X” = the course number, and “ThG” = “thesis graduate”) aimed at improving research advising through subject evaluations. 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 departments. The resource has become a vital tool in helping departments continually assess and improve the relationship between students and their research advisors.

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. Comprising 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 to PAC ideas for new endeavors and describes challenges he faces, with students providing frank, unfiltered, confidential feedback. The president also invites the cabinet’s students 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. See PAC’s charge in the document repository.

\(^{30}\) https://corporation.mit.edu/committees/additional-committees/corporation-joint-advisory-committee-institute-wide-affairs-cjac

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. With increased demand for flexibility and an opportunity for exploration, we expect these qualities to become even further ingrained in the Institute’s academic program in the years ahead.

A decade of change

MIT has a rich and lengthy tradition of interdisciplinary collaboration with an appreciation that solutions to complex problems often exist at the intersections of fields. Since 2009, this appreciation has grown even deeper. Since the Institute’s last comprehensive review, 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, or EECS). Through these joint programs, faculty are creating new interdisciplinary pathways for teaching and exploration. The launch of the MIT Stephen A. Schwarzman College of Computing responds to and builds on 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 ready 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 vice chancellor for undergraduate and graduate education 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. Following an unsuccessful attempt to revise the GIRs in 2009, the requirements remain a sensitive and charged subject. However, recent activity suggests the faculty may welcome an opportunity to consider a systematic and comprehensive review of the requirements.

Undergraduate degree programs

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 the 17 subjects that comprise 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 8.5 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, reviewing and approving any new or revised undergraduate degree programs and ensuring that a department clearly presents a program’s required subjects and units via a detailed and publicly available degree chart.33

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 number represents the credit units assigned for laboratory, design, or fieldwork. And the third number 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). 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.

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 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 a bachelor of science 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. In looking through the course catalog, there are examples of subjects with 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. 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 (two hours of lecture, zero hours of laboratory, one hour of preparation). Another example is 5.001 (Frontiers in Molecular and Materials Science) offered by the Department of Chemistry that has a value of two units (two lecture).

33 http://catalog.mit.edu/degree-charts/
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 large amounts of time working on projects. 4.023 (Architecture Design Studio I), for instance, is an undergraduate subject with 24 credit units (zero lecture, 12 laboratory, 12 preparation).

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 MIT’s January term (Independent Activities Period, or IAP). The Department of Mechanical Engineering offers several partial-term six-credit-unit subjects at the undergraduate level, such as 2.05 (Thermodynamics) (three lecture, zero laboratory, three preparation) and 2.00 (Introduction to Design) (two lecture, two laboratory, two preparation). The MIT Sloan School of Management offers a number of six-credit-unit subjects at the graduate level that are half-term and/or offered during IAP. This approach introduces students to a number of different concepts in depth. Examples of these module subjects include 15.322 (Leading Organizations) (three lecture, zero laboratory, three preparation) and 15.339 (Developing Leadership Capabilities) (two lecture, zero laboratory, four preparation).

Some subject listings have units arranged. In these cases, the instructor and student adjust the 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 are 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 suggest the following calculation: three MIT units is 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 full institution, 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.

Central to the objective of the Institute’s undergraduate educational programs is the development of critical and constructive approaches to theory and practice in science, engineering, and other disciplines. As noted above, the GIRs help provide a common core of prerequisite knowledge that virtually all departments depend on for the success of their majors. 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. This understanding is needed for most degree programs at the Institute and is essential in developing in students the skills they need to excel in their careers and as educated citizens in a world strongly influenced by science and technology. The science core includes two calculus subjects (single and multivariable), two physics subjects (electricity and magnetism, and classical mechanics), 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 FPC before going to the faculty for a vote. Also included in the GIRs are two restricted electives in science and technology (REST)\(^35\) and the Institute laboratory requirement.\(^36\) Students have a choice in these subjects, but the requirements, particularly in the REST, are often captured by particular majors to meet departmental requirements. The CoC has responsibility for determining which subjects count toward fulfilling the REST and Institute laboratory requirements.

**Communication requirement**: Undergraduates are required to 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 humanities, arts, and social sciences (HASS) requirement and the requirements of the major program, allowing students to simultaneously fulfill the GIRs and their major requirements. The CI-H subjects develop foundational communication skills in expository and argumentative writing and speaking, while the CI-M subjects provide instruction and practice in the specific forms of communication common to the major field’s professional and academic culture. The communication requirement\(^37\) 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. 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. 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.

**Humanities, arts, and social sciences (HASS) requirement**: MIT provides a substantial and varied program in the humanities, arts, and social sciences that forms an essential part of the education of every undergraduate. This program is intended to ensure that students develop a broad understanding of human society, its traditions, and its institutions. The requirement enables students to deepen their knowledge in a variety of cultural and disciplinary areas and encourages the development of sensibilities and skills vital to an effective and satisfying life as an individual, a professional, and a member of society. The objectives of the program are to develop skills in communication, both oral and written; knowledge of human cultures, past and present, and of the ways in which they influence one another; awareness of concepts, ideas, and systems of thought that underlie human activities; understanding of the social, political, and economic frameworks of different societies; and sensitivity to modes of communication and self-expression in the arts. Every candidate for a bachelor’s degree must complete a minimum of eight HASS subjects, including distribution and concentration.

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37 [https://registrar.mit.edu/registration-academics/academic-requirements/communication-requirement](https://registrar.mit.edu/registration-academics/academic-requirements/communication-requirement)
components. The CUP, through its permanent Subcommittee on the HASS Requirement (SHR), oversees the HASS requirement. Its oversight – from the curriculum to the overall health of the requirement – mirrors SOCR’s oversight of the communication requirement.

**Physical education:** The physical education requirement aims to provide undergraduates with 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 (DAPER) 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, the 2009 self-study described recently approved, but not yet implemented, changes to the HASS requirement, specifically the revision of 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 MIT 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. 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. 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 6 units to be applied toward fulfilling the requirement. Since the introduction of the Institute laboratory requirement in 1965, undergraduates have been able to satisfy it 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. Years ago, the Department of Chemistry implemented a modular structure in 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 Faculty Policy Committee’s (FPC) 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

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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 science, math, and engineering (SME) requirements. Any change to the GIRs would need to carefully and thoughtfully respond to 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. 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 the education of MIT’s undergraduates and consider whether formal exposure to algorithmic or computational thinking should be required of all MIT undergraduates. (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.”) In 2017, the Working Group on Computational Thinking reported that approximately 86% of recent MIT graduates took at least one subject in computation, arguing 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.

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 comprehensive deliberations to consider how best to proceed. During the 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

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40 https://facultygovernance.mit.edu/sites/default/files/reports/2017-01_computational_thinking_requirement_FINAL_CLEAN.pdf
opening of the MIT Schwarzman College of Computing, the CUP has put these discussions on hold so that any next steps can be considered within the context of a more comprehensive review of the GIRs.

Undergraduate majors and minors

Between 2009 and spring 2019, the MIT faculty approved 13 new undergraduate majors, compared to six between 1999 and 2009.\textsuperscript{41} Five of the 13 are joint majors offered by two departments; in four of these, 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. [PENDING FACULTY APPROVAL IN APRIL]

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. A minor may include subjects that count toward the GIRs. 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. This depth and expertise must be sufficient to enable the student to appreciate the complexities and issues that are central to the minor, and to perform at a level sufficient to solve realistic problems and/or to make a contribution to the field. Students who successfully complete minors have their fields of study included in 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 document repository.

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, 

\textsuperscript{41} One of these six, Course 8-B, was subsequently removed and changed to a flexible option within the SB in Course 8 (Physics).
Computer Science and Electrical Engineering, 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. Complete information, including the numbers of students with double majors that include Course 6, can be found below in Figure 3.

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 Schwarzman College of Computing. We explore this narrative in detail in Standards 2 and 3.

**Undergraduates Majoring in Course 6 as of Fifth Week Fall Term**

Registrar’s Office 11/13/18

<table>
<thead>
<tr>
<th>Single Majors</th>
<th>Term</th>
<th>Major</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
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<td>96</td>
<td></td>
</tr>
<tr>
<td>Fall 2009</td>
<td>6-2</td>
<td>288</td>
<td></td>
</tr>
<tr>
<td>Fall 2009</td>
<td>6-3</td>
<td>217</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>601</td>
<td></td>
</tr>
<tr>
<td>Fall 2018</td>
<td>6-1</td>
<td>58</td>
<td></td>
</tr>
<tr>
<td>Fall 2018</td>
<td>6-2</td>
<td>357</td>
<td></td>
</tr>
<tr>
<td>Fall 2018</td>
<td>6-3</td>
<td>733</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Double Majors / Double Degree</th>
<th>Term</th>
<th>Major</th>
<th>Count</th>
</tr>
</thead>
<tbody>
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<td>6-1</td>
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<td></td>
</tr>
<tr>
<td>Fall 2009</td>
<td>6-2</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Fall 2009</td>
<td>6-3</td>
<td>36</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>75</td>
<td></td>
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<tr>
<td>Fall 2018</td>
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</tr>
<tr>
<td>Fall 2018</td>
<td>6-2</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Fall 2018</td>
<td>6-3</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>108</td>
<td></td>
</tr>
</tbody>
</table>

6-1: Electrical Science and Engineering  
6-2: Electrical Engineering and Computer Science  
6-3: Computer Science and Engineering

Figure 3: Undergraduates majoring in Course 6, fall 2009 and fall 2018

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. As we write this report, the study group is finalizing its recommendations 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 Electrical Engineering and Computer Science 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 about as they considered their options for a major. Thirty-two of the 250 students also participated in two interviews (one fall and one spring) to provide deeper insight. The data collected as part of this study provides 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 vice chancellor for undergraduate and graduate education 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, mathematics, and engineering (SME) GIRs would have improved the major selection process for them more than any other option they were asked to consider.43 As the vice chancellor’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.”44

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 higher levels of 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

42 SME GIRs refers to subjects 3.091, 5.111, or 5.112; 7.01n; 8.01n; 8.02n; 18.01n; and 18.02n, otherwise known as the science core. Subject titles and descriptions are available in the MIT Bulletin: http://catalog.mit.edu/subjects/.

43 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 1-5. 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.

44 https://registrar.mit.edu/system/files?file=2018-08/CUP_ExperimentGrading_IncreaseFlex_MajorExplore_First-year_0.pdf
opportunities. Ultimately, the goal is to increase overall satisfaction with the undergraduate experience at MIT, improving academic performance and reducing stress.

The Office of the Vice Chancellor is responsible for executing and assessing the experiment, 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 Office of the Vice Chancellor 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 stressing to first-year students the importance of exploration, 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 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 unique 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.

Based on these findings, the CUP is considering a proposal for a second phase of the experiment to be conducted with the September 2019 incoming first-year students. While the details are still under review, if approved, phase two would continue to assess the strengths and weaknesses of options for enabling greater exploration of fields and majors during the first year, informing longer-term policy decisions about the first-year experience and the GIRs more holistically.

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.” 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
In 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 depicted in Figure 4.

<table>
<thead>
<tr>
<th>Term</th>
<th># Full-term subjects</th>
<th># Sub-term subjects</th>
<th>Sub-term subjects: % of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009 FA</td>
<td>996</td>
<td>39</td>
<td>4</td>
</tr>
<tr>
<td>2010 SP</td>
<td>1000</td>
<td>47</td>
<td>4</td>
</tr>
<tr>
<td>2010 FA</td>
<td>938</td>
<td>36</td>
<td>4</td>
</tr>
<tr>
<td>2011 SP</td>
<td>1003</td>
<td>57</td>
<td>5</td>
</tr>
<tr>
<td>2011 FA</td>
<td>987</td>
<td>35</td>
<td>3</td>
</tr>
<tr>
<td>2012 SP</td>
<td>1032</td>
<td>60</td>
<td>5</td>
</tr>
<tr>
<td>2012 FA</td>
<td>1018</td>
<td>44</td>
<td>4</td>
</tr>
<tr>
<td>2013 SP</td>
<td>1039</td>
<td>66</td>
<td>6</td>
</tr>
<tr>
<td>2013 FA</td>
<td>1005</td>
<td>53</td>
<td>5</td>
</tr>
<tr>
<td>2014 SP</td>
<td>1053</td>
<td>70</td>
<td>6</td>
</tr>
<tr>
<td>2014 FA</td>
<td>950</td>
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</tr>
<tr>
<td>2015 SP</td>
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<tr>
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<tr>
<td>2018 SP</td>
<td>1040</td>
<td>112</td>
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</table>

Figure 4: Numbers of full-term and sub-term subjects, and sub-term subjects’ percentage of total number of subjects, academic years 2010 – 2018

Recognizing this trend and the inadequacy of existing policies to account for 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. 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.

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 Office of the Vice Chancellor (OVC) 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, with 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.

With specific regard to the academic program, the vice-chancellor convenes the Graduate Academic Performance Group (GAPG), which operates under the authority of the CGP, a standing committee of the faculty. 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 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 following term, they may be refused further registration. Departmental graduate committees may recommend to the GAPG allowing a student to register only for a less advanced degree.

CGP, in addition to overseeing 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 that 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 reduction 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 has submitted a draft report summarizing its findings and recommendations, and has 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 non-resident 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.

**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. The Institute has traditionally been a national leader in graduate education, with top-ranked programs in engineering; chemistry; mathematics; the physical and life sciences; economics; political
science; linguistics; science, technology, and society; architecture; media studies; urban studies; and management.

Graduate students may pursue work leading to any of the following degrees: doctor of philosophy (PhD); doctor of science (ScD); engineer’s degrees;\(^{47}\) 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). Of these, 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, students are expected 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,\(^{48}\) which in some cases may be interdisciplinary rather than departmental. For example, the interdisciplinary graduate program in Computational and Systems Biology, a degree granting program, has 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 look to ensure 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. Of these, both master of engineering programs and one of the PhD programs involve computing. Two of the concentrations (biophysics and statistics) are available to students not just in two different departments, but also 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. A list of graduate programs MIT established between 2009 and 2019 can be found in the document repository. [PENDING FACULTY APPROVAL IN MAY]

There have been two major structural changes in graduate programs since 2009. 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, as well as 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,

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\(^{47}\) 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](http://catalog.mit.edu/mit/graduate-education/general-degree-requirements/#engineersdegreetext).

\(^{48}\) [https://gradadmissions.mit.edu/programs](https://gradadmissions.mit.edu/programs)
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 by the *Financial Times*.49

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. Program administrators also conduct regular LinkedIn profile reviews to track employment changes since graduation. Figure 5 reflects EMBA alumni who report that they received a promotion in their current organization, left for promotion elsewhere, or founded their own companies.

<table>
<thead>
<tr>
<th></th>
<th>Change in employment: % of entire class</th>
<th>Change in employment: % of alumni with publicly available LinkedIn profiles</th>
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</thead>
<tbody>
<tr>
<td>EMBA Class of 2012</td>
<td>77.4%</td>
<td>96%</td>
</tr>
<tr>
<td>EMBA Class of 2013</td>
<td>73.5%</td>
<td>98%</td>
</tr>
<tr>
<td>EMBA Class of 2014</td>
<td>78.3%</td>
<td>98.8%</td>
</tr>
<tr>
<td>EMBA Class of 2015</td>
<td>72%</td>
<td>96.5%</td>
</tr>
<tr>
<td>EMBA Class of 2016</td>
<td>78%</td>
<td>96.5%</td>
</tr>
<tr>
<td>EMBA Class of 2017</td>
<td>54.5%</td>
<td>79.5%</td>
</tr>
<tr>
<td>EMBA Class of 2018</td>
<td>59%</td>
<td>59%</td>
</tr>
</tbody>
</table>

*Figure 5: EMBA alumni who report being promoted in their current organization, leaving for promotion elsewhere, or founding their own companies. Those without LinkedIn profiles may have made similar career moves, but these moves are not tracked.*

The results of the end-of-program survey for the Class of 2018 suggest that students are pleased 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 the program to friends or colleagues who might be prospective students. Sloan plans to 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 online/residential master’s programs. 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 from around the world an opportunity not only to earn a non-degreed professional credential online, but also to clear a pathway to an on-campus master’s degree.

program. Three MIT master’s degree programs currently consider applications from students who have successfully completed the relevant MicroMasters credential. They are:

- 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;
- Master of Applied Science in Supply Chain Management/Master of Engineering (blended track) 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, respectively, 2008 and 2016. 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.
Standard 5: Students

All of the areas for emphasis the Commission highlighted in continuing MIT’s reaccreditation in 2009 and approving its interim report in 2014 touch, in one way or another, on the student experience. Through the student lens, we have structured this Standard to highlight MIT’s activity – both progress made and work that remains – in five priority areas: access and equity, the co-curricular experience, student wellbeing, physical spaces, and dining. Undergraduate and graduate students served on the Standard 5 planning group and provided valuable insights into each priority.

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. 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.

As noted in the data first forms, for entry year 2017, MIT offered admission to 1,452 first-year undergraduate students from a pool of 20,247, with 1,097 choosing to enroll. For entry year 2018, MIT offered admission to 1,464 first-year undergraduate students from a pool of 21,706 applicants (a rate of 6.7%), with more than 76% of those offered admission choosing to enroll, the highest yield in the Institute’s history. Of those who enrolled in 2018, the mean SAT evidence-based reading and writing score was 741, and the mean SAT mathematics score was 787. The enrolling first-year undergraduate class was 49% female, 63% students of color (identified in whole or part as African American, Asian American, Latinx, or Native American), and 18% 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. MIT’s Office of Admissions “enrolls 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.”

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 available financial resources.

\(^{50}\) the gender-neutral term for a person of Latin American origin or descent

\(^{51}\) https://mitadmissions.org/apply/process/the-mitadmissions-mission/
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 GPA at MIT and graduation rates. Admissions leadership uses these data points in feedback loops to determine whether certain criteria in the admissions process need to be adjusted. Specifically, the office examines the relationship between the outcomes with test scores, high school GPAs, activities, and awards of incoming students, and also focuses on more qualitative characteristics, such as perseverance, desire to learn, and ability to work on a team. Over time, the office has altered how it weights different measures and factors in determining whom to admit, based on feedback from these outcome measures.

In 2015, CUFA 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 socioeconomic background.52

In recent years, the Admissions Office has placed an emphasis on increasing the socioeconomic diversity of the undergraduate student body, focusing on students from lower socioeconomic backgrounds – such as those eligible for federal Pell Grants (19% of the 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,53 and, of more than 2,000 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.54

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

- MIT nearly doubled its undergraduate need-based grants, from $65 million to $120 million, between 2008 and 2018.
- 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

52 http://mitadmissions.org/pages/cuafa-diversity-statement
53 Defined as the Ivy-league schools as well as Duke, MIT, Stanford, and the University of Chicago
54 http://www.equality-of-opportunity.org/college
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 covers 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 spring 2019, MIT announced the tuition, housing, and dining rates for academic year 2020. The total cost of attendance will increase by 4.2% to $73,160, with a 4.9% increase in the financial aid budget to $136.3 million.

In recent years, MIT has improved its communications regarding financial aid and affordability, publishing a targeted brochure that it sends 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.

At the graduate level, although admissions is managed by the departments, the Office of Graduate Education (OGE) plays a critical role in coordinating the outreach, recruitment, admissions, and retention of students. 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:

- 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, 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, OGE has hosted 826 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.
Over the last decade, the number of URM students applying to, admitted to, and enrolled in MIT graduate programs has increased significantly. Between 2008 and 2018, URM students applying to doctoral programs increased by 127% (from 396 to 898), with an increase of 152% (from 311 to 785) in the number of URM students applying to master’s programs. For the fall 2018 admissions cycle, MIT admitted 128 underrepresented doctoral candidates, with 61 choosing to enroll (a 48% yield) and admitted 240 underrepresented master’s students, with 161 choosing to enroll (a 67% yield). In academic year 2019, MIT enrolled 570 URM students representing 14% of the Institute’s domestic graduate students and a 6% increase in underrepresented graduate student enrollment over the 2018 academic year. While these data are encouraging, MIT must maintain its focus on students from specific populations, particularly those who identify as Black and African American, as enrollments from students in those populations at the doctoral level have not increased at the same rate. In fact, MIT enrolled only 59 Black and African American doctoral students during the 2019 academic year, compared to 62 in 2008 (a 4.8% decrease). Conversely, at the master’s level, Black and African American students have seen a 92% increase in enrollment, from 64 in 2009 to 123 in 2019.

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.

MIT has also taken steps to offer increased support to graduate students with families and students with disabilities. In fall 2018, MIT implemented a new graduate student parental leave policy55 for all graduate students who become parents, making birth and non-birth parents eligible for one month of parental leave. Graduate students who give birth (“birth parents”) 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 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 (BSU) and Black Graduate Student Association (BGSA). Hearing reports of unrest elsewhere, he wanted to understand what life at MIT

55 https://oge.mit.edu/gpp/registration/changes/childbirth-accommodation-parental-leave/
is like for the Institute’s URM 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 perspective⁵⁶, the other from the graduate student perspective⁵⁷ – that they presented to President Reif and Institute leadership at a December 2015 meeting of Academic Council.

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 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:

- 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 (OME) and talk with mental health and counseling staff.
- Every academic department articulated and posted online a formal statement affirming its commitment to student health, diversity, and inclusion.⁵⁸
- The Office of Multicultural Programs and OGE made a number of changes to the orientation programs for undergraduate and graduate students. For instance, starting in 2016, incoming first-year students have participated 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, including adding 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 public, data-driven diversity dashboard to increase transparency with regard to staff, faculty, and student diversity.⁵⁹ Moreover, the Office of the Registrar now publishes MIT’s undergraduate⁶⁰ and graduate⁶¹ URM enrollments by course and year.
- During the 2016 application cycle, 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 US 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.

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⁵⁷ [http://bgas.mit.edu/recommendations](http://bgas.mit.edu/recommendations)
⁶¹ [https://registrar.mit.edu/statistics-reports/graduate-minority-enrollment](https://registrar.mit.edu/statistics-reports/graduate-minority-enrollment)
The co-curricular experience

MIT encourages all of its students to participate in activities outside the classroom to complement their academics – in the community, laboratory, nonprofit, corporate office, or foreign country. 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 (UROP), 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 35 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 233 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 department leadership assess the strength of its 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). For the 38 undergraduate living groups in the fraternity, sorority, and independent living group (FSILG) community, there are four governing councils: 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 presents 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 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 program that engages first-year students in targeted mentorship by trained upper-level students to further all residents’ holistic development and wellbeing. 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, Bexley Hall, a former apartment building that housed more than 100 students, closed, and Senior House, which housed students from all undergraduate years, transitioned to graduate student housing. A 2013 engineering study of Bexley uncovered severe water infiltration and structural damage that would have made repair considerably more expensive than new construction. Following a collaborative process with students, faculty, and staff to consider the Institute’s options for Bexley’s future, MIT leadership made the decision to close the building in 2013, ultimately replacing it with a public park in 2015.

In June 2016, Institute leadership alerted Senior House residents about a plan to leverage MIT’s tradition of shared governance to address academic and health and wellbeing 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 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), heads of house and house teams, and 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 have 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 conduct an in-house rush to determine which first-year students will be placed on each floor.

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

62 http://chancellor.mit.edu/sh-decision-process
MIT is taking a multi-pronged approach to address the concern. To enhance the move-in experience, in August 2018, current students, as well as staff from DSL and the Office of the Vice Chancellor, underwent a training session and volunteered their time as members of a welcome team, working scheduled shifts in the undergraduate residence halls and greeting new students and parents to campus. Volunteers managed the check-in process and were available to answer questions, engaging students from the moment they arrived and helping to foster a sense of community on their first day. In response to positive feedback, MIT will continue to enhance this welcome program and identify new strategies for streamlining and strengthening move-in logistics.

To address concerns about rejection, undue stress, and a lack of personal agency, Chancellor Barnhart and Suzy Nelson, vice president and dean for student life, initiated a collaborative process in fall 2018 that continues as we conduct this self-study. They met with the faculty heads of house – the faculty and their spouses or partners who live in and lead a residence hall’s house team – DormCon, and other student leaders and MIT community members to discuss how 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/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 receive feedback on their draft designs. Following the workshop, Chancellor Barnhart and Dean Nelson held individual house meetings with student leaders, faculty heads of house, and other house team members. They discussed which of the students’ ideas to try in the short term and which need more time to be assessed and implemented.

**Student wellbeing**

MIT has taken steps to understand and respond to increasingly complex student health and wellbeing issues, particularly in the areas of sexual assault and mental health. In typical MIT fashion, the Institute has leveraged 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 survey (CASA) to all students to gain solid, baseline data about the prevalence of sexual assault on campus, attitudes about it, and obstacles to progress. The survey launched on April 27, 2014, two days before the White House Task Force called on all US 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 Violence Prevention 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:

- 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 sexual assault 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, reaching more than 1,000 students.
- 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.

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

- All incoming MIT 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 required online training for all current faculty and staff beginning during academic year 2018.
- 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. The new policy 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.
- 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. The survey’s results are currently under review. MIT

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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
will continue to seek new opportunities to evaluate the effectiveness of its mental health and wellness and sexual assault education and prevention work.

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 wellbeing and, that same year, realigned key student support services in 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 wellbeing checks, hospitalizations, discharge, and other emergency and recovery situations.

DSL also took steps to strengthen student support in the residential communities. In 2012, the division introduced residential life area directors (AD) to all undergraduate residence halls, bolstering the existing house structure of live-in faculty heads of house along with graduate residential advisors, who are available to clusters of 30 to 40 students for academic and personal support. The AD is likewise available to help individual students while also assisting the heads of house with programming and community-building. 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, fraternities, sororities and independent living groups.

MIT also increased the number of staff in Graduate Personal Support, a function administered by the Office of Graduate Education, creating print guidelines and online trainings to help faculty recognize and support students in distress, and adding 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.” Under new leadership, 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, 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, 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
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 advancing novel approaches to wellbeing.
- 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 over 6,000 MIT community members on issues including resiliency, self-care, life skills, 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. This work includes the introduction of online training to help first-year undergraduate students recognize peers in distress as well as the distribution of Professor Daniel Jackson’s *Portraits of Resilience*, a collection of first-hand accounts from MIT community members working to overcome mental health challenges, to the Class of 2021.
- 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 over the past six years. These reports present analysis of various aspects of the department climate while also providing contextualization in the form of demographic comparisons (gender, ethnicity, sexuality, and disability status) within the department as well as comparisons with peer departments and trend data over time. IR provides these metrics separately for 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, and DSP staff work to connect the department with the resources necessary to implement their plans. The department will be able to monitor changes using the results of surveys that are administered biennially.

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, 79% of respondents report knowing where to go if they need professional help for their mental or emotional health. Moreover, about 75% of undergraduate students visit 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 Response offices. And students report an increase in respect in the interactions they witness between their peers. In 2015, 80% of undergraduates who responded to the Undergraduate Enrolled Student Survey agreed with the statement “Students at MIT treat one another with respect.” In the 2017 Student Quality of Life Survey, administered to all MIT students, nearly 90% of undergraduates and graduate students agreed with the statement.
Physical spaces

Recognizing the important living and learning opportunities that residential and other community spaces offer to students on campus, MIT has made a significant investment in improving the physical spaces where students live, work, and play outside of the academic learning space. 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[67] — a flexible framework that helps the Institute make thoughtful, well-informed choices about its physical development and renewal – DSL, the Department of Facilities, and the Office of Campus Planning developed a plan for the renewal of student housing that aligns with broader campus goals to reduce the Institute’s deferred maintenance. 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. Constructed in 1975 and home to a diverse community of nine living groups, New House’s townhouse design separated residents into six individual houses and offered limited space to convene the residence’s entire community. The building’s systems had outlived their design and were in a constant state of disrepair, leaving a large backlog of deferred maintenance and raising questions about the house’s lifespan. 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[68], 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.

In the fall of 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. A 275-foot corridor now extends the entire length of the building, allowing residents to move freely between communities and levels, and the removal of walls on the first floor and a redesign of the outdoor courtyards provide more common space for residents to meet and collaborate. 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 in close proximity to campus. This development has directly affected graduate students, leading to increased demand for on-campus housing options. In the spring of 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 those needs. 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[^69] recommended that MIT increase its graduate housing stock to accommodate 500 to 600 additional students. 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 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[^70] to assess how housing availability and student needs had changed since the Clay Report three years earlier. 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,[^71] 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. To ensure these efforts do not lose momentum, 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, as well as DSL Administration. Additionally, MIT will convene an *ad hoc* version of the initial Graduate Housing Working Group every three years for rigorous reassessment of the graduate housing landscape.

MIT’s commitment to address 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. DSL is working closely with each organization to understand

[^70]: [http://chancellor.mit.edu/gradhousingworkgroup](http://chancellor.mit.edu/gradhousingworkgroup)
its facility needs and develop plans to support current and future residents. Leveraging separate efforts to reduce deferred maintenance in student housing, MIT undertook an FSILG facilities assessment,72 completed in June 2018, of 34 off-campus fraternity, sorority, and independent living group facilities. 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.

To grow and maintain its diverse and competitive intercollegiate athletic programs, and to meet the physical education and recreation requirements of all students, MIT has made a significant investment in modernizing its campus athletic facilities, with major renovations to Steinbrenner Stadium, Morrison Outdoor Track, the baseball and softball fields, and the Institute’s outdoor tennis complex. MIT is also planning major renovations of two other key athletic facilities. First, the Institute plans to renovate and repurpose the Pierce Crew Boathouse, providing a modern home for MIT’s crew team and other water sports by improving indoor workout space, increasing boat storage, replacing the dock and boat launch system, renovating existing locker rooms, improving work areas for coaches, and upgrading finishes within the facility. Second, MIT has completed an assessment of the Rockwell Cage gymnasium, with discussions underway for facility modernization that would include a sports arena for MIT’s basketball and volleyball programs, space for special events, a strength and conditioning room, office spaces, meeting spaces, and recreational spaces.

Dining

In continuing MIT’s reaccreditation following the 2009 self-study, the Commission encouraged the Institute to take steps to increase student satisfaction with regard to dining. While dining is not typically a focus of Commission attention, the commissioners felt they could not ignore the sustained and robust student dissatisfaction with their dining options. In response, MIT has critically assessed student dining and made important gains that connect food accessibility and security with student success, health, and wellness. Those gains appear in three key activities: a 2010-11 house dining review, which produced a new meal plan structure; a 2016-17 comprehensive food and dining review; and an ongoing program MIT calls Dining 2.0, whose goal is to provide a holistic, best-in-class residential and retail dining experience. We describe each effort below.

As a first step in responding to the Commission’s feedback, in March 2010, the dean for student life formed the House Dining Advisory Group (HDAG), comprising heads of house and student leaders, to evaluate and improve on-campus dining. The group launched a community conversation about dining and reviewed market research and the results of an extensive study by the 2007 Blue Ribbon Committee on Dining. HDAG hosted forums in all four residences with dining halls and a fifth forum at the Stratton Student Center. To promote ongoing community engagement, MIT Campus Dining published two websites: the house dining review site, which included an archive of dining documents going back 50 years and provided updates for public review; and the dining idea bank, where students, faculty, and other members of the MIT community could post ideas, comments, and questions. In May 2010, HDAG made its final recommendations for changes at all four dining locations, including seven-day-a-week service, weekly breakfast and full brunch on the weekend, and all-you-care-to-eat service.

72 http://ailg.mit.edu/fsilg-facilities-assessment
MIT also implemented a new system that required participation by all house dining residents at a financially stable price. After a year of preparation, the new House Dining Program launched in fall 2011, with a new management company, a new meal plan structure, and a standing House Dining Committee of students, faculty, and staff. At the same time, Howard Dining Hall opened in renovated Maseeh Hall in fall 2011, providing a central campus dining resource, including a kosher food station and serving as the primary lunch location due to its proximity to east campus classes. Subsequently, MIT expanded meal service periods beyond breakfast, lunch, and dinner to include late-night service at Maseeh and Simmons Halls as a way to encourage social connections at later hours, providing access to food service 17 hours a day.

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. Over the course of 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. DSL published a website to share the group’s findings and provide updates.

That fall, MIT engaged Envision Strategies, one of the country’s premier consulting firms specializing in strategic planning and operations for restaurants, foodservice, hospitality, and retail enterprises. The consultants reviewed data compiled by the Dining Data Review Working Group; toured MIT retail and house dining facilities; conducted focus groups with student stakeholders, including undergraduate and graduate students, meal plan holders, cook-for-yourself residents, FSILG members, and student athletes; and administered the MIT Food & Dining Survey in March 2017 to gather student feedback. Based on these efforts, Envision Strategies recommended modifying MIT’s meal plan structure, expanding dining locations and operating hours, and adding programmatic elements such as cooking classes and special events. Envision’s recommendations provided a roadmap for MIT’s next steps in improving the on-campus dining experience.

That roadmap has informed MIT’s ongoing work to implement 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 – Bon Appétit and Restaurant Associates – into a network of two dozen food operators across campus. Dining 2.0 also empowers a dining team – a director, hired in January 2018, resident district manager, retail director, residential director, production chefs, marketing manager, and administrative support – 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. Recognizing students’ diverse food needs, MIT Dining undertook several building projects to improve food production. During the fall of 2017, the Institute fully renovated Pritchett Dining, introducing a new late-night option on east campus, and in January 2018, MIT opened Rebecca’s Café, which offers late-night meal service, cooking classes, and a meal-kit program. During summer 2018, the existing kosher kitchen was decommissioned, replaced by a newly renovated kosher kitchen and catering kitchen that opened in the Stratton Student Center soon thereafter, allowing for greater production capability and improved service.

MIT has taken a number of additional steps to improve dining on campus, including piloting healthy meal replacement vending machines in underserved housing locations on campus; introducing principles from an initiative called Menus of Change, which focuses on nutrition and menu design; and establishing a dining committee to review current and future vendors at the Stratton Student Center as a way to reinvigorate the center’s food community. DSL has also partnered with MIT’s Sustainability Office to assess the Institute’s overall food cycle, and staff continually review the program’s recycling, composting, local foods partnerships, food donations, and energy consumption.

In fall 2017, in response to survey data showing that 2% to 8% of MIT graduate students and as many as 13% of undergraduates do not have enough to eat, 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, 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. DSL has developed a comprehensive plan for assessing 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, 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, and 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 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, 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.

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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. 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.”

Over the ensuing 18 months, the task force worked to understand the changing nature of higher education and articulate a vision for MIT’s future, a comprehensive strategic planning process that laid the groundwork for many of the experiments, initiatives, and other activities we describe here.

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

During academic year 2019, there were 1,056 members of the MIT faculty. Of these, 1,042 were full-time, 805 (76%) were men, and 794 (75%) were tenured. Faculty appointments are based in MIT’s 31 academic units across five schools. To address changing academic demands, school deans generally have the authority to reallocate faculty slots among departments within a school. On behalf of departments, 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. 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 focus on faculty whose expertise bridges computing and non-computing disciplines. The “bridge” faculty will foster a sense of collaboration, opening new pathways for interdisciplinary teaching and scholarship between the college and MIT’s other academic units.

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 (DAPER), 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

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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. These include lecturers, senior lecturers, adjunct professors, professors of the practice, visiting professors, professors post-tenure, instructors, technical instructors, and graduate student teaching assistants (TAs). In academic year 2019, MIT employed slightly fewer than 550 non-tenure-track instructional staff, 60% of whom were in full-time paid appointments. 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 as 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. While TAs serve as classroom and laboratory instructors, test graders, discussion leaders, and tutors, they rarely serve as primary instructors. 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 cognizant 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. 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 relevant 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 AAU institutions.

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

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77 https://facultygovernance.mit.edu/sites/default/files/reports/2002-01_Faculty_Search_Committee_Handbook.pdf
78 https://policies.mit.edu/employment-policy-manual/20-hiring-policies/22-affirmative-action-serious-search-policy-
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. 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, inter-departmental, 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 all major 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 curricula, campus planning, admissions and financial aid, and international activities. Many faculty also participate in student life activity, 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 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 the 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.

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79 https://policies.mit.edu/policies-procedures/30-faculty-appointment-promotion-and-tenure-guidelines/33-review-decision-not
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. Effective 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 as 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. 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.

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. The provost regularly asks the school deans to evaluate and report on the success of programs designed to support faculty diversity and inclusion goals, and is exploring with the deans the reestablishment of school-based gender equity committees or officers.

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. The Institute Community and Equity Office (ICEO), created in 2013 to promote community, equity, inclusion, and diversity,

80 https://policies.mit.edu/policies-procedures/70-general-employment-policies/71-nondiscrimination-and-non-retaliation#7.1.3
81 https://policies.mit.edu/policies-procedures/70-general-employment-policies/71-nondiscrimination-and-non-retaliation#7.1.4
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 MLK Program invites individuals of any URM group, with an emphasis on African Americans, to join MIT for at least one academic term. It promotes intellectual interactions and 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), Academic Council – MIT’s senior leadership – underwent training for implicit bias, as did several academic and administrative offices. We describe the BGSA recommendations in Standard 5.

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.84 The Department of Electrical Engineering and Computer Science (EECS) statement,85 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. 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.”86

With an eye toward expanding the pipeline of qualified women candidates, the Office of Graduate Education (OGE) 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 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 EECS 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 Biomedicine, Chemical Engineering, Physics, Mechanical Engineering, Nuclear Science and Engineering, and Civil and Environmental Engineering – and even beyond.

84 http://diversity.mit.edu/departmental-statements/
85 http://www.eecs.mit.edu/diversity/
86 http://web.mit.edu/physics/about/values.html
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, two years ago 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>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2014</th>
<th>2018</th>
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<tbody>
<tr>
<td>Women</td>
<td>198</td>
<td>225</td>
<td>239</td>
</tr>
<tr>
<td>URM</td>
<td>65</td>
<td>75</td>
<td>83</td>
</tr>
<tr>
<td>International</td>
<td>426</td>
<td>430</td>
<td>455</td>
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Figure 6: The number of women, URM, and international faculty in 2009, 2014, and 2018.

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

At the time of this report, the provost is reassessing the organizational structure and strategy of the ICEO. MIT’s inaugural ICEO stepped down in the summer of 2018; an interim ICEO has been in place since then.

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 2018, 83 on-campus subjects taught by 110 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.

87 http://ir.mit.edu/diversity-dashboard/?rq=diversity%20
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 MIT students and those around the globe. 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 107 MOOCs MITx ran during academic year 2018, 71 were developed and/or managed by course teams that include 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 advance 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.

Department of Materials Science and Engineering Professor Lorna Gibson 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, 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. ODL and OME will work 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). 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.

As of February 2019, MITx had built 164 MOOCs – modules corresponding to more than 100 semester-long on-campus MIT courses – from 22 departments in all five schools, and has run them a total of 514 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 developed at MIT. More than 3.6 million unique learners have enrolled 7.8 million times in MITx courses, with enrollment necessary to see the content of a course. Anyone around 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 November 2018, MITx had awarded 188,000 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 courseware 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 1.8 million subscribers, making it the largest .edu channel on YouTube. 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 (including more than 200 faculty to date) 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.

88 https://openlearning.mit.edu/campus/digital-innovations
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.

The MITx Faculty Advisory Committee (MITx FAC) provides strategic advice and guidance for MITx and plays a critical role in the MITx grant process, reviewing, assessing, and ranking the proposals and making funding recommendations to MITx. The committee helps MITx build a portfolio of offerings that represents 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, supporting 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. Working professionals around the world learn from the online courses for free; 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 February 2019, 27 universities in 17 countries on six continents offered admitted MicroMasters recipients an accelerated pathway to 75 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 1,700 learners from around the world have earned MITx MicroMasters credentials from the first two programs, Supply Chain Management and Data, Economics, and Development Policy. 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. Those students’ academic performance and self-reported satisfaction with the experience were at least as strong as 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, and about half (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 who were 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” – 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.

These students were more likely than the traditional residential students to arrive at MIT planning on returning 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 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 a somewhat higher GPA 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.” To this end, Vice Chancellor for Undergraduate and Graduate Education Ian Waitz 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

89 https://osf.io/preprints/socarxiv/8nbszw/
90 http://orgchart.mit.edu/node/5/letters_to_community/our-new-vice-chancellor
identifying connections between foundational concepts and real-world application, to exploring possible majors, to participating in discipline- and career-related activities.\footnote{https://sites.google.com/view/mitfyebb/desiredoutcomes}

These desired outcomes laid the framework for an effort the vice chancellor 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 students 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 (GIR), MIT’s core required courses.

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 temporal constraints on the GIRs to enable students to explore more options for their majors.
- 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, to Academic Council, and to the 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 the momentum, MIT offered a three-credit follow-up subject during Independent Activities Period (IAP) 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 we expect to intensify in the years ahead.

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. We detail these efforts below.

Although all first-year undergraduate students are paired with an advisor, the advisor is not necessarily a member of the faculty. About six years ago, the faculty focused their attention on a steep decline in faculty participation in first-year undergraduate advising. Between academic years 1997 and 2012, the rate of first-year undergraduate students advised by a member of the faculty dropped from a high of 89% to a low of 35%. The results of the 2011 Enrolled Student Survey reflected the impact of this change, with MIT students reporting significantly lower satisfaction with student-faculty interaction than at peer institutions. The survey also revealed that MIT seniors were much less than students at peer institutions to know three or more faculty members who could write letters of recommendation. In response to these data, during academic year 2013, the faculty presented, discussed, and approved a motion to renew their commitment to first-year undergraduate advising. Although the motion did not mandate action, it shone a light on the importance of advising for first-year students and encouraged faculty to become more engaged. It worked. As of 2018, 99% of MIT’s undergraduate first-year students were advised or mentored by a member of the faculty. Many also benefit from formal advising relationships with administrative staff, lecturers, and researchers.

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 (DSL) 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 also taken steps to diversify the advising experience and offer additional opportunities for mentorship during students’ first semester on campus. In fall 2016, the Institute offered the first Mens et Manus First-year Advising Seminar, designed to allow incoming first-year students to explore their interests by working on hands-on projects with a focus on application. The seminar exposed students to modern prototyping methods (such as 3D printing and laser cutting), enabling them to make devices that build on required subjects such as calculus, mechanics, and electricity and magnetism. Mens et Manus is one of 54 advising seminars MIT offers each fall as an alternative to traditional first-year undergraduate advising. Seminars allow small groups of students to get to know their advisors while learning about a topic of interest to them, with topics ranging from nucleic acids, to operations research, to the solar system, to blacksmithing, to the arts. With an emphasis on hands-on learning and making in a way that relates directly to concepts in the science GIRs Mens et Manus is unique. Three class projects – a simple loudspeaker, a brushless motor, and the final independent project – provide real-world context for the lessons students learn in the seminar. Each project acts as a medium through which students gain a deeper understanding of the principles covered in MIT’s science GIRs.

Undergraduate students typically declare a major at the end of their first year or in the fall of their sophomore year; responsibility for advising then shifts to their home departments. Each department

92 https://ovc.mit.edu/strategic-priorities/goals/
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 (X.ThG), 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, 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. Every incoming graduate student receives the best practices 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.

Still, critical work remains to enhance advising for graduate students. The OVC, partnering with DSL and the GSC, has identified advising as one of the key areas of focus as part of its Graduate Student Roadmap.

Experiential learning

The report of the Task Force on the Future of MIT Education emphasized MIT’s tradition of experiential learning as foundational to its educational mission, and recommended enhancing and expanding opportunities for hands-on learning. Since then, MIT has bolstered existing programs and

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94 https://ovc.mit.edu/strategic-priorities/graduate-student-roadmap/
created a new organizational unit that brings multiple offices together under the common theme of experiential activities.

In late 2018, the OVC launched the Office of Experiential Learning (OEL), driven by MIT’s commitment to *mens et manus*. OEL’s programs exemplify and embody hands-on educational experiences, both inside and outside the classroom, exposing students to different ways of thinking and solving problems, broadening their communications skills, and helping them develop a better sense of self. The office brings together heretofore disparate experiential learning opportunities – in global education, undergraduate research, making, international development, and service – creating a centralized resource to help students work beyond the confines of the classroom, interacting with communities near and far, and creating space for collaboration, compassion, and reflection. Working closely with the TLL, OEL leadership is laying the foundation for ongoing data collection, analysis, assessment, and evaluation of the office’s programs. It aims to bring together people from across and beyond the Institute with a common mission; identify and develop new systems, policies, practices, and initiatives; measure and quantify student engagement in experiential learning; and support and encourage the participation and inclusion of diverse groups of students and faculty.

Experiential learning for MIT’s undergraduate students often begins in the lab. Teaching and research at the Institute are inseparable, a link embodied by the Undergraduate Research Opportunities Program (UROP). Administered by OEL, UROP positions 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. We describe an assessment of UROP in Standard 8.

Prior to the creation of the OVC in 2017, a visiting committee for the dean for undergraduate education provided valuable council on all matters under the dean’s purview. Since oversight of graduate education was distributed largely 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 Waitz, the committee was renamed and its scope was expanded to encompass graduate education as well. The newly coined visiting committee for undergraduate and graduate education now advises the vice chancellor on matters pertaining to undergraduate and graduate education, and those that touch MIT’s educational model more broadly, including the programs OEL administers, as described above.

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 2018, 692 students had 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 OEL is in coordinating and supporting experiential learning, a dedication to mind and hand infuses educational activities across the Institute. We describe three key programs 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 including 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 27 country programs span all continents, engaging 1,250 MIT students per year. The program’s rapid expansion has had a profound impact on students’ international learning experiences: 36% of seniors surveyed in 2009 reported having some kind of international education 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 degree student respondents in 2018 reported having an educational experience abroad, with 41% of those students involved in a MISTI program. Among this group of graduating students, 94% of undergraduate and 93% of master’s students who participated in MISTI were satisfied or very satisfied with their experience.95

MISTI also operates a program called “Global Startup Labs,” which 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.

95 https://static1.squarespace.com/static/5b63672bcecf372eea958d8a5/t/5bff147e1ae6cfb7775d0210/1543443584681/GS-S-2018-Overall.pdf
Second, Beaver Works 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 MIT operates in Lexington, Massachusetts. Launched in 2013, Beaver Works promotes collaborative research on matters of national security and supports the fabrication of prototype systems. Lincoln 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 program annually.

Finally, perhaps the most significant recent application of experiential learning – with ramifications for undergraduate engineering education 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. 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, the program is guided by five fundamental principles:

- 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.
- MIT should help students prepare to be makers or discoverers, teaching engineering fundamentals as a foundation for careers in research and practice.
- 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.
- Given the speed of scientific and technological development, MIT should teach students how to more effectively think and learn by themselves.
- 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 four pilot cross-departmental “threads” — Advanced Materials Machines, Autonomous Machines, 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 will 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.97

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 input;
- 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 TLI, working with NEET faculty, are developing a rubric to assess students’ adoption of the 11 NEET “Ways of Thinking,” cognitive approaches NEET has 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. We describe three 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 a critical new home for MIT’s Center for Microbiome Informatics and Therapeutics (CMIT), 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 the institute’s faculty hiring and spurred it to develop a strategic plan.

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

97 If NEET were a major, it would have the fourth highest enrollment, after Courses 6, 2, and 18.
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. And with a new Climate Portal, it facilitates communication about climate across MIT and provides a publicly accessible platform for learning and engagement. To expose undergraduate students to concepts and problems related to environment, climate, and sustainability, ESI is partnering with faculty across all four GIR disciplines (chemistry, biology, math, and physics) to develop resources that faculty can incorporate into their classes. It has developed an undergraduate minor in environment and sustainability and is working the Sustainability Initiative at the MIT Sloan School of Management to create a diverse cohort of learners by extending the school’s master’s certificate in sustainability to graduate students across the Institute.

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). 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 plan includes basic research to improve our understanding of climate change; the establishment of new low-carbon energy centers to accelerate breakthrough technologies to mitigate its effects; the development of enhanced educational programs on climate change; new tools to share climate information globally; and measures to reduce MIT’s own carbon emissions. 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 and provides recommendations and guidance. During 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, multi-faceted 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 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. IDSS will likely move under the purview of the MIT Schwarzman College of Computing.

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98 https://climate.mit.edu/science-action
Standard 7: Institutional Resources

In extending MIT’s accreditation following the 2009 self-study, 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 through fiscal years 2017 and 2018. 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. Here we describe these activities and detail the strength of MIT’s institutional resources – human, financial, physical, and technological.

Human resources

MIT’s human resources function is centralized in the Human Resources Department and also distributed throughout the Institute’s departments, labs, and centers. Human resources 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.

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. As we look ahead to potential challenges over the next few years, we note that several peer institutions have also recently made a significant commitment of resources to computing. This movement in higher education presents the likelihood of competition for faculty in computing fields and those we call “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.

The Institute offers a comprehensive benefits package, including vacation, health insurance, retirement programs, and tuition assistance, for eligible employees, and extends many benefits, including 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 the 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, EBOC includes three standing subcommittees focused on employee health, work-life issues, and retirement.

To support efforts to attract the best talent, MIT conducts an annual market analysis designed to determine competitive pay positioning for all benchmark jobs. MIT has also undertaken a compensation initiative, a multi-phase, multi-year project that was implemented in April of 2019. This effort to create a compensation foundation – 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 – reflects MIT’s commitment to its community, and 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 a workplace of inclusion that welcomes and supports people of varying backgrounds, different 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 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 on local DLC ownership and decision making provides a customized approach that addresses individual cultures and organizations to meet their individual needs. This approach takes a number of forms, including reflecting on department 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.

The Human Resources Department has developed a creative solution to monitoring and documenting good faith hiring practices through the development of an online tool called Enriching Diversity, which provides current data to enable improved hiring and decision making. The Department sponsors seven employee resource groups – American, Black American, Caribbean (ABAC); Asian Pacific American (APA); Disabilities; Latino; LBGTQ; Millennial; and Women in 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. Human Resources 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.\(^{100}\) 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 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, who meet four times a 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.

The executive vice president and treasurer (EVPT), the Institute’s chief financial officer, 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 budget and to monitor key metrics of the Institute’s financial health. The provost and the EVPT oversee an extensive annual budget process for the Institute’s academic, research, and administrative units to assure 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 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 MIT students, support faculty creativity, and maintain the Institute’s world-class facilities. She 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 our 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 MIT Stephen A. Schwarzman 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, overseeing research integrity and compliance and playing a central role in managing MIT’s research relationships with the federal government. 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. 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 (F&A) rates, and acts as the point of contact for Defense Contract Audit Agency (DCAA) and other audits of the research enterprise.

As a result of the growth of MIT’s invested assets, support from investments now funds a larger share of Institute operations. 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. Non-federal sponsors funded 38% of research, up from 17% in 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 that reflects the construction of new buildings, including the Ray and Maria Stata Center for Computer, Information and Intelligence Sciences; Media Laboratory Complex Brain and Cognitive Sciences Center; Koch Institute for Integrative Cancer Research; 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 continued in fiscal years 2017 and 2018. 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.

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 supporting the work of 2,000 MIT faculty and researchers in the heart of campus – 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, consolidating 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 performance lab, 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.” 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.

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. The 600-acre solar farm, which began operation in March 2017, represents the largest aggregated purchase of renewable energy by non-affiliated parties in the United States. MIT’s share of the purchase adds carbon-free energy to the grid equivalent to 40% of MIT’s annual campus electric use. 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 a key commitment of MIT’s Plan for Climate Action, described in Standard 6: 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

101 http://web.mit.edu/cstfreport/
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 United States federal 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 on June 2017. In approving the petition in October of that year, 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. 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, with completion planned for the summer of 2019. Site 5, a 17-floor building to be constructed at 314 Main Street, will be 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 new MIT Stephen A. Schwarzman 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.

102 https://capitalprojects.mit.edu/projects/kendall-square-initiative
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 community needs, responding to the feedback as appropriate.

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 from 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. 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 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.

Among the task force’s recommendations was 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”). In the decade since the policy’s enactment, as of January 2019, the MIT community has placed nearly 31,000 articles in the Institute’s Open Access Collection, and users have downloaded the articles more than 11.6 million times. The Committee on the Library System, a standing committee of the faculty, monitors and upholds the MIT Faculty Open-Access Policy.

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103 [https://v3.pubpub.org/pub/future-of-libraries](https://v3.pubpub.org/pub/future-of-libraries)
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 in to an open access license that grants the Institute nonexclusive permission to make the author’s scholarly articles available. In effect, the license allows the author to share scholarly work as needed for noncommercial 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.” 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.

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 (ITGC) 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 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 the MIT campus network, with a particular focus on upgrading MIT to the next generation of Internet addressing. IS&T is now in the process of upgrading MIT’s network (“MITnet”) equipment and architecture to enable support for IPv6 devices, hosts, and networks. The Institute also launched the Information Protection at MIT website (infoprotect.mit.edu) to help community members protect Institute and personal data. MIT plans to continue to migrate administrative and student systems to cloud-based platforms.

104 [http://orgchart.mit.edu/node/6/letters_to_community/open-access-mit-and-beyond](http://orgchart.mit.edu/node/6/letters_to_community/open-access-mit-and-beyond)
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. Those 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 – driven by data and 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.

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 design new programs and launch 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 practice;
- 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 affecting student experiences and to assess and evaluate pedagogical and curricular experiments to support student learning at the subject, program, department, school, and Institute levels;
- 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 we explore 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 faculty contributions to teaching are evaluated and rewarded.
TLL’s assessment 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, 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 the 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 instructor or department interest and need, 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 provide a resource to educational researchers. Public materials include survey instruments, aggregate results, a question search tool, and a statement of confidentiality.

Below we summarize 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.

*Educational effectiveness at the Institute level*

MIT tracks a number of traditional outcomes measures, including graduation rate, debt upon graduation, and employment and salary at graduation. As noted in the data first forms, MIT’s IPEDS retention rate for students pursuing a bachelor’s degree is 99%, with a six-year graduation rate of 94%, an increase of 3% since 2015. As described in Standard 5, MIT’s commitment to increase financial aid 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

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106 http://ir.mit.edu/surveys
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 those who started a job after completing an MIT bachelor’s degree accepted an annual salary of $89,710, compared to $65,324 in 2008; those who started a job after completing an MIT master’s degree accepted an annual salary of $127,978, compared to $98,497 a decade prior.107-108

As encouraging as they data are, they only begin to tell the story of how MIT measures educational effectiveness and outcomes. Throughout this self-study, we describe various efforts to understand the Institute’s effectiveness across a broad range of topics, and steps taken 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. One of MIT’s most powerful tools in evaluating educational effectiveness is a robust survey program that methodically gathers input from students, faculty, staff, postdoctoral scholars, alumni, and employers.

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. It adds a data point in time between MIT’s immediate exit survey and its more in-depth alumni survey. The best source of data on how well MIT is preparing its graduates for their careers comes from the undergraduate alumni survey, which we describe in the following paragraphs.

Since 2005, MIT has conducted a comprehensive undergraduate alumni survey every four years. The most recent iteration,109 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. The results of this survey indicate that MIT graduates excel in a number of fields. Those who wish to continue their studies at the graduate level do so with great success, and those who enter the workforce make an immediate and meaningful impact. From the 2017 survey, 74% 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 this graduate or professional education, 85% reported that MIT prepared them “very well” or “more than adequately” for their graduate or professional program; an additional 12% indicated that they were prepared “adequately.”

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 

107 https://static1.squarespace.com/static/5b63672bcefc372eaa958d8a5/t/5bff147e1ae6cfb7775d0210/1543443584681/GSS-2018-Overall.pdf
108 https://static1.squarespace.com/static/5b63672bcefc372eaa958d8a5/t/5be365f00ebbe8090d3ea0ba/1541629425184/GSS-2008-Overall.pdf
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 to the 2017 undergraduate alumni survey who are currently employed, 81% said that MIT prepared them “very well” or “more than adequately” for their current career; an additional 16% responded that they were “adequately” prepared. Eighty-nine percent reported that they are “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 of respondents reported being “very satisfied” or “generally satisfied” with their undergraduate education at MIT. Eighty-seven percent of respondents “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, alumni 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,\textsuperscript{110} which solicits expectations of the college experience, secondary school experiences, degree goals and career plans; Undergraduate Enrolled Student Survey,\textsuperscript{111} which asks students how their skills and abilities have changed since enrolling at MIT; and the Student Quality of Life Survey,\textsuperscript{112} which gathers factors that affect a student’s ability to have a fulfilling and productive academic and personal life.

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 the group’s work. For example, although 94% of incoming first-year undergraduate students say they were at least fairly certain of their intended major, 75% say they changed their intended major at least once. As the study group continued to deliberate, the CUP approved an experiment to allow first-year undergraduate students entering in fall 2018 more flexibility in the General Institute Requirements (GIRs) to encourage exploration of majors earlier in their MIT career. The experiment, described in Standard 4, was designed 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,\textsuperscript{113} and Standard 4 details the assessment of the experiment.

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 its regulation on grading. Until April

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\item \textsuperscript{110} \url{http://ir.mit.edu/survey-of-new-students/}
\item \textsuperscript{111} \url{http://ir.mit.edu/undergraduate-enrolled-student-survey-ess/}
\item \textsuperscript{112} \url{http://ir.mit.edu/student-quality-of-life/}
\item \textsuperscript{113} \url{https://sites.google.com/view/mitfvebh/desiredoutcomes}
\end{itemize}
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2019, Section 2.62 of the Rules and Regulations of the Faculty stated that grades “are not rigidly related to any numerical scores or distribution function.” With input from the Faculty Policy Committee, Committee on the Undergraduate Program, 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. [PENDING APRIL APPROVAL]

This revision reemphasizes to instructor 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 level

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 in the departments. 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 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. Examples of these reports can be found in the document repository.

For the 16 ABET-accredited undergraduate programs, as described below, outcomes reflect those prescribed by ABET. For other programs, outcomes are those provided by the department and/or statements of goals for the undergraduate program. Individual departments often provide the

114 https://facultygovernance.mit.edu/rules-and-regulations#2-60-grades
visiting committees more in-depth analysis of these data 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 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 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 TLL to examine, reflect on, and improve his teaching approach and effectiveness in the class. 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 document repository.

ABET, which accredits MIT’s undergraduate programs in the School of Engineering – accounting for 70% of MIT’s undergraduate students – also factors heavily in the Institute’s ongoing assessment of its academic programs. ABET requires participating departments to identify learning objectives for every subject and department-level curriculum, and provide evidence that students are meeting those learning objectives. It is worth noting that even departments that do not participate in ABET accreditation articulate and make public their educational objectives and student outcomes.

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 the accredited departments’ 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, as they drive data collection from assessments both direct (assignments, tests, rubrics) and indirect (surveys and reflective essays), and help 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.\textsuperscript{115}

IR has created an online platform\textsuperscript{116} that allows departments across the Institute to collect and consolidate student learning outcomes and related assessment data. At the start of each semester, instructors enter their desired learning outcomes into the application. They can also enter assignments (e.g., exams, projects, problem sets, labs, 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.

The Department of Aeronautics and Astronautics (AeroAstro) employs two additional tools to measure and assess learning outcomes. The first is end-of-semester faculty reflective memos, which instructors use to continually evaluate and improve the design and delivery of their subjects to help ensure that subject-level learning outcomes are achieved. 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.

The second tool is a platform called Xoces,\textsuperscript{117} which catalogs, structures, and visualizes learning outcomes across the department. Designed by former MIT Professor Karen Willcox and colleagues, Xoces is open-source software that maps the relationships among outcomes across the department’s undergraduate curriculum. AeroAstro has mapped approximately 1,400 outcomes from more than 29 subjects in the undergraduate curriculum from a subset of prerequisite, GIR subjects across MIT (e.g., mathematics, physics, and materials science). Xoces helps faculty and staff identify gaps in their

\textsuperscript{115} https://www.abet.org/accreditation/accreditation-criteria/criteria-for-accrediting-engineering-programs-2018-2019/#outcomes
\textsuperscript{116} https://outcomes.mit.edu
\textsuperscript{117} http://kiwi.ices.utexas.edu/education/xoces.php
teaching and expand on the existing outcomes in the department. It also helps develop clearer, more explicit connections between subjects in the integrated framework of the undergraduate curriculum. The results provide an enduring record of learning outcomes, promoting a smooth transition when a new instructor assumes responsibility for a particular subject. Xoces also facilitates the design and development of embedded assessments in resources shared through online learning platforms. For example, faculty and instructors for the subject Computational Methods in Aerospace Engineering, a junior/senior-level class, used the outcomes map to provide an explicit framework for connecting and integrating pre-class online readings with in-class active learning activities. The platform connects outcomes across the subject, allowing students to find other assessment activities that relate to each outcome.

In the spring of 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 IR, TLL, and the 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 vice chancellor for undergraduate and graduate education initiated 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 vice chancellor 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 vice chancellor 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.

*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 we describe three such activities – in research, global education, and student life – and provide 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 STEM 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 UROP, 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 Interphase Edge participants and the Laureates and Leaders Program, 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 document repository.

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. 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.

In 2015, MIT’s signature global-education program, MIT International Science and Technology Initiatives (MISTI), described in Standard 6, partnered with the TLL to conduct a comprehensive assessment of the program’s effectiveness. A TLL assessment and evaluation expert worked with MISTI faculty and program directors to create pre/post experience surveys to accurately 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 US;
- Cultural competency in the host country;
- Access to faculty or supervisors who can provide a professional recommendation in the US versus outside the US; 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 identify the strengths of its internship program and determine the extent to which intended program outcomes were being met. 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 (IAP). 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 whom we want our students to be as future adults,” the vice president and dean for student life charged a division-wide taskforce in spring 2018 to develop 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 DSL’s work: advancing knowledge; cognitive complexity; self-awareness and development; interpersonal and engagement; and community, civic, and global engagement. In the fall of 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 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 group is also developing a communication plan and professional development plan, as assessment tools and resources. This work will continue over the summer of 2019, with the final product rolled out to the
division in the fall 2019. 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 DSL to promote student learning outside of 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 document repository.

*Educational effectiveness at the subject level*

Although a commitment to measure, experiment, test, and revise is ingrained in MIT’s educational model, the Institute does not approach subject-level assessment systematically. MIT 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 departmental units. Formative, mid-semester evaluations are encouraged, although not mandated. TLL works with faculty and instructors upon request to develop specific and targeted formative evaluations. It also supports the interpretation of responses and the implementation of evidence-based pedagogical strategies to address issues identified in the evaluations.

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 has also asked about the quality of instruction in various broad fields. The 2019 Enrolled Student Survey, which is administered quadrennially, asked about the quality of instruction in humanities and arts (93% were very or generally satisfied), social science (93%), engineering (91%), natural sciences and math (91%), and premed (80%).

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 (MITCET), are required to submit desired learning outcomes and plans for measuring the outcomes. Since 2010, TLL has provided substantive assessment and evaluation support for more than 50 projects in educational assessment. A full list can be found in the document repository. We provide two examples of subject-level assessment 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 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 gain 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 20.020, but also to understand content in other MIT subjects and read and extract information from scientific articles more effectively. 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 the work, the subject saw an overall subject rating increase of 20%, from 5.8 in 2010 to seven on a seven-point scale in 2015.

Second, in 2012, the Mathematics Department won a grant from a local educational foundation to rebuild its basic probability and statistics course. The course is intended to provide practical foundations in probability and statistics, so critical to science and engineering today, in a hands-on, 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 Bayesian statistics; and a truly student-centered introduction to probability. The traditional lecture-based instruction was replaced with a flipped classroom: an online text was written specifically for the course, and included integrated automatically graded questions to test comprehension. The classroom of choice was one of the rooms designed by the Physics Department to facilitate a highly interactive educational experience. Students 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; the ability to cover additional material, more thorough learning, and a positive learning atmosphere.
Standard 9: Integrity, Transparency, and Public Disclosure


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

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. 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 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,\footnote{https://orgchart.mit.edu/sites/default/files/reports/20150417-taskforce-gbv-education-prevention.pdf} charged with recommending strategies to address gender-based violence at MIT; and the Task Force on
Institute Handling of Student Sexual Misconduct Complaints\textsuperscript{134} to evaluate and recommend changes to the process by which the Committee on Discipline (COD) adjudicates student sexual misconduct cases. In response, 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\textsuperscript{135} to oversee an Institute-wide approach to prevent and respond to sexual misconduct and other forms of gender-based discrimination. 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 have led MIT to update its consensual relationship policy, initiate mandatory sexual misconduct prevention and response training for all faculty and staff, and introduce the student-focused wellbeing policies 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\textsuperscript{136} which allows a user to view and sort demographic data about the Institute’s students, postdoctoral scholars, faculty, and staff communities using multiple variables. Through MIT’s Common Data Set\textsuperscript{137} the Institute regularly publishes data on undergraduate and graduate enrollment, financial aid, student life, and annual expenses. 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.\textsuperscript{138} 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\textsuperscript{139} accredits a number of the Institute’s engineering programs, the American Chemical Society\textsuperscript{140} accredits the chemistry program, the Association to Advance Collegiate Schools of Business\textsuperscript{141} accredits the MIT

\textsuperscript{134} \url{https://cod.mit.edu/taskforce}
\textsuperscript{135} \url{https://facultygovernance.mit.edu/committee/committee-sexual-misconduct-prevention-and-response}
\textsuperscript{136} \url{http://web.mit.edu/ir/pop/diversity.html}
\textsuperscript{137} \url{http://web.mit.edu/ir/cds/index.html}
\textsuperscript{138} \url{http://web.mit.edu/ir/pop/students/index.html}
\textsuperscript{139} \url{http://main.abet.org/aps/AccreditedProgramsDetails.aspx?OrganizationID=309&ProgramIDs=}
\textsuperscript{140} \url{https://chemistry.mit.edu/academic-programs/undergraduate-programs/biochemistry-major-certification/}
\textsuperscript{141} \url{https://www.aacsb.edu/accreditation/accredited-schools?F_Country=United+States}
Sloan School of Management’s business programs, and the National Architectural Accrediting Board\(^\text{142}\) and the Planning Accreditation Board\(^\text{143}\) accredit the School of Architecture and Planning’s degree programs. To promote transparency, MIT has a long tradition of making its accreditation materials publicly available. Recently, MIT published a new website\(^\text{144}\) for institutional accreditation, sharing self-studies, interim reports, and relevant correspondence with the Commission on Institutions of Higher Education dating back 20 years.

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. The results of these reviews are used for improvement. For instance, a team charged with overseeing the MIT Bulletin,\(^\text{145}\) the Institute’s course catalog, continually assesses and improves how the product describes the Institute’s structure, academic offerings, and activities. The Bulletin serves as the official source of information about academic programs and opportunities. It includes an overview of the student body, with information about the campus setting, academic and other support services, and co-curricular and non-academic opportunities, as well as institutional learning and physical resources available to students. A recent redesign included the implementation of a content management system and the introduction of 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, the Registrar’s Office, and the 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.\(^\text{146}\) The new sites meet Web Content Accessibility Guidelines (WCAG) 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.

\(142\) [https://www.naab.org/school-view/?record_id=20484](https://www.naab.org/school-view/?record_id=20484)


\(144\) [https://accreditation.mit.edu](https://accreditation.mit.edu)

\(145\) [http://catalog.mit.edu/](http://catalog.mit.edu/)

\(146\) [https://mitadmissions.org/afford/](https://mitadmissions.org/afford/)