

Dean for Undergraduate Education

The [Office of the Dean for Undergraduate Education \(DUE\)](#) is focused on enhancing undergraduate education as well as delivering mission-critical functions for both undergraduate and graduate students. DUE's scope includes:

- Delivering the essential capabilities of admissions, financial services, and registration
- Fostering student diversity at all educational levels
- Promoting student success through advising and mentoring, effective learning strategies, and other forms of support.
- Partnering with faculty to enrich learning through educational innovation and online learning
- Encouraging hands-on, project-based learning both inside and outside the classroom
- Providing and expanding global educational opportunities for students
- Supporting students as they explore career options and opportunities

DUE comprises nine offices: Admissions, Experiential Learning, Global Education and Career Development, Minority Education, Registrar, Reserve Officer Training Corps, Student Financial Services, Teaching and Learning Laboratory, and Undergraduate Advising and Academic Programming.

This report begins with an introduction by the dean and is followed by individual office reports.

Dean's Priorities and Highlights

Throughout his tenure as dean for undergraduate education, Dennis Freeman has been a strong advocate and proponent of gathering, analyzing, and synthesizing meaningful and timely data to discern trends, challenges, and opportunities that will positively affect MIT undergraduate students. During AY2017, he continued to work with the senior administration, the Chancellor's team, DUE leadership team, faculty committees, and faculty colleagues on several key issues and opportunities.

Freshman Advising Seminar

For the second year, a hands-on Freshman Advising Seminar was offered, 6.A01 Mens et Manus: Building on the Science Core. As the title implies, the class aims to create maker activities to support concepts covered in the science core of the General Institute Requirements (GIRs). The seminar was developed by Dean Dennis Freeman, Professor of Mechanical Engineering Martin Culpepper (MIT's "maker czar"), and Dawn Wendell, a senior lecturer in mechanical engineering. Students applied elementary principles of physics, math, and chemistry to design and build a simple loudspeaker, a brushless

motor, and a final independent project. In the process, they gained experience with rapid prototyping techniques such as laser-cutting and 3D-printing.

The seminar was well-received and will be expanded in fall 2017 to involve more faculty and to incorporate additional projects. New sections will be offered in computational physics and chemistry, as well as in autonomous robotics. Ultimately, the long-term goal is to use the 6.A01 model to develop a new freshman learning community, like Concourse or the Experimental Study Group.

Dean's Action Group

In February 2016, the Association of American Universities (AAU) awarded MIT a \$20,000 grant to advance efforts to improve undergraduate education in STEM fields. The grant is part of the AAU Undergraduate STEM Education Initiative, created in 2011 to encourage universities to use teaching practices in STEM education that have been proven to be effective in engaging students and helping them learn.

The grant will be used for the Dean's Action Group, a two-year project that aims to develop and share cross-disciplinary, evidence-based teaching practices. The project is co-led by Dennis Freeman (who pledged an additional \$20,000 for the program); Janet Rankin, interim director of the MIT Teaching and Learning Laboratory (TLL); and Darshita (Dipa) Shah, associate director of TLL. So far, the group's actions are already leading to closer collaborations. For example, there has been considerable interest in incorporating freshman projects into mainstream requirements for physics.

Algorithmic Reasoning and Computational Thinking

During the spring of 2016, Chair of the Faculty Krishna Rajagopal and Dennis Freeman assembled a group of faculty from all five schools of the Institute to conduct an in-depth study of the role of algorithmic reasoning and computational thinking in the context of the education of MIT undergraduates. The group was asked to consider a set of questions relating to this topic, including whether formal exposure to algorithmic reasoning and computational thinking should be required of all MIT undergraduate students.

In a final report published in January 2017, the group concluded that algorithmic reasoning and computational thinking should play an explicit role in the formal education of MIT undergraduates. A key recommendation of the report is to explore ways to connect algorithmic reasoning and computational thinking to domain-specific contexts across different intellectual disciplines. The working group envisions that some elements of computational thinking should be taught in subjects designed for a major, or designated as suitable for a major, so students can understand computation in a disciplinary context, thereby increasing the utility of what they learn.

To advance this recommendation, grant funding was made available to develop subjects that use and teach algorithmic reasoning and computational thinking in domain-specific contexts. To date, the funding has sponsored a number of projects to prototype ideas for incorporating elements of computational thinking into the curriculum. The working group also considered several approaches to incorporating algorithmic reasoning

and computational thinking into the formal education of MIT undergraduates. These approaches will be considered during the upcoming academic year by the Committee on the Undergraduate Program, which exercises oversight for the MIT undergraduate academic program, including the General Institute Requirements.

Interphase EDGE Program Assessment

Administered by the Office of Minority Education (OME), Interphase EDGE is a two-year scholar enrichment program that includes a summer session for matriculating freshmen and continues with programming during the freshman and sophomore academic years. Interphase EDGE was created in 2012 (based in part on a prior program called Interphase) with 78 student participants. Shortly after the first cohort of Interphase EDGE scholars graduated in June 2016, OME collaborated with TLL to undertake an assessment of the effectiveness of the program. Results of the study indicated that the program did reach its non-academic goals; however, students who participated in the Experimental Studies Group Freshman Learning Community had higher academic outcomes than those who did not.

OME and TLL are currently conducting an analysis of the academic and non-academic outcomes of the most recent cohort of students who graduated in June 2017. Based on the assessment, OME will continue to build on the positive outcomes of Interphase EDGE by strengthening programmatic support, potentially expanding the reach of the program, and exploring new hybrid programs.

MacVicar Fellows Program 25th Anniversary

This year marked the 25th anniversary of the MacVicar Faculty Fellows Program. Founded in 1992 to honor MIT's first dean for undergraduate education, Margaret MacVicar, the program recognizes MIT's most exceptional teachers and mentors, each of whom has made outstanding contributions to undergraduate education. To date, nearly 100 MacVicar Faculty Fellows from a broad range of academic disciplines have been selected through an annual nomination process. Fellows receive a grant to support their teaching and join a small academy of scholars committed to exceptional instruction and innovation in education.

To mark the anniversary, the theme of the annual MacVicar Day Symposium in March was "Pushing Boundaries: A Legacy of Learning through Exploration and Discovery." A lively panel of faculty and student participants shared their perspectives on the value of undergraduate research at MIT—a fitting tribute to MacVicar, who launched the highly acclaimed Undergraduate Research Opportunities Program in 1969.

Summary of Highlights

Enhancing Undergraduate Advising and Engagement between Students and Faculty

The dean continued to support efforts to foster stronger connections between students and faculty. These efforts took various forms, many of which were supported by the Undergraduate Advising and Academic Programming Office (UAAP).

- This year, 183 faculty were recruited to advise or mentor 92.5% of the Class of 2020, a 4.5% increase over last year. UAAP supports these faculty advisors, acting as a resource to faculty or as a backup when faculty are unavailable. In addition, faculty were matched with 203 associate advisors, who serve as peer mentors to first-year students.
- To increase engagement among freshmen and faculty, UAAP offered eight receptions, hosted by Dean Freeman, and 11 luncheons or dinners.
- UAAP hosted 18 events at which faculty discussed with freshmen topics such as academic challenges, choosing a major, pursuing graduate school, and personal stories about their career paths.
- First generation students—those students who are the first in their family to attend college—were invited to several events with first generation faculty, to share their unique experiences and make personal connections.
- UAAP offered 12 programs throughout the academic year to improve training and development of associate advisors.
- With funding from DUE, the Experimental Study Group continued to offer its faculty mentoring program, in which faculty and freshmen engage in informal discussions and participate in extracurricular activities, such as hiking trips, concerts, and Friday lunches.

Functional Enhancements

Several offices completed systems upgrades during the academic year.

- The Registrar's Office developed a new web-based request process, called QuickRoom, for ad hoc classroom reservations. The tool offers greater efficiency and real-time availability for students, faculty, and staff looking for a space to meet or work.
- In partnership with a local software development company, the Registrar's Office began a digital diploma pilot, secured by the Bitcoin blockchain. The diploma can be shared with employers, schools, family, and friends in a secure, easily verifiable format. Roughly 100 graduates from the Master of Finance and Master of Science in Media Arts were invited to participate.
- Student Financial Services (SFS) implemented an integrated student account billing and payment portal to facilitate these processes for students and their families. The portal, MITPAY, allows SFS to integrate all student account transactions (such as ebill, payment plans, and student refunds) into a single system.
- UAAP worked with an outside developer to completely redesign the UAAP website with a new look, better navigation, and improved content. This was a complex undertaking because of the many program-specific websites that fall under UAAP.

- In partnership with Information Services and Technology, UAAP has undertaken a redesign of the Undergraduate Research Opportunities Program online application, review, approval, and database. The office expects to launch the new system in fall 2017.
- Similarly, UAAP launched a new online application system for the Freshman Pre-Orientation Program application process. Roughly half of the incoming freshmen sign up for this program.

Review of Curriculum Changes and Enrollment Trends

The Registrar's Office facilitated the review of a number of proposed changes in the curriculum to establish new majors, minors, degree types, and subjects. The office assisted with two proposals to establish new undergraduate degrees in chemistry and biology (Course 5-7) and computer science, economics, and data science (Course 6-14).

A new interdisciplinary minor was approved in polymers and soft matter in conjunction with Courses 2, 3, 10, and 20. Also, an inter-school minor was approved in environment and sustainability, offered by the Environmental Solutions Initiative.

The Registrar's Office provided advice and guidance on the creation of a new degree-type, a master's degree in applied science, and a new "micro-masters" degree in data, economics, and development policy. In addition, the office managed the review of 20 new communication intensive subjects and 45 new and revised subjects that will count toward the Humanities, Arts, and Social Sciences (HASS) Requirement.

A Committee on the Undergraduate Program (CUP) study group has begun an analysis to understand the trends and factors influencing major enrollments and students' choice of major. The Registrar's Office has already participated in discussions with CUP and will support the study group as it continues to analyze and collect additional data in the upcoming academic year.

Admissions and Financial Aid

MIT continues to attract and recruit an exceptional cohort of incoming students. The Admissions Office received 20,247 applications for the freshman Class of 2021, a 6.5% increase over last year. In part, the increase is due to the fact that international students were eligible to apply for Early Action admission—a change that was implemented with the incoming Class of 2020 last year. In all, 1,452 students were admitted (7.2% of the applicant pool, compared to 7.9% in AY2016), including 14 waitlisted students. The overall yield on admitted students increased slightly to 76% (compared with 74% in AY2016).

The composition of the Class of 2021 reflects MIT's ongoing commitment to fostering diversity and excellence in the student body. Women represent 46% of the class, 18% are the first generation in their families to attend college, and 11% are international students. Students come from 49 states and 61 countries. Two of the incoming students are veterans, part of the Admissions Office's recent efforts to recruit veterans as freshmen or as transfer students.

Students in the Class of 2021 have self-identified in the following racial/ethnic groups: American Indian/Alaskan Native, 2%; Asian American, 33%; Black/African American, 10%; Hispanic/Latino, 14%; Native Hawaiian/Pacific Islander, 0%; White, 48%. Twenty-three percent of the enrolling class self-reported as an underrepresented minority student. (Note: students may identify with more than one racial or ethnic group.) MIT's partnership with the QuestBridge program, a nonprofit that recruits high-achieving students from low-income backgrounds, continues to be a fruitful one. This fall, 99 QuestBridge finalists will enroll at MIT (compared with 62 students in AY2016).

MIT continues to strive to make the dream of attending MIT a reality by providing financial aid to students who demonstrate need. To that end, the Institute allocated \$114.2 million in 2017 to its financial aid budget, benefiting a broad range of students and families and offsetting a 3% increase in tuition and fees—the smallest percentage increase since 1970. In AY2017, the annual price of an MIT education was \$66,028 per student: \$48,452 for tuition and fees; \$14,210 for room and board; an estimated \$2,816 for books, supplies, and personal expenses; and an average of \$550 for travel.

Space

The Kendall Square Revitalization Project has already had major impacts on DUE this year. In November 2016, the Teaching and Learning Lab relocated from E39 to E19 and Global Education and Career Development moved from E39 to E17. Plans have been finalized to relocate the Admissions Office to Kendall Square E38/E39 in 2020, where they will have a major presence at the new gateway to MIT. This new location, across from the MIT Museum, will provide much-improved office and reception space and most importantly, a dedicated space to host admissions information sessions.

Budget

DUE had a successful FY2017 budget cycle, in which it received new funding to advance a number of priorities, as well as non-recurring funds to continue an important pilot:

- Funding for enhancements to OME's Interphase EDGE, their flagship program for incoming freshmen
- Funding for the Experimental Study Group to enhance and expand GIR subject offerings in a small-cohort setting
- Funding for Concourse to expand curriculum in support of interdisciplinary learning
- Funding for Admissions' QuestBridge Partnership program
- Funding to continue a pilot to enhance the freshman learning experience, 6.A01 Mens et Manus: Building on the Science Core

Affirmative Action

DUE continues to be one of the most diverse organizational units at MIT, with an ongoing commitment to developing a workforce that reflects the rich diversity of the MIT community. The DUE office heads are expected to show leadership in the area of

diversity, and this effort is shared across DUE. Every employee shares responsibility for fostering an inclusive work environment in which all employees may do their best work.

As a result of the efforts of the leadership team and hiring managers throughout the organization, DUE succeeded in attracting and hiring underrepresented minorities and women to fill open positions across the division. In the past year, DUE met all of its placement goals for women and minorities.

For the period June 1, 2015–May 31, 2016, 85% of all new DUE hires were women and 37% were minorities. During the same period, DUE promoted 20 staff members: 18 women (90%) and seven minorities (35%).

Reorganization

In April 2017, Chancellor Cynthia Barnhart announced the appointment of Ian A. Waitz to the newly created position of vice chancellor. Waitz will be responsible for leading and integrating the offices for undergraduate and graduate education (formerly DUE and ODGE), effective July 1, 2017. Prior to the appointment, Waitz, the Jerome C. Hunsaker Professor of Aeronautics and Astronautics, served as dean of the School of Engineering from 2011 to 2017.

After four years of service as dean for undergraduate education, Dennis Freeman will now focus his efforts on launching a year-long pilot to experiment with and evaluate new models for the first-year experience. In that capacity, he will enlist input from the faculty and the broader MIT community to identify strategies and programs that will improve learning outcomes and strengthen the links between educational innovation and the student experience.

Dennis M. Freeman
Dean for Undergraduate Education
Professor of Electrical Engineering

Global Education and Career Development

The mission of [Global Education and Career Development \(GECD\)](#) is to empower MIT students and alumni to achieve lifelong success through seamless access to transformative global experiences, comprehensive and holistic career services, and mutually beneficial connections with employers and with graduate and professional schools. Our goal is to engage students and alumni in the self-discovery needed to craft lives that are intellectually challenging, personally enriching, and of service to the world.

GECD's talented and hard-working staff strives to elevate GECD to become MIT's leading voice for careers and global education, develop confident and world-ready graduates, create a work culture that maximizes staff growth and engagement, and leverage expanding external partnerships.

Changes and Initiatives

Relocation

In November 2017, GECD relocated for the second time in just over two years from E39-305 to E17-294. GECD's satellite office in Building 5 was closed. A major renovation of the building's second floor was completed, and an on-campus interview facility and classroom are part of the office footprint, located in Building E19. The location is closer to the main campus and GECD is optimistic that student traffic will rebound from the 30% drop the office experienced since the first move. This move was clearly communicated to students, partners, and staff, and GECD is proud of how effectively each team operated despite the disruptive change.

Response to the 2016 Visiting Committee Report

The 2016 Dean for Undergraduate Education (DUE) Visiting Committee requested an audit of MIT Career Services and a set of recommendations for strengthening student career support and diversifying the range of job and career opportunities offered to students, particularly within the fall career fair, which is managed by a student committee. Thus far, GECD has completed a comprehensive audit of MIT Career Services; collected and analyzed relevant data from students, including their perceptions of the fall career fair; drafted a set of recommendations; and worked intensively on the issues, as detailed below.

With the help of Institutional Research and Dean Dennis Freeman, GECD administered a career exploration survey to all MIT students to gather feedback about their career interests and experiences at the fall career fair. Survey respondents reported gaps in the fair, particularly around companies and industries related to careers in academia, health/medicine, law, education (K-12), research, nonprofit, and government. Results will guide efforts to diversify employer engagement, increase career exploration, and improve the fall career fair experience for all students. GECD has advised the fair's leaders in developing short- and long-term diversity strategies.

In collaboration with Institutional Research, GECD also added questions on student career confidence to the graduating student survey. A range of 21% to 31% of graduating

seniors report a lack of career confidence in one or more areas. This was most prevalent among students enrolled in smaller academic departments and schools.

The audit found that a majority of MIT undergraduates use Career Services and that users report high satisfaction. Most students are unaware of the range of services offered and look primarily to peers, the fall career fair, and parents for career information. The cited gaps in industries and company diversity also exist within GECD's employer portfolio, although the spring career fair offers a successful model for broadening industries and companies. A benchmarking study found that Career Services' staff size is smaller than at peer institutions. There are also new models of career services emerging that MIT should consider implementing. GECD provided a set of recommendations to the dean and will bring this forward to the new vice chancellor. DUE provided non-recurring funding to pilot new career exploration programming to address some of these issues.

Enhanced Communications and Access to Resources

GECD launched a new, upbeat marketing campaign for the spring career fair. GECD also piloted a job opportunity email alert tool for students via MIT CareerBridgeLink and continued to update and streamline the educational resources on the GECD website. The main study-abroad subscriber list was shifted from MIT Mailman to Constant Contact, which helped increase open rates from 30% to an average of almost 40%. GECD's Twitter following increased as well, as a result of involving additional staff in providing more rich content via this platform.

GECD increased access to resources by replacing outdated PDFs with updated HTML content, including a new section pointing students to industry research resources and an expanded set of prehealth resources. Although there were lower page views than last year, the average time on a page has increased 20%, suggesting greater user engagement. The Go Global website's bounce rate has decreased and the average number of pages viewed per session has increased. Finally, GECD is also engaged in an online learning pilot to improve service to students.

New Seminar Series in Public Health

Prehealth Advising initiated a successful, health-related seminar series for MIT students during MIT's Independent Activities Period (IAP), Exploring Public Health through the Lens of Endometriosis, with 25 students in attendance. Participants were able to learn about endometriosis, treatment options, health insurance, research, the patient experience, and advocacy efforts—as well as educate local high school students about the disease. In a survey, 82% of respondents indicated that they had increased their knowledge of endometriosis through this seminar series and 92% would recommend this course. GECD will continue to offer this seminar series annually on varied health-related topics.

Expanded Study and Research Abroad Opportunities

In collaboration with the Global Studies and Languages Section in School of Humanities, Arts and Social Sciences (SHASS), Global Education launched the third IAP program in

Madrid this past January: 21G.711 Advanced Spanish Conversation and Composition, designed to advance speaking and writing fluency. Seventeen students participated in the program and had the added benefit of homestays with Spanish families and numerous cultural activities. The Imperial-MIT Summer Research Exchange, co-sponsored with the MIT Office of Undergraduate Advising and Academic Programming (UAAP), was expanded to include two computer science students from each institution for this summer, with a total of 18 students participating in the exchange.

MIT Global Classroom Fund

Global Education, in collaboration with MIT International Science and Technology Initiatives (MISTI), established an MIT Global Classroom Fund through recently renewed Fung Foundation funding. This fund will support new learning opportunities for MIT undergraduate students through coursework abroad that exposes them to global ideas, challenges, and opportunities. The fund enables MIT faculty to develop new or to expand existing courses and course modules for an experience abroad. Four faculty members and instructors were awarded grants in AY2017, including a literature course in London, a D-Lab course focused on inequities and environmental challenges in the global economy, and a joint hackathon between MIT students and Singapore University of Technology and Design students.

Key Accomplishments and Activities

Global Education

There were 1,132 undergraduate participants in global opportunities within 57 countries between June 1, 2016 and May 31, 2017, compared to 897 in the prior year—an increase of 26%. The breakdown of experiences included: 641 internships, 185 in study abroad, 65 public service and service learning opportunities, 35 internship/IROP collaborative opportunities, and 132 in research. A new category of short-term experiences (workshops, training, and teaching) was added, with 74 opportunities during the past year. There were significant increases in internships, research, and study abroad, while undergraduate participation in public service, service learning, and research/internship collaborative opportunities declined.

The 2016 Graduating Student Survey indicated that 49.8% of graduating seniors reported completing a global experience during their studies, a 4.9% increase from the prior year. Among survey respondents, 90% reported gains in understanding cultural differences, 89% reported increased adaptability, 80% reported an enhanced ability to communicate cross-culturally, and 79% reported increased self-confidence. Preliminary results from the 2017 Graduating Student Survey indicate that 54% of graduating seniors reported completion of an international experience during their studies, an 8.4% increase over 2016. The survey closes in September 2017.

In AY2017, GECD had 184 MIT undergraduates participate in study abroad opportunities, representing an impressive 47% increase over AY2016. Security concerns continue to force cancellations of some long-standing programs; however, new programs were launched during this period. The Fung Foundation grant and new general Institute funds enabled us to provide a total of \$156,541 in study abroad

scholarships to 57 eligible students, an increase of 71% in funding and 46% in recipients over AY2016.

New faculty-led programs had a total of 57 undergraduate participants. They include 21G.711 Advanced Spanish Conversation and Composition in Madrid; HST.S46 Evolution of an Epidemic; an archeological dig in Cyprus; and an intensive music program in Senegal. Existing study-abroad programs maintained participation rates or increased.

This was the last year of the Cambridge-MIT Undergraduate Student Exchange due to funding changes in the United Kingdom. During its 16-year history, 829 MIT and Cambridge students participated in the year-long exchange, with 19 MIT students participating in the final year of the program. Planning is under way for a multi-departmental undergraduate student exchange with Imperial College London in place of the Cambridge-MIT exchange.

During AY2017, 686 students attended 28 global education–sponsored group sessions and events, a 14% decrease over AY2016. Distinguished Fellowship programs transitioned to UAAP in December 2016 and their participant data is not included in this report. There were 2,557 individual appointments, drop-in visits, email advising, and videoconferencing or telephone advising sessions, an increase of 19% over the prior year. Of the individual participants, 690 were unique contacts, an increase of 31% over AY2016, with an average of 3.7 “touches” per student.

Prehealth Advising/Support of the MIT Committee on Prehealth Advising

There were 116 MIT student and alumni applicants (46 undergraduates, five graduate students, and 65 alumni) in the 2016 medical school application cycle, up 10% from 105 in 2015. The acceptance rate for undergraduate service users was 93%, a 2% increase from the prior year, while the acceptance rate for all applicants who used prehealth services was 84%. The national acceptance rate was 41%.

There were 1,250 individual prehealth contacts, including appointments, drop-in visits, videoconferences, and emails, a significant decrease over last year. This decline is due to a change in our data collection processes to only track telephone calls that are substantive and involve advising. There were significant increases in drop-in and in-person visits, while videoconferencing and phone appointments declined. This is likely due to the move closer to main campus. Of these visits, 290 unique students and alumni used the service, with an average of 2.8 “touches” per student or alumnus.

There were 325 students and alumni who attended 31 workshops and events, a 30% decrease over the prior year, which is attributable to a shift in student and alumni preferences for on-demand instead of live webinars. The office has recently developed a comprehensive set of online resources, including webinars, tip sheets, presentations, and additional links. In the last quarter, there were 433 total views of the 36 newly added online resources.

Prehealth Advising supports and staffs the Committee on Prehealth Advising. Throughout the year, prehealth staff set up meetings, helped frame discussions, provided background material and data, coordinated committee communications, and facilitated the full committee process to calibrate and approve the final candidate ratings. In 2017, there were 89 evaluation interviews conducted with one of 10 faculty committee members and the senior assistant director for prehealth advising.

Two of prehealth's targeted programs continue to be successful. The 2017 Physician Shadow Program offered 90 shadow opportunities to undergraduates, compared to 87 in 2016, with 66 physicians from Tufts, Massachusetts General, and Boston Children's Hospital. Among survey respondents, 90% reported a better understanding of a medical specialty area. The Discover Prehealth Freshman Pre-Orientation Program enrolled 20 students, an increase of two from the prior year. New activities included sessions about the Sloan Healthcare Certificate and MISTI Africa.

Career Development Programs

There were 3,629 contacts for individual career counseling services via appointments, drop-in visits, videoconferences, and emails, a decrease of 7% from AY2016. Of these sessions, 1,869 were unique users, with an average of 1.9 "touches" per student. Drop-in services decreased by 14% for all students; the availability of drop-in services at four different locations likely contributed to this decline. According to a career counseling service survey, 93% of respondents rated the services "extremely helpful" or "very helpful" and 97% would refer others to an appointment.

Career Services offered 147 workshops, panels, seminars, and events this past year, with more than 5,767 students, postdocs, and alumni attending—representing a 30% increase in overall attendance. We continue to increase the number of programs targeted to freshmen and sophomores, with 438 in attendance. A noteworthy program for undergraduates featured Heidi Kasevich presenting the talk "Quiet Power: Learning to Lead as an Introvert." Of the overall participation numbers, 2,364 graduate students attended programs, a decline of 26%. Targeted graduate programming included the panel "Nuts and Bolts of an Academic Job Search"; the Nature Research Seminar on effective lab leadership by the executive editor of *Nature*, Sir Phil Campbell; "After the PhD/Postdoc: Positioning Yourself for Success," a talk by Melanie Sinche, author of *Next Gen PhD*; and an academic job search workshop and a talk on giving effective presentations, both by Jean-luc Doumont. In a survey of workshops and events, 99% of respondents found the content useful and 95% would recommend the workshop to others.

GECD continues to see growing use of online career resources for students and alumni, with an overall increase of 38% in hits, usage, or new registrations compared to last year. There were 94 new users of the mock interview platform Interview Stream, 8,410 hits to the Going Global international resource, 18,633 views of CareerSpots career videos, 141 users who accessed the MyPlan career assessment tool, and 225 users who accessed Versatile PhD, a platform for exploring non-academic careers.

Enrollment in the SP.800 Freshmen/Alumni Summer Internship Program course decreased to 83. Christopher Capozzola, associate professor of history, served as the program's faculty advisor for AY2017. In a course survey, all responding students agreed that the course helped them assess how potential career options incorporate their values, interests, and skills; 94% agreed that they can develop a career plan and feel prepared to search for a summer experience.

There were 14 disclosed MIT law school applicants during AY2017, including three students and 11 alumni, with 100% of MIT applicants admitted. The number of applicants declined by 10, representing a 42% decline from AY2016. The mean grade-point average for accepted MIT applicants was 3.28/4.0 (converted from the MIT 5.0 scale), and the average LSAT score was 160.5.

Employer and Recruiting Programs

The employment rate among those seeking jobs from the Class of 2016, within three months of graduation, was 89% for undergraduates and 81% for master's degree recipients. The mean salary for graduating seniors increased slightly from the prior year to \$84,882. The mean salaries for graduate students showed a slight increase reported for master of science graduates at \$86,307, a 4% increase for master of business administration at \$134,851, and a 10% increase to \$111,201 for master of engineering graduates respectively. The mean salary for doctoral graduates entering postdoctoral positions showed a small decrease at \$60,605 for the second year in a row, while the mean salary for doctoral graduates entering other positions remained nearly constant at \$117,404. This year's preliminary placement data for the Class of 2017 is favorable, indicating that 81% of undergraduates and graduate students seeking employment have already accepted job offers. The survey period concludes in September 2017.

In AY2017, Career Services hosted 144 different employers on campus conducting 2,749 interviews, representing a 45% decrease from last year. Reasons for the decrease include the continuing trend to convert past interns to full-time hires, increasing use of videoconferencing interviews; the growth of employers located in Kendall Square using their own offices for interviews; and earlier recruiting in the fall rather than year-round. The top five industries participating in on-campus recruiting were computers/high tech/Internet, consulting, finance, aviation/aerospace, and consumer products—with the last two new to the list from last year.

There were 2,595 jobs posted through CareerBridge, a 15% decrease from last year. Through iNET, an online internship consortium with peer schools, there were 230 registered MIT students, with access to 2,146 internship postings. The spring career fair hosted a total of 70 companies from diverse industries, including the sciences, start-ups, robotics, and health/medicine, and was attended by 1,000 students, representing a 24% increase over last year. Overall, there were 1,701 new employers registered, who attended the career fair, conducted interviews on campus, or posted jobs.

In January 2017, GCED sponsored six corporate site visits, including The Broad Institute, Vertex Pharmaceuticals, Domeyard LP, Audible, Cisco Systems, and Wolf Greenfield,

with 107 students participating. According to a post-event survey, 67% of respondents found the site visits “somewhat helpful” or “very helpful.”

Personnel and Professional Activities

Staff Transitions

Distinguished Fellowships was moved from GECD to Undergraduate Advising and Academic Programs, including two staff members, Kimberly Benard and Dwynette Smith. Two additional staff members departed GECD: Todd Jamieson and Debra Shafran. The following staff members were hired: Ashlee Andrews, program assistant; Pierre-Briand Bendsen-Jensen, assistant director of employer relations; and Akunna Rosser, assistant director for prehealth advising. Bob Dolan was promoted to assistant director and Jake Livengood was promoted to senior assistant director.

Leadership

Aleshia Carlsen-Bryan served as a member of the executive board for the Northeast Association of Advisors for the Health Professions (NEAAHP) and planned the Boston Local Area Networking Conference at the University of Massachusetts Medical School. Deborah Liverman is co-leading the Consortium on Financing Higher Education’s career services group. Julie Maddox serves on CISabroad’s advisory board. Meredith Pepin served on the proposal review committee for the 36th Annual Conference on the First-Year Experience.

Awards

Tyrene Jones, Deborah Livengood, and Meredith Pepin were recipients of DUE Infinite Mile Awards.

MIT Committees and Service

Malgorzata Hedderick is a member of the ICC Policy and Procedures Coordinating Committee. Deborah Liverman continues to serve on the Dr. Martin Luther King Jr. Celebration Committee. Julie Maddox serves on the MIT Travel Registry working group and the International Emergency Team. Melanie Parker chairs the Global Theme Team, and Malgorzata Hedderick co-chairs the Student Safety Advisory Team. Deborah Liverman, Melanie Parker, Meredith Pepin, and Libby Reed served on MIT MindHandHeart Initiative working groups. Scott Murray, Tyrene Jones, and Julie Maddox serve on the DUE Diversity and Inclusion Council. Meaghan Shea served as a member of the DUE Infinite Mile Committee.

Conference Presentations and Publications

Bob Dolan presented “Interviewing” and “Negotiating Job Offers” at the American Society of Microbiology Conference, and also presented “Converting Your CV to a 2-Page Resume for Industry” at the National Postdoctoral Association Conference.

Tyrene Jones and Deborah Liverman presented “Going from Buzzwords and Quotas to an Intentional and Inclusive Career Center” at the National Association of Colleges and Employers Conference.

Tyrene Jones also presented “Prepping for a Job Interview,” and Melanie Parker presented “Academic Resumes, Cover Letters, and CV Writing” at the Materials Research Society Fall Meeting and Exhibit.

Jake Livengood presented “Improv Your Programs: Improving Communication and Interviewing Skills” at the regional Graduate Career Consortium, as well as at Harvard University, New York University, and Tufts University.

Meredith Pepin and Deborah Liverman presented “The Importance of Mentors during the Internship Experience for First-year Students” at the Global Internship Conference. Deborah Liverman also presented “Trends in Career Services” at ETH Zurich University and the Career Service Network of Switzerland.

Akunna Rosser presented “Prefacing Advising Conversations through Data” at the NEAAHP Conference 2017. Meaghan Shea presented “The Early Bird Gets the Worm: Freshman Pre-Orientation Program” at the NEAAHP Boston Local Area Network Meeting 2017.

Bob Dolan authored “Career Exploration Strategy” and “Branding—Effective Career Exploration Strategy” both in the Oxford University Press by the Federation of European Microbiology Society and the Genetics Society of America, as well as two additional articles, “When Targeting Non-Academic Jobs, Does Your Resume Communicate the Right Message?” and “CV Writing and the Academic Job Search.”

Jake Livengood co-authored “Facebook, Crowdsourcing, and the Transition to College,” in the *Journal of Further and Higher Education*.

Lily Zhang co-authored an article titled “Working with International Students in the US and Beyond: A Summary of Survey Research by NCDA International Student Services Committee” in the *Journal of International Students* Zhang also authored a book review on The Academic Job Search Handbook published in the *NACE Journal*.

Future Plans

GECD will continue to work under its five-year strategic plan, prioritizing visibility and developing confident and world-ready graduates through staff growth and engagement, and also expanding external partnerships.

Pilot Efforts to Strengthen Career Support and Diversify the Range of Career Opportunities

Career Services will pilot several new efforts to enhance career exploration and to diversify industry representation. We will expand upon early engagement programs for freshmen and sophomores and add new efforts targeted to students in Courses 5, 7, 9, and 12, including on-campus interviews, employer site visits, programming, and events with the fall career fair. Along with the vice chancellor, Career Services staff will work closely with fair organizers to finalize a proposal for changes.

Implementation of New Technologies

A new career services platform, GradLeaders, will be implemented, which will improve career services management; student appointments, activity tracking, and note-taking; and connections to internships, jobs, and employers. Global Education will be implementing a new system called GoAbroad HQ to manage study abroad lead generation and customer relationship management, and is contributing significantly to the planned launch of MIT's enterprise-wide risk management system, Terra Dotta.

New Study Abroad Programs

Global Education hopes to finalize plans for the multi-departmental study abroad exchange with Imperial College London to replace the Cambridge-MIT Exchange, which ended this year. The new Literary London IAP program will launch in January 2017 through the new global classroom fund.

Enhancing Prehealth Advising

Prehealth Advising will be expanding their prehealth mentoring program beyond the initial collaborative effort with the Alumni Association's externship program and will partner with the Alumni Association to utilize the PeopleGrove platform. Prehealth advising will also conduct analysis of medical school applicant acceptances and yields and build upon the new strategic plan to develop initiatives to enhance prehealth student experiences and outcomes.

20th Anniversary of SP.800 and SP.801, Freshmen/Alumni Summer Internship Program

GECD's Freshmen/Alumni Summer Internship Program, a nine-month program that prepares freshmen to identify potential career paths and find an internship, is turning 20 years old, with a celebration planned for October 2017 to recognize its impact on more than 1,400 MIT alumni.

Melanie Parker
Executive Director

Office of Admissions

The MIT Office of Admissions enrolls a diverse and talented 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 Institute upholds a commitment to meritocracy and fair access to the admissions process for students from all backgrounds.

Overview and Accomplishments

The Office of Admissions received 20,247 applications for the first-year class entering in fall 2017, a 6.5% increase over last year. This increase is due in part to allowing international students (based on citizenship) to apply Early Action for the first time for entry year 2016. There were 1,318 international citizens who applied Early Action for entry year 2017 versus 1,012 for entry year 2016. Overall, applications from international students (non-US citizens or permanent residents) increased from 4,299 for entry year 2016 to 4,653 for entry year 2017, an 8.2% increase. Admitted students totaled 1,452, including 14 students admitted from the wait list, together representing 7.2% of the applicant pool.

The overall yield on admitted students increased to 76%. Women will make up 46% of the first-year class, and yield on women was 71% versus 81% for men.

There were 636 applicants for transfer admission. Twenty-nine were admitted, and 26 are expected to enroll. Five enrolled in spring 2017, 21 will enroll in fall 2017, and two are taking a gap year as part of the MIT-Wellesley Double Degree Program.

Veteran Recruitment Initiative

Several years ago, Admissions set a goal to enroll more veterans as undergraduate students. In 2015, Admissions established a partnership with the organization Service to School VetLink that helps veterans matriculate to college. In addition, there have been several efforts to recruit veterans, including visits to the Pentagon and Camp Pendleton, as well as connecting with veterans' program administrators at national events. As a result, MIT is enrolling seven undergraduate veterans in fall 2017—two as first-year students and five as transfer students.

Recruitment Travel and Outreach

Domestic recruitment travel consisted of visits to 34 states and Puerto Rico through 66 central meeting programs. Sixty of these were MIT-only and four were group meetings in collaboration with other schools, including Pomona College, the California Institute of Technology, and Yale University. International recruitment travel included trips to Argentina, Brazil, Colombia, Costa Rica, Ecuador, Georgia, Kazakhstan, Panama, Peru, Russia, and Switzerland.

Visit Programs

On campus, the Admissions Office assumed responsibility for the daily campus tour program, a function previously managed by Institute Events. MIT welcomed more

than 44,000 visitors for information sessions, and provided approximately 2,400 tours to prospective students, parents, and other visitors to the Institute. In fall 2016, the Admissions Office hosted a hands-on lab tour for 40 educators from the National Consortium of Secondary STEM Schools. In addition, last fall, Admissions hosted a group of college counselors from independent schools across New England. In the spring, Admissions hosted approximately 50 educators from the National Partnership for Educational Access. The Campus Preview Weekend yield event continued to be successful with 1,111 admitted students and more than 1,100 parents attending.

Class Profile and Commitment to Diversity

The composition of the Class of 2021 reflects MIT's ongoing commitment to student body diversity and excellence. Of the first-year students entering in 2017, 46% are women, 18% will be the first generation in their families to graduate from college, and 11% are international citizens. Students will be coming from 49 US states and 61 countries. Eighty-nine percent of the incoming class members have been leaders (president, captain, etc.) of an organization, and more than a third (35%) have founded an organization or business. Forty-four percent were valedictorians and 94% graduated in the top 5% of their high school class. MIT continues to partner with the QuestBridge program, a nonprofit organization that recruits high-achieving students from low-income backgrounds, and 99 QuestBridge finalists will be enrolling in the fall. Twenty percent of the Class of 2021 are Pell Grant recipients, up from 16% the previous year. The freshmen enrolling in 2017 arrive with mean SAT scores of 745 verbal and 781 math. These average scores are from the newly administered SAT (beginning in March 2016) or adapted from the old SAT, so they are not directly equivalent to score averages from previous years.

Enrolling students who are US citizens or permanent residents are asked to self-identify their race/ethnicity within categories established by the US Department of Education. International students do not report a race or ethnicity, but when reporting race/ethnicity percentages of the enrolling class Admissions does include international students as part of the entire class—therefore the percentages listed here are from the entire class. Students in the enrolling class have self-identified in the following racial/ethnic groups: American Indian/Alaskan Native: 2%; Asian American: 33%; Black/African American: 10%; Hispanic/Latino: 14%; Native Hawaiian/Pacific Islander: 0%; White: 48%. Twenty-three percent of the enrolling class self-reported as an underrepresented minority student. (Note: students may identify with more than one racial or ethnic group.)

Educational Council

The MIT Educational Council increased the number of alumni interviewers to 5,385 and conducted 17,375 interviews. The pool of interviewers is 19% international and 39% female. This year's group of Educational Counselors includes members from the classes of 1941 to 2017, with 33% of the volunteers hailing from the last 10 graduating classes.

Communications

In response to the recently combined leadership of Admissions and Student Financial Services, a new communications team was formed to support both offices. The team developed several new initiatives, including two brochures—one highlighting the social sciences and the other on biology and chemistry. The team also launched an ongoing print and digital campaign that details innovation and entrepreneurship opportunities at MIT.

Staffing

In AY2017, the staff was composed of 22 administrative staff and 10 support staff, consisting of 22 women and 10 men. Thirty-eight percent of the staff were underrepresented minorities (Hispanic, Asian, and African American).

Stuart Schmill

Dean of Admissions and Student Financial Services

Office of Experiential Learning

The [Office of Experiential Learning \(OEL\)](#) brings together the Edgerton Center; D-Lab; and three First-Year Learning Communities: Concourse, the Experimental Study Group (ESG), and Terrascope. Its director is J. Kim Vandiver, dean for undergraduate research and director of the Edgerton Center. The faculty directors for D-Lab, Concourse, ESG, and Terrascope are, respectively, Professors Dan Frey, Anne McCants, Leigh Royden, and David McGee. Each director has provided a separate report with highlights and new directions during AY2017.

Edgerton Center

Now in its 25th year, the mission of the [Edgerton Center](#) is to uphold the legacy of Harold “Doc” Edgerton—inventor, entrepreneur, explorer, and longtime MIT professor—by promoting hands-on and project-based learning, offering subjects in engineering and imaging, supporting student clubs and teams, maintaining student machine shops, upholding MIT’s expertise in high-speed and scientific imaging, and offering a year-round K-12 science and engineering program. The center created a [short video](#) that communicates the spirit of the center. The video was screened at the Edgerton Center’s 25th Anniversary Gala held in April at the MIT Museum.

Hands-on Learning for MIT Students

Student Clubs and Teams

Since 1994, the center has supported student clubs and teams with seed money, safety and administrative oversight, and with workspace, equipment, and advising. The center is home to more than a dozen student teams (including over 250 students) such as MIT Motorsports, the Solar Electric Vehicle team, the MIT Rocket team, and the MIT Robotics team.

In June, the MIT Motorsports team finished in second place overall across multiple categories at the Formula SAE (Society of Automotive Engineers) Collegiate Design Series Electric competition in Lincoln, Nebraska.

In the first annual Spaceport America Cup, the MIT Rocket Team took second prize in the 10,000-foot commercial off-the-shelf, solid or hybrid rocket propulsion system category at the International Intercollegiate Rocket Engineering Competition. This was the inaugural year of the competition in partnership with the Experimental Sounding Rocket Association.

In January, the MIT Hyperloop Team was one of only three, out of 27 competing teams, that passed safety and design tests, earning the right to run their pods on the one-mile-long Hyperloop track. The team was awarded third place in Design and Construction, and won the Safety and Reliability Award.



Senior Will Harvey was the MIT Motorsports team driver at the 2017 Formula SAE Electric competition in Lincoln, Nebraska. Photo: John Burchard/Sports Car Club of America

Newly appointed MIT Motorsports team captain, junior Cheyenne Hua, sees the value of being a member of the team in both the community she has found and in the hands-on skills she has learned. “I found my family here,” says Hua. “If I were to go back and ask my 14-year-old self, ‘What do you want to be doing in college?’ I’d want to be building things. That’s what I’m doing now.”

Hands-on Academic Offerings

The Edgerton Center offers 20 to 25 subjects for credit each year, including 17 subjects associated with D-Lab, 6.163: Strobe Project Lab, and 6.070: Electronics Project Lab (the latter two taught by James Bales, associate director of the Edgerton Center). Thirty-six people traveled from as far away as Europe and the Middle East (United Kingdom, Switzerland, Norway, and Israel) to attend the 2017 offering of our professional short program, 6.51s High-Speed Imaging for Motion Analysis. Staff also taught EC.A790, a freshman advising seminar, and assisted in teaching 2.007 and 2.00b.

Student Machine Shops

One of MIT’s original makerspaces, the Edgerton Center provides well-equipped workshop spaces for students in three unique shops on campus, with a total of approximately 10,000 square feet. A continuous goal of the Edgerton Center is to improve the quality of the engineering environment for students.

The transformation of N51—known as the Area 51 CNC Shop—is now complete, providing students with a state-of-the-art fabrication lab, including mills, lathes, machining centers, a water-jet cutter, a thermal-forming machine, 3D printers, and an injection-molding machine. Acquired in 2007, the 2,000-square-foot space gives individual students, clubs and teams, and staff and faculty access to CNC tools and equipment, with 350 students trained on the CNC machinery. Students and staff look to technical instructor and master machinist Patrick McAtamney for expertise and guidance.

Now in its 20th year, the Edgerton Center Student Shop in 44-022 continues to draw students, and the machine-shop training class is full months in advance. Of all the shops on campus, only the Edgerton Student Shop supports all students, regardless of their departmental affiliation, providing access to tools for projects of their choosing, as well as basic training in the safe use of the tools. Approximately 200 students this year have taken the 12-hour training in the Edgerton Student Shop. The need for training remains high, with 80 students on the waiting list. Students spend more than 5,000 cumulative hours annually in the Student Shop, expertly led by shop manager Mark Belanger.

The Milk Drop Shop on the third floor of N52 allows for small assembly work and



Mitchell Hsing (G), a member of the Schmidt Research Group, mills an aluminum component at the Edgerton Student Shop. The Schmidt Research Group is designing and fabricating micro-vacuum pumps that can be used for portable diagnostic instruments that require vacuum processing of samples.

larger group work by students on clubs and teams. The center acquired an Epilog Fusion M2 laser cutter. Future initiatives for a battery technology lab and rapid prototyping equipment are projected.

Staff member Diane Brancazio led the renovations of the Edgerton Student Project Lab (4-409) which now functions as both a classroom and a MakerLodge, part of the Project Manus initiative led by Professor Martin Culpepper that introduces freshmen to the tools and technology of making.

K-12 Engagement

Daily, three-hour, project-based lessons in science and engineering for 4th- through 8th-grade students continue to draw more than 2,500 students annually from public, private, and home schools in the greater Boston area and throughout New England. Edgerton Center instructor Amy Fitzgerald leads the lessons—aligned with Massachusetts state standards—with assistance from MIT students. This high-demand program is now in its 20th year.

This early initiative led by the Edgerton Center’s founder and director, Professor J. Kim Vandiver, fueled the growth for future K-12 programming. The center now serves more than 3,000 young students who participate, at minimal or no cost, in a range of hands-on engineering programs offered on-site.

In 2004, the center began working with the John D. O’Bryant School of Mathematics and Science (JDOB) in Roxbury, MA. JDOB educators and students have since worked collaboratively with staff member Edward Moriarty. Ties established between the center and the high school remain firm, with preference given to JDOB students for the Engineering Design Workshop program. The workshop, now in its 11th year, is a one-month summer engineering program for high-school students led by Moriarty. Six JDOB graduates have matriculated at MIT and two JDOB alumni are in their sophomore year at the Institute.



Students in You GO Girl!, the four-day program for rising 9th-grade girls, learn about chemical reactions, first by running a wet lab, then by using LEGO® models to confirm their understanding of chemical change. Robert Veith, the center’s K-12 project coordinator, oversaw the third and final year of the SeaGlide workshop, a one-week summer program for high school teachers and students, co-taught by staff from the Carderock Division of the Naval Surface Warfare Center.

Amy Fitzgerald is in her seventh year of collaboration with General Electric (GE) and its plant in Lynn, MA, on the GE Girls summer program. GE Girls was piloted at MIT in 2011, with 25 rising 7th-grade girls from the Lynn Public Schools. This model has been disseminated to other GE sites and partner educational institutions across the nation. Similarly, Fitzgerald's You GO Girl! summer program, now in its 17th year, engages rising 9th-grade girls in hands-on, project-based lessons in science and engineering.

The Saturday Thing, now in its 12th year, is a program developed by Moriarty that features "unstructured play in a constructive environment." Staffed by Moriarty and MIT alumni volunteers, the program has been replicated in states from Alaska to Florida.

Classroom science teachers seek out the Edgerton Center's Atoms and Molecules sets, made from basic LEGO® bricks, which enable educators to teach concepts in biology, chemistry, and Earth science. Over the past year, we have fulfilled 21 requests to schools across the nation, and 326 in total.

The first sets of Edgerton Center-patented, injection-molded protein and tRNA models have been produced, to go with new DNA/RNA models for use in teaching hands-on middle school and high school biology. Sixty-nine DNA/RNA sets with instructional materials have been distributed to teachers across the nation and nine teachers internationally. Instructional teacher training videos are in production. In collaboration with the Boston Public Schools, the Edgerton Center is training biology teachers at all 32 high schools in the city in the use of all modules in the life sciences curriculum. To date, half of the teachers have been trained and 14 high schools have received the curriculum materials. Kathleen Vandiver, the author of the curricula, has been assisted by Amanda Mayer in the project.

The Edgerton Center's collaboration with i2 Camp—a network of middle school STEM camps—is in the fifth and final year of its grant. Along with other MIT groups, the center developed and implemented an additional science and engineering curriculum that is in place at 14 domestic and two international locations. During Boston STEM week, more than 6,500 Boston Public School students took part in i2 Camp courses. Kinetic Sculpture, developed by the center for i2 Camp, was one of the six courses taught during the week.

This is the third and final year of our collaboration with the Meadowbrook School of Weston. The center developed an integrated, interdisciplinary, design-thinking curriculum and advised on the school's "maker space." A one-year collaboration with Cranbrook Schools in Cranbrook, MI, is in progress with the goal of accelerating innovation and design thinking in the school's curriculum. In addition, the center collaborated with the Winsor School, a private girls' school located in Boston. Edgerton Center staff served as consultants in design thinking on their Global Forum project.

K-12 educators and administrators from as far as China and the Middle East frequently turn to the center requesting hands-on engineering workshops. However, given staffing and space constraints, we are frequently unable to accommodate the many requests.

One way of spreading the experience of the engineering process—and sharing the ethos of the center—is through maker spaces, which are increasingly a fixture in middle- and high-school environments. To this end, Diane Brancazio has led a series of workshops for K-12 educators on how to design and fulfill the potential of a maker space—and how to empower students with the iterative and creative process of engineering. The demand for these workshops is high.

Brancazio leads the Learning Supported by Making project, which received a Teaching and Learning Innovation Grant from the Teaching Systems Lab. The goal is to enable K-12 teachers to integrate maker-based projects into their curricula. The project builds on previous experience in delivering hands-on learning opportunities, as well as on the growing maker movement. There is a need to help educators connect the excitement of making with learning goals in essential subjects, including (but not exclusively) in STEM fields. This project is directed at putting learning into action, by developing and disseminating a methodology for integrating project-based maker activities with core subject content goals.

D-Lab

Founded in 2002 by Amy Smith, senior lecturer in mechanical engineering, [MIT D-Lab](#) works with people around the world to develop and advance collaborative approaches and practical solutions to global poverty challenges. The program's mission is pursued through interdisciplinary MIT courses, research in collaboration with global partners, technology development, and community initiatives—all of which emphasize experiential learning, real-world projects, community-led development, and scalability.

D-Lab has active partners around the world in countries including Botswana, Brazil, Colombia, El Salvador, Ethiopia, Ghana, Guatemala, Haiti, Honduras, India, Lesotho, Nepal, Nicaragua, Nigeria, Pakistan, Peru, the Philippines, Tanzania, Uganda, and Zambia. International partners—such as local non-governmental organizations and social enterprises—define student projects, participate in research, collaborate on the design of technologies, host design summits and trainings, and much more.

Over 15 years, D-Lab has developed 24 MIT courses, enrolled more than 2,000 students in its MIT classes, trained more than 5,000 people worldwide in design or business skills, and provided financial support or mentorship to more than 70 designers and entrepreneurs.

Student Engagement

D-Lab courses continue to be popular among MIT students. This past year, 227 students (183 MIT, 15 Wellesley, 27 Harvard, and two Mass Art) enrolled in 17 D-Lab subjects and one independent study. Two new courses were offered, including D-Lab: Gender and D-Lab: New Economies. D-Lab students come from a variety of disciplines: 114 of the students were from the School of Engineering, 31 from the Sloan School of Management, 13 from the School of Architecture and Planning, five from the School of Science, and the remainder spread across other fields (or from other institutions). D-Lab students tackled more than 65 projects for dozens of partners, which were presented at end-of-semester showcases.

Over the course of the year, through Independent Activities Period trips as well as through spring break and summer fieldwork, 47 D-Lab students traveled to countries including Botswana, Colombia, El Salvador, India, Indonesia, Lesotho, Nicaragua, South Africa, Tanzania, Thailand, Uganda, and Zambia, to work intensively with D-Lab community partners. D-Lab's International Development Innovation Network (IDIN) sent another 52 students from MIT and outside universities into the field. D-Lab makes international fieldwork possible to all D-Lab: Development and D-Lab: Energy students, as well as to a selection of students from each of the other D-Lab classes. Student travel funds were augmented for the second year by \$17,250 from the Underclassmen Giving Campaign. D-Lab staff and researchers also oversaw more than a dozen undergraduate research projects during AY2017 and supervised numerous additional interns from a variety of institutions.

D-Lab Scale-Ups Fellowship Program

D-Lab Scale-Ups was created in 2012 to identify and support technology ventures with potential for wide-scale poverty alleviation. The Scale-Ups fellowship program has sponsored 33 social entrepreneurs working on four continents in sectors including healthcare, agriculture, clean water, waste, energy, hands-on education, prosthetics, and mobile financial services. Through most of the year, the program worked with the four 2016 fellows and made six new awards in June 2017. As of November 2016, Scale-Ups had awarded \$590,000 to fellows. Following Scale-Ups funding, these entrepreneurs have raised more than \$11.4 million in equity, debt, and grant investment. The cumulative impact of the Scale-Ups ventures continues to grow, with 343 direct and 3,278 indirect jobs created, and 701,047 users reached. Founded with a gift from Community Jameel, the program now receives support from the United States Agency for International Development (USAID), Newman's Own Foundation, and other private gifts.

Research

MIT D-Lab's research groups produce accessible knowledge and tools that support technology-enabled solutions to global poverty challenges. The research team specializes in field research that involves working closely with partners and community members around the developing world.

Biomass Fuel and Cookstoves

Nearly three billion people worldwide rely on biomass and traditional methods for cooking and heating. These time-honored means of cooking pose acute and chronic health risks, introduce time burdens on women and children, contribute to unsustainable harvest of forests, and in many cases, represent a significant cost burden on base-of-pyramid households.

Led by research scientist Daniel Sweeney, the D-Lab Biomass Fuel and Cookstoves team has developed innovative methods for testing and evaluating fuels and cooking technology in the lab and in the field as well as developing a range of approaches for measuring performance and impact. Principle projects from the past year included a four-week, USAID-funded International Development Design Summit focused on cookstoves in East Africa, produced in conjunction with the Global Alliance for Clean

Cookstoves; a multi-year study of the adoption of improved charcoal cookstoves in Soroti, Uganda; “The Makaa Project: Co-Design, Performance Testing and Techno-Economics to Improve a Ugandan Charcoal Cookstove” (a master’s thesis project overseen by Sweeney); and the research and development of a major publication, “Handbook for Biomass Cookstove Research, Design, and Development,” funded and to be released and distributed by the Global Alliance for Clean Cookstoves.

Mobile Technology Group

The Mobile Technology Lab, established in 2014 by Richard Fletcher and based at D-Lab, develops new mobile technologies for a wide range of applications that have social impact, including: mobile health, global health, mobile psychiatry, and intelligent agriculture. Their research spans the areas of electronics and sensor design, advanced signal processing algorithms, machine learning, and user interface design.

Current projects include pulmonary and cardiovascular disease diagnostics, video plethysmography, mobile health and behavior medicine, a mobile heart Doppler, a neonatal assessment device, mobile fluorometer, mobile environmental monitoring, and others. In the second half of 2016, the Mobile Technology Group published six journal articles.

Off-Grid Energy

According to the World Bank, roughly 1.2 billion people lack access to modern energy services such as affordable and reliable heating, cooking, mechanical power, transportation, lighting, and telecommunications services. D-Lab believes local organizations in off-grid communities can be powerful agents of change for driving increased energy access, regardless of their existing expertise in the energy sector.

Over the course of the last year, D-Lab Off-Grid Energy Group principal projects included a solar lantern market test in Morocco; a year-long study of Ugandan improved cook stove companies; additional energy assessment training in India and Cameroon; and the production and piloting of the comprehensive D-Lab Energy Assessment Toolkit (with Mercy Corps), which includes data collection tools, data analysis, and visualization tools. These efforts were led by D-Lab researcher Eric Verploegen, with funding from Mercy Corps and Shell Foundation, Grameen-Jameel Microfinance Ltd., MIT-Singapore University of Technology and Design, and other significant private funders. The Energy Assessment Toolkit is intended to guide local organizations through the process of gathering the information needed to make informed decisions about which technologies and business models are best suited to meet the specific needs of their communities through market-based initiatives.

Agriculture and Water

Over the past year, D-Lab has been expanding its research portfolio in agriculture and water with two projects in India: “Goat Herder Needs Assessment” with Heifer International, and the Abdul Latif Jameel World Water and Food Security Lab-funded “Development of Low-Cost Water Filter Using Sapwood Xylem.” Amy Smith and Rohan Karnik of mechanical engineering are co-principal investigators.

The water filter project aims to address the largely unmet need to provide safe and affordable drinking water to low-income groups by developing low-cost water filters that exploit the natural filtration capabilities of xylem tissue in wood. The Goat Herder Needs Assessment project was carried out by D-Lab in spring 2016. As a result of the research and subsequent analysis through summer and fall 2016, the team has started to identify critical challenges and gaps, as well as potential interventions to improve the productivity of the smallholder goat activities.

Local Innovation

Led by IDIN staff member Elizabeth Hoffecker, this group explores the role of local innovation and grassroots problem-solving in improving community wellbeing and addressing development challenges associated with poverty. Current research is organized into three areas: local innovation processes and ecosystems; development impacts of local innovation; and enabling and scaling local innovation.

One recent project is the “Development Outcomes of Local Innovation” study focused in Vietnam, Sri Lanka, Tanzania, and Cameroon. For this project, \$35,000 was raised from the Swiss Development Corporation, in addition to funding from the International Development Innovation Network’s budget from USAID. A peer-reviewed article, “Towards a Complexity-Aware Theory of Change for Participatory Research Programs Working within Agricultural Innovation Systems,” builds on insights from the fieldwork in this study.

A second project on co-developing a locally viable method of avocado oil production in Tanzania received \$10,000 from the Global Center for Food Systems Innovation at Michigan State University.

Practical Impact Alliance

In fall 2014, D-Lab launched the MIT Practical Impact Alliance (PIA), designed to foster shared learning and collaborative action among corporations, non-governmental organizations, and social enterprises committed to scaling solutions to global poverty. Current members include CARE, Ajinomoto, Danone, Johnson & Johnson, Melton Foundation, OCP/Phosboucraa Foundation, Pact, SC Johnson, Siemens Stiftung, USAID Global Development Lab, and World Vision International.

During AY2017, PIA working groups released four publications: “The Metrics Café: A Guide to Bring Funders and Grantees to the Table”; “Ready, Steady, Scale!: Assessing the Scale-Readiness of Your Social Enterprise”; “Inclusive Recycling: Five Building Blocks for Implementing Sustainable Systems in Low and Middle Income Countries”; and “Mobile Phones and Behavior Change: Good Practices for mHealth Interventions.”

In fall 2016, the second annual PIA Co-Design Summit took place in Zambia. The summit brought together more than 25 individuals, including PIA members, Zambian innovators, social entrepreneurs, and members of the local community for a week-long experience of practicing co-design and participatory research.

International Development Innovation Network

The International Development Innovation Network, launched in 2012, is a five-year program funded by the US Agency for International Development's Global Development Lab. IDIN empowers a diverse, global network of innovators to design, develop, and disseminate low-cost, practical solutions to alleviate poverty.

In its fifth year, IDIN fostered and supported its growing network of more than 800 inventors, technologists, and social entrepreneurs from 61 countries who are currently advancing more than 150 innovation technologies and services and 40 social ventures.

In addition, IDIN trained 209 innovators (a nearly even mix of men and women from 29 different countries) at five International Development Design Summits (IDDS) this year: IDDS Botswana (D'Kar, Botswana); IDDS Amazon (Boa Vista do Acara, Brazil); IDDS Cookstoves (Kampala, Uganda); the PIA Co-Design Zambia (Naboye, Zambia); and IDDS Hogares Sostenibles (Sololá, Guatemala).

The 20 IDIN Innovation Center partners are community organizations connecting people to resources, education, infrastructure, and support for the development of technologies that will have an impact on communities living in poverty. Newly IDIN-affiliated Innovation Centers during the past year include DefkoAkNiep Lab (Senegal), GIC Space (Cameroon), Kepler Tech Lab (Rwanda), Sisaket Innovation Lab (Thailand), Victronix Workshop (Tanzania), Artisan Hive (Cameroon), and Link 4/UVG (Guatemala).

IDIN also sponsored 24 D-Lab Creative Capacity Building workshops with a total of 467 participants in six countries: Botswana, Tanzania, Zambia, Uganda, Ghana, and Rwanda.

Comprehensive Initiative on Technology Evaluation

D-Lab continues to be an active partner in the Comprehensive Initiative on Technology Evaluation (CITE), headquartered at the Department of Urban Studies and Planning and funded by the US Agency for International Development. D-Lab staff members Kendra Leith (evaluation manager) and Lauren McKown (IDIN communications) spend half of their time on CITE-related work. Over the past year, CITE initiated two studies led by D-Lab. The first is a wheelchair evaluation, led by D-Lab instructor and Developing World Mobility research lead Matt McCambridge, to compare technical performance of eight wheelchairs which are distributed widely in the developing world, using information gathered from low-cost sensor technology and surveys. The second, led by D-Lab Off-Grid Energy Group lead Eric Verploegen and conducted in partnership with the World Vegetable Center and Mercy Corps, is an evaluation of technologies designed to improve the storage of vegetables using evaporative cooling. Both studies will be completed in fall 2017.

Personnel Changes

In July 2016, D-Lab hired Bob Nanes, a veteran of international development, for the newly created position of executive director. D-Lab instructor Matt McCambridge was made a full-time staff member and Anish Paul Antony joined the staff as a postdoctoral researcher.

Concourse Program

Concourse is a freshman learning community of students and instructors dedicated to exploring foundational questions at the heart of humanistic inquiry and the relationship of these questions to science and engineering. Concourse supplements the MIT experience with the environment of a liberal arts college in which students and faculty together think about the questions that span disciplines, how to formulate those questions, and how to begin to answer them. The curriculum covers the standard science core curriculum (mathematics, physics, and chemistry), offers its own core humanities classes, and integrates both the sciences and humanities into a larger context in the program's weekly freshman-advising seminar. Concourse math and science classes follow the standard curriculum, with scheduled lectures, recitations, problem sets, and quizzes. The humanities classes are Communication Intensive in the Humanities, Arts, and Social Sciences (CI-H) subjects. Their small size permits the class to focus on careful reading, cogent analysis, thoughtful discussion, and good writing. Small group size (maximum of 55) allows for an intimate atmosphere in which a passion for learning and thinking beyond the traditionally strict disciplinary boundaries is fostered.

Personnel

Members of the Concourse faculty and staff for AY2017 included Professor Anne McCants, director; Paula Cogliano, program administrator, Concourse; Linda Rabieh, lecturer, Concourse; Robert Winters, lecturer, Concourse; Steve Drasco, lecturer, Concourse; Jolyon Bloomfield, lecturer, physics; and Elizabeth Vogel Taylor, lecturer, Concourse. In addition, 27 undergraduates were employed as teaching assistants, tutors, and graders.

Enrollment

Concourse had 49 students registered for the fall term seminar. Spring enrollment was 38.

Teaching and Curriculum

Two sections of CC.110 *Becoming Human: Ancient Greek Perspectives on the Best Life* were offered as communication-intensive Humanities, Arts, and Social Sciences subjects in the fall term. In math and science, Concourse offered CC.801/CC.8012 *Physics I*, CC.1802 *Calculus II*, and 18.01A/18.02A and CC.5111 *Principles of Chemical Science*. In the spring, there were two humanities offerings: CC.116 *How to Rule the World*, which was also a CI-H course, and CC.120J *Making Books in the Renaissance and Today*, which was cross-listed with the History Department for a second year. For math and science, Concourse offered CC.802/CC.8022 *Physics II*, CC.1803 *Differential Equations*, and CC.512 *Organic Chemistry*. The fall freshman advising seminar was CC.A10/CC.010 *The Concourse of Core Questions and Ideas*, and it continued in the spring with CC.011 *Thinking Across the Disciplines*. There were also two seminars specifically for upperclassmen alumni: in the fall, CC. S11 *Concourse Special Topic*, and in the spring, CC.012 *Continuing Conversations*.

Accomplishments

Concourse has continued to flourish under the direction of Professor McCants. Enrollments remain robust, and the program continues to develop and strengthen its unique interdisciplinary aspects that permit students to learn deeply as well as to reflect upon and discuss the connections among their courses and between discovery in science and social and political life more generally.

To advance these goals, Concourse continues to expand the options available for first-year and upperclassmen alumni students to engage in conversation between the science and humanistic disciplines. Concourse received a \$25,000 extension of its award from the TW Smith Foundation for an additional year. The funding has allowed the program to continue enhancing upperclassmen seminar offerings, such as CC.012: Continuing Conversations, by providing funding for curriculum work conducted by Linda Rabieh. This award also helped fund an annual curriculum planning retreat.

The spring seminar CC. 011: Thinking Across the Disciplines introduces freshmen to faculty guest lecturers from a wide range of departments at MIT. Guest speakers offered students insights into how their own research and discipline touches on the core questions at the heart of Concourse's focus. Concourse also served as a home for piloting creative new classes such as the hands-on offering with History, CC.120J: Making Books in the Renaissance and Today, in which students built a hand-set printing press and then produced their own books using it. In an effort to address students' physical as well as intellectual well-being, the program continued to offer Concourse-specific physical education classes through a collaboration with the Athletics, Physical Education, and Recreation Department.

Concourse is committed to robust and supportive advising. All staff members serve as advisors, with upperclassmen as associate advisors. Weekly staff meetings enable staff to quickly learn about any student who is struggling academically, emotionally, or socially—and then offer support in a timely way. Developing supportive relationships with students and among the students themselves is a crucial part of Concourse's mission. The program promotes community through regularly organized outings to plays, concerts, museums, and films—often followed by dinner to stimulate conversations and continue the discussions.

Experimental Study Group

Student Statistics

Fifty-nine first-year students were enrolled in the [Experimental Study Group \(ESG\)](#) this year. Of those, 59% were female, 39% were underrepresented minorities, and 8% were international students from countries including India, Iran, Kenya, Singapore, and Taiwan. Approximately 25 non-ESG students enrolled in the five humanities classes offered at ESG. An additional 63 students (most of whom were never in ESG) enrolled in eight pass/fail undergraduate seminars sponsored by ESG in the fall and spring terms.

Staff and Faculty

ESG's administration was headed by Professor Leigh Royden, as well as associate director Graham Ramsay and academic administrator Paola Rebusco. Bettina McGimsey completed her second full year as associate in charge of community and resource development.

Analia Barrantes continued to head the ESG physics staff, joined by Rebusco. Professor Royden co-taught 8.012 to cover for Rebusco, who left on maternity leave partway through the fall term. The mathematics staff was headed by Jeremy Orloff and included Gabrielle Stoy. The chemistry and biology offerings at ESG were taught by Patricia Christie. Former post-doctoral fellow Kyle Peet provided additional help by teaching a section of biology (7.013) in the fall, and a third section of biology in spring 2017. Professor Nick Boekelheide, on sabbatical from Colby College, taught one fall section of 5.111. In the fall term, Dave Custer taught ES.033J Science Writing and the New Media. He also taught (for the fourth time) humanities CI-H credit subject ES.333 Production of Educational Videos: Skills for Communicating Academic and Professional Content in spring 2017. In the fall term, Lee Perlman taught ES.112 Philosophy of Love, and in the spring term he taught ES.S42 Self and Soul.

The ESG teaching staff were assisted by 47 undergraduate teaching assistants in the fall and 28 in the spring; 65% of them were women, and the teaching assistants provided excellent support to the freshmen, learned valuable teaching and leadership skills, and achieved an overall median grade point of 4.8 while doing so.

Educational Initiatives

Faculty Mentoring Program

With funding from the Dean for Undergraduate Education, ESG continued its faculty mentoring program, which is designed to engage ESG freshmen and faculty in meaningful discussions on a range of topics, from discovering Undergraduate Research Opportunities Programs to exploring possible majors. Faculty participated in a range of activities, including informal talks with small groups of students, hiking trips, theater and concert outings, and ESG's Friday lunch conversations. Faculty mentors included John Belcher (physics), John Essigman (chemistry), Taylor Perron (earth, atmospheric, and planetary sciences), Alex Slocum (mechanical engineering), David Vogan (mathematics), and Karen Willcox (aeronautics and astronautics). This program is now guaranteed as part of ESG's ongoing mission, thanks to the addition of a line-item to the base budget through the Office of the Provost.

Teaching in Prison Initiative

A major new initiative, spearheaded by Lee Perlman, brings together individuals incarcerated at MCI-Norfolk with MIT undergraduates in a novel approach to teaching subjects in philosophy and ethics. In spring 2017, Perlman received a \$50,000 grant to continue and expand this effort, with outreach to and involvement of several faculty members from across MIT.

Experimental Study Group Documentary

In anticipation of ESG's 50th anniversary celebration in 2019–2020, the group is working on a feature-length documentary about ESG. The film will span the entire history of ESG, from its inception in 1969 to the present. Directed by Graham Ramsay, the documentary will have an essential teaching component, providing ESG students with the opportunity to learn elements of filmmaking, interviewing, editing, and production.

Undergraduate Seminars

In fall 2016, ESG offered three seminars including a freshman advising seminar ES.729 *It's Dangerous to Take Mechanics Alone: Take Python Too!* (taught by Professor Royden and Rebusco and Barrantes, and ESG alumnus and graduate student Joseph Griffin); ES.200 ESG Teaching Seminar (taught by Christie); and ES.S10 *Introduction to Psychopharmacology* (taught by ESG alumnus Zachary Fallows '09). In spring 2017, ESG sponsored three undergraduate seminars: ES.010 *Chemistry of Sports* (taught by Christie and Steve Lyons); ES.200 ESG Teaching Seminar (taught by Stoy); and ES.S41 *Confronting the Alien in Alienation* (taught by Dave Custer).

Physical Space

With support from Jeanne Hillery, the Dean for Undergraduate Education's (DUE) director of finance, and funding from Critical Resilient Interdependent Infrastructure Systems and Processes, ESG renovated two of its smaller classrooms. This created space that can now be used as a single large classroom or two smaller seminar rooms.

Awards

Winners of the annual Peter and Sharon Fiekowsky Community Service Award, given for outstanding contributions to the ESG community, included Seeta Patel '20, David Mejorado '20, Danny Gelman '20, Allan Gelman '20, and Elaheh Ahmadi '20. Winners of the annual Peter and Sharon Fiekowsky Excellence in Teaching Award, given to graduating seniors who have demonstrated excellence in teaching at ESG over a sustained time period, were Christian Cardozo-Aviles '17, and Jason Fischman '17.

Financial Support from MIT

In March 2017, with support from Kim Vandiver, ESG received a permanent increase to its base budget of \$64,000 to support salaries for ESG lecturers in humanities, a post-doctoral teaching program, undergraduate TA salaries, and ESG's faculty mentoring program. This financial support was awarded following successful pilot programs that were funded by ESG alumni. With support from the DUE director of human resources, Sharon Bridburg, ESG also received equity salary increases for its four female lecturers for an average increase of approximately 15% per lecturer.

Fundraising

By the end of FY2017, ESG raised an endowment of nearly \$1,100,000 in gifts and pledges, with \$800,000 in hand. These funds support educational innovation and experimentation that is not covered in by ESG's base budget. This ongoing fundraising effort will culminate in 2020 when ESG will celebrate its 50th anniversary.

Conclusion

ESG's director and staff continue to work towards improving the freshman experience at MIT. ESG, in concert with its sister programs, continues to work toward expansion of the First-year Learning Community educational model as an integral part of the freshman year and to advocate for innovation, flexibility, and personalized education in the undergraduate experience.

Terrascope

Terrascope is a learning community designed to help first-year students develop the skills to analyze and solve complex problems, work effectively in multidisciplinary teams, and communicate in a variety of formats, including formal presentations, web pages, interactive displays, and radio broadcast segments. The program also serves as an important source of community and support for students as they make the transition to MIT. Terrascope students are presented a complex problem in the fall focused on issues of sustainability and the environment in a credit-bearing subject, 12.000 Solving Complex Problems. The problem that forms the focus for the year's Terrascope curriculum typically relates to environmental sustainability. However, Terrascope is intended to be a valuable experience for students entering all fields. Terrascope classes are unlike any others students will take at MIT, and many students find that the skills they learn can be applied to the rest of their academic studies and in future employment. Terrascope considers first-year students as scientists and engineers from the first day of class and empowers them to think about—and propose solutions to—major issues facing humanity. The Terrascope experience continues in the spring with two classes, one on design process and one (satisfying a communication requirement) on using radio/audio to communicate technical ideas. In addition, each year students may participate in a week-long field experience to gain firsthand experience of issues they have studied from a distance during the year. Core science and mathematics subjects are taken outside the program. Program-affiliated faculty and staff advise all students who join the program each fall. Terrascope also provides students with facilities—workshop and classroom space, a lounge, and a kitchen—as well as community-building events and activities throughout the year.

Personnel

David McGee, the Kerr-McGee Career Development Associate Professor in Earth, Atmospheric, and Planetary Sciences, is director of Terrascope and teaches 12.000 Solving Complex Problems (this year with the aid of teaching assistant Christopher Kinsley). Also assisting were Terrascope staff members Ari Epstein and Emily Martin, along with a dedicated group of undergraduate teaching fellows (all graduates of Terrascope) and a group of MIT alumni who act as mentors within the subject. In the spring, Lecturer Ari Epstein and D-Lab staff member Libby Hsu collaborated to teach 1.016 Design for Complex Environmental Issues. Epstein also taught SP.360 Terrascope Radio in the spring. Undergraduate teaching fellows participated in both of these classes. Emily Martin carried out overall program-coordination duties and held primary responsibility for maintaining and strengthening the Terrascope community and extracurricular programming; she also oversaw the renovation and use of the Terrascope office, classroom, kitchen, and lounge spaces.

Enrollment

In the fall term, 43 students completed 12.000 Solving Complex Problems. In the spring term, 16 students completed 1.016 Design for Complex Environmental Issues, and 12 students completed SP.360 Terrascope Radio.

Program Highlights

This has been a very good year for Terrascope, both in terms of classes and programming and in terms of overall development. Much of the program's activity focused on building partnerships with other MIT units, paving the way for further development in the future. Terrascope continued to strengthen its relationship with the new Environmental Solutions Initiative (ESI), in both formal and informal ways. Terrascope staff participated in development of the new sustainability minor championed by ESI, and Terrascope classes are now officially recognized as a possible "on-ramp" to participation in the minor. In addition, ESI provided financial support necessary for revamping 1.016 Design for Complex Environmental Issues in ways that would make it more attractive to students and maintain its relevance to ESI-related fields. As mentioned above, this year Terrascope and D-Lab began a formal partnership in the design and teaching of Subject 1.016—an extremely successful collaboration that is expected to continue in the future. Terrascope worked with the Department of Mechanical Engineering to ensure that 1.016 will provide the education in design process necessary to fulfill a requirement for the 2-A major, with the result that the class now also carries the subject number 2.00C. Terrascope also collaborated with the MIT International Science and Technology Initiatives (MISTI) Mexico program in the design of this year's field experience, in which students explored sustainability issues related to Mexico City.

This year also marked a key turning point in international collaboration. Terrascope worked with Universidad de Chile in Santiago, Chile, to create a new program, modeled on Terrascope, for the school's engineering and architecture students. To that end, this spring (and for part of the fall) Terrascope hosted Universidad de Chile faculty member Luisa Pinto, working closely with her as she designed the new program, to be implemented in the coming academic year.

In addition, this year saw considerable strengthening of the community-oriented aspects of Terrascope, beginning with substantial renovation of the Terrascope spaces. The office and classroom are now much better suited to encouraging collaborative engagement and teamwork, the kitchen is better equipped and capable of being operated in a more environmentally sustainable manner, and the lounge areas are more inviting and appealing. In addition, the community now formally participates in intramural athletics and specialized physical education programming, both of which are expected to expand next year.

Terrascope students received national recognition for their work this academic year. The final project of the 2016 Terrascope Radio class was awarded Best Documentary at the National Student Electronic Media Convention, and this year's production has been picked up by the Pacifica Radio Network for inclusion in its popular *Sprouts* program, which is broadcast weekly by between 50 and 100 public, college, and community radio stations.

This year's Terrascope theme problem focused on making cities worldwide more sustainable, resilient, and equitable. Freshmen in the program developed a comprehensive approach to solving the problem, and then presented and defended it in front of a panel of global experts. The spring break field experience was devoted to an exploration of Mexico City, covering topics such as transit, housing, access to fresh water, food markets, redesign of urban spaces, and geohazards—all in the context of the city's unique history. Students in the spring class SP.360 Terrascope Radio created a production that presented all of these issues in a unique format—part documentary and part radio-drama—specifically developed to attract and maintain the interest of nontechnical audiences. Students in Design for Complex Environmental Issues developed hands-on design projects aimed at solving problems related to urban sustainability. These included an easily assembled kit version of a small-scale wind turbine, a system for increasing the bicycle-carrying capacity of urban buses, and techniques for using waste plastic as a strengthening material in adobe bricks.

Looking forward, program staff and leadership plan to continue Terrascope's outreach to other units within MIT, such as the Office of Sustainability, and to organizations outside the Institute as well. Next year's core Terrascope problem will present a unique opportunity for such partnerships; it involves developing adaptations to hazards expected to be created by climate change, both on the MIT campus (and in Cambridge in general) and at specific other locations around the world. Efforts to strengthen the program's ties with its rapidly growing population of alumni will continue as well.

J. Kim Vandiver

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Office of Minority Education

The mission of the [Office of Minority Education \(OME\)](#) is to promote academic excellence, build strong communities, and develop professional mindsets among students of underrepresented minority (URM) groups—with the ultimate goal of developing leaders in academia, industry, and society. The office supports MIT’s academic mission to provide the best possible education for all students, while serving the nation’s need to have underrepresented and underserved students in science and engineering disciplines pursue higher education and achieve success in these fields. The vision of the OME is to imagine an MIT experience where all students are connected, happy, excelling, expanding their boundaries, and inspired to follow and achieve their passions. The Office of Minority Education plays an integral role in shaping the college experience of students from underrepresented groups through a robust portfolio of programs and services that fall under five key functions:

- We advise and advocate for students
- We help create a sense of belonging (community-building) and facilitate referrals and access to resources (internal and external)
- We help students achieve their academic goals
- We help students discover and pursue their professional goals
- We provide a holistic network of support

In so doing, the OME positively impacts the experience of all students at MIT and helps the Institute fulfill its overall mission.

Signature Programs

Interphase EDGE

Interphase EDGE (Empowering Discovery | Gateway to Excellence), also known as IP, is a two-year scholar enrichment program which includes a seven-week summer session as well as programming during the academic year (through the end of sophomore year). The focus of the summer program is to give scholars an introduction to the MIT experience by exposing them to the rigors of a full subject load and to life on campus. In addition, the IP curriculum is uniquely designed to impart pivotal concepts that increase long-term academic success. The program not only gives students an “edge” on their MIT experience, it also catalyzes their success beyond MIT. During summer 2016, scholars participated in seminars, workshops, and activities designed to ensure their smooth transition into college life. Additionally, throughout the academic year, first- and second-year scholars continued to build upon the relationships created during the summer by attending bi-weekly and/or monthly meetings with EDGE advisors and monthly professional and academic enhancement workshops and events, including programs that exposed them to various career pathways.

A 2010 assessment (with comparative data over 10 years of Interphase) conducted by Lisa O’Leary Shuler, formerly of the Teaching and Learning Laboratory, revealed the strengths and opportunities of the traditional Interphase model. The assessment

showed that Interphase was achieving its non-academic goals. Interphasers reported the program helped them transition to MIT and build social networks, and also gave them a preview of academics. Although Interphase was achieving some of its intended goals, it seemed Interphase could do more to improve academic outcomes for participating students beyond their first semester. This led to the implementation of Interphase EDGE. This program began as a pilot in summer 2012 (curriculum changes were implemented in summer 2011), and is now institutionalized. EDGE includes both summer and academic year components. In June 2016, the first cohort of Interphase EDGE scholars graduated. Soon after, the program enlisted the help of Melissa Barnett, formerly of the Teaching and Learning Lab, and Ingrid Vargas, formerly with the Chancellor's Office and the Office of the Dean for Undergraduate Education, to complete an assessment of the Interphase EDGE program.

Results of the assessment confirmed the effectiveness of Interphase EDGE in achieving its non-academic goals. Participants overwhelmingly (more than 97%) reported being satisfied or very satisfied with the program, most frequently praising the program for helping them to get to know other students and for helping them to build social networks. Participants also praised the program for helping them transition to MIT, get to know the Institute, and learn about useful resources. Many participants also praised the program for providing a preview of MIT's academic rigor and for helping them gain confidence in their academic skills.

Results of the assessment relative to academic outcomes exposed two groups: Interphase EDGE students who participated in the Experimental Studies Group (ESG, one of MIT's four freshman learning communities) and Interphase EDGE students who participated in none of the freshman learning communities. Academic outcomes for the former were consistently higher than those for the latter, and exceeded those for students in control groups that participated in ESG without EDGE, as well as students in neither EDGE nor any freshman learning community.

The second cohort of Interphase EDGE scholars graduated in June 2017. Prior to the organizational restructuring (i.e., the creation of the new Office of the Vice Chancellor), discussions were under way with Dean Freeman about how to support and expand the reach of the program. Ideas under consideration included growing Interphase EDGE by increasing slots so more students could benefit, creating hybrid programs that would combine the most effective parts of Interphase EDGE and ESG, and creating a new Freshman Pre-Orientation Program (tentatively called IP²) that would offer an abridged version of the Interphase EDGE summer and academic-year components.

The inaugural 2012 cohort of Interphase EDGE scholars consisted of 78 students. All of these students were advised by IP staff members during their first year. After the 2013 MIT faculty resolution on advising was passed (requiring that all first-year students be advised or mentored by a faculty member), major changes needed to be made to the original Interphase EDGE advising model. The 2013 entering cohort consisted of 71 students, and IP staff advised about 50% of the cohort. In 2014, however, all of the Interphase EDGE scholars were advised by non-Interphase staff and/or faculty. In 2015, with support from Dean Freeman, a hybrid version of the original Interphase EDGE

advising model was implemented. IP staff advised about 30% of the students in the cohort; the rest were advised by non-IP staff/faculty. In 2016, the program followed the same model.

The Interphase EDGE advising component is a critical aspect of the program design. The program's advising philosophy is one of increased access, personalized attention, and proactive engagement. Early on, the model showed notable results. For example, among the 2012 and 2013 scholars who had Interphase EDGE staff as their first-year advisors, fall fifth-week flag rates (a list of freshmen who are either failing or in danger of doing so after the fifth week of term) declined to 18.2% and 13.5%, respectively. For the IP '14 cohort (all students advised externally), the fall fifth-week flag rate rose to 24.3%.

Fall 2016 flag rates for Interphasers were lower than previous semesters, at 12.9%. In the spring, the flag rate for Interphase EDGE students rose slightly above the previous semester, around 15.7%. However, only 9% of the students flagged had an IP staff member as their primary advisor, and of those, 100% recovered by the end of the semester. For flagged students not advised by Interphase staff (91%), the recovery rate was 60%. This suggests a need to reconsider fully implementing the original advising model as proposed in 2012 in order to improve short- and long-term academic outcomes. Implementing the original Interphase EDGE model does not in any way contradict the faculty resolution. Every student in IP who has a staff member as a first-year advisor is also matched with an MIT faculty mentor.

Finally, academic-year programming is a core component of the Interphase EDGE model. The IP '16 cohort comprised 70 students (79% URM, 63% first generation or low socioeconomic status, and 40% female). These students attended bi-weekly advising meetings, undergraduate research info sessions, sleep and stress workshops, MIT resource workshops, and workshops designed to help students choose a major. In August 2016, sophomore Interphasers (IP '15), participated in a two-day retreat at the Connors Conference Center. The primary objectives of the retreat were to reconnect the cohort, help them reflect on lessons learned during their first year at MIT, re-establish their connection to the MIT community, and help them begin the process of thinking about their lives or pathways after MIT. In addition to the retreat, Interphase EDGE advisors held monthly individual check-ins with the sophomores, connected them to various MIT programs and resources for upperclassmen, and facilitated informal focus groups with the scholars to discuss program outputs.

Seminar XL and Seminar XL/Limited Edition

Seminar XL and Seminar XL/Limited Edition (LE) are academic enrichment seminars, primarily for freshmen, which implement an innovative and effective small-group learning concept. In Seminar XL/LE, groups of four to six students meet for 90 minutes twice per week during the semester, to share their understanding of course concepts and problem-solving methods. A facilitator, typically an upperclassman or graduate student, guides each group. First-year students can receive course credit provided they attend at least 80% of the group sessions.

In AY2017, a total of 144 students participated in the program. Eighteen of those students registered for more than one Seminar XL/LE subject, for a total of 162 enrollments. The majority of students who registered for Seminar XL/LE (69%) were underrepresented minority students. Eight students participated in Seminar XL/LE sessions. LE sessions are the same as regular sessions, but they begin after the “add date,” and students can earn one unit of credit for LE participation in a subject in which they received a fifth-week flag. The staff of 21 facilitators delivered content in 17 subjects, three of which were not General Institute Requirements but rather introductory courses to popular majors—including 5.12 Organic Chemistry I, 6.00 Introduction to Computer Science and Programming, and 6.009 Introduction to Algorithms. The offering of these introductory courses is a response to feedback from past Seminar XL participants.

The Seminar XL/LE training and evaluation plan, developed in collaboration with the MIT Teaching and Learning Laboratory, involves offering training to new and returning facilitators and administering quantitative assessments at the middle and end of each semester. Below are highlights of the feedback for both the fall and spring semesters.

- 85% of the respondents agreed that they “understood concepts better after the Seminar XL session”
- 84% of the participants who responded in fall 2016 stated they would “recommend their facilitator”
- 80% of the respondents “would participate in Seminar XL again”
- 77% of participants who responded in spring 2017 rated the “quality of teaching” in Seminar XL as “excellent” (the highest option)

AY2017 was a year of staff transition for Seminar XL/LE. Moving forward, the Seminar XL/LE staff will focus on increasing the number of graduate student facilitators to further improve the teaching and learning experience in Seminar XL/LE sessions.

Talented Scholars Resource Room

The Talented Scholars Resource Room, also known as TSR², is a study lounge (room 16-159). All MIT undergraduates are welcomed to use the space to study individually or in groups, to lounge between classes, or heat up their lunch in the microwave. In addition to serving as a comfortable and centrally-located space, the TSR² provides three free academic resources each semester: p-set nights, exam reviews, and one-on-one appointments. P-set nights are weekly drop-in sessions in which students ask teaching assistants questions about their p-sets and get tips on how to frame and solve problems. Exam reviews are also drop-in sessions that occur 24-48 hours before an exam, particularly in classes that are General Institute Requirements. Lastly, one-on-one appointments are pre-scheduled one-hour individual appointments that students can reserve using an online booking system.

All students who use the TSR² lounge space or its academic services are asked to sign-in to a computer kiosk. Data compiled in AY2017 show that 381 students visited

the space at least 1,734 times. Most of the TSR^2 users were underrepresented minority students (61%) and freshmen (58%). Below is the breakdown by semester.

Visit Type	Fall 2016	Spring 2017
P-set night	120	152
Exam Review	68	113
One-on-one Appointments	45	150
Individual Study	212	581
Lounge	106	187
Total Visits	551	1,183

There was a significant increase in student visits in the spring compared to the fall semester, particularly in one-on-one appointments (233% increase) and individual study (174% increase). This is likely due to two things. First, TSR^2 significantly increased advertising to promote its services, including the availability of the space as a study lounge. Second, TSR^2 was more diligent about having students sign in via the computer kiosk.

This academic year, 25 teaching assistants (upperclassmen and graduate students) provided coverage for p-set nights, exam reviews, and one-on-one appointments. Surveys sent out to students who participated in any of these three services showcased the following:

- 92% and 95% of respondents in fall and spring, respectively, agreed that they “would request/recommend this tutor again”
- Combined feedback for the AY16-17 shows that 91% of respondents agreed that p-set nights, exam reviews, and one-on-ones helped better prepare them for their exams and courses
- 82% and 86% of respondents in fall and spring, respectively, agreed that the “TA helped me better understand the material”
- 72% of respondents in the spring rated their TAs as “excellent” (the highest option), which was an improvement from the fall semester (58%)

Based on the experience and feedback from the fall semester, TSR^2 staff implemented changes which included: adjusting p-set hours from 7–11 pm to 6–10 pm; providing healthy snacks once a week during p-set nights; and providing performance-based increases in hourly compensation to teaching assistants. Additional improvements that the TSR^2 staff would like to implement in the next academic year include increasing the number of graduate student teaching assistants and streamlining the online one-on-one appointment booking process.

Laureates and Leaders

Laureates and Leaders, the Office of Minority Education’s signature graduate school program, continues to offer relevant and high-quality programming. This academic

year, 26 sophomores were selected to be part of the 2019 Laureates and Leaders cohort. They join the class of 2018 cohort, bringing the current total of Laureates and Leaders participants to 44. The breakdown is 55% female, 68% URM, and 32% non-minority (this latter data point also includes students who identify with multiple ethnicities—which is 16%).

The 2017 Laureates and Leaders class, composed of 19 active members, graduated in June. Of the 19 students:

- Nine will enroll in PhD programs in schools such as MIT, Caltech, and Stanford
- Three will take a gap year before applying to PhD programs
- Three will earn a master's in engineering (MEng) before pursuing a PhD
- Two will pursue MD/PhD degrees
- One will pursue a master's in business administration
- One will take a gap year before applying to medical school

Similar to last year, AY2017 programming included faculty research talks, team building activities, workshops, study breaks, panel discussions, and in-person Graduate Record Examinations review sessions. As part of the yearly program assessment, the program collected student feedback. Notable highlights of the feedback survey included:

- 100% of the respondents shared that, to date, their expectations of the program have been met
- 100% of the respondents felt “positively about the Laureates and Leaders program”
- 97% of respondents agreed that “the program improved my understanding of the graduate school application process”
- 50% of the respondents felt “connected to the other students in the program”

Based on the student feedback, Laureates and Leaders staff plans to increase cohort socialization by adding a more intentional community-building event (such as a weekend retreat) in the upcoming academic year.

Mentor Advocate Partnership Program

The Mentor Advocate Partnership (MAP) is a volunteer mentoring program which pairs MIT freshmen with staff, faculty, post-doctoral researchers, and/or graduate students for a year-long mentoring relationship. MAP entered its ninth year with 34 mentors (44% URM; 71% female) and 37 protégés (78% URM; 46% female). The program's kickoff event, Nexus, was held in September 2016, as mentors and protégés participated in customized training sessions led by [Mass Mentoring Partnership](#). During the academic year, these mentoring relationships were catalyzed through one-on-one interactions and a series of group activities throughout fall 2016 and spring 2017. Key group events included a mentor appreciation luncheon, ice cream social, and an end-of-year

celebration, at which mentors and protégés were recognized for their participation in the program. Additionally, there was a special training session for mentors, held in November 2016, called Effective Mentoring: Making a Connection, Making a Difference.

Although the response rate for the end-of-year survey was lower than anticipated (27% of protégés and 59% of mentors responded), 80% of mentors said that “my protégé is open with me (shares thoughts and feelings)” and 80% of protégés reported that their mentors care about them.

E-Mentor Advocate Partnership

Now in its fourth year, the MAP E-Mentor Advocate Partnership program (EMAP), a spin-off of the traditional MAP program, continued to focus on pairing MIT sophomores, juniors, and seniors with industry and alumni professionals. EMAP aims to help participants transition from their undergraduate years at MIT to the workplace and/or graduate school. Protégés communicate with their mentors via email, Skype, text, and phone. For AY2017, there were 32 mentors (28% URM, 34% female) and 35 protégés (70% URM, 57% female). EMAP mentors are from companies that are members of OME’s Industrial Advisory Council for Minority Education (IACME). Mentors came from the following companies: BP, Draper Laboratory, Google, Intel, MIT Lincoln Lab, NASA, and Raytheon. In addition, several mentors were from MIT affinity groups, such as Black Alumni at MIT and Latino Alumni at MIT. Of the 35 protégés, there were 12 sophomores, 16 juniors, and seven seniors.

According to the end-of-year survey (completed by 46% of the protégés) 71% reported that working with their mentor better prepared them to transition from MIT into the workplace, 76% reported being more confident in their readiness to develop as a professional, and 57% reported having made valuable connections with people in industry. Mentors (44% response rate) reported having a positive experience as well: 69% agreed that they gained personally from this mentoring relationship and 69% said they would volunteer again next year or in the future.

An EMAP graduating senior captured the essence of the program with this feedback: “I have used EMAP as a way to get advice on starting a transition into a career and advice from my mentors has been a great help to me. I think one of the biggest things they have helped me with is learning to talk about my experiences with confidence and being aware of my worth.”

A key goal of EMAP is to enhance the mentor-protégé experience. Although this can be complicated, since these relationships are (primarily) virtual in nature, EMAP hopes to refine training programs for mentors and protégés and strengthen match-tracking processes. The latter will enable EMAP to more closely monitor the success of the relationships and to intercede earlier if the relationships encounter challenges, such as not being able to connect as often as one of the participants would like.

Momentum

In January 2017, a total of 29 students (24 first-year, five second-year, 80% URM, and 55% female) participated in the Momentum program, an interdisciplinary project-

based class held during the Independent Activities Period. The program is funded by OME's Industrial Advisory Council for Minority Education, which is composed of 23 corporate, government, and nonprofit organizations. Additional funding was provided by the General Motors Foundation and the Center for Sensorimotor Neural Engineering. Representatives from IACME companies also served as judges for the Momentum poster presentation and competition.

This year was the third and final year of Momentum's partnership with the National Science Foundation Center for Sensorimotor Neural Engineering (NSF CSNE). Participants explored the brain-computer interface to improve lives by connecting the brain with technology. Professor Joel Voldman from the Electrical Engineering and Computer Science Department (EECS) served as the lead instructor. Professor Voldman is also a member of the OME Faculty Advisory Committee and served as the MIT principal investigator for the NSF CSNE grant that fosters this partnership. Joe Steinmeyer, a lecturer from EECS, taught several lectures/workshops and provided general technical support throughout the class. Marc Graham PhD '06 (mechanical engineering) led a lecture on deterministic design. Barbara Hughey, a senior lecturer in the Department of Mechanical Engineering, and Jane Kokernak, a lecturer in Comparative Media Studies/Writing, led a workshop on effective poster making. Students also participated in a customized public speaking workshop led by Eliza VanCort, a public speaking trainer. Throughout the class, students received assistance with resume building, public speaking, and interviewing skills. Participants were also connected to various Institute resources such as D-Lab, EECS Communication Lab, MIT Communication Lab, and Global Education and Career Development, as they built their prototypes and prepared for their final poster presentations and competition.

Students worked in small teams to construct a customized rover to navigate a course. Each team designated a driver who could not see the course but had to navigate the rover using a feedback system. Momentum 2017 culminated with a poster presentation, competition, and networking event with industry representatives on February 2. Each team presented their final projects. Five IACME companies (Microsoft, Lincoln Lab, NASA, Jet Propulsion Laboratory, and Raytheon) interviewed Momentum participants for potential internship positions; 22 students received interviews, five offers were extended, and five were accepted. Two videos of Momentum 2017 are available: [Momentum 2017 Intro](#), and [Momentum 2017 Poster Presentations and Competition](#).

The 29 students involved in Momentum juggled schedules, met new people, learned new skills, and helped create something that they may not have otherwise thought possible. A participant stated, "Momentum has made me realize that I am very excited about hands-on work...the problem-solving, design, and actual coding/EE work. I also have a better understanding of how I like to work—intensely and closely with a small group of teammates."

Master Your Future

Master Your Future is funded and delivered in collaboration with IACME. The events and workshops are designed to help sophomores, juniors, and seniors successfully navigate the work environment. There are four Master Your Future professional

development modules: Career Paths, Job-finding Skills, Business Etiquette, and Employability.

During the fall, the Master Your Future program offered a “Networking 101” workshop with a representative from Capital One. This workshop helped students develop a pitch and learn how to create and maintain professional networking connections, using role-playing activities to encourage active student participation. In the spring, a representative from MIT Lincoln Laboratory facilitated a Cultural Responsibility workshop. The workshop sought to help students develop skills to prepare them for high performance teamwork within diverse groups. A second spring workshop was offered by a representative of NASA Jet Propulsion Laboratory. The workshop, “Job Search Strategies,” provided students with an overview of how to find job opportunities, ways to make a resume and cover letter stand out, and how to develop professional connections. Twenty-five students attended Master Your Future workshops in AY2017.

Recharge Day

On November 2, several offices within DUE came together to host a day of stress-relieving activities for students. DUE Recharge Day was a collaborative effort to provide students with an opportunity to engage with DUE offices and take a few minutes out of their day to relax and recharge. Students were also encouraged to participate in a “passport challenge.” The passport was a card that students could take to each location and receive a sticker for participating. If students visited at least four offices, they were entered into a TechCASH raffle, and the first 100 students to complete the challenge received a DUE Recharge portable cell phone charger.

More than 350 students participated in the challenge and 125 completed it. Each office hosted its own activities, and all were popular with students. The OME welcomed students with “Hugs and Hot Chocolate” served by staff. OME staff was able to provide a little stress relief by offering a warm and welcoming atmosphere, high-fives, words of encouragement, and hugs (for those who needed them), while students enjoyed hot chocolate and snacks. Approximately 200 students visited the OME for the event.

Graduating Minority Luncheon

The Graduating Minority Luncheon was sponsored by the Office of the Dean for Student Life, The Office of the Dean for Undergraduate Education, and the Office of the Dean for Graduate Education. The luncheon took place in Walker Memorial on June 9 and drew approximately 500 attendees. The planning committee was made up of individuals from the Office of Minority Education, the Office of Multicultural Programs, and the Office of Dean for Graduate Education. Designed for undergraduate and graduate students and their families, the luncheon was both a celebratory event and an opportunity to recognize students’ accomplishments. The event included a photo booth to help graduates and their families capture the memories from this very special day.

New and Pilot Initiatives

Let's Chat in the OME

This spring, the Office of Minority Education partnered with staff in MIT Mental Health to offer anonymous sessions, called Let's Chat in the OME, on four different evenings. This initiative was a direct response to the Black Student Union's (BSU) and the Black Graduate Student Association's (BGSA) call for more support for students of color in the area of mental health and well-being.

The new chief of mental health services, Karen Singleton, supported this endeavor and personally offered her counseling services at two of the four sessions offered in April and May. In total, four MIT mental health practitioners held appointments in the OME. The counselors held private sessions with 12 students. The OME collected only participation data; students were not asked for their names or any related demographic information. Due to the strong level of interest in this program, OME plans to offer it again in the fall. The main goal is to increase access and reduce barriers to services that can be integral to overall student success and mental well-being.

Prehealth Advising in the OME

The Office of Minority Education is always looking for ways to better serve students and to be responsive to their expressed needs. In partnership with prehealth advisors from the Global Education and Career Development office, the OME offered drop-in prehealth advising services onsite on three different dates during the spring semester. Prehealth advisors met with 16 students who were primarily interested in medical careers. The 16 participants included: 10 females (63%), nine URMs (56%), seven seniors (44%), one junior (6%), four sophomores (25%), three freshmen (19%), and 1 alumnus (6%). OME plans to offer this program again in the fall.

Males of Color Initiative

The progress of males of color, particularly as it relates to higher education access and degree completion, has become of topic of concern for many universities across the nation, including MIT. Following the recommendations for a more inclusive MIT set forth by the BSU and the BGSA, the Office of Minority Education began to envision a program that would support male students of color at the Institute. Creating the framework for this program involved collaborating with Luis Ponjuán (a faculty member at Texas A&M University and a national expert in this field), other administrators at peer institutions implementing similar programs, and attending the Men of Color National Summit, hosted by Clemson University in April 2017.

Ponjuán visited MIT in October 2016 and March 2017. In the fall, he met specifically with OME staff to educate and inform the team about this issue. He interviewed a small group of males of color in order to catalyze the conversation about what the OME can do to address the needs of MIT students in this specific area. He also held a public forum that attracted close to 100 staff, faculty, administrators, undergraduates, and graduate students. In the spring, he conducted a three-day visit to MIT. During that time, Ponjuán and one of his colleagues met with key stakeholders, including male undergraduate and graduate students of color and staff, faculty, and senior administrators, including

Chancellor Cynhia Barnhart, Vice President Kirk Kolenbrander, Vice President and Dean for Student Life Suzy Nelson, and Dean for Undergraduate Education Dennis Freeman. In these sessions, he inquired about their experiences of, or their interactions with, male students of color, both inside and outside of the classroom. These individual and group meetings were designed to give Ponjuán a better understanding of the experiences of male students of color on MIT's campus, as well as the institutional policies and programs targeted to help underrepresented students succeed academically, specifically male undergraduate and graduate students. Ponjuán offered a second public forum on the topic that was also well-attended.

Ponjuán is currently preparing a report that will highlight his findings relative to the experiences, successes, and challenges facing underrepresented males at MIT. The report will also offer specific recommendations on what the Office of Minority Education can do, and more importantly, what MIT can do, to support the continued success of males of color. (It is important to note that this is not a research project. The report is for internal MIT use only.) The final report is expected in late July or early August 2017.

In the meantime, the OME has started its own exploratory work in this area. The office has built a framework for a program that could be rolled out as early as fall 2017, however, it will likely be implemented in spring 2018. This summer, the OME will be sharing the framework with MIT faculty, staff, and students in order to get specific feedback on the proposed program infrastructure and core components. Of course, Ponjuán's findings will be integrated into this new program as appropriate or feasible. The program is tentatively being called MAN UP2 (Male Achievement Nurtured for Unlimited Power and Potential). Designed as a cohort-based program, MAN UP2 seeks to support the academic, emotional, social, and professional needs of male students of color. By developing campus partnerships with Global Education and Career Development, Student Support Services, Student Disability Services, the Office of Undergraduate Advising and Academic Programming, and others, MAN UP2 will deliver workshops and trainings pertinent to the experiences of male students of color at MIT. Participants will have the opportunity to connect with male alumni of color in industry and receive peer mentoring from male upperclassmen and graduate students.

Fund Development

Each year, the OME receives financial support from IACME, which now comprises 23 corporate, government, and nonprofit partners, including the newest partners Akamai and Praxair, as well as members of the Black Alumni/ae of MIT and Latino Alumni/ae of MIT. The council, co-chaired by MIT alumnus Robert Kurtz '63 and Dean DiOnetta Jones Crayton, provides approximately \$80,000–\$90,000 annually to underwrite costs associated with current programs and initiatives. The Kristala L. Jones Prather (1994) Interphase Fund has now been converted into an endowed account. The OME also continues to receive nominal yet impactful contributions from key alumni each year.

As mentioned earlier, this January marked the final year of the CSNE sponsorship of a three-year collaboration with the Momentum program, however, the OME continues to partner with the center to support its diversity, education, and outreach goals. The OME and the MIT Office of Engineering Outreach Programs received approximately \$40,000

to offer classes, workshops, faculty talks, and seminars that exposed students to careers in neural engineering. Over the last year, Interphase EDGE, Laureates and Leaders, and Momentum hosted three major events that exposed over 100 students to the CSNE's research.

Staffing and Infrastructure

This spring, many students of color experienced great distress as they struggled to understand the political and social justice issues facing the nation, while striving to achieve their substantial academic and professional goals at MIT. Empirically speaking, feeling a "sense of belonging" became even more important to the students we serve. Many of these students find or establish a sense of belonging at MIT through their affiliations with student organizations. This year, however, student leaders of the OME Student Advisory Council (OMESAC) which is composed of 17 student organizations, asked the OME to help them in a way that they never have before. In order to effectively manage their mental health and well-being and their academic workload, they needed help coordinating some of their large-scale, signature events. The OME hired a part-time/temporary events coordinator to work directly with the student organizations.

This past year, the OME focused on refining its brand. We updated the [website](#), developed new marketing brochures, and expanded our social media presence to include Facebook, Twitter, and Instagram. Staff includes the associate dean/director, three OME assistant deans, two program coordinators, two program assistants, and two administrative assistants. The current professional team is creative, committed, and highly qualified. They are also experts at leveraging current resources and building partnerships and collaborations that allow the OME to offer more to the students it serves. Overall, the OME had an exceptional year, and remains committed to doing this work with excellence.

DiOnetta Jones Crayton

Associate Dean, Office of the Dean for Undergraduate Education

Director, Office of Minority Education

The Registrar's Office

The Registrar's Office ensures the integrity of academic information; fosters curricular innovation and educational community-building; and develops and maintains a robust infrastructure that is responsive to the evolving needs of students, faculty, staff, and alumni.

Technological Highlights

This was the second of three years guided by the 2015–2018 Education Systems Roadmap: Advancing the Student-Faculty Experience. The Registrar's Office continued to partner with Information Services and Technology (IS&T) in stewarding the projects, enhancements, and mandates contained therein on behalf of the Dean for Undergraduate Education, the Office of the Dean for Graduate Education, and the Dean for Student Life. The Registrar's Office advanced significant technological improvements through the following efforts:

- Developed and deployed a new web-based request process for requesting and managing classroom reservations for ad hoc events. The Registrar's Office manages the largest volume of space for events on campus and this new system provides not only a more efficient request tool, but also the ability to see what space might be available within the current term.
- Partnered with Learning Machine to develop a digital diploma pilot secured against the Bitcoin blockchain. The June 2017 Master of Finance and Master of Science in Media Arts and Sciences cohorts were included in the pilot.
- Expanded the cross-registration process with Harvard University so that MIT students could use the MIT add/drop system to initiate and submit cross-registration for Harvard subjects.
- Expanded the suite of enrollment tools by developing and deploying central tools for instructors to manage pre-registration enrollment and/or maintain a waitlist.
- Digitized the Light Load and Change of Major petition processes using the Mendix platform as recommended by IS&T.
- Continued to develop the underlying data structure to support subjects, including developing a new version of the Oracle Form SCASUBJI and partnering with vendor CourseLeaf to digitize the process by which departments propose subjects. The release of these products is due in late summer 2017.
- Partnered with the National Student Clearinghouse to provide self-service for students who need Enrollment Certification letters.

Educational Policy and Governance

The Registrar's Office played a major role in advising senior administrators and faculty committees on several complex student issues involving registration, academic calendar, and degree programs. Highlights included:

- Provided ongoing staff support to the Committee on Curricula (CoC), as well as the Committee on the Undergraduate Program (CUP) and its standing Subcommittee on the Communication Requirement (SOCR) and Subcommittee on the Requirement (SHR). The office also served as an active member of the Committee on Graduate Programs.
- Facilitated the review of two proposals to establish new undergraduate degrees in chemistry and biology (Course 5-7) and computer science, economics, and data science (Course 6-14).
- Approved a new interdisciplinary minor in polymers and soft matter in conjunction with Courses 2, 3, 10, and 20. Also approved an inter-school minor in environment and sustainability offered by the Environmental Solutions Initiative. The minor will receive academic oversight from a faculty committee with representation from all five Schools.
- Provided advice and guidance on the creation of a new degree type: master of applied science.
- Provided advice and guidance on the creation of a new “micro-master’s” degree in data, economics, and development policy.
- Actively participated in discussions and provided support for the CUP study group to understand trends and factors influencing major enrollments and student choice of major. The study group began meeting and analyzing data. The Registrar’s Office will continue to support the group as it continues to analyze and collect additional data in the upcoming academic year.
- SOCR reviewed 74 student petitions and SHR reviewed 73. The subcommittees also reported to the CoC on the petitions received and reviewed in the previous academic year.
- Managed the review by SOCR of 20 new Communication-Intensive subjects and the review by SHR of 45 new and revised subjects that will count toward the HASS Requirement.
- Provided general advising and targeted reminders to students as they progressed through the Communication Requirement and the HASS Requirement.
- The CoC reviewed 196 applications for double majors, 14 petitions regarding the Restricted Elective in Science and Technology requirement, and 11 Institute Laboratory petitions. On behalf of the CoC, the curriculum management team also worked with SOCR and SHR to coordinate the complex review of General Institute Requirements for former students who apply for readmission after failing to complete their undergraduate studies within 10 years of original entry. Six such cases were reviewed during AY2017.
- The dynamic nature of MIT’s curriculum was aptly illustrated by the addition of 194 subjects (104 undergraduate; 90 graduate), coupled with revisions to 563 existing subjects (310 undergraduate, 253 graduate). In addition, 100 subjects were removed from the catalog, and three were reinstated. MIT begins AY2018

with a regular curriculum that includes 3,883 subjects (45.9% undergraduate, 54.08% graduate).

- CoC collaborated with CUP to create a motion to revise Section 2.84.3 of the Rules and Regulations of the Faculty, which governs the Institute Laboratory Requirement, such that approved subjects with other than 12 and 6 units can be used toward fulfilling the 12-unit requirement. The Faculty approved the motion at its April 2017 meeting.
- CoC approved a proposal to divide Course 5's four modular laboratory subjects into discrete 3- to 6-unit subjects that would run for a third of a term, some of which could be combined for Communication-Intensive subjects in the major or Institute Laboratory credit.
- CoC discussed the eligibility guidelines for a double major, focusing on two issues: the minimum grade point average (GPA) requirement and the practice of awarding financial aid to students who stay at MIT past eight terms in order to graduate with a double major. Plans to revise the committee's guidelines and application language concerning GPA are in progress. The committee referred the latter issue to the Committee on Undergraduate Admissions and Financial Aid for consideration.
- In keeping with its responsibility to seek reviews of interdisciplinary minors at least once every five years, CoC conducted a review of all interdisciplinary minors within the School of Humanities, Arts, and Social Sciences.
- Worked with faculty governance to advise on and implement new calendar deadlines for partial term subjects.
- Worked with the assistant dean for LGBTQ+ Services to create a process for students to change the gender marker on their official academic record more easily.
- Worked with the assistant dean for LGBTQ+ Services, the Institute's Title IX Coordinator, IS&T, and the Information Technology Policy Committee to modify the procedures by which students can change their Kerberos user name.

Faculty Support

The Registrar's Office provided exemplary service and maintained a trusted partnership with the faculty and the community in support of the Institute's educational mission.

Classroom Scheduling

The schedules team made 5,314 classroom reservations for lectures, recitations, laboratories, and design sessions in support of MIT subjects. The team processed an additional 11,598 reservations for academic activities, such as exams (including final exams), review sessions, not-for-credit seminars, office hours, tutorials, presentations, and more.

MIT's classrooms are also in high demand as community spaces for meetings, conferences, student groups, continuing education, and registered events throughout the year. The Schedules Section made 25,348 classroom reservations for 7,655 events on behalf of the MIT community for the fall and spring terms, and more than 8,017 reservations for over 1,141 events in the summer.

Classroom Management Highlights

Changes to Classroom Inventory

- Led the effort to develop a design scope for the renovation of lecture hall 35-225. The renovation is to include improved sightlines, fixed student tables, and three video projectors.
- Completed the renovation of classrooms 4-148, 4-152, 4-156, 4-160, and 4-364. These classrooms were completed for the start of the fall 2016 term.
- Completed the seating replacement and room finishes update for lecture hall 26-100. These updates were completed for the start of the fall 2016 term.
- Completed the seating replacement and room finishes update for lecture rooms E51-315 and E51-325. These updates were completed for summer 2017.

Enhancements to Classrooms

- Installed new floor covering and a motorized projection screen in 13-1143, and also painted the room
- Converted 1-136 recitation classroom with tablet armchairs to a seminar room with conference table and chairs
- Installed new acoustic wall panels and painted rooms 26-302, 26-310, 26-314, 26-322, and 26-328
- Installed new classroom door and painted 4-249
- Installed new acoustic wall panels, window shades, and audio/visual system in 3-133
- Replaced tablet armchairs in 1-135, 1-242, 4-152, 4-158, 4-162, 36-144, 36-153, 36-156, 36-372, and 38-166
- Installed new tables and chairs in 4-148 and 36-112, and new tables in 4-144 and 4-146
- Replaced floor covering in 1-246, 36-112, and 36-156 and installed new whiteboard in 33-418
- Installed new video projectors and updated code to Crestron control systems for classrooms 3-333, 4146, 4-159, 4-163, 4-231, 4-237, 4-253, 56-114, and 56-154

- Installed new audio-visual systems, including video projector and connection points for laptops, in seminar classroom 4-251

The MacVicar Faculty Fellows Program

- This year marked the 25th anniversary of the [MacVicar Faculty Fellows Program](#). The program, honoring MIT's best undergraduate teachers, named three new Fellows: Associate Professor Maria Yang, mechanical engineering; Professor Caspar Hare, philosophy; and Professor Scott A. Hughes, physics.
- The new fellows were introduced publicly by Dean for Undergraduate Education Dennis Freeman on MacVicar Day, March 17, 2017, at a symposium called *Pushing Boundaries: A Legacy of Learning Through Exploration and Discovery*. Symposium speakers included Anantha Chandrakasan, electrical engineering and computer science; Neil Gershenfeld, media arts and sciences; Anne McCants, history; and Ian A. Waitz, dean of the School of Engineering. In addition, three MIT students and a recent graduate shared their personal experiences with undergraduate research, including seniors Kevin Castro, Peter Schmidt-Nielsen, and Shirin Shivaiei, and alumna Ava Soleimany '16.
- MacVicar Day concluded with a dinner hosted by Provost Martin Schmidt and Chancellor Cynthia Barnhart. A special guest throughout the day was Victoria MacVicar, sister of the late Margaret MacVicar, professor of physical science, and dean for undergraduate education, for whom the program is named.

Subject Evaluation

- During the end-of-term evaluation period for fall 2016, 1,016 subjects in 37 departments and programs were evaluated online. There were 21,510 evaluations completed by 7,393 students, including ratings and comments for 2,191 instructors. The average response rate of subjects evaluated online was 65%, excluding registered listeners. The average overall rating of subjects was 5.9 and the average overall rating of instructors was 6.1 (1 = very poor, 7 = excellent).
- During the end-of-term evaluation period for spring 2017, 1,078 subjects in 38 departments and programs were evaluated online. There were 17,927 evaluations completed by 6,664 students, including ratings and comments for 2,189 instructors. The average response rate of subjects evaluated online was 61%, excluding registered listeners. The average overall rating of subjects was 6.0 and the average overall rating of instructors was 6.2.

Curriculum Development Funds

Funding is available to faculty groups to develop new curricula from the [d'Arbeloff Fund for Excellence in Education](#) and the [Alumni Class Funds](#). Both funds aim to enhance undergraduate education and are administered by the curriculum and faculty support team.

The d'Arbeloff Fund was established through a gift from Brit (SM '61) and Alex ('49) d'Arbeloff. This year there were two calls for proposals for d'Arbeloff funding. The first call was for projects to improve the quality of teaching and enhance learning experiences through creative curricular and pedagogical initiatives. The second was a special call to develop subjects that use computational thinking along the lines described by the Study Group on Algorithmic Reasoning and Computational Thinking. The d'Arbeloff Funds awarded support for seven projects (including two in computation), totaling more than \$312,000 (including \$98,500 for computation projects). Funded projects came from all five Schools.

The Alumni Class Funds for educational innovation are available due to the generous donations of the alumni classes of 1951, 1955, 1972, and 1999. These funds are available for innovative educational projects that encourage creative curriculum and teaching changes, improve the quality of teaching, and enrich the learning experience—including the imaginative use of technology and applications. This year the Alumni Class Funds supported eight proposals totaling over \$391,200. This was a smaller number of proposals than is usually funded; however, more money than usual was spent.

Faculty Outreach

Throughout the year, Dean Freeman facilitated monthly meetings of the Undergraduate Officers Group, with support from the registrar and her staff. Agenda topics included the Institute Lab Requirement, the Working Group for Computational Thinking, the CUP Study Group on Major Selection, New Engineering Education Transformation, academic belonging, academic integrity and the Committee on Discipline, Institutional Research overview and survey data, the Healthy Minds student survey, the Career Fair, new limited-enrollment management tools, online scheduling tools, and updates from Student Support Services on supporting students at end of term. The officers also met with the new dean for student life; the director of the Department of Athletics, Physical Education, and Recreation; the vice president for open learning; and the chancellor and vice chancellor.

Communications

The Registrar's Office renewed its efforts to focus on communications. A redesign of the office's website addresses the needs of key stakeholders in an efficient manner using current technology tools. Requirements were gathered and designs developed for the top two levels of pages. In addition, an analysis of the office's social media presence, branding, and overall communication strategy is underway.

Data Request and Academic Calendar Highlights

The Registrar's Office provided data and analyses for several Institute studies undertaken by faculty committees, departments, and the administration. These included GPA and graduation rate studies for undergraduates, time to degree for some master's programs, change of major and double major studies, and an analysis of when students satisfy the science core General Institute Requirements. This section of the office is currently participating in a CUP working group looking at freshman choice of major and trying to understand the factors involved and what data might be useful in examining

that issue. The office also collaborated with faculty on how to best represent joint majors on in-house reports, how to understand minors and double majors, the correlation of undergraduate academic success and living groups, and responding to student concerns by making the minority student enrollment tables available online to everyone with an MIT certificate.

The 2016–2017 Academic Calendar was driven by Labor Day falling on September 5. This had the effect of splitting the fall semester final exam period so that it began on Friday, December 16, and ended on the following Thursday, December 22, which is the latest date in the fall that academic exercises are allowed. Because the New Year's Day holiday was observed on Monday, January 2, the Independent Activities Period did not begin until January 9 and lasted into February. Commencement was held on June 9, the latest possible date in the current calendar scheme.

Registration

In AY2017, student enrollment was 11,376, compared with 11,331 in AY2016. There were 4,524 undergraduates (compared to 4,527 the previous year) and 6,852 graduate students (compared to 6,804). The international student population, including citizens from 128 countries, was 3,365, representing 10% of undergraduates and 42.4% of the graduate population. (Students with permanent resident status are counted as US citizens.)

In AY2017, there were 4,412 female students (2,086 undergraduates and 2,326 graduates) at the Institute, compared with 4,347 (2,082 undergraduates and 2,265 graduates) in AY2016. In September 2016, 512 first-year women enrolled at MIT, representing 46% of the freshman class of 1,115 students.

In AY2017, there were (as self-reported by students) 3,794 minority students (2,407 undergraduates and 1,387 graduates) at the Institute, compared with 3,708 (2,327 undergraduates and 1,381 graduates) in AY2016. Minority students included 536 African Americans (non-Hispanic), 152 Native Americans, 20 Native Hawaiians or Other Pacific Islanders, 947 Hispanic Americans, and 2,139 Asian Americans. The first-year class enrolled in September 2016 included 632 minority students, representing 56.7% of the class.

Degrees Awarded

Degrees awarded by the Institute in AY2017 included 1,121 bachelor's degrees, 1,780 master's degrees, 10 engineer's degrees, and 622 doctoral degrees—a total of 3,533 (compared with 3,511 in AY2016).

Staff

Jenna DiTullio joined the curriculum and faculty support team as an administrative assistant, replacing Brian Nelson.

Tom Scahill joined the curriculum and faculty support team as a staff associate, replacing Lauren Weitkamp.

Alison Trachy joined the staff in the position of communications coordinator, replacing Jessie Scheffler.

Deb Boldin was promoted from senior administrative assistant to communications administrator.

Mary Callahan

Registrar and Senior Associate Dean for Undergraduate Education

Office of Undergraduate Advising and Academic Programming

The [Office of Undergraduate Advising and Academic Programming \(UAAP\)](#) sets a standard of excellence in providing quality student-centered services to all undergraduates to enhance their academic success, social adjustment, and assimilation to the Institute. To achieve that vision, UAAP provides programming, access to Institute resources, and services that recognize the many needs, diversity, and individuality of students at MIT. Efforts include coordinating freshman pre-orientation and orientation programs, facilitating academic advising and mentoring relationships, building community through the First Generation Program, providing access to academic programming and personal support, and promoting leadership development. UAAP responsibilities also include management, operation, and oversight of the Undergraduate Research Opportunities Program (UROP), Usability and Accessibility/ Assistive Technology Information Center Laboratory (ATIC), and the Distinguished Fellowships Program, as well as coordination of the Independent Activities Period (IAP). UAAP also provides staff support for the Committee on Academic Performance.

New Initiatives

UAAP continued to make progress on the Faculty-voted motion that all freshmen have a faculty advisor or mentor. To that end, 183 faculty were recruited and 92.5% of the Class of 2020 had a faculty relationship; of those, 84% (933) were advised by faculty and 8.5% (98) had a formal faculty mentor. This was almost a 5% gain over last year. UAAP staff consultants continued to support these faculty advisors, serving as not only a resource, but also as backup when faculty were unavailable. Over the course of the year, eight receptions for freshmen and faculty, hosted by Dean Freeman, took place to facilitate engagement. Also, 11 faculty luncheons/dinners were organized for first-year students and faculty.

With support of two grants from the Amgen Foundation, the Amgen UROP Scholar Program supported 20 undergraduates. This was the 10th year of the program. The second grant established MIT as the Global Program Office with administrative oversight for 17 site programs—10 in the United States, five in Europe, and two in Japan. With the intention of continuing to engage program alumni, this year UAAP hosted Amgen Alumni events at the University of Cambridge (UK), during the Society of Neuroscience Conference in San Diego, and at the American Association for Cancer Research meeting in Washington, DC.

In support of international immersion experiences for students, we:

- Offered to support all faculty who engage undergraduates in research activities abroad
- Funded 35 MISTI UROP placements
- Supported 40 traditional International Research Opportunities Program (IROP) projects for summer 2016, including exchanges with Imperial College and Hong Kong University of Science and Technology

Student research experiences took place in 22 countries.

UAAP continued to participate in resource development efforts and stewardship with respect to UROP gifts and endowment, and funds from the Amgen Foundation, the Lord Foundation, the Baker Foundation, and the Class of 1959. This year, two new UROP funds were established: the Gargi UROP Fund and the Yichen Zhang (1986) UROP Fund.

The office coordinated an all-DUE (Dean for Undergraduate Education) office event, called “Recharge,” that provided students with an opportunity to engage with DUE offices and take a few minutes to relax and recharge. Each office hosted a different, creative activity. With a “passport” in hand, students were encouraged to visit at least four offices. More than 375 students participated.

UAAP collaborated with Global Education and Career Development (GECD) on programming to help engage local young alumni with freshman and sophomore students. The objective was to provide opportunities for students to speak with alumni about their educational path, to find out what alumni would recommend for them to do during their undergraduate years, and to gain insights into possible career choices.

As of July 1, 2016, Student Support Services and Student Disabilities Services were reorganized and moved from UAAP/DUE to be under the Division of Student Life and its new vice president and dean.

In December 2016, the Distinguished Fellowships Program moved from GECD to UAAP. This reorganization better aligns staff who recruit and support students competing for fellowships within an academic organization that typically advises and mentors exceptional undergraduates.

The Assistive Technology Information Center (ATIC), including the Usability/Accessibility team, moved from Information Services and Technology (IS&T) to DUE, specifically within UAAP. The motivation for this reorganization was to move these resources within the academic enterprise to ensure accessibility to electronic course content and usability of new technologies.

Functional Enhancements

With an outside developer, UAAP undertook a complete redesign of the full suite of UAAP websites, including new navigation and content. The new site launched in March 2017.

Working with IS&T, the office has redesigned the UROP online application, review, approval, and database. With increased functionality, the new system will allow processes to respond to new “models” of UROP, such as SuperUROP, IROP, and international exchanges. This new online application system will be tested during summer 2017 and will be fully launched with the fall 2017 application process.

In August 2016, UAAP launched an online application system for the Freshman Pre-Orientation Program application process. The application was completed for the Class of 2020; 667 applications were received via this system and reviewed by the directors of the 26 programs that were offered before orientation in 2016.

During IAP 2017, departments, administrative offices, Association of Student Activities groups, and non-student groups sponsored 484 non-credit activities and 186 for-credit undergraduate subjects. Enrollment in these subjects was 4,531 registrants. (not including thesis or UROP for credit.)

To support the academic success of first-year students, UAAP sponsored 64 sessions on learning strategy and academic programming. Associate advisors offered 22 of those programs within their residences; this was a focused priority of the Associate Advisor Steering Committee. UAAP also hosted 18 events at which faculty discussed academic challenges, the selection of majors, graduate school, and related personal stories of their career pathways. In addition, 11 programs were sponsored by the First Generation Program, about half of which included faculty.

Freshmen were advised or mentored by 183 faculty plus teaching staff and administrators, including those who led 54 freshman advising seminars. In all, 498 students participated in an advising seminar. Advisors were matched with 203 associate advisors, who served as peer mentors to the first-year students. Beyond the new advisor training and the orientation advisor training for fall registration, three programs were offered: Student Support Resources, Sexual Misconduct at MIT: Title IX Efforts and Supporting Survivors, and Mental Health Clinicians and the Resources They Provide Students. Approximately 25 faculty members attended each session.

The training and development of associate advisors was an articulated priority. Twelve different programs were strategically offered to associate advisors throughout the academic year.

The First Generation Program remains active with an enthusiastic student advisory board and faculty advisor. The program sponsored 11 events, including a welcome dinner, faculty luncheons, an alumni dinner, and study breaks. First generation students participated in a Campus Preview Weekend panel. A senior recognition ceremony was held at which Dean Freeman and Professor Paul Lagace presented seniors with first generation sashes to wear with Commencement regalia. Finally, the program sponsored three first-generation students and one staff member to attend the Ivy Conference at Yale University.

UAAP engaged MIT women faculty, including Professors Amy Keating, Anette (Peko) Hosoi, Sangeeta Bhatia, in an effort to showcase women in STEM.

The three recipients of the UAAP 2017 Institute Convocation Awards were Professor Daniel Jackson (Arthur Smith Award for contributions to student life and learning), Professor Tracy Slatyer (Baker Foundation Award for Excellence in Undergraduate Teaching), and Professor Elsa A. Olivetti (Earll M. Murman Award for Excellence in Undergraduate Advising).

Undergraduate Research Opportunities Program Activities and Funding

During summer 2016 and AY2017, 4,450 Undergraduate Research Opportunities Program (UROP) projects were completed. Of the projects completed during the

academic year, 65% were paid experiences. Of the total number of UROP students, 55% were female. Among seniors graduating in 2017, 91% participated in at least one UROP; in particular, 92% of non-underrepresented minority students and 85% of underrepresented minorities (222 of 260) took part in UROP.

UAAP provided \$4,038,416 in direct funding. The direct funding budget comprises endowment income (54%), expendable gifts (8%), general Institute funds (38%), and foundation grants (1%). The UROP book-value endowment is \$18.68 million, represented by 66 named, endowed funds and 10 named gifts.

Faculty allocated \$4,726,631 in support of UROP. Half of MIT faculty mentor and supervise UROP students. UROP remains the primary opportunity for students to engage with faculty outside of the classroom.

Usability and Accessibility

Assistive Technology Information Center Laboratory (ATIC) served 68 clients this year: eight undergraduates, 14 graduate students, 25 employees, and one alumna. ATIC provided 93 individual consults with clients. The laboratory obtained alternative format course materials for 47 courses for eight students with print disabilities. Accessibility/Usability reviewed 45 accessibility projects and 31 usability projects. They also evaluated six combined usability/accessibility projects.

Distinguished Fellowship and Academic Excellence

Overall, MIT fielded four Marshall Scholars, four Schwarzman Scholars, one Gates Scholar, three Soros Scholarship recipients, and, currently, five Fulbright finalists.

In all, 42 individual students submitted applications for Rhodes, Marshall, Mitchell, Churchill, or Schwarzman Scholarships.

Two individuals were selected for Randolph G. Wei UROP Awards, and there were six recipients of Eloranta UROP Awards.

Future Plans and Initiatives

Looking ahead, UAAP has identified the following objectives:

- Continue to work toward ensuring every freshman has either a faculty advisor or mentor
- Pursue the viability of developing an early warning system for upperclassmen that also supports the CAP end-of-term review effort
- With the support of a second Johnson & Johnson gift, expand the Johnson & Johnson Summer UROP Scholars Program into a year-round, women in STEM speakers program featuring female MIT faculty, researchers, and alumnae
- Establish the office as the lead advocate for web accessibility and usability through training and assistive technology events, including a student hackathon, and help drive a proposal to develop web access policies and guidelines for the Institute

- Define programming to engage students with faculty mentors and identify a strategy to add value to the UROP experience; survey UROP faculty supervisors to understand what they view as advantages and/or challenges in serving as research mentors to undergraduates, how faculty define mentoring, and how they develop relationships with students in order to know them well enough to provide references
- Continue to work with the Office of Leadership Giving with the intention of fully endowing MIT's Undergraduate Research Opportunities Program

Staffing Changes

This year, three individuals were hired:

- Alice Rugoletti, staff associate, Advising and New Student Programming team, replacement hire
- Anna Wetterhorn, staff associate, Academic Performance, replacement hire
- Brianna Giacoppe, assistive technology specialist, replacement hire
- Two individuals transferred from GECD to UAAP:
 - Kim Benard, assistant dean, Distinguished Fellowships and Academic Excellence. This position was reclassified from an assistant director to an assistant dean.
 - Dwynette Smith, administrative assistant, Amgen and Distinguished Fellowships

Finally, Kate Quinn was reclassified from administrative assistant to assistive technology specialist, and Julie Norman retired at the end of AY2017, after 17 years of service to the Institute.

Julie B. Norman
Director
Senior Associate Dean for Undergraduate Education

Reserve Officer Training Corps

Air Force Reserve Officer Training Corps

The mission of the [Air Force Reserve Officer Training Corps \(AFROTC\)](#) is to develop high-quality leaders for the US Air Force (USAF).

Accomplishments

The quality of the cadet corps and cadre remained first-class in AY2017, and our cadets continued to be recognized by the Air Force for their performance. During summer 2016, the juniors attended an intense field-training leadership course. Each year, AFROTC recognizes the best overall detachments (out of 145). Detachment 365 earned the Right of Line Award as the best small detachment in the nation. Additionally, Cadet Martin York (Course 16) was recognized as the best AFROTC, Officer Training School, and US Air Force Academy cadet in the nation at a ceremony in Washington, DC, hosted by the chief of staff of the Air Force. This academic year, the cadets achieved both best average GPA and best average fitness score of any detachment.

Several cadets received individual recognition. MIT Cadets Nicholas James and Dayannara Muñoz were two of 33 cadets nationwide who received the Society of American Military Engineer Award. Muñoz is one of four AFROTC cadets competing at the national level for the Cadet Research Award. MIT Cadets Martin York and John Graham were selected as the top 10% of all AFROTC commissionees this academic year. Also, Nicholas James was selected by AFROTC as one of three cadets nationwide to compete for this year's Cadet of the Year Award.

Increasing the size of the cadet corps continues to be a priority. There were six AFROTC cadets commissioned in June 2017 and four are expected to commission in June 2018. However, the rising sophomore and incoming freshman classes each have approximately 20 students. Part of this success is due to participation in MIT programs such as Campus Preview Weekend and support from MIT Admissions to identify interested ROTC candidates.

Graduates of this program continue to move on to distinguished career opportunities. This year, two Course 16 MEng graduates were selected to attend Euro-NATO Joint Jet Pilot Training, the Air Force's most prestigious initial training program. One was selected to attend medical school on an Air Force Health Professionals Scholarship. Two others received educational delays to pursue graduate education (one PhD at the California Institute of Technology, and one master's degree at MIT). Of the remaining two, one was selected for the cyber career path and the other for aircraft maintenance officer.

Table 1. Year-end Enrollment in Air Force ROTC, as of June 2017

	Freshmen	Sophomores	Juniors	Seniors	5th Year	Total
MIT	13	3	3	3	5	27
Harvard	6	2	0	1	0	9
Tufts	0	1	0	0	0	1
Wellesley	1	1	0	0	0	2
Salem State	0	0	0	0	0	0
Total	20	7	3	4	5	39

Highlights of the cadet training program included Air Force simulations in the Joint ROTC Simulator, Career Day with 20 active-duty officers, leadership reaction course at Fort Devens, and our annual Dining In (traditional military banquet) and joint sports day with Boston University. Also, the Air Force, Army, and Naval ROTC programs combined to conduct a sports competition (in which the AFROTC cadet wing won the trophy for the second year in a row), a Veterans Day ceremony, a commissioning ceremony, and a formal joint-service military ball.

In addition to the weekly leadership training, three cadets attended the National Character and Leadership Symposium at the US Air Force Academy in Colorado Springs, CO. The cadet wing hosted more than 30 voluntary morale and training events over the course of the year. AFROTC is thankful for the support from MIT to make these events happen.

Staffing Changes

There will be one military staff change during summer 2017. Lieutenant Taylor Hubbard replaces Lieutenant Colonel Michael Clifford.

Lieutenant Colonel Sheryl A.E. Ott
United States Air Force

Army Reserve Officer Training Corps

The mission of the [Army Reserve Officers Training Corps \(AROTC\)](#) is to select, retain, train, and commission cadets from MIT, Harvard University, Tufts University, Lesley University, Wellesley College, Salem State University, Gordon-Conwell Theological Seminary, and Endicott College in a two-, three-, or four-year program in order to prepare them for future leadership roles in the US Army, the nation, and the world. Our vision is to develop agile and adaptive leaders who utilize critical and creative thinking skills to solve complex, ambiguous problems.

Accomplishments

AROTC commissioned 10 officers this year. One of these officers completed his undergraduate degree at MIT and will serve as an ordnance officer in the Army Active

Component. Three cadets were selected for the ultra-competitive Educational Delay Program, for which only 70 out of 5,400 cadets nationwide were selected. One cadet will attend medical school at the University of Michigan and one will attend medical school at the University of Southern California before serving their Army commitments as doctors. A third cadet will complete a dual degree program at Duke University (master of divinity and master of public policy) before serving her commitment to the Army as a chaplain. Six cadets earned the honor of “Distinguished Military Graduate,” which placed them in the top 20% of all cadets nationwide.

As of May 1, 2017, 61 students were enrolled in the Army ROTC program. Over \$1,724,066.00 was awarded in scholarships for all students in the consortium, a notable increase from last year. The graduating class of 2017 is expected to commission 11 officers, which means the program will not meet the Army-directed commission mission. Both the freshman Class of 2020 and incoming Class of 2021 have seen significant growth from previous years, particularly with regards to MIT students. The Class of 2020 currently has nine MIT students on full ROTC scholarship and the Class of 2021 is expecting 10 MIT students with full scholarships.

Year-end Enrollment for Army ROTC, as of May 1, 2017

	Freshmen	Sophomores	Juniors	Seniors	Total
MIT	12	4	0	1	17
Harvard	2	4	2	2	10
Wellesley	2	2	0	3	7
Tufts	2	1	2	1	6
Other Affiliates	3	7	8	3	21
Total	21	18	12	10	61

Our cadets continue to achieve excellence academically, physically, militarily, and morally/ethically. In April 2017, an MIT freshman cadet was the winner of the Military Historical Society of Massachusetts annual essay competition. She received a \$4,000 prize—\$2,500 awarded directly to her and \$1,500 to her host program. The latter amount will be used to continue to build MIT’s military history library.

At the annual Cadet Leader Course conducted at Fort Knox, KY—attended by more than 5,000 rising seniors nationwide—our cadets exceeded local, regional, and national averages in nearly all measurable areas, as they do every year. Five cadets (including one MIT student) were selected to participate in the Cultural Awareness and Language Proficiency and Project Global Officer programs over the summer, spending up to two months abroad in Cambodia, Indonesia, Rwanda, Vietnam, and Senegal. One cadet attended air assault school and one attended airborne school. One cadet is participating in an internship with the National Security Agency. This summer, two cadets will serve with an active-duty unit and shadow an officer as part of the Cadet Troop Leadership Training program.

Our instructors continue to excel at classroom leadership instruction and hands-on training of cadets and of non-ROTC students here at MIT. During the Independent Activities Period (IAP), the cadre participated in its 16th consecutive year facilitating a capstone exercise for 90 students in the Sloan School of Management's IAP class called Leadership Lessons Learned from the Military. We also hosted a Leadership Development Workshop during IAP, providing three days of conceptual and hands-on leadership development training to 16 members of the MIT community, including undergraduates, graduate students, fellows, athletic staff, and more.

In the past academic year, MIT Army ROTC conducted the following major events: New Cadet Orientation in both September and January, field training exercises at the Fort Devens Army Reserve Forces Training Area in September and at Joint Base Cape Cod in April (in conjunction with the ROTC Programs at Boston University and Northeastern), a formal Dining In in November, a military ball in March, a battlefield staff ride at Lexington and Concord in April, and commissioning ceremonies at MIT, Harvard, Tufts, Wellesley, Salem State, and Endicott.

Staffing Changes

The Army assigned two new full-time instructors during the past year: Captain Nadi Kassim (Operations Officer) and Sergeant First Class (Promotable) Darrell Brown (Military Science Instructor).

Challenges and Future Plans

MIT Army ROTC's continued challenge is to remain viable by increasing the number of cadets in the program, especially from MIT. Acceptance rates into MIT for ROTC scholarship applicants have increased in the last two years, resulting in much larger incoming and outgoing freshman classes. While the current reduction in the size of the Army has resulted in fewer available scholarships, there has been an increase to the number of scholarship recipients who both apply to and get accepted to MIT. This bodes extremely well for the continued viability of the program.

Lieutenant Colonel Peter F. Godfrin Jr.
United States Army

Naval Reserve Officer Training Corps

The [Naval Reserve Officer Training Corps \(NROTC\)](#) program hosted by MIT develops and provides full-scholarship opportunities to midshipmen aspiring to become ensigns in the US Navy or second lieutenants in the Marine Corps. The mission of NROTC is to prepare students morally, mentally, and physically, imbuing them with the highest ideals of duty and loyalty. Graduates possess a basic professional background, are motivated toward careers in the Navy and Marine Corps team, and are devoted to the service of our nation. They embody the potential for future development in mind and character in order to assume the highest responsibilities of command, government, and citizenship.

NROTC midshipmen enroll in eight different naval science courses during their time at MIT, including naval engineering, history, doctrine, operations, leadership, and ethics. The curriculum is nationally recognized, centrally supported, and taught at more than 65 universities nationwide. Guest speakers are invited to enhance course relevancy with evolving trends in technology, national policy and development, and geopolitics. Coursework is further tailored by the instructors to reflect their individual operational experiences and is monitored by the visiting professor of naval science, Captain James Horten.

NROTC officers and staff are committed to ensuring that every midshipman balances his or her time and energy to realize the tremendous benefits of an MIT, Harvard, or Tufts education. Midshipmen complement their rigorous NROTC commitments with extracurricular activities such as varsity athletics, fraternity and sorority leadership positions, and other school events, including leadership conferences. Others participate in community activities such as volunteering, counseling, and mentoring.

While the NROTC staff is responsible for mentoring and instructing students, midshipmen build leadership skills while running the NROTC battalion. Midshipmen are involved in the planning and implementation of numerous military and civic activities and events, including the weekly leadership labs, the Joint Service Ball, field-training exercises, sailing regattas, and tri-service competitions.

Year-end Enrollment in Naval ROTC, as of June 2017

	Freshmen	Sophomores	Juniors	Seniors	Total
MIT	6	5	4	6	21
Harvard	6	2	4	3	15
Tufts	1	1	3	1	6
Total	13	8	11	10	42

Accomplishments

During summer 2016, midshipmen patrolled undersea aboard submarines, flew in Seahawk helicopters, piloted aircraft carriers and guided missile destroyers, and conducted amphibious landings ashore with the Marines. A total of 29 successful midshipman summer cruises were conducted globally.

AY2017 was the second year that the MIT NROTC unit enjoyed the use of two simulators in Building 53 at MIT. The Conning Officer Virtual Environment ship simulator, which was installed at only five universities nationwide, offers midshipmen a highly realistic immersive experience to enhance training during navigation and Naval Operations courses. Additionally, midshipmen used the Joint Military Simulator Lab to conduct operational decision-making exercises for cadets and midshipmen including newly developed and implemented leadership scenarios.

The academic year concluded on June 9 with the commissioning of six NROTC students, one Army ROTC student, and five Air Force ROTC students on board the *USS*

Constitution. General Darren McDew, US Transportation Command, was the guest of honor and presented commissioning scrolls to all of the new officers. MIT President L. Rafael Reif also provided congratulatory remarks.

Ensigns Natalie Shifflet (*USS Gonzalez* in Norfolk, VA) and Julia Rubin (*USS The Sullivans* in Mayport, FL) will serve in the surface warfare community. Ensign Monica Shifflet will train as a naval flight officer. Ensigns Vardaan Gurung, Colleen McCoy, and Sean Lowder will become engineers for naval reactors in Washington, DC, providing cradle-to-grave oversight and support for all naval nuclear propulsion reactors and support equipment.

NROTC hosted numerous high-profile visits and distinguished guests during AY2017, including:

- The Honorable Ray Mabus, secretary of the US Navy
- Admiral John Richardson, US Navy, chief of Naval Operations
- General Robert Neller, US Marine Corps, commandant of the Marine Corps
- Admiral Michael Rogers, US Navy, commander, US Cyber Command and director of the National Security Agency
- General Darren McDew, US Air Force, commander, US Transportation Command
- Admiral Scott Swift, US Navy, commander, US Pacific Fleet
- Stephen Trautman, deputy director, Naval Reactors Program
- Vice Admiral Joseph Aucoin, US Navy, commander, US 7th Fleet
- Vice Admiral Philip Cullom, US Navy, OPNAV N4
- Major General Richard Cripwell, British defense attaché to the United States

Staffing Changes

MIT NROTC bid fond farewells to Lieutenant Charles Daniel, the senior/junior class advisor who departed for submarine department head school.

This year, NROTC welcomes Lieutenant Hans Nowak as the senior/junior class advisor. An additional member will replace Don Davis as the supply technician, following his passing last year.

Throughout AY2018, the NROTC program eagerly looks forward to increased student numbers in its family of superbly qualified individuals at MIT—who continue to maintain and teach the highest standards of excellence.

Captain James E. Horten
United States Navy

Student Financial Services

Student Financial Services (SFS) is committed to making the dream of attending MIT a reality by providing students and their families with the resources necessary to meet their financial obligations. By helping today's students finance their education, SFS hopes to inspire them to join the infinite circle of support that allows MIT to ensure access and affordability for future generations.

The core responsibilities of SFS are organized around two major functional areas: billing and collecting tuition, fees, and other Institute charges; and administering student financial aid, including student and parent loans, and student employment.

Highlights and Updates

Underscoring its commitment to preserving broad access to MIT, the 2016–2017 annual financial aid budget increased by approximately 10.4%. The Institute allocated \$114.2 million to ensure affordability for its 4,524 undergraduate students. This sharp increase in the financial aid budget reflects the commitment to removing financial barriers to attaining an MIT education by reducing the amount that parents are expected to contribute.

SFS implemented a fully integrated student account billing and payment portal in February 2017 in order to streamline and enhance the experience for students and their families. The TouchNet bill and payment portal, known as MITPAY, allows SFS to integrate all student account transactions—ebills, payment plans, electronic payments, student refunds, and 1098T tax forms—into a single system which is integrated into the Ellucian Banner Student Account System.

Billing and Collecting Tuition, Fees, and Other Institute Charges

Tuition, fees, and other major Institute charges totaled \$708,867,833 in AY2017, a 4.6% increase over the previous year, and includes:

Tuition: \$608,954,863
 Student life fee: \$3,460,727
 Housing: \$61,804,450
 Meal plan: \$9,396,445
 TechCASH: \$652,445
 Medical insurance: \$22,908,249
 Medical billing: \$189,386
 Late fees: \$46,388
 Departmental charges and credits: \$1,454,930

Graduate tuition charges totaled \$395 million, or 65% of total tuition, and the undergraduate tuition was \$214 million, or 35% of the total.

As of June 30, 2017, the student accounts receivable balance, netting out credit balances and exclusive of advance summer term billing, was \$356,767. Students are eligible for refunds when the credits on their student account exceed their charges. In AY2017, 4,633 refunds, totaling \$21.5 million, were issued to students.

The overall education loan notes receivables as of June 30, 2017—comprising Federal Perkins Loans, MIT Educational Loans, MIT Technology Loans, and MIT Parent Loans—decreased by 11.2% to \$40.2 million.

The MIT Educational Loan Plan is a benefit program that provides loans to eligible employees to help finance undergraduate or graduate education of eligible dependent children. SFS administers this loan program on behalf of Human Resources. In AY2017, a total of \$2.5 million was loaned and \$2.2 million collected. The year-end receivables balance for this program continued to climb, rising 2.9% to \$8.2 million.

Administering Undergraduate Student Financial Aid

MIT believes that parents and students have primary responsibility, to the extent that they are able, for paying the costs of an undergraduate education. The Institute recruits and enrolls the most talented and promising students, without regard to their financial circumstances. It awards aid only for financial need and does not award undergraduate scholarships for academic or athletic achievements or any other nonfinancial criteria. MIT guarantees that each student's demonstrated financial need is fully met.

In AY2017, the annual price of an MIT education totaled \$66,028 per student—\$48,452 for tuition and fees; \$14,210 for room and board; an estimated \$2,816 for books, supplies, and personal expenses; and a per student average of \$550 for travel. With 4,489 undergraduates enrolled, the collective price for undergraduates was \$296.4 million. Of this amount, families paid \$153.1 million, or 52%. Financial aid covered \$143.3 million, or 48%.

When determining the percent of undergraduates on financial aid, MIT uses a broad definition by including need- and merit-based scholarships, grants, student loans, and employment from institutional, federal, state, and private sources. For AY2017, 90% of undergraduates (4,046 students) received \$143.3 million in financial aid. If the definition of financial aid is narrowed to only include need-based aid, 60% of MIT undergraduates received need-based aid.

For students with family incomes under \$80,000 a year, the Institute continues to ensure that scholarship funding will allow them to attend MIT tuition-free, a policy put in place in 2008. In AY2017, 35% of undergraduates (1,569 students) received scholarships and grants from all sources equal to or greater than tuition. Of these students, 1,039, or 23% of undergraduates, had family incomes under \$80,000.

In AY2017, 17% of undergraduates (769 students) received a Federal Pell Grant. Based on a policy the Institute put in place in 2006, the Institute matches the Pell Grant dollar for dollar by reducing a recipient's loan and/or term-time job expectation, and not the MIT scholarship.

Sources of Undergraduate Student Financial Aid

MIT was the largest source of financial aid to its undergraduates in AY2017, providing 83% of the aid undergraduates received. Ninety-one percent of the aid MIT provided was scholarships, 9% student employment, and less than 1% student loans.

Private sources of financial aid—including charitable and civic organizations, corporations, foundations, banks, and other financial institutions—provided 9% of all aid undergraduates received in AY2017, making them the second largest source of financial aid. These included private scholarships and alternative student loans, so-called to distinguish them from federal loans. State aid is not a significant factor in financing an MIT education.

The federal government was the third largest source of financial aid to MIT undergraduates in AY2017, providing the remaining 8% of the aid undergraduates received. Undergraduates received Federal Pell Grants, Federal Supplemental Educational Opportunity Grants, Reserve Officer Training Corps Scholarships, Federal Direct Subsidized and Unsubsidized Stafford Loans, Federal Perkins Loans, and Federal Work-Study, including Federal Work-Study Community Service.

Undergraduate Scholarships and Grants

Scholarships and grants from all sources totaled \$126.2 million, with 68% of undergraduates (3,047 students) receiving scholarships. MIT awarded \$108.5 million in need-based scholarships to 57% of undergraduates (2,579 students). The average MIT scholarship was \$42,081. Approximately 75% of MIT scholarships were funded from restricted sources, and 25% came from the general Institute budget or unrestricted sources.

Undergraduate Student Loans

During AY2017, 16% of undergraduates (731 students) borrowed \$6.4 million. The average loan per borrower was \$8,781, and the median was \$6,432. Approximately 29% of undergraduates in the Class of 2017 (328 students) borrowed at some point during their education. Their debt ranges from \$832 to \$118,709, with the 90th percentile at \$38,986. The average total debt per borrower is \$19,819 and the median is \$16,192.

Undergraduate Student Employment

Sixty-eight percent of undergraduates (3,040 students) earned wages from on-campus employment and employment under the Federal Work-Study Program, including both on- and off-campus programs. Their wages totaled \$10.6 million, or an average of \$3,496 per student worker.

Undergraduate Parent Loans

Approximately 3% of undergraduate families (143 parents) borrowed \$3.9 million through an education parent loan program administered by MIT. Federal Direct PLUS loans accounted for 93% of the dollars borrowed. The average loan per borrower was \$26,974.

Administering Graduate and Professional Student Financial Aid

Graduate and professional students receive tuition support and stipends in connection with research assistantships, teaching assistantships, and fellowship appointments. While this support is considered financial aid, it is not included in this report, as it is not administered by SFS.

Graduate and Professional Student Loans and Federal Work-Study

Graduate and professional students are eligible for need-based financial aid, including student loans and student employment under the Federal Work-Study Program, both of which are administered and reported by SFS. In AY2017, loans totaled \$40.2 million, a decrease of approximately \$4.7 million from the prior year, with 9.8% of graduate and professional students (674 students) borrowing an average of \$59,591. Graduate student employment earnings under the Federal Work-Study Program, including on- and off-campus programs, totaled \$1.21 million, with 2.0% of graduate and professional students (139 students) earning \$8,718 on average.

Graduate and Professional Student Grants

In AY2017, 3.2% of graduate and professional students (222 students) received grants from private sources totaling \$7.3 million. Seventy-seven percent of this amount was received through sponsor billing, a process by which a sponsor, such as a foreign government, agrees to cover tuition and other Institute charges for a student and SFS invoices that sponsor.

Staffing

New hires included: Andre Barbosa, assistant director for financial aid; Matt Cromie, assistant director for financial aid; Keith Dimalanta, assistant director for financial aid delivery; Kerry Harris, counselor for customer service; Chrissy Monaco, assistant director for financial aid; and Henry Rea, assistant director for financial aid.

Five staff members left for new professional opportunities: Paula Bernal-Bromley, counselor for financial aid delivery; Larissa Douglas, student service representative; Michelle Gaffney, assistant director for financial aid; Anna Wetterhorn, assistant director for financial aid; and Emma Wilcox, assistant director for financial aid. Two staff members retired: Liz Barnes, assistant director for financial aid and Gail Novak, assistant director for financial aid delivery.

There are two open positions: administrative assistant II for operations and counselor for financial aid delivery.

As the year ends, there are 34 positions, exclusive of the Dean, including two open positions. Of the 32 positions filled, 59% of the staff members are female, 41% are male, and 34% belong to an underrepresented minority group.

Stuart Schmill

Dean of Admissions and Student Financial Services

Teaching and Learning Laboratory

The [Teaching and Learning Laboratory \(TLL\)](#) was founded in 1997 as a resource for faculty, administrators, and students who share a desire to improve teaching and learning at MIT.

Our mission is to partner with MIT educators to create an environment where students are academically challenged, actively engaged, and personally supported—and to contribute to MIT’s standing as a leader in science and engineering education.

In 2017, TLL launched more than 14 new and substantive programs and initiatives, continued to offer signature programs and services, and significantly increased the scope of its work. Members of the TLL team have worked effectively and efficiently with each other and with MIT collaborators, despite several operational constraints. TLL has been short-staffed since June 2015, when director Lori Breslow stepped down and then-associate director Janet Rankin took over as interim director.

TLL staff are deeply committed to supporting learners and teachers at MIT. This engaged, collegial, and committed team supports each other and collaborates effectively with colleagues throughout the Institute. TLL

TLL’s work falls into six main categories:

- Supporting faculty teaching practice
- Supporting the assessment and evaluation efforts of faculty, departments, and programs
- Supporting graduate students and postdocs
- Supporting students
- Supporting the dissemination of evidence-based teaching practices
- Supporting staff across the Institute

Supporting Faculty Teaching Practice

Many MIT faculty and instructors care deeply about student learning and seek support to continuously improve the teaching and learning experiences in their classrooms. In AY2017, TLL staff collaborated with faculty and instructors to develop strategies and solutions that address faculty teaching needs while operating within the constraints of their time and energy.

TLL Faculty Cohort

TLL launched the [TLL Faculty Cohort Program](#) with the theme of teaching inclusively. The AY2017 cohort comprised six faculty members from across the Institute who met monthly during fall 2016 to discuss issues related to diversity and inclusion in their classrooms. Participants worked with each other and with TLL colleagues to develop and implement a variety of strategies to make their classrooms more inclusive.

Participants were each given \$2,000 in discretionary funds. TLL provided funds (from its operating budget) for one participant from each School. Because three faculty members from the School of Architecture and Planning participated in the cohort this year, the School contributed funds to support the participation of their additional two members. The cohort model was extremely well-received, and TLL plans to offer additional cohorts during AY2018.

Dean's Action Group

TLL secured two years of funding (\$20,000) from the Association of American Universities for the Dean's Action Group to disseminate evidence-based research practices across MIT. Facilitated by TLL, and building on the successes of the 2016 Faculty Cohort Program, the Dean's Action Group (consisting of MIT faculty and instructors) will convene monthly throughout AY2018 and AY2019 to share how they have implemented evidence-based teaching practices in their courses and to work to adapt these shared practices in subjects across the Institute. Dean for Undergraduate Education Dennis Freeman provided an additional \$20,000 in matching funds as a member of the group. TLL held a kickoff meeting for the cohort in spring 2017 and has begun meeting one-on-one with participating faculty and instructors.

Faculty Workshops and Consultations

TLL offered New Faculty Orientations to Teaching to new faculty in the Schools of Science, Engineering; and Humanities, Arts, and Social Sciences. The orientations provided introductions and overviews of teaching at MIT. TLL invited experienced faculty and upper-level undergraduates to share their perspectives and advice.

TLL provided pedagogical consultations and support to more than 20 MIT educators on a wide range of subjects, projects, and initiatives. Consultations focus on topics such as strengthening traditional teaching skills (lecturing), active learning, collaborative learning, and small group learning. Other topics include handling classroom challenges, as well as assessment and evaluation of student progress. This year, Darshita (Dipa) Shah and Janet Rankin consulted one-on-one with approximately 15 MIT educators. Shah consulted numerous times throughout the year with several junior faculty who were interested in improving their teaching effectiveness.

Shah provided pedagogical and organizational support for Professor Karen Willcox's Fly-by-Wire Grant, a US Department of Education First in the World Development Grant. Shah devoted 50% of her effort to this project during the fall and winter.

Supporting Assessment and Evaluation Efforts

TLL's assessment and evaluation (A&E) experts (who hold doctorates in sociology, social research methodology, and education) utilize a wide-range of quantitative and qualitative assessment methods and analytical techniques. For each project that they undertake, they work to identify the most appropriate approach for the stated goals. Members of the A&E team strive to continuously expand their expertise in specific analysis techniques and methods so that they can design and execute effective and meaningful studies. Additionally, A&E staff are committed to broadening their knowledge of data visualization methods in order to more effectively communicate the findings of their work.

TLL provided A&E services for seven distinct Alumni Class Funds projects, two d'Arbeloff projects, and a Reimagining Undergraduate Education project. In addition, TLL consulted and provided assessment services for a host of other MIT projects and initiatives. In total, TLL's assessment and evaluation experts consulted with more than 35 MIT faculty/instructors on more than 20 projects with a wide variety of assessment needs. They also offered six workshops on designing assessment studies at MIT and delivered presentations at national assessment and evaluation meetings and conferences.

TLL received \$30,430 from faculty grants for assessment and evaluation services.

The addition of a third assessment and evaluation expert in May 2015 continues to have significant positive impact on the effectiveness of the office. A&E experts Melissa Barnett, Anne Marshall, and Rudolph (Rudy) Mitchell support each other's work and provide complementary areas of expertise and interest. This enables TLL to more effectively meet the needs of the MIT community.

Our assessment and evaluation efforts have been augmented and supported by the work of Assistant Director Leann Dobranski, who has made significant contributions to survey design, administration, and analysis for multiple TLL assessment projects. The assessment and evaluation projects of TLL staff in AY2017 are presented in Table I.

The large increases in TLL consultations and projects are due, in part, to the enhanced collaboration between the Office of Faculty Support and the Teaching and Learning Lab with respect to Alumni Class Funds and d'Arbeloff Funds. Additionally, there has been a general increase in the number of MIT faculty who seek support for the evaluation and assessment of their teaching practices.

Ongoing and Completed Assessment Projects

- MIT International Science and Technology Initiatives
 - Survey administration
- Alumni Class Fund Projects
 - Music Dictation Web Application – Professor Garo Saraydarian (Barnett)
 - Incorporating State-of-the-art, Hands-on, High-speed Videography and Image Analysis Lab Activities – Professor Lydia Bourouiba (Marshall)
 - Coastal Ecology Primer for Engineers – Professors Chryssostomos Chryssostomidis, Juliet Simpson, Eduardo Bastidas (Marshall)
 - Bringing Russian to MIT: Developing Curriculum and Materials for the New Russian Literature Course – Professor Maria Khotimsky (Barnett)
 - Landscape Experiences – Rebecca Uchill (Marshall)
 - Integrating Biological Engineering into MIT's Maker Movement – Steven Wasserman, Maxine Jonas, Natalie Kuldell, Julie Sutton (Barnett)

- GIR (General Institute Requirement) Environment – Professor John Fernández and Amanda Graham (Barnett)
- d'Arbeloff Funds Projects
 - Music Technology Lab – Professor Eran Egozy (Marshall)
 - 6.811 Principles and Practices of Assistive Technology – Professor Julie Greenberg (Mitchell)
- 6.002x Circuits & Electronics (Marshall)
 - Preliminary assessment study and report
- 6.A01 Freshman Advising Seminar – Dean Dennis Freeman and Dawn Wendell (Marshall)
 - Pre-post survey development, full assessment plan, pre-survey collection, post-survey collection
- The Efficacy of Digital Poster Presentations – Professor Jean-François Hamel (Marshall)
 - Study design development
- Madrid-MIT M+Visión Consortium Participant Impact Study – Professor Martha Gray (Mitchell)
 - Program evaluation study of the second-year experience of the 2013 cohort (Mitchell)
- NIH IMPACT Program Participant Impact Study – Professor Martha Gray (Mitchell)
 - Pre-survey reports: preliminary statistics (2)
 - Statistical reports (3)
 - Post-survey statistical report (1)
- A Five-year, Retrospective Study of the Impact of 5.111 TA Training on Entering, First-year Chemistry Graduate Students (fall 2007 and fall 2008) – Professor Catherine Drennan (Mitchell)
 - Final report

Supporting Graduate Students and Postdocs

MIT graduate students and postdocs require a range of professional development opportunities and support. In response to articulated and perceived needs, TLL developed and/or offered a range of certificate programs, workshops, and trainings for graduate students and postdocs.

TLL provided a spring and a summer offering of the Kaufman Teaching Certificate Program (KTCP). The KTCP is designed for graduate students and postdocs who wish to develop skills to support their teaching at MIT and/or are preparing for future faculty careers. The program consists of seven two-hour sessions and microteaching opportunities. In 2017, 209 participants completed the program. The total annual cost of the KTCP is approximately \$50,000–\$70,000. Since its inception in 2009, the program has been supported in part by funds from the Dean for Undergraduate Education (\$25,000–\$35,000 per year). TLL began admitting postdocs to the program in 2014, and since 2015, the Office of the Vice President for Research has provided funding to support postdoc participation (approximately \$25,000–\$35,000 per year). See Table II for the cost of the KTCP in 2017, along with the breakdown of sources of financial support for the program.

TLL also offers the EdTech Teaching Certificate Program. This seven-session program is designed for participants with a variety of interests and career goals. Workshop activities, discussions, and assignments immerse participants in innovative educational tools and technologies.

TLL offered the subject 5.95J Teaching College-Level Science and Engineering (Rankin) during the fall semester. The MIT OpenCourseWare (OCW) Educator site for this subject launched in fall 2016. OCW filmed individual classes and interviewed Rankin to create the Instructor Insights portion of the site.

TLL provided graduate students and postdocs a wide variety of workshops, including: “What We Know about Student Learning”; “Teaching with Educational Technology”; “Problems and Pitfalls in Teaching; Active Learning”; “Presentation Skills for Academics”; “How to Use Teamwork in the Classroom”; “Assessing Student Learning”; and “Mentoring Students.”

In addition, TLL offered trainings in fall and spring for new teaching assistants (TAs) in the School of Engineering, the Department of Brain and Cognitive Sciences, and the Department of Economics. More than 360 participants attended these sessions in AY2017.

Supporting Students

MIT students sometimes lack the physical, emotional, internal, and external supports necessary for their wellness and sense of belonging. In 2017, TLL partnered with [MindHandHeart \(MHH\)](#) to work within departments to develop strategies to promote students’ success. TLL staff also worked with faculty and staff across campus on a variety of projects to foster community and belonging.

This year, TLL and MHH launched a new initiative: You Belong @MIT. During spring 2017, TLL hosted a variety of events to engage the MIT community in discussions on academic belonging. The goal was to help participants identify department- and subject-based strategies to increase students’ sense of belonging. Spring 2017 events included a presentation by academic belonging expert Professor Catherine Good (Baruch College, the City University of New York), as well as journal club meetings and brown-bag

discussions. In the fall, TLL will continue disseminating the research findings and focus on working with departments to implement tools and strategies in their specific classroom and departmental contexts. We also plan to create a series of videos on academic belonging for MIT faculty and instructors.

Leann Dobranski provided project management as well as assessment and evaluation support for “Narrowing the Gap,” Professor Joanne Yates’s intervention study for prefreshmen, aimed at narrowing the achievement gap between majority students and students of underrepresented minority groups.

TLL began consulting with Clinical Director for Campus Life Maryanne Kirkbride (executive administrator of MHH) and Vice President Kirk Kolenbrander to develop the Enhancing Academic Climate pilot program.

In addition, TLL partnered with David Randall and Tiffany Melendez (Division of Student Life) to provide workshops on student support and wellbeing for TAs.

Supporting Staff

The Teaching and Learning Lab supported the teaching, learning, and communication needs of offices and centers by developing and facilitating staff workshops, helping staff to teach and communicate with their constituents more effectively. During AY2017, TLL worked with the following MIT offices and staff:

- The Office of Minority Education (OME): TLL ran Interphase-Edge facilitator trainings, Seminar XL/LE facilitator trainings, Talented Scholars Resource Room (TSR^2) tutor trainings, and a workshop for OME staff on implicit bias. Approximately 60 staff members and students were involved in these events.
- The Office of Undergraduate Advising and Academic Programming: TLL offered the Facilitating Effective Research Workshop series for Undergraduate Research Opportunities Program mentors three times during the year for approximately 65 graduate student and postdoc mentors.
- The Office of Graduate Education: TLL offered the Facilitating Effective Research Workshop series for MIT Summer Research Program for approximately 20 graduate students and postdoc mentors.
- The Global Education and Career Development Office: TLL developed a workshop for career consultants on effective presentations.
- MIT International Science and Technology Initiatives: TLL worked on the longitudinal, mixed-method impact study and offered several workshops for program managers.
- The Office of Experiential Learning: TLL consulted with D-Lab staff on pedagogy and assessment.

Supporting Dissemination of Evidence-Based Teaching Practices

Often, faculty and instructors engage in interesting and impactful work to improve teaching and learning in their own subjects, but the benefits and challenges of these efforts are rarely shared across campus. TLL actively works to identify and implement strategies and venues for the dissemination of the work of MIT faculty and others across campus and beyond. Efforts in this area in 2017 are highlighted below:

- TLL expanded the DUE Talks (DUE Education Talks) Speaker Series to include presentations by members of the MIT community and national experts on teaching and learning topics. The AY2017 presenters included Professor Craig Carter and Kyle Keane (MIT); Professor David Meile (Boston College); Calvin Lai (Harvard University); Elizabeth (Libby) Mahaffy and Julio Oyola (MIT Division of Student Life); Professor James Lang (Assumption College); Professor Catherine Good (Baruch College, CUNY); and Professor David Pritchard (MIT).
- TLL expanded the web resource Guidelines for Teaching to include a larger collection of examples from MIT instructors.
- TLL began revision of its website to better support members of the MIT teaching and learning community by providing practical and timely resources and information. This includes an expansion of online resources for assessment and evaluation.
- Funding was secured from the Association of American Universities for the Dean's Action Group (see the description in the section Supporting Faculty Teaching Practice).
- TLL worked with individuals from the MIT-Singapore University of Technology and Design (MIT-SUTD) Program and the MIT-Africa Program. In particular, TLL offered three workshops for Tunisian faculty in the MIT-Educator Program during summer 2016, and enrolled faculty from the MIT-SUTD Program and the MIT-Africa Initiative in the Kaufman Teaching Certificate Program and 5.95J. In addition, TLL hosted visitors from Australia, Brazil, Chile, France, India, Singapore, Spain, Tunisia, and the United Kingdom who wished to explore undergraduate teaching and learning at the Institute.
- In July 2016, Rankin and Barnett traveled to Toulouse, France, to work with faculty at the Institut National Polytechnique de Toulouse, focusing on assessment and evaluation, as well as on the adoption of evidence-based teaching practices.
- Daniel Nocivelli (TLL's administrative assistant) led the way in strengthening TLL's Twitter presence, @mit_tll, by tweeting news, events, and other relevant content for MIT educators and for the teaching community, at large. TLL

Funding

TLL received over \$130,000 in non-base funding during AY2017.

Table 1. Source, use, and amount of non-base funding received by TLL in FY2017

Source	Use	Amount
d'Arbeloff Grant Fund for Excellence in Education	Project Assessment	\$2,489
Alumni Class Funds	Project Assessment	\$9,445
Office of Vice President for Research	Support of postdoctoral participants in the Kaufman Teaching Certificate Program	\$27,005
Office of the Dean for Undergraduate Education	General program support for the Kaufman Teaching Certificate Program	\$24,615
MIT-SUTD Collaboration	Support of SUTD faculty participants in the Kaufman Teaching Certificate Program	\$3,600
MIT IMPACT Program		
Funding from the National Institutes of Health through Professor Martha Gray	Support of Rudy Mitchell's work on the grant	\$18,496
Fly-by-Wire project, Scalable Differentiated Instruction. Funding from the US Department of Education through Professor Karen Willcox	Support of Dipa Shah's work on the grant	\$19,316
"Narrowing the Gap" Project. Funding from the Dean for Undergraduate Education	Support of Leann Dobranski's work on the grant	\$27,500
Total		\$132,466

Personnel

In winter 2017, TLL launched a search for an assistant/associate director for teaching and learning (two-year term position). This position is funded exclusively by TLL salary reserve money. TLL is delighted that Lourdes Alemán (formerly of the MIT Office of Digital Learning) joined TLL on July 1, 2017, as associate director. Alemán brings a portfolio of experience and expertise that diversifies and enhances TLL's teaching and learning-related services and support.

TLL is grateful for the support of Daniel Nocivelli, administrative assistant, who has made significant contributions to many aspects of the work described in this report

Janet Rankin, Interim Director
Teaching and Learning Laboratory