

## **Bernard M. Gordon–MIT Engineering Leadership Program/ Undergraduate Practice Opportunities Program**

The [Bernard M. Gordon–MIT Engineering Leadership \(GEL\) Program](#) was launched in July 2007 through a \$20 million pledge (with a matching component) from the Bernard M. Gordon Foundation. This was the largest gift made to MIT's School of Engineering for curriculum development. The program's mission is to educate and develop the character of outstanding MIT students as potential future leaders in the world of engineering practice and development, and to endeavor to transform engineering leadership in the nation, thereby significantly increasing product development capability.

The program provides a select group of MIT engineering undergraduates with a challenging and supportive environment in which they develop leadership skills that help them to become highly effective leaders of engineering teams. This year, more than 200 rising juniors and seniors applied to the program, primarily motivated by the excellent recommendations they received from former participants. Admission into the program is primarily based on a student's commitment to participate and engage fully. The first year of the program (GEL1) introduces students to engineering leadership experiences and development; approximately 130 students participate. For an exclusive group of 30 to 35 students, the second year of the GEL Program (GEL2) is an intensely personalized leadership development program that includes opportunities for leadership practice and significant interactions with industry leaders, staff, and peers.

The Undergraduate Practice Opportunities Program (UPOP) predates the GEL Program. It was launched in 2001 as an initiative of the dean of the School of Engineering at that time, Thomas Magnanti. UPOP is a yearlong program that prepares MIT sophomores to enter and thrive in the professional world, through experiential learning, individual coaching, access to internships, and mentoring relationships with MIT alumni and industry partners. It includes an intense weeklong workshop during January. UPOP helps participants get a summer internship and gain practical experience in their field.

In 2008, when the GEL Program was formed, UPOP became a part of the GEL Program, forming a natural progression from UPOP in the sophomore year to GEL1 and GEL2 in the junior and senior years. (Although UPOP is a viable entryway into GEL, it is not a prerequisite.) A UPOP organizational restructuring late in academic year 2013 streamlined the alignment of UPOP and the GEL Program, generating improved synergy and use of resources.

In June 2016, the Biological Engineering Communication Laboratory moved under the Gordon program and became the School of Engineering Communication Lab. It uses a very effective franchise model to provide structured and need-driven peer coaching for papers, presentations, faculty applications, laboratory reports, and so on, primarily to graduate students. Participating departments and organizations at present are Biological Engineering, Nuclear Science and Engineering, the Broad Institute of MIT and Harvard, Electrical Engineering and Computer Science, Chemical Engineering, and Mechanical Engineering.

## **Gordon–MIT Engineering Leadership Program**

In AY2018, the GEL Program continued to focus on its mission to educate and develop tomorrow's engineering leaders with a new approach that encompasses students' professional, personal, and leadership progression. The GEL Program creates a supportive environment that promotes core values and complements the strong technical fundamentals that typically define the rigorous MIT educational experience.

Students in the GEL Program enhance their departmental education by developing their leadership and teamwork skills in an engineering context, helping to prepare them to be effective and for success in an industry setting. In addition, the GEL Program provides augmented opportunities in leadership and innovation, character development, invention, and implementation. The program is delivered through a dedicated instructional staff supplemented by other relevant subjects, collaborations with industry, volunteer mentors, and "engineers in the room." The program also offers professional education opportunities for early- and mid-career engineering professionals and for developing innovative design skills.

During AY2018, the GEL Program gained increasing relevance within the Institute and elsewhere. The program also made considerable progress toward program goals.

*Goal: Educate and prepare the potential future leaders of engineering innovation, invention, and implementation efforts.*

Rising juniors and seniors from engineering and other departments are encouraged to apply to the first year of the program. UPOP serves as a recommended and accessible pathway into the GEL Program (in AY2018, 51% of incoming GELs came from UPOP), but students can also enter by having demonstrated equivalent experience in an engineering project in an academic or industrial setting. Students in the GEL Year 1 Program (GEL1) actively participate in a set of augmenting elective subjects and immersive learning experiences that, taken together, approximate the level of an MIT concentration.

Students who demonstrate exceptional leadership potential in engineering industry and remain on track to successfully complete the first-year program requirements can elect to apply for advancement to the highly selective GEL Year Two Program (GEL2). GEL2 provides a wide range of intensely personalized leadership development activities for 30 to 35 second-year students, featuring a high degree of interaction with industry leaders, faculty, and fellow peers. The aggregate two-year program requirements approximate the level of an MIT minor.

In fall 2018, 168 students are expected to enter GEL1, up significantly from an initial cohort of 17 GEL1 students in fall 2008. Incoming GEL1 students will represent 13 departments across the Institute, including all of the engineering departments. A total of 34 students will advance to GEL2.

Incoming GEL1 students will largely represent MIT's School of Engineering (in proportion to department size), but will also include students from Courses 4 (Architecture), 8 (Physics), 12 (Earth, Atmospheric, and Planetary Sciences), 15 (Management), and 18 (Mathematics) who have expressed an interest in engineering. Because one of the program's

objectives is to prepare GEL students to work in industry with professionals from other disciplines, it is important that GEL students learn how to collaborate effectively early in the program. In addition to the GEL Program's ongoing efforts to support MIT's undergraduate and graduate students, the program's faculty and staff also work closely with MIT Professional Education to create and deliver courses on engineering leadership and innovation for early- and mid-career engineering professionals. In summer 2018, there were 30 participants in the Engineering Leadership for Emerging Leaders and 66 in the Mastering Innovation and Design-Thinking course. These courses received positive feedback and contributed significant funds to the GEL operating budget. The program plans to explore expanding future offerings and to continue to work with participants from local companies who are able to participate in the GEL Program as mentors and engineers in the room.

### **Program Expansion and Development**

The GEL Program continues to be widely acknowledged by the Institute as a valuable asset to students' educational experience and in developing potential future leaders in the world of engineering practice. The program's impact has been strengthened at the Institute through collaboration with related programs, such as the MIT School of Engineering's New Engineering Education Transformation Program; the new Humanities, Arts, and Social Sciences negotiation and leadership concentration proposed by the School of Architecture and Planning; and the GEL Program's participation in the innovation and entrepreneurship minor.

GEL is working closely and actively with the graduate student population to meet an increasing demand to create and deliver an engineering leadership development experience for graduate students. David Niño, senior lecturer, is overseeing this initiative; for a third and fourth time, he offered GEL's first graduate course, 6.928 Leading Creative Teams in fall 2017 and spring 2018. Niño also taught a series of four workshops over Independent Activities Period (IAP) designed specifically for graduate engineering and technology students who want to make an impact in their career. The graduate course and workshop series both received overwhelmingly positive feedback from the graduate students who completed them. In an effort to provide graduate students with more opportunities to hear from leaders in industry, GEL hosted a special talk with Hector Ruiz, former chairman and chief executive officer of Advanced Micro Devices, Inc., who spoke on "Technology, Leadership, and the Courage of Conviction." The program also co-hosted a panel event later in the year with the Department of Aeronautics and Astronautics that was focused on NASA leadership and human space exploration. The panel featured Ellen Ochoa, director of Johnson Space Center and veteran astronaut, and Professor Dava Newman, former NASA deputy director.

The Office of the Vice Chancellor invited the GEL Program to become a collaborator in an initiative to provide more opportunities for graduate students to learn and practice leadership during their time at MIT. This summer, Senior Lecturer Niño is working closely with a graduate student committee charged with drafting a proposal to design some form of universal leadership training for graduate students that will later be presented to the senior administration for approval. As part of GEL's other collaborative efforts, the program has been in discussion with several engineering departments about expanding the graduate course into a leadership development certificate program for doctoral students. The program is looking into embedding GEL leadership modules into

existing professional-oriented MIT master's degree programs, such as System Design and Management, Integrated Design Management, Leaders for Global Operations, and Supply Chain Management. GEL believes that gaining support from departments and programs such as these will result in increased program awareness among students, who might then in turn help generate a greater demand for the GEL Program's graduate offerings. Further, the program is continuing to work with the School of Engineering Communication Lab to establish further interest among their respective graduate students.

The GEL Program participated for the first time in this year's MIT 24-Hour Challenge and experienced great success. As part of the all-day online fundraising event, GEL participated in a related challenge to kick off its 10th anniversary fundraising activities—GEL's Industry Advisory Board agreed to give a gift of \$20,000 to the program if there were 50 donations earmarked for GEL during those 24 hours. GEL reached its participation goal early. Some Industry Advisory Board members agreed to make a second donation to the program if 25 additional donations were made. Donations were made by staff, industry sponsors, current students, GEL alumni, and parents of alumni and students, as well as by friends of the program. By the end of the day, GEL had exceeded both participation goals, with 116 gifts from 114 donors and more than \$40,000 funds raised.

As a way to continue to capitalize on the program's 10th anniversary and the success of the MIT 24-Hour Challenge, GEL hopes to increase its fundraising activity in AY2019. The program will engage with the School of Engineering and MIT's Office of Resource Development to develop and implement a fundraising initiative for the graduate program, which was benchmarked for \$10 million in MIT's 2016 Capital Campaign.

The GEL Program also worked with the Office of Digital Learning and was instrumental in securing a deal with the Boeing Company to create digital and blended leadership modules for the Leadership Academy for Scientists, Engineers, and Researchers. These modules will be marketed within the Institute to students and more widely, in industry, to entry- mid-level professionals.

This was the program's second year after launching its corporate engagement and sponsorship program for engineering companies. The effort is to increase industry's participation in the program's educational pursuits and further support students' internship and job search activities. In AY2018, the GEL Program raised \$20,000 from industry sponsorships. This year's list of corporate sponsors included Apple, General Motors, Lockheed Martin, the Naval Nuclear Laboratory, Northrop Grumman, Pioneer Natural Resources, Shell, and SpaceX. When planning for AY2019, the GEL Program will work on increasing its overall corporate sponsorship activities as well as broadening its target list of companies to create more engagement opportunities for the program's diverse group of engineering majors.

### **Gordon–MIT Engineering Leadership Program Years One and Two: Continued Growth**

During the AY2018 admissions cycle, word of mouth from motivated GEL students, increased synergy with UPOP, and a highly effective marketing campaign generated the second-highest number of applications in the program's history with a total of 206 applications. This continued growth demonstrates that engineering students recognize

the importance of strengthening their professional development skills as they prepare to leave MIT and make an impact in industry and the world.

With the goal of becoming future leaders of engineering innovation, invention, and implementation efforts, 100 GEL Program students earned Certificates of Completion in May 2018—33 from GEL2 and 67 from GEL1.

*Goal: Increase the focus of national engineering education on the development of leaders of engineering innovation, invention, and implementation.*

In AY2018, the GEL Program continued to play a key role in advancing the Community of Practice for Leadership Education for Twenty-first-Century Engineers (COMPLETE) by participating in its annual conference at the University of San Diego, CA, in May. As a founding member of COMPLETE, the GEL Program remains a driving force behind advancing the agenda for this group.

The ongoing COMPLETE meetings—the purpose of which is to share best practices and advance the practice of engineering leadership—gather representatives from more than a dozen institutes in North America with engineering leadership programs. Creative public relations efforts augmented the program’s visibility in numerous national and trade publications, reinforcing GEL’s position as the thought leader in engineering leadership.

The GEL Program has actively and regularly shared best practices with others by hosting multiple visits from other colleges and universities that either have, or are seeking to establish, engineering leadership programs. The program recently developed a strong relationship with the University of Los Andes (Colombia); with the GEL Program’s coaching and guidance, that university has designed and launched a very successful engineering leadership program that is similar to the GEL Program. The GEL Program will continue to engage with and share best practices with the University of Los Andes as the program makes it through its first pilot year in AY2019.

The GEL Program’s impact on engineering leadership has grown to a national level through participation in the American Society of Engineering Educators (ASEE). In the past three years, GEL has played a vital role in developing the newest Engineering Leadership Development Division (LEAD) of ASEE, which is the ninth largest division in the ASEE; it has more than 700 members who are educators of engineering leadership. David Niño is currently representing the GEL Program and serves as treasurer of the division, working closely with Northeastern University and other allies to lead strategic planning.

In support of the GEL Program’s mission to disseminate best practices in engineering leadership education, program staff actively participated in the June 2018 annual ASEE conference in Salt Lake City, Utah. Executive Director Leo McGonagle planned and helped lead a panel discussion on “Approaches, Tips, and Techniques to Start, Grow and Sustain Engineering Leadership Development Programs.” During the conference, Engineering Leadership Instructor Jim Magarian also presented a paper, “Engineering Students and Group Membership: Patterns of Variation in Leadership Confidence and Risk Orientation” along with co-author and MIT alumna Alison Olechowski, who is now an assistant professor at the University of Toronto. Jim Magarian and Alison Olechowski

were both acknowledged and won an award for Best Paper in the Engineering Leadership Development category at the conference.

### **Staffing Update**

In summer 2017, Lisa Stagnone joined the GEL Program's staff to serve as senior program assistant. Lisa formally provided direct administrative support to the dean in the Office of the Dean for Undergraduate Education.

During AY2018, the GEL Program continued to lead a comprehensive search for a new industry co-director to manage the three programs that fall under the program (i.e., GEL, UPOP, and the Communication Lab). MIT Chemical Engineering alumnus Reza Rahaman, formerly vice president and chief innovation officer at Clorox Company, will join the program's staff in early September.

### **Undergraduate Practice Opportunities Program**

UPOP is a yearlong professional development program. Its mission is to prepare sophomores to successfully integrate into and thrive in the professional world, and to be strong contributors to their organizations.

Each year, UPOP supports several hundred MIT sophomores. Applicants come from all Institute majors and represent almost half the sophomore class, providing, each year, a rich cross-section of the student body.

In AY2018, of the 485 who applied, 439 applicants were admitted; 276 students completed the Team Training Workshop requirement (weeklong workshops over IAP or a three-day workshop over Presidents' Day weekend); and 261 students completed all the requirements of the yearlong program, including participation in and reflecting upon the summer internship. About 51% percent of the Gordon–MIT Engineering Leadership Program applicants were originally UPOP students. The programs work closely together in GEL Program recruitment campaigns.

UPOP requirements include participation in the intense weeklong Team Training Workshop, delivered twice over IAP, or the three-day alternative workshop over Presidents' Day weekend. These workshops feature experiential modules taught by MIT faculty and other industry professionals, focusing on themes of communication, problem-solving, and teamwork; topical seminars led by staff, industry professionals, and MIT alumni. UPOP students must also secure a career-relevant summer practical experience, submit written reflective reports during their summer experience, and complete follow-up meetings with staff in the fall semester of their junior year.

Over the past few years, the UPOP curriculum has expanded to offer additional collaborative workshops in the fall and spring semesters, with greater opportunities to engage with MIT resources and departments, such as MindHandHeart, MIT Libraries, the MIT International Science and Technology Initiatives Program, and the Society of Women Engineers. Continuing customized employer events this year allowed students to learn more about the career opportunities available to them and practice engaging with employers. These events also are a source of revenue.



## Student Program Retention

UPOP began its first year of operation in AY2002 with approximately 73 students. Annual applications to UPOP now average between 42% and 49% of MIT sophomores, reflecting the demand from MIT undergraduates for the unique programming provided by UPOP. UPOP has maintained a steady retention rate of 57% since implementing some significant changes in AY2013. The program now maintains a two-pronged approach to retention efforts: personalization and flexibility. Keeping in mind the research on the importance of fostering a community, UPOP staff prides itself in its ability to provide one-on-one advising, workshops, and “meet and greets” with various resources on campus. The program also maintains an open-door policy throughout the year for advising and coaching needs. The UPOP employer relations and student program teams hold office hours to coach students in personalized internship searches and career advice. The program is a resource for UPOP alumni throughout their time at MIT and later. A substantial number of juniors and seniors continue to use UPOP career advising services.

One core requirement of UPOP’s yearlong program—attendance at one of UPOP’s two weeklong Team Training Workshops during IAP—presents a scheduling conflict for many of MIT’s sophomores. An increasing number of other campus programs are offered over IAP and sophomores may, for example, be involved with the Alumni Association’s Externship Program, the MIT International Science and Technology Initiatives Program’s Global Teaching Labs, and other opportunities. Most of the students who drop out of UPOP do so because of this scheduling conflict. It is also an impediment to applicants.

To convert this from a problem into an opportunity, UPOP offers immense flexibility in integrating such conflicts into part of the yearlong curriculum requirements. For students who participate in a qualifying alternative, the program offers a three-day alternative version of the weeklong Team Training Workshop, held over Presidents’ Day weekend. As an added layer of support, this past year UPOP continued to hold so-called IAP Conflict Clinics where more than 250 of UPOP’s admitted students met individually with UPOP staff to exhaust all retention options for them. In addition, an extensive à la carte menu of workshops and events allows students to tailor the program to best fit their individual needs, interests, and schedules.

## Summer 2018 Internships

UPOP students are required to participate in a summer experience within an organization to help develop and expand their professional horizons. The majority of UPOP students participated in industry internships, both domestic and international, from large corporations to small start-ups; others spent the summer in research and government organizations. Students also participated in undergraduate research opportunities programs, engaging in research opportunities at other institutions, teaching and tutoring, and volunteer activities. Some 70% of UPOP students participated in a traditional industry internship, more than half of which were acquired through a UPOP-established employer connection.

The total number of UPOP students was 261. There were 178 total industry internships (domestic and international); of these, 100 were through a direct UPOP connection with

the employer. Almost all the other UPOP students found an Undergraduate Research Opportunities Program internship or another career-relevant summer position. The top employers of UPOP interns in summer 2018 included Facebook, Google, MIT Lincoln Laboratory, Bose, Merck, Covaris, Indeed, Northrup Grumman, and Pioneer.

### **Employer Engagement and Sponsorship**

In AY2018, UPOP again attracted a large pool of actively engaged volunteers, sponsors, and employers who offered internships. More than 100 companies posted UPOP-specific job opportunities for sophomores and more than 125 companies registered for each of the two Team Training Workshops' capstone events: the January networking luncheons.

In addition to UPOP's traditional offerings of company field trips and educational events, UPOP hosted 11 corporate-sponsored events.

UPOP initiated an industry sponsorship campaign in AY2014. The campaign raised \$48,000 that year, but the program now averages more than \$145,000 per year in sponsorships.

### **MIT Alumni and Mentor Support and Involvement**

UPOP continued and expanded the mentorship program within the Team Training Workshop weeks during IAP and Presidents' Day weekend. MIT alumni and other industry professionals volunteer to participate in the workshops as mentors for teams of seven to eight students. Mentors are essential for facilitating curriculum content and guiding student discussions at their tables. Of the 45 mentors who participated in AY2018, 35 were repeat participants from past years and 10 were newcomers. Additionally, as part of the series UPOP Presents, several alumni delivered topical seminars for the MIT community during IAP and the spring semester. Subjects included Patent Law: What You Claim Is What You Get—Sort Of; Incorporating Ethics in Engineering; Software Design—Waterfall to Agile; and Human Factors in Engineered Design Systems. Nearly 100 MIT alumni participated as industry guests at events within the yearlong curriculum.

To continue advancing the goals of UPOP through mentor and alumni involvement, in 2014 the program established a UPOP Advisory Board that meets once a year. The board comprises 20 or more MIT alumni and industry professionals who work actively with UPOP staff on committees and curriculum revision. UPOP also engages with more than 480 community members, many of whom are MIT and UPOP alumni, through a monthly newsletter that provides updates and highlights of the yearlong program.

### **Alumni**

UPOP continued its series of Industry Rotations in the spring semester, inviting UPOP alumni and early-career MIT alumni to engage current UPOP students in discussions about their career paths. UPOP alumni continue to be involved as industry volunteers, intern employers, and sponsors on behalf of their organizations. In AY2018, 39 UPOP alumni participated in the program as industry volunteers.



## Staff

UPOP has five full-time staff members reporting to Professor Joel Schindall, director of UPOP, the Gordon Engineering Leadership Program, and the Communication Lab. The full-time staff comprises two student program staff, a student program coordinator and a student program assistant; an employer relations program manager; a mentor liaison and outreach coordinator; and a communications and operations coordinator.

## Accomplishments and Awards: GEL and UPOP

Combined, the GEL Program and UPOP affected more than 1,000 students throughout the year. The combined programs earned corporate funding in the form of grants and company sponsorships as well as donations from a pool of committed individual donors, including program alumni.

## Engineering Leadership Program

- More than 200 MIT undergraduates applied to join GEL1 in spring 2018; 168 students representing 13 MIT departments (including all departments in the School of Engineering) will enter GEL1 in fall 2018.
- A hundred GEL students earned program Completion Certificates in May 2018.
- GEL continues to participate in the planning for the School of Engineering's New Engineering Education Transformation Program.
- Almost 60 students completed GEL's graduate course, which had pilot programs for a third and fourth time in fall 2017 and spring 2018.
- About 100 participants total registered for the GEL Program's two MIT Professional Education courses offered in summer 2018.
- GEL's industry engagement and sponsorship program, launched in July 2016, raised \$20,000 in corporate sponsorship and matching gifts.
- In March 2018, GEL kicked off its tenth anniversary activities and participated in the MIT 24-Hour Challenge for the first time. GEL exceeded both participation goals with 116 gifts made from 114 donors with more than \$40,000 funds raised.
- In September 2017, GEL hosted a tech talk with Hector Ruiz, former chairman and chief executive officer of Advanced Micro Devices, who spoke about "Technology, Leadership, and the Courage of Conviction."
- In March 2018, GEL co-hosted a special panel event with the Department of Aeronautics and Astronautics. The event was focused on NASA leadership and human space exploration; it featured Ellen Ochoa, director of Johnson Space Center and veteran astronaut, and Professor Dava Newman, former NASA deputy director.
- GEL is working with the Office of the Vice Chancellor to design an Institute-approved form of universal leadership training open to all graduate students.
- GEL continues to be in discussion with several engineering departments about expanding the graduate course into a leadership development certificate program for doctoral students.

- The program is also looking into embedding GEL leadership modules into existing professional-oriented MIT master's degree programs, such as System Design and Management, Integrated Design Management, Leaders for Global Operations, and Supply Chain Management.
- GEL is working with the School of Engineering Communication Lab to establish shared synergies and generate additional interest among the Communication Lab's graduate students.
- The GEL Program worked with the Office of Digital Learning to secure a deal with Boeing to create digital and blended leadership modules to be marketed to students at MIT and more widely in industry to entry- and mid-level professionals.
- GEL held two Industry Advisory Board meetings to receive input from engineering leaders.
- GEL continued to be a significant thought leader and driving force in developing the ASEE's new LEAD, which is the fastest-growing division in the ASEE, with more than 700 members.
- GEL presented a paper and participated in a panel discussion at the annual ASEE conference in Salt Lake City, UT, in June 2018.
- Engineering leadership specialist Jim Magarian and his co-author Alison Olechowski were both acknowledged and had their paper win the Best Paper in the Engineering Leadership Development category at the 2018 ASEE conference.
- GEL hired a new senior program assistant in summer 2018.
- GEL successfully led a comprehensive search for a new industry co-director to manage programs under Gordon (i.e., GEL, UPOP, and the School of Engineering Communication Lab).

### **Undergraduate Practice Opportunities Program**

- Almost 500 sophomores (485 members of the Class of 2020) applied to UPOP in fall 2017. More than 300 members of the Class of 2019 (315) graduated from UPOP in September 2017.
- UPOP's corporate sponsorship program raised more than \$145,000 in AY2018.
- A total of 58 individual donors contributed more than \$1,000,000 to the program in AY2018.
- UPOP's original endowment fund goal of \$5 million, to be raised through the efforts of UPOP mentors, has been met.
- UPOP's efforts to increase diversity among its mentor pool to better reflect the UPOP student population resulted in two new mentors of color and three new female mentors.

## Plans for the Future

The GEL Program's plans include the following goals for the program, UPOP, and the Communication Lab:

- Expand outreach efforts and increase awareness of GEL and UPOP programs among prospective MIT students;
- Continue to perform educational assessments related to the overall efficacy of GEL and UPOP; and
- Continue to explore new synergies that will benefit growth and development of the programs under the GEL Program's organizational structure (i.e., GEL, UPOP, and the Communication Lab).

## Engineering Leadership Program

- Expand outreach and increase awareness of the GEL Program among MIT alumni in an effort to increase MIT alumni engagement with the program.
- Continue to work closely with the Office of Resource Development to solicit potential supporters to provide funds to expand the program and fund development of a graduate program.
- Work closely with the Office of the Vice Chancellor and the graduate community on a strategic plan for a universal leadership training program for graduate students, then use the opportunity to further develop the GEL graduate program; determine what the appropriate vehicle is for expansion (e.g., more residential or online course offerings, workshops and talks, mentorship and coaching, and so on).
- Work with the Office of Digital Learning and with Boeing to create digital and blended leadership modules to be marketed internally to students at MIT and more widely in industry to entry- and mid-level professionals.
- Continue to expand GEL's corporate engagement and sponsorship program to attract a larger and more diverse set of engineering companies.
- Continue to diversify GEL's mentor roster to be more representative of the current engineering majors in the program.
- Increase outreach (and thus awareness) of MIT Professional Education courses to engineering and technology companies vested in supporting younger employees' professional and leadership development.
- Explore new opportunities for collaboration with the MIT departments where GEL can lend its expertise in engineering leadership to help channel new innovations.
- Continue to help lead strategic planning (with Northeastern University and other allies) for the ASEE's newly established LEAD.
- Support and help transition the new industry co-director who will be managing programs under Gordon (i.e., GEL, UPOP, and the School of Engineering Communication Lab).

## **Undergraduate Practice Opportunities Program**

- Expand outreach and increase the awareness of UPOP, a program for sophomores, among incoming freshmen, their parents, the MIT Admissions and orientation staff, and educational counselors.
- Expand outreach and increase awareness of UPOP through engagement with the Alumni Leadership Conference and the Corporation Development Committee.
- Diversify UPOP’s mentor roster to be more representative of the diversity of students in the program.
- Explore the expansion of UPOP to a graduate student population.
- Expand opportunities for mentor and alumni engagement through vehicles such as the UPOP Presents seminars.
- Explore the expansion of UPOP through making aspects of the program available to other programs within the MIT community and to outside organizations.
- Continue fundraising efforts with corporate sponsorships and MIT alumni donors.
- Participate with the MIT Annual Fund in the 24-Hour Challenge on Pi Day, a targeted fundraising outreach campaign to the UPOP alumni base (which has almost 3,000 members).
- Continue to recruit and retain a significant percentage of MIT sophomores.
- Continue to review and refine the yearlong and Team Training Workshop curricula to best prepare MIT sophomores for the transition from the world of academia to the world of work.
- Continue to expand the roster of employers who engage and hire UPOP students.

## **School of Engineering Communication Lab**

The School of Engineering Communication Lab is a professional development resource that uses discipline-specific peer coaching to improve the technical and professional communication skills of graduate students, postdoctoral associates, and undergraduates. Since its successful launch in 2012 within a single department (Biological Engineering), the Communication Lab has grown to include branches within six departments and institutions: Biological Engineering, Chemical Engineering, Electrical Engineering and Computer Science, Mechanical Engineering, Nuclear Science and Engineering, and the Broad Institute. Each departmental Communication Lab has a team of four to 16 trained graduate students and postdoctoral associates—the Communication Fellows—and one half-time manager, all under the leadership of one central program manager.

In 2016, the Communication Lab became a member of the GEL Program as a complement to its existing undergraduate leadership programs. The Communication Lab team is now working to build synergy with GEL’s developing graduate leadership program.

The Communication Lab has four distinctive features:

- **Discipline specificity:** Training graduate students and postdoctoral associates within a given department to act as communication coaches for their fellows means that these Communication Fellows can engage with their clients about both the communication and the science. Their coaching is informed by a deep understanding of each field’s expectations, language, and culture. Each Communication Lab can also customize its practices and resources according to its department’s demographics, rhythm, and culture.
- **One-on-one peer coaching:** Communication Fellows ask their clients strategic questions to help them analyze communication principles such as audience, message, and structure. The Communication Fellows do not provide line editing or grammar corrections. Their high-level focus encourages clients to create their own solutions and learn transferable communication skills.
- **Authentic tasks:** Clients can bring any professional or technical communication task to the Communication Fellows for input, including papers, presentations, faculty applications, and laboratory reports.
- **“Just in time”:** Working on authentic, deadline-driven needs, gives clients immediate and genuine motivation to learn communication principles. The Communication Lab aims to provide clients with resources in a manner tied to real deadlines—for example, offering workshops four weeks prior to the National Science Foundation Graduate Research Fellowship deadlines, and encouraging attendees to come to the Communication Lab for one-on-one coaching during the subsequent weeks.

The Communication Lab also has an impact on department members beyond clients:

- The peer coaches, who are carefully selected and are paid a modest stipend, receive valuable skill development from the training workshops and additional professional development activities, from their experience in coaching their clients, and from the experience of working together as a team.
- Many faculty members have stated that the program results in better publications and presentations and also reduces their workload.
- The cross-departmental model allows the overall program to develop, evaluate, and refine a repository of tested material. This has already led to a website that is widely used both inside and outside MIT (the CommKit), a research paper that has been published and presented at ASEE, and a weeklong Summer Institute to help share this knowledge with other universities.

Altogether, the Communication Lab is a flexible, adaptable, and lean program that uses student leadership and minimal staffing to support diverse communication initiatives. Since its launch, the Communication Lab has served more than 1,700 unique clients with more than 3,800 hours of one-on-one coaching in more than 4,600 appointments. In addition, the Communication Lab has partnered with more than 85 subjects and academic programs and offered more than 150 workshops. To date, 108 Communication Fellows have been trained, a workforce and resource of exceptionally articulate and creative student leaders.

## Staffing Updates

During AY2018, the Communication Lab's staff comprised one full-time program manager (Diana Chien), four 50% full-time equivalent (FTE) departmental managers, a 10% FTE administrative assistant, and an hourly curriculum consultant/instructor.

- Program leadership: AY2017 was the Communication Lab's first year under the leadership of Diana Chien, who replaced founder Jaime Goldstein.
- Departmental leadership: The program manager trained four new departmental managers during this academic year, for the Biological Engineering, Chemical Engineering, and Mechanical Engineering departments and the Broad Institute. The Chemical Engineering departmental manager departed at the end of June 2018, after one year with the Communication Lab; this position is currently being filled.
- Additional staffing: The program added a 10% FTE administrative assistant and an hourly curriculum consultant/instructor who assisted the program manager with cross-departmental curriculum development, external-facing workshops, and other workshops as needed.

## Accomplishments and Awards

Overall in AY2018, the Communication Lab continued to thrive in its core mission of providing one-to-one communication coaching, with average usage rates of at least one session per day in each member department.

Selected AY2018 data includes the following:

- Percentage of each department's population that used that department's Communication Lab: 62% of Biological Engineering, 11.6% of Electrical Engineering and Computer Science (the largest department by an order of magnitude), 49% of Nuclear Science and Engineering, and 15% of Chemical Engineering.
- Depending on the department, 34% to 62% of clients are repeat users, showing that users find value in working with the Communication Fellows.
- Surveyed users reported that they felt that the Communication Lab helped them most with organization and structure, visuals, the writing process, and articulating ideas.
- Depending on department, 58% to 90% of users reported that the Communication Lab is helping them acquire the skills that they need to be successful at MIT.
- Mechanical Engineering joined in January 2018 as the newest Communication Lab department, and launched its lab in April 2018 with a team of eight Communication Fellows. The Communication Lab now serves five out of eight School of Engineering departments.
- Civil and Environmental Engineering and the Institute for Data, Systems, and Society are both exploring the possibility of launching their own Communication Labs.



- Department Communication Lab teams have refined existing communication initiatives and launched new ones, including approximately 20 workshops. Individual departments' efforts include the following:
  - Biological Engineering: Developed online resources supporting the faculty application process; supported the second cohort of undergraduate thesis writers (after having launched the undergraduate thesis program).
  - Chemical Engineering: Hosted numerous events supporting career skills and responsible research documentation.
  - Electrical Engineering and Computer Science: Supported multiple departmental symposia and poster sessions; launched a mentoring program for department members interested in science communication.
  - Nuclear Science and Engineering: Continued to significantly redesign the department's graduate seminars and launched a dissertation writers' support group.
  - Cross-departmentally: Communication Fellow taskforces published new online resources about public policy communication.

The program manager led internal development, including:

- Revising the Communication Fellow training curriculum based on feedback from all current fellows, and
- Launching the Communication Lab's first educational study, which will quantify the impact of Communication Fellows' coaching on documents and on clients' skills.

In June 2018, the Communication Lab held its second Summer Institute, a four-day workshop for external institutions that aim to create their own communication labs.

- The workshop was attended by eight participants from six institutions: the Air Force Institute of Technology, Cornell University, Monash University (Australia), Northeastern University, the Rose-Hulman Institute of Technology, and MIT's Department of Civil and Environmental Engineering.
- The workshop received overwhelmingly positive feedback and raised approximately \$18,000 for the program.
- Previous Summer Institute participants have launched their own initiatives. Brandeis University launched its own Communication Lab, Boston University plans a fall 2018 launch, the California Institute of Technology launched a graduate science communication course, and Hofstra University created a director of science writing position.

### **Plans for the Future**

The GEL Program's plans for the future include:

- Reevaluating systems and staffing to ensure scalability and sustainability as the program continues to grow;

- Expanding outreach and increasing awareness of Communication Labs in newer or larger member departments: Electrical Engineering and Computer Science, Chemical Engineering, and Mechanical Engineering;
- Completing and publishing educational studies to inform the refinement of current coaching practices and to disseminate the model;
- Maintaining intellectual rigor and freshness by providing opportunities for staff and Communication Fellows to learn from additional literature and experts;
- Continuing to find opportunities for Communication Fellows to collaborate and network across departments;
- Building programming for alumni Communication Fellows, including involving them as professional development resources for current Communication Fellows;
- Supporting external institutions that attend the Summer Institute to develop a collaborative community of Communication Lab users;
- Collaborating with GEL's other member programs, especially the developing graduate leadership program; and
- Exploring and developing sources of additional funds, such as donations, to support expansion of the program.

**Joel Schindall**

**Director**

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