

Office of Engineering Outreach Programs

The [Office of Engineering Outreach Programs](#) (OEOP) in the School of Engineering runs academic enrichment programs that reach more than 450 middle and high school students locally and nationally each year. These programs are all offered free of charge and focus on exposing students to engaging and challenging curricula in engineering and science. Our goal is to provide traditionally underserved students with multiple entry points to academic and professional careers in the science, technology, engineering, and mathematics (STEM) disciplines.

OEOP's core programs—the Minority Introduction to Engineering and Science (MITES) Program; the Engineering Experience at MIT (E2@MIT) Program; the MIT Online Science, Technology, and Engineering Community (MOSTEC) Program; the Saturday Engineering Enrichment and Discovery (SEED) Academy; and the STEM Program—also support MIT's mission to sponsor K–12 programs that foster unique learning experiences for students and help build a pipeline of diverse and highly qualified scientists and engineers.

Raising over 80% of its own funds annually, OEOP makes significant efforts to maintain its financial resources and support. In close cooperation with the Dean of Engineering and MIT development officers, OEOP secures funding for its programs from a broad range of corporations, foundations, MIT alumni, OEOP alumni, and other individuals.

The following table shows the numbers of students served since 2007 in various engineering outreach programs.

Students Served by Office of Engineering Outreach Programs, 2007–2015

	2007	2008	2009	2010	2011	2012	2013	2014	2015
SEED	85	94	93	92	90	95	90	95	89
MITES	64	66	70	71	80	80	78	72	68
MOSTEC	0	0	0	0	64	115	88	133	117
E2@MIT	0	0	0	0	64	76	76	107	91
STEM	80	84	78	89	93	86	85	86	94
Total	229	244	241	252	391	452	417	493	459

Statistics

In AY2016, 78 students who applied to MIT from the 2015 MITES, MOSTEC, E2@MIT, and SEED Academy programs were accepted. All of the students who graduated from the AY2016 SEED Academy were accepted into college. Also, in fall 2015, the eighth and ninth SEED Academy students were admitted as freshmen to MIT.

Programs

Minority Introduction to Engineering and Science Program

In 2015, the MITES Program served 68 students from across the United States and Puerto Rico. Of these students, 50% were female, 87% were members of underrepresented minority groups (African American/Black, Hispanic, or Native American), and 53% qualified for free or reduced-price lunches. Participants completed rigorous courses in physics, calculus, life science, and humanities that aligned with the types of courses students would experience during their first semester at MIT. Students also gained a better understanding of engineering fields through active participation in hands-on enrichment courses, seminars with leading scientists and engineers from academia and industry, and innovative design competitions.

MITES participants spent a rigorous 30–35 hours in classes and labs each week and received daily assignments. Students took physics, calculus, a humanities course, and a life science course (chemistry, biochemistry, or biology). Previous coursework and student interest was used to determine which classes a student would take. Student interest was also taken into consideration for the life science course, while the humanities course was taught at the same level for all participants. Finally, three afternoons a week, students participated in a hands-on enrichment course (digital design, engineering design, genomics, electronics, or architecture).

In addition to course study, students had the opportunity to discuss career options with MIT faculty members, MIT graduate students, and practicing scientists and engineers. Students interacted with MIT admissions and financial aid officers at seminars and dinners to better understand how to gain admission to top schools such as MIT. They also participated in a college fair with recruiters from 18 universities.

At the conclusion of the 2015 MITES Program:

- 95% of our students believed they were more able to collaborate effectively with others
- 95% were more confident in their ability to identify and ask significant questions that clarify various points of view and lead to better solutions
- 93% were more confident in their ability to effectively analyze and evaluate evidence, arguments, claims, and beliefs
- 90% believed they were more likely to be successful in college

Following the program, 26 MITES students were admitted into MIT's class of 2020. Others are pursuing studies at prestigious institutions such as Harvard College, Stanford University, and Princeton University.

Engineering Experience at MIT Program

In 2015, E2@MIT served 91 students from across the United States. The classes offered through the program provide students with a workload comparable to that of a first-year student at a top-tier university such as MIT. The program's goal is to boost the confidence and preparedness of each of our students, encouraging them to pursue

higher education and a career in a STEM field. Courses are designed to be technically feasible for students to complete in one week's time, with approximately 20 hours of in-class work and 10 hours of work outside of class. Instructors are responsible for teaching the core principles of engineering. Students are responsible for working together in small groups or as a class to learn the value of collaboration and sharing of ideas when solving problems. At the end of the course, students presented their work to their peers and instructors in an engineering showcase in which they described in detail their approach to the problem, overall design process, and solution. Twenty-nine E2@MIT students were admitted to MIT's class of 2020. Twenty-nine E2@MIT students were admitted to MIT's class of 2020.

At the conclusion of the 2015 E2@MIT Program:

- 92% of students stated that their course stimulated them to think in new ways
- 92% of students stated that the course helped them understand how to apply their learning to real problems
- 86% of students stated that the program helped them understand what they want to do
- 86% of students stated that the program gave them the skills they need to successfully pursue their educational goals

MIT Online Science, Technology, and Engineering Community Program

The MOSTEC Program served 117 students from across the United States in 2015. Of these students, 49% were female, 82% were members of underrepresented minority groups (African American/Black, Hispanic, or Native American), and 32% qualified for free or reduced-price lunches. During the academic phase of the program, which ran from July to August 2015, students completed online coursework and projects in science, engineering, and technical writing. The enrichment phase of the program ran from August 2015 to January 2016. During this phase, students continued to learn about science and engineering by interacting with MIT faculty and staff and by receiving online mentorship from undergraduate students, graduate students, and industry professionals. Students also had access to admissions and financial aid experts. Twenty-three MOSTEC students were admitted to MIT's class of 2020.

At the conclusion of the 2015 MOSTEC Program:

- 85% of students stated that they were challenged in their online course
- 75% of students believed they were more able to collaborate effectively with others
- 75% of students felt that they could better ask key questions and think critically
- 76% of our students felt that they were more able to present a project or activity to a large group
- 72% of students stated that it is more important for them to have a challenging STEM experience in college

Saturday Engineering Enrichment and Discovery Academy

SEED Academy, an academic enrichment and technical career exploration program for public high school students in Boston, Cambridge, and Lawrence, recently completed its 14th year. SEED Academy provides participants with an engaging, hands-on curriculum that strengthens their higher-order math, science, and communication skills. It includes a challenging learning environment with high expectations and access to positive role models. SEED Academy students learn about engineering and technology, including current trends and promising future developments in these fields.

For approximately eight Saturdays in both the fall and spring terms of the academic year, SEED Academy students come to MIT to take a series of courses taught by a team of graduate student instructors and undergraduate teaching assistants. The instructional staff develops curricula to support students' understanding of math and science concepts. Each SEED Academy module focuses on a different technical discipline such as mechanical engineering, robotics, or synthetic biology. Students increase their mastery of academic subjects through the practical application of math and science concepts and exposure to a university environment.

In 2015–2016, SEED Academy graduated a class of 25 students who were accepted into a number of prestigious universities, including MIT, Harvard, Stanford, the Wentworth Institute of Technology, Boston University, Bucknell University, Hamilton College, Northeastern University, the University of Illinois Urbana-Champaign, the University of Massachusetts Amherst, and the University of Massachusetts Boston. In fall 2016, SEED Academy will begin to accept applications from students in grades 7–12 and will serve these students until they complete high school. As part of this change, the STEM Program is being phased out and the STEM summer institute will not take place in 2016.

Science, Technology, Engineering, and Math Program

In 2015, 94 talented students from Boston, Cambridge, and Lawrence completed the STEM Program summer institute. During the five-week program, students explored subjects ranging from biology and chemistry to engineering design and pre-calculus. STEM students spent 20 hours per week in class, with daily assignments requiring an additional one to two hours of studying each night. Participants engaged in learning beyond the classroom by way of visits to Lincoln Laboratory and the Wright Brothers Wind Tunnel. Industry experts, including aerospace engineer Michelle Carpenter from Draper Laboratory, provided students with information on careers in STEM fields. In addition, MIT students and staff answered students' questions about college and graduate school. The program culminated with a ceremony in which students presented their final projects to their peers, families, MIT staff, and guests.

The learning continued for many of the STEM Program students who chose to participate in the voluntary OEOP Middle School Mentoring Program. During the 2015–2016 school year, 56 students were paired one on one with mentors from MIT, Brandeis University, and Harvard, among other schools. Students met with their mentors one Saturday each month to support their academic development during the academic year.

STEM Program students who entered ninth grade following the 2015 summer institute were also invited to join the ninth-grade cohort, specifically developed to help our oldest students make a successful transition into high school. The cohort ran concurrently with the regular mentoring program sessions in the fall semester; ninth graders were encouraged to discuss important high school topics such as choosing the right courses, avoiding negative influences, and managing their time. The formal meetings of the ninth-grade cohort continued through December, when the students officially graduated from the STEM Program.

The STEM Program will end in summer 2016. For fall 2016, students served by the program were invited to apply to SEED Academy as early as in the seventh grade.

Shawna Young
Executive Director