
Section 6

MIT and Industry

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MIT and Industry

MIT welcomes all industry partners who seek practicable and pragmatic solutions, and who share and celebrate the entrepreneurial spirit that brings new ideas to life. Together, MIT and industry can make great progress in creating new knowledge, in shaping new leaders, and in bringing important, new technologies to market.

- Direct industry sponsored R&D at MIT totaled \$180 million in FY2019.
- Over 800 companies provided R&D/gift support to MIT; 54 companies funded \$1 million+, 271 companies funded \$100 thousand–\$1 million.
- MIT consistently tops the National Science Foundation rankings in industry-financed R&D expenditures among all universities and colleges without a medical school.

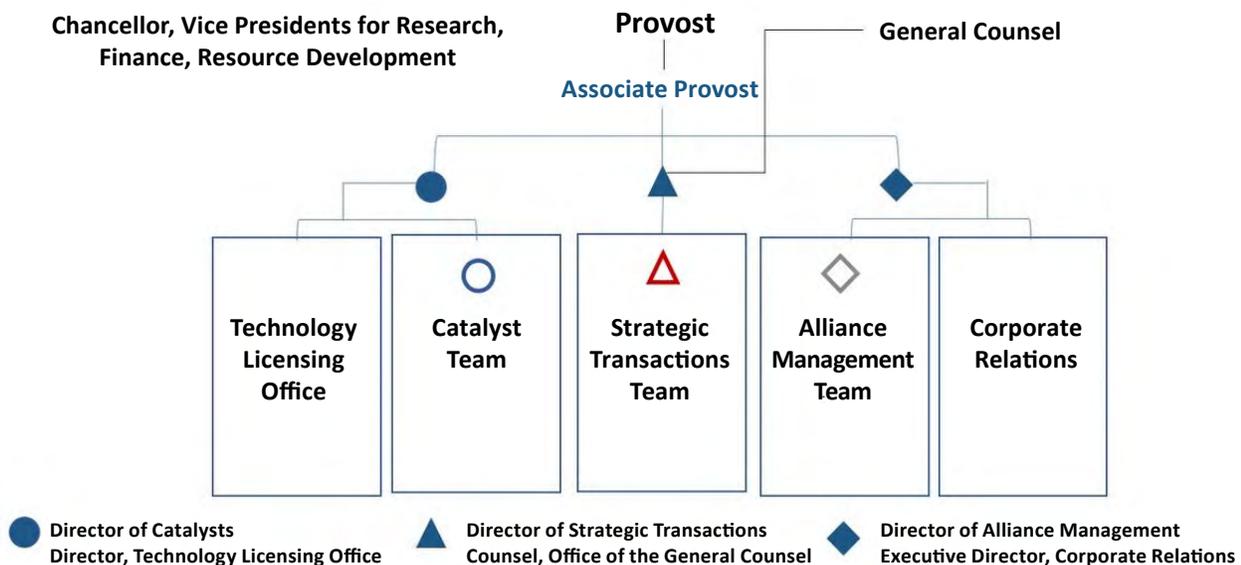
Office of Strategic Alliances and Technology Transfer

In September 2019, the MIT Office of Strategic Alliances and Technology Transfer (OSATT) was launched to bolster faculty leaders who are pursuing alliances, collaborations and other research engagements with sponsors.

The OSATT team is led by MIT’s Associate Provost, Krystyn Van Vliet, in coordination with three directors, who bring deep experience in academic research agreements, technology transfer, and engagement with external sponsors and collaborators. Lesley Millar-Nicholson serves as director of catalysts, responsible for faculty engagement and agreement development, while continuing to serve as director of the Technology Licensing Office. Meghan McCollum Fenno serves as director of strategic transactions, responsible for negotiations, while continuing to serve as counsel in the Office of the General Counsel. Karl Koster serves as director of alliance management and continues to serve as executive director of Corporate Relations.

OSATT’s new services assist faculty in catalyzing potential agreements and in managing the important next steps for establishing operations at MIT that meet the shared goals and expectations. OSATT, along with Research Administrative Services (RAS), replace the former Office of Sponsored Programs (OSP). RAS, reporting to the Office of the Vice President for Research, Maria Zuber, manages pre-award administration of grants and contracts sponsored by the federal, state, and local governments, as well as some philanthropic foundations, and post-award activities for all sponsored programs.

OSATT Organization



Industrial Liaison Program

MIT is the first research university to have formal and systematic liaisons with firms. Today, its Industrial Liaison Program (ILP) helps company managers by scheduling and facilitating face-to-face meetings with MIT faculty, coordinating on-campus networking activities, and advising company managers on how to navigate, adapt and benefit from the dynamic, interdisciplinary MIT environment. Over 260 of the world's leading companies partner with the Industrial Liaison Program to advance their research agendas at MIT.

MIT Differentiators

Real World Impact

MIT is dedicated to research that is animated, if not inspired, by application to industry. Considering viable paths to commercialization from the outset expedites solving real-world challenges/problems.

Interdisciplinary Culture

An interdisciplinary environment and holistic approach to technological development avoids silos, and allows thought leaders from multiple disciplines and fields to collaborate freely and reach for the previously unimaginable.

Out of the Box Thinking

MIT's prowess at ideation and its ability to speed groundbreaking technologies to commercialization makes the Institute the first place industry turns to for the next big idea.

Fearlessly Entrepreneurial

The MIT ethos champions extraordinary individuals who are eager to pursue new high-risk startups that will potentially change the world. Faculty, researchers and students relish their status as outliers—techies, geeks, and dreamers—and thrive in this 24/7 domain of science and technology exploration.

Hub of Innovation Ecosystem

The Cambridge innovation ecosystem is synonymous with MIT. Many startups born at MIT choose to stay close to home, leveraging the community's random, informal interactions that catalyze idea generation and growth.

Industry Partners

A selection of these partnerships are described below.

Commonwealth Fusions Systems

In March 2018, MIT partnered with new private company, Commonwealth Fusion Systems (CFS) to fast track progress toward the dream of fusion power—potentially an inexhaustible and zero-carbon source of energy. CFS will join with MIT to carry out rapid, staged research leading to a new generation of fusion experiments and power plants based on advances in high-temperature superconductors—work made possible by decades of federal government funding for basic research.

IBM

In September 2017, IBM announced a 10-year, \$240 million investment to create the MIT-IBM Watson AI Lab in partnership with MIT. The collaboration aims to advance AI hardware, software, and algorithms related to deep learning and other areas; increase AI's impact on industries, such as health care and cybersecurity; and explore the economic and ethical implications of AI on society.

Philips

In May 2015, Philips announced an alliance with MIT that will ultimately support MIT research in the company's core areas of health care and lighting solutions technology. The agreement follows the company's recent decision to move its North American research headquarters to Kendall Square, citing the area's concentration of startups and research labs—especially in the biomedical area—and for its proximity to MIT.

Liberty Mutual

In April 2019, Liberty Mutual announced a \$25 million, five-year collaboration to support artificial intelligence research in computer vision, computer language understanding, data privacy and security, and risk-aware decision making, among other topics. With the Quest, MIT is working to accelerate progress on techniques and technologies that can help countless industries seize the transformative opportunities of AI.

Selected Projects funded by Industry

Flexible Piezoelectric Devices for Gastrointestinal Motility Sensing

Improvements in ingestible electronics with the capacity to sense physiological and pathophysiological states have transformed the standard of care for patients. Yet, despite advances in device development, significant risks associated with solid, non-flexible gastrointestinal transiting systems remain. Here, we report the design and use of an ingestible, flexible piezoelectric device that senses mechanical deformation within the gastric cavity. We demonstrate the capabilities of the sensor in both in vitro and ex vivo simulated gastric models, quantify its key behaviours in the gastrointestinal tract using computational modelling and validate its functionality in awake and ambulating swine. The proof-of-concept device may lead to the development of ingestible piezoelectric devices that might safely sense mechanical variations and harvest mechanical energy inside the gastrointestinal tract for the diagnosis and treatment of motility disorders, as well as for monitoring ingestion in bariatric applications.

<http://ilp.mit.edu/newsstory.jsp?id=25541>

Boosting Energy Storage for Smartphones, Cars, and the Electrical Grid

In the grand global march toward clean energy, batteries bring up the rear—constraining the performance of everything from tiny sensors to smartphones to electric cars to the electrical grid. That's a challenge taken on by Ju Li, MIT professor of materials science engineering and of nuclear science and engineering. Supported by corporate partnerships, his battery research ranges from fundamental chemical and mechanical studies to creating prototypes for commercial systems.

<http://ilp.mit.edu/newsstory.jsp?id=25062>

Nanolayered Thin Films for Wound Treatments

Paula Hammond's current research work exploits layering techniques that uses water to create multi-layer thin film that contains multiple drugs. The process allows introduction of proteins and DNA into layered films without denaturing and destroying their function, and means higher amounts can reach the treatment area than is possible in traditional polymer materials. Hammond has used the technology to

introduce proteins into bandages that help stop bleeding and eliminate infection, and one of her latest projects, supported in part by the U.S. Army through the Institute for Soldier Nanotechnologies, includes coating bandages with systems containing nucleic acids called siRNA which silence genes that can cause scarring.

ilp.mit.edu/newsstory.jsp?id=22491

Transforming Healthcare Decisions with Analytics

Dimitris Bertsimas is harnessing analytics and computational power to make predictive and prescriptive algorithms for healthcare. With a data footprint that went back to the 1990s, Bertsimas has created a system that predicts outcomes for new drugs with high accuracy, allowing pharmaceutical companies to identify promising trials, and avoid significant early investment costs. He is also developing presumptive analytics, taking what is already known, combining it with modeling, and being able to predict and propose the next 10 drug trials. The result is better delivery of care. Bertsimas hopes over the next decade to see the medical industry incorporate algorithms that continually learn from data in order to propose more targeted recommendations.

<http://ilp.mit.edu/newsstory.jsp?id=23363>

Design, Planning and Operation of Highly Responsive and Sustainable Urban Last-mile Delivery Networks

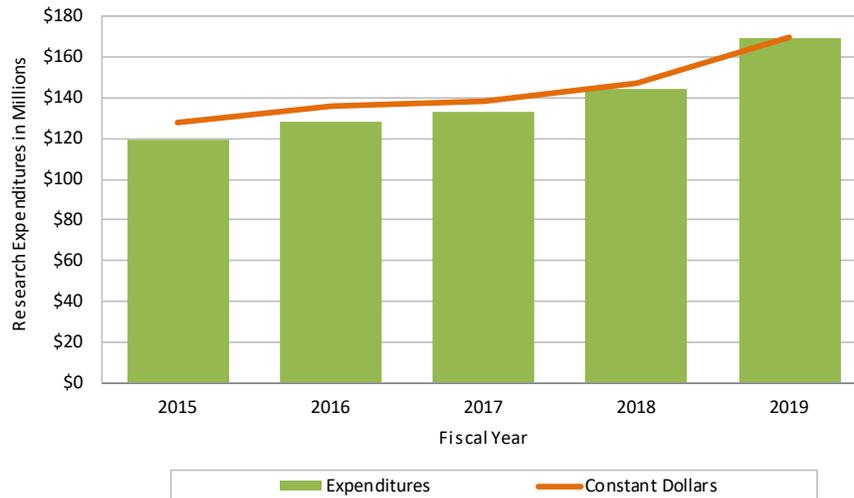
This project aims to understand the impact of rapid urbanization and the growing importance of highly responsive/on-demand last-mile delivery services in e-commerce and omni-channel retailing on the design, planning, and operation of urban last-mile distribution networks. Here, omni-channel retailing refers to the integrated operation of offline (i.e., brick-and-mortar) and online retail channels and their underlying logistics. Understanding the implications of urbanization and the growth in e-commerce on the optimal structure of distribution facility networks and fleets further allows us to analyze the economic, social and environmental viability and impact of various innovative approaches to the design and operation of future urban last-mile distribution systems.

<http://ilp.mit.edu/newsstory.jsp?id=24118>

Campus Research Sponsored by Industry

Campus Research Expenditures (in U.S. Dollars) Prime Sponsor Industry Fiscal Years 2015–2019

	2015	2016	2017	2018	2019
Campus research	119,238,077	128,308,988	132,914,760	144,126,295	169,605,879
Constant dollars*	127,597,120	136,382,718	138,726,472	147,113,118	169,605,879



*Constant dollars are calculated using the Consumer Price Index for All Urban Consumers weighted with the fiscal year 2019 equaling 100.

Technology Licensing Office Statistics for FY2019

Total number of invention disclosures:	789
Number of U.S. new utility patent applications filed:	439
Number of U.S. patents issued:	381
Number of licenses granted (not including trademarks and end-use software):	82
Number of options granted (not including options as part of research agreements):	31
Number of software end-use licenses granted:	63
Number of companies started (number of new license or option agreement to MIT technologies that serve as the foundation for a start-up company):	25

Entrepreneurship

MIT is recognized as one of the most entrepreneurial universities in the world. Its faculty ranks include hundreds of serial startup founders, and its hands-on approach to education encourages students to make a difference in the world by discovering and exploiting new technologies. The science-based ventures coming out of MIT helped transform Kendall Square into a major hub of biotech innovation, and the area thrives today with startups representing an array of industries from energy, to healthcare, to nanotech to advanced manufacturing.

\$100K Entrepreneurship Competition

The MIT \$100K Entrepreneurship Competition (student group) is the leading business plan competition in the world. The competition was founded in 1990 to encourage students and researchers in the MIT community to act on their talent, ideas, and energy to produce tomorrow's leading firms. Entirely student-managed, the competition has produced hundreds of successful ventures that have created value and employment.

The Engine

In October 2016, MIT announced “The Engine,” a startup accelerator that will assist startups engaged in scientific and technological innovation, i.e. tough tech, with the potential to transform society in such areas as biotechnology, robotics, manufacturing, medical devices and energy. MIT is the Engine's anchor limited partner, contributing \$25 million to the Engine Fund which had reached \$200 million by October 2017. The accelerator, which will be open to startups not otherwise affiliated with MIT, includes a dedicated high-tech workspace of 26,000 square feet of space at 501 Massachusetts Avenue with the aim of growing to 200,000 square feet in the next several years.

Deshpande Center for Technological Innovation

The Deshpande Center for Technological Innovation was established at the MIT School of Engineering in 2002 to increase the impact of MIT technologies in the marketplace, and support a wide range of emerging technologies including biotechnology, biomedical devices, information technology, new materials, tiny tech, and energy innovations. Since 2002, the Deshpande Center has funded more than 80 projects with over \$9 million in grants. Eighteen projects have spun out of the center into commercial ventures, having collectively raised over \$140 million in outside financing. Thirteen venture capital firms have invested in these ventures.

Martin Trust Center for MIT Entrepreneurship

The Martin Trust Center for MIT Entrepreneurship is committed to fostering and developing MIT's entrepreneurial activities and interests in three primary areas: education and research, alliance, and community. The Center educates and nurtures students from across the Institute who are interested in learning the skills to design, launch, and grow innovation-based ventures. The Center facilitates business and technology partnerships by combining breakthrough academic research with practical, proven experience. The people of the Center cultivate and nourish a thriving network that unifies academic, government, and industry leaders around the vision of entrepreneurial success.

MIT Sloan's Action Learning Labs

MIT Sloan's Action Learning Labs take the idea of learning-by-doing to a whole new level. These Labs aren't run-of-the-mill practicums; they are a total immersion into MIT Sloan's signature experiential learning model—Think-Act-Reflect. Action Learning Labs enable students to translate classroom knowledge and theory into practical solutions for real organizations across the globe. The breadth of opportunities provided by a diverse selection of labs allows students to pursue their specific interests and passions—or explore something totally new—while developing and strengthening their problem-solving and leadership capabilities.

MIT Startup Exchange

MIT Startup Exchange actively promotes collaboration and partnerships between MIT-connected startups and industry. Qualified startups are those founded and/or led by MIT faculty, staff, or alumni, or are based on MIT-licensed technology. Industry participants are principally members of MIT's Industrial Liaison Program (ILP). MIT Startup Exchange maintains a propriety database of over 1,800 MIT-connected startups with roots across MIT departments, labs and centers; it hosts a robust schedule of startup workshops and showcases, and facilitates networking and introductions between startups and corporate executives. MIT Startup Exchange and ILP are integrated programs of MIT Corporate Relations.

MIT Regional Entrepreneurship Acceleration Program

The MIT Regional Entrepreneurship Acceleration Program (reap.mit.edu) provides opportunities for communities around the world to engage with MIT in an evidence-based, practical approach to strengthening innovation-driven entrepreneurial (IDE) ecosystems. The program achieves this by translating research insights into practical frameworks, convening stakeholders focused on IDE, and educating regional leaders through team-based interaction to achieve economic and social impact. REAP is an MIT Executive Education capstone global initiative designed to help regions accelerate economic growth and social progress through innovation-driven entrepreneurship.

Venture Mentoring Service

Venture Mentoring Service (VMS) supports innovation and entrepreneurial activity throughout the MIT community by matching both prospective and experienced entrepreneurs with skilled volunteer mentors. VMS uses a team mentoring approach with groups of 3 to 4 mentors sitting with the entrepreneur(s) in sessions that provide practical, day-to-day professional advice and coaching. VMS mentors are selected for their experience in areas relevant to the needs of new entrepreneurs and for their enthusiasm for the program. VMS assistance is given across a broad range of business activity, including product development, marketing, intellectual property law, finance, human resources, and founders issues. VMS services are offered without charge to MIT students, alumni, faculty and staff in the Boston area.

Learning

Leaders for Global Operations

The Leaders for Global Operations (LGO) program is an educational and research partnership among global operations companies and MIT's School of Engineering and Sloan School of Management. Its objective is to discover, codify, teach, and otherwise disseminate guiding principles for world-class manufacturing and operations. The 24-month LGO program combines graduate education in engineering and management for those with two or more years of full-time work experience who aspire to leadership positions in manufacturing or operations companies. A required six-month internship comprising a research project at one of LGO's partner companies leads to a dual-degree thesis, culminating in two master's degrees—an MBA (or SM in management) and an SM in engineering.

Professional Education

MIT Professional Education provides short courses, semester or longer learning programs and customized corporate programs for science and engineering professionals at all levels. Taught by renowned faculty from across the Institute, MIT Professional Education programs offer professionals the opportunity to gain crucial knowledge in specialized fields to advance their careers, help their companies, and have an impact on the world.

- **Short Programs.** Over 40 courses, in two-to-five day sessions, spanning the range of disciplines at MIT, are taught on the MIT campus each summer by MIT faculty/researchers and experts from industry and academia. Participants earn Continuing Education Units (CEUs) and certificates of completion.
- **Digital Programs.** These online programs address topics of high interest to industry, delivering timely, expert knowledge of MIT faculty and researchers to a global audience. The benefits of online learning include the ability of busy professionals to gain advanced knowledge at their own pace and convenience, without the need to travel to the MIT campus.

- **Advanced Study Program.** A unique, non-degree program at MIT that enables professionals to take regular, semester-long MIT courses, to gain specific knowledge and skills needed to advance their careers and take innovative ideas back to their employers. Participants earn grades, MIT course credit, and an Advanced Study Program certificate.
- **Custom Programs.** Professional Education offers customized programs tailored to meet the specific training needs of corporations. These MIT faculty-led programs can be a single week or several weeks over a year, with interrelated on-the-ground projects. These specialized programs can be delivered at MIT and/or at company sites.
- **International Programs.** Select courses from Professional Education's Short Programs can be brought to international locations in Asia, the Middle East, Europe and Latin America. These globally-relevant courses enable professionals who cannot easily come to the MIT campus access to MIT knowledge and expertise in high interest topics, often with a local focus.

Sloan Fellows Program in Innovation and Global Leadership

This full-time, 12-month (June–June) immersive MBA program is designed for high-performing mid-career professionals. The program typically enrolls more than 100 outstanding individuals with 10–20 years of professional experience from at least two dozen nations, representing a wide variety of for-profit and nonprofit industries, organizations, and functional areas. Many participants are sponsored by or have the strong support of their employers, but the program also admits independent participants, many with unique entrepreneurial experiences and perspectives. The program is characterized by a rigorous academic curriculum, frequent interactions with international business and government leaders, and a valuable exchange of global perspectives.

Sloan Executive Education

MIT Sloan Executive Education programs are designed for senior executives and high-potential managers from around the world. From intensive two-day courses focused on a particular area of interest, to executive certificates covering a range of management topics, to custom engagements addressing the specific business challenges of a particular organization, their portfolio of non-degree, executive education and management programs provides business professionals with a targeted and flexible means to advance their career development goals and position their organizations for future growth.

System Design and Management

System Design and Management (SDM) is a master's program in engineering and management. Jointly offered by MIT's School of Engineering and the Sloan School of Management, SDM educates mid-career professionals to lead effectively and creatively by using systems thinking to solve large-scale, complex challenges in product design, development, and innovation.

Recruiting

Global Education and Career Development

The MIT Global Education and Career Development center assists employers in coordinating successful on- and off-campus recruitment of MIT students and provides students with opportunities to interact and network with professionals and obtain quality internships and full-time positions. MIT is proud to serve the needs of undergraduates (including Sloan), graduates and MIT alumni. (Departments that conduct their own recruiting include Chemistry, Chemical Engineering, and Sloan School of Management.)

Sloan's Career Development Office

Sloan's Career Development Office (CDO) serves a vital role in connecting MIT Sloan's innovative master's students and alumni with the world's leading firms. The CDO is dedicated to supporting employer recruiting goals and helping them identify the best candidates for their organization.