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Facts and History

The Massachusetts Institute of Technology is one of the world's preeminent research universities, dedicated to advancing knowledge and educating students in science, technology, and other areas of scholarship that will best serve the nation and the world. It is known for rigorous academic programs, cutting-edge research, a diverse campus community, and its long-standing commitment to working with the public and private sectors to bring new knowledge to bear on the world's great challenges.

William Barton Rogers, the Institute's founding president, believed that education should be both broad and useful, enabling students to participate in "the humane culture of the community" and to discover and apply knowledge for the benefit of society. His emphasis on "learning by doing," on combining liberal and professional education, and on the value of useful knowledge continues to be at the heart of MIT's educational mission.

MIT's commitment to innovation has led to a host of scientific breakthroughs and technological advances. Achievements of the Institute's faculty and graduates have included the first chemical synthesis of penicillin and vitamin A, the development of inertial guidance systems, modern technologies for artificial limbs, and the magnetic core memory that enabled the development of digital computers. Exciting areas of research and education today include neuroscience and the study of the brain and mind, bioengineering, energy, the environment and sustainable development, information sciences and technology, new media, financial technology, and entrepreneurship.

University research is one of the mainsprings of growth in an economy that is increasingly defined by technology. A study released in February 2009 by the Kauffman Foundation estimated that MIT graduates had founded 25,800 active companies. These firms employed about 3.3 million people, and generated annual world sales of $2 trillion, or the equivalent of the eleventh-largest economy in the world.

MIT has forged educational and research collaborations with universities, governments, and companies throughout the world, and draws its faculty and students from every corner of the globe. The result is a vigorous mix of people, ideas, and programs dedicated to enhancing the world's well-being.

Fields of Study

MIT supports a large variety of fields of study, from science and engineering to the arts. MIT's five academic schools are organized into departments and other degree-granting programs. In addition, several programs, laboratories, and centers cross traditional boundaries and encourage creative thought and research.

School of Architecture and Planning
Architecture
Media Arts and Sciences
Urban Studies and Planning
Center for Real Estate

School of Engineering
Aeronautics and Astronautics
Biological Engineering
Chemical Engineering
Civil and Environmental Engineering
Electrical Engineering and Computer Science
Engineering Systems
Health Sciences and Technology
Materials Science and Engineering
Mechanical Engineering
Nuclear Science and Engineering

School of Humanities, Arts, and Social Sciences
Anthropology
Comparative Media Studies / Writing
Economics
Foreign Languages and Literatures
History
Humanities
Linguistics and Philosophy
Literature
Music and Theatre Arts
Political Science
Science, Technology, and Society

Sloan School of Management
Management

School of Science
Biology
Brain and Cognitive Sciences
Chemistry
Earth, Atmospheric, and Planetary Sciences
Mathematics
Physics

Interdisciplinary Educational Programs
American Studies
Ancient and Medieval Studies
Computation for Design and Optimization
Computational and Systems Biology
Computer Science and Molecular Biology
Leaders for Global Operations
Microbiology
Operations Research
Psychology
Polymer Science and Technology
MIT-Woods Hole Joint Program in Oceanography and Applied Ocean Science and Engineering
System Design and Management
Technology and Policy
Transportation
Women's and Gender Studies

Digital Learning

The Office of Digital Learning (ODL) is committed to helping the MIT community transform education on campus and worldwide through the opportunities afforded by emerging learning technologies. Through MIT OpenCourseWare, the Office of Educational Innovation and Technology, and MITx—in collaboration with edX—ODL helps faculty to experiment with and implement technology-supported pedagogies, expands global access to MIT educational materials, and furthers the understanding of best practices in emerging digital and scalable learning activities.

MIT OpenCourseWare is MIT's long-standing effort to share the core academic materials—including syllabi, lecture notes, assignments, and exams—from the entire MIT curriculum freely and openly on the Web to support formal and informal education worldwide.

The Office of Educational Innovation and Technology partners with faculty, staff and students in the exploration, development, and dissemination of innovative uses of technology for teaching and learning in the classroom and online.

A constituent office of the Office of Digital Learning, MITx works with MIT faculty to employ emerging digital scalable learning pedagogies and technologies both in the MIT residential courses and through courses offered globally on the edX platform.

A not-for-profit enterprise of its founding partners Harvard University and the Massachusetts Institute of Technology, edX is focused on transforming online and on-campus learning through groundbreaking methodologies, game-like experiences, and cutting-edge research on an open source platform. The edX platform hosts courses created by MITx for global audiences.

http://odl.mit.edu

Research Laboratories, Centers, and Programs

In addition to teaching and conducting research within their departments, faculty, students, and staff work in laboratories, centers, and programs.

Some of these include:

Center for Advanced Urbanism
Center for Archaeological Materials
Center for Biomedical Engineering
Center for Civic Media
Center for Collective Intelligence
Center for Computational Engineering
Center for Computational Research in Economics and Management Science
Center for Energy and Environmental Policy Research
Center for Environmental Health Sciences
Center for Global Change Science
Center for Gynepathology Research
Center for International Studies
Center for Materials Science and Engineering
Center for Real Estate
Center for Transportation and Logistics
Computer Science and Artificial Intelligence Laboratory
Deshpande Center for Technological Innovation
Division of Comparative Medicine
Francis Bitter Magnet Laboratory
Haystack Observatory
Institute for Medical Engineering and Science
Institute for Soldier Nanotechnologies
Institute for Work and Employment Research
Joint Program on the Science and Policy of Global Change
Knight Science Journalism Program
David H. Koch Institute for Integrative Cancer Research
Laboratory for Financial Engineering
Laboratory for Information and Decision Systems
Laboratory for Manufacturing and Productivity
Laboratory for Nuclear Science
Lean Advancement Initiative
Legatum Center for Development and Entrepreneurship
Lincoln Laboratory
Martin Trust Center for MIT Entrepreneurship
Materials Processing Center
McGovern Institute for Brain Research
Media Laboratory
Microsystems Technology Laboratories
MIT Catalyst Clinical Research Center
MIT Center for Art, Science, and Technology
MIT Center for Digital Business
MIT Energy Initiative
MIT Kavli Institute for Astrophysics and Space Research
MIT Portugal Program
MIT Professional Education
MIT Program in Art, Culture and Technology
MIT Sea Grant College Program
Nuclear Reactor Laboratory
Operations Research Center
Picower Institute for Learning and Memory
Research Laboratory of Electronics
Simons Center for the Social Brain
Singapore-MIT Alliance for Research and Technology
Sociotechnical Systems Research Center

http://web.mit.edu/research/

Academic and Research Affiliations

Collaborative Partnership

edX

A not-for-profit enterprise of its founding partners Harvard University and the Massachusetts Institute of Technology, edX is focused on transforming online and on-campus learning through groundbreaking methodologies, game-like experiences, and cutting-edge research on an open source platform. See pages 9 and 91 for more information.

Idaho National Laboratory

Under the purview of the U.S. Department of Energy, the Idaho National Laboratory includes the National University Consortium (NUC)—five leading research universities from around the nation whose nuclear research and engineering expertise are of critical importance to the future of the nation's nuclear industry. MIT leads the NUC team in support of nuclear research and related education programs. The NUC consists of MIT, Oregon State University, North Carolina State University, Ohio State University, and University of New Mexico.

https://inlportal.inl.gov/portal/server.pt/community/home

Magellan Project

The Magellan Project is a five-university partnership that constructed and now operates two 6.5 meter optical telescopes at the Las Campanas Observatory in Chile. The telescopes allow researchers to observe planets orbiting stars in solar systems beyond our own and to explore the first galaxies that formed near the edge of the observable universe. Collaborating with MIT on the Magellan Project are Carnegie Institute of Washington, Harvard University, University of Arizona, and University of Michigan.

Massachusetts Green High Performance Computing Center

The Massachusetts Green High Performance Computing Center (MGHPCC) is a collaboration of five of the state's most research-intensive universities—MIT, University of Massachusetts, Boston University, Northeastern University, and Harvard University—the Commonwealth of Massachusetts, CISCO, and EMC. The MGHPCC, which opened in November 2012, is a datacenter dedicated to providing the growing research computing capacity needed to support breakthroughs in science.

http://www.mghpcc.org/

MIT and Masdar Institute Cooperative Program

In 2006, MIT began collaborating with the government of Abu Dhabi to establish a graduate research university focused on alternative energy, sustainability, and advanced technology. The MIT and Masdar Institute Cooperative Program supports Abu Dhabi's goal of developing human capital for a diversified knowledge-based economy. See page 90 for more information.

Northeast Radio Observatory Corporation

The Northeast Radio Observatory Corporation (NEROC) is a nonprofit consortium of educational and research institutions that was formed in 1967 to plan an advanced radio and radar research facility in the Northeast. NEROC presently consists of nine educational and research institutions, these are MIT, Boston University, Brandeis University, Dartmouth College, Harvard University, Harvard-Smithsonian Center for Astrophysics, University of Massachusetts, University of New Hampshire, and Wellesley College.

http://www.haystack.mit.edu/hay/neroc.html

Singapore-MIT Alliance for Research and Technology Centre

The Singapore-MIT Alliance for Research and Technology (SMART) Centre is a major research enterprise established by MIT in partnership with the National Research Foundation of Singapore. The SMART Centre serves as an intellectual hub for research interactions between MIT and Singapore at the frontiers of science and technology. See page 88 for more information about SMART.

http://smart.mit.edu/

Academic and Research Affiliations
(continued)

MIT Skoltech Initiative
The MIT Skoltech Initiative is a collaboration between the Skolkovo Foundation, the Skolkovo Institute of Science and Technology (Skoltech), and MIT to develop a new graduate research university. The new institution aims to break ground in bringing together Russian, U.S., and global research and technology, and in integrating research, teaching, innovation, and entrepreneurship. See page 88 for more information.

Synthetic Biology Engineering Research Center
The Synthetic Biology Engineering Research Center (SynBERC) is a multi-institution research effort to lay the foundation for the emerging field of synthetic biology. In addition to MIT, participating universities are University of California at Berkeley, University of California at San Francisco, Harvard University, Stanford University, and Prairie View A&M University. SynBERC's foundational research will be motivated by pressing biotechnology applications. SynBERC work will also examine the ethical, economic, and biosecurity implications of synthetic biology and assess the effects of intellectual property and security regimes on the development of the field.

http://synberc.org/

Major Collaborator
Broad Institute
The Broad Institute seeks to transform medicine by empowering creative and energetic scientists of all disciplines from across the MIT, Harvard, and the Harvard-affiliated hospital communities to work together to address even the most difficult challenges in biomedical research. See page 62 for more information.

http://www.broadinstitute.org/

Charles Stark Draper Laboratory
Founded as MIT's Instrumentation Laboratory, Draper Laboratory separated from MIT in 1973 to become an independent not-for-profit research and educational organization. MIT and Draper Laboratory still collaborate in areas such as guidance, navigation and control, complex reliable systems, autonomous systems, information and decision systems, and biomedical and chemical systems.

http://www.draper.com/

Howard Hughes Medical Institute
Howard Hughes Medical Institute (HHMI) is a scientific and philanthropic organization that conducts biomedical research in collaboration with universities, academic medical centers, hospitals, and other research institutions throughout the country. Sixteen HHMI investigators hold faculty appointments.

http://www.hhmi.org/

Ragon Institute
The Phillip T. and Susan M. Ragon Institute was established at MIT, Massachusetts General Hospital, and Harvard in February 2009. The Ragon Institute brings scientists and clinicians together with engineers using the latest technologies in an interdisciplinary effort to better understand how the body fights infections and ultimately to apply that understanding against a wide range of infectious diseases and cancers. The initial focus of the institute is the need for an effective vaccine against AIDS.

Whitehead Institute for Biomedical Research
The Whitehead Institute is a nonprofit, independent research institution whose research excellence is nurtured by the collaborative spirit of its faculty and the creativity and dedication of its graduate students and postdoctoral scientists. Whitehead's primary focus is basic science, with an emphasis on molecular and cell biology, genetics and genomics, and developmental biology. Whitehead is affiliated with MIT through its members, who hold faculty positions at MIT. A small number of junior investigators also hold positions at Whitehead Institute as part of the Whitehead Fellows program.

http://wi.mit.edu/

Other Affiliation
MIT-Woods Hole Oceanographic Institution Joint Program in Oceanography and Applied Ocean Science and Engineering
The Woods Hole Oceanographic Institution (WHOI) is the largest independent oceanographic institution in the world. MIT and WHOI offer joint doctoral degrees in oceanography and doctoral, professional, and master's degrees in oceanographic engineering.

http://mit.whoi.edu/

Naval Construction and Engineering

The graduate program in Naval Construction and Engineering (Course 2N) is intended for active duty officers in the U.S. Navy, U.S. Coast Guard, and foreign navies who have been designated for specialization in the design, construction, and repair of naval ships. The curriculum prepares Navy, Coast Guard, and foreign officers for careers in ship design and construction and is sponsored by Commander, Naval Sea Systems Command. Besides providing the officers a comprehensive education in naval engineering, the program emphasizes their future roles as advocates for innovation in ship design and acquisition.

http://web.mit.edu/2n/

Reserve Officer Training Corps Programs

Military training has existed at MIT since students first arrived in 1865. In 1917, MIT established the nation's first Army Reserve Officer Training Corps (ROTC) unit. Today, Air Force, Army, and Naval ROTC units are based at MIT. These programs enable students to become commissioned military officers upon graduation. More than 12,000 officers have been commissioned from MIT, and more than 150 have achieved the rank of general or admiral.

https://due.mit.edu/rotc/rotc-programs

Study at Other Institutions

MIT has cross-registration arrangements with several area schools. At the undergraduate level, students may cross-register at Harvard University, Wellesley College, Massachusetts College of Art and Design, and the School of the Museum of Fine Arts. At the graduate level, qualified students may enroll in courses at Harvard University, Wellesley College, Boston University, Brandeis University, and Tufts University. International study opportunities including the Cambridge-MIT Exchange, departmental exchanges, and the MIT-Madrid Program are described on page 93.

Education Highlights

MIT has long maintained that professional competence is best fostered by coupling teaching with research and by focusing education on practical problems. This hands-on approach has made MIT a consistent leader in outside surveys of the nation's best colleges. MIT was the first university in the country to offer curriculums in architecture (1865), electrical engineering (1882), sanitary engineering (1889), naval architecture and marine engineering (1895), aeronautical engineering (1914), meteorology (1928), nuclear physics (1935), and artificial intelligence (1960s). More than 4,000 MIT graduates are professors at colleges and universities around the world. MIT faculty have written some of the best-selling textbooks of all time, such as *Economics* by Paul A. Samuelson and *Calculus and Analytic Geometry* by George Thomas. The following are some notable MIT teaching milestones since 1969, when humans, including MIT alumnus Buzz Aldrin, first landed on the moon.

1969 MIT launches the Undergraduate Research Opportunities Program (UROP), the first of its kind. The program, which enables undergraduates to work directly with faculty on professional research, subsequently is copied in universities throughout the world. About 2,400 MIT students participate in UROP annually.

1970 The Harvard-MIT Program in Health Sciences and Technology is established to focus advances in science and technology on human health and to train physicians with a strong base in engineering and science.

1971 MIT holds its first Independent Activities Period (IAP), a January program that emphasizes creativity and flexibility in teaching and learning.

1977 MIT organizes the Program in Science, Technology, and Society to explore and teach courses on the social context and consequences of science and technology—one of the first programs of its kind in the U.S.

Education Highlights
(continued)

1981 MIT launches Project Athena, a $70 million program to explore the use of computers in education. Digital Equipment Corporation and IBM each contribute $25 million in computer equipment.

1981 The MIT Sloan School of Management launches its Management of Technology program, the world's first master's program to focus on the strategic management of technology and innovation.

1983–1990 MIT language and computer science faculty join in the Athena Language Learning Project to develop interactive videos that immerse students in the language and character of other cultures. The work pioneers a new generation of language learning tools.

1984 MIT establishes the Media Laboratory, bringing together pioneering educational programs in computer music, film, graphics, holography, lasers, and other media technologies.

1991 MIT establishes the MacVicar Faculty Fellows Program, named in honor of the late Margaret A. MacVicar, to recognize outstanding contributions to teaching. MacVicar, a professor of physics, had conceived of, designed, and launched UROP (see 1969, above).

1992 MIT launches the Laboratory for Advanced Technology in the Humanities to extend its pioneering work in computer- and video-assisted language learning to other disciplines. Its first venture was a text and performance multimedia archive for studies of Shakespeare's plays.

1993 In recognition of the increasing importance of molecular and cell biology, MIT becomes the first college in the nation to add biology to its undergraduate requirement.

1995 MIT's Political Science Department establishes the Washington Summer Internship Program to provide undergraduates the opportunity to apply their scientific and technical training to public policy issues.

1998 MIT teams up with Singapore's two leading research universities to create a global model for long-distance engineering education and research. This large-scale experiment, the first truly global collaboration in graduate engineering education and research, is a model for today's distance education.

1999 The University of Cambridge and MIT establish the Cambridge-MIT Institute, whose programs include student and faculty exchanges, an integrated research program, professional practice education, and a national competitiveness network in Britain.

1999 MIT establishes the Society of Presidential Fellows to honor the most outstanding students worldwide entering the Institute's graduate programs. With gifts provided by lead donors, presidential fellows are awarded fellowships that fund first year tuition and living expenses.

2000 MIT Faculty approve the Communication Requirement (CR), which went into effect for the Class of 2005. The CR integrates substantial instruction and practice in writing and speaking into all four years and across all parts of MIT's undergraduate program. Students participate regularly in activities designed to develop both general and technical communication skills.

2001 Studio Physics is introduced to teach freshman physics. Incorporating a highly collaborative, hands-on environment that uses networked laptops and desktop experiments, the new curriculum lets students work directly with complicated and unfamiliar concepts as their professors introduce them.

2001 MIT launches OpenCourseWare, a program that makes materials for nearly all of its courses freely available on the web and serves as a model for sharing knowledge to benefit all humankind.

2001 MIT establishes WebLab, a microelectronics teaching laboratory that allows students to interact remotely on the Web with transistors and other microelectronics devices anywhere and at any time.

2001 MIT's Earth System Initiative launches Terrascope, a freshman course in which students work in teams to solve complex earth sciences problems. Bringing together physics, mathematics, chemistry, biology, management, and communications, the course has enabled students to devise strategies for preserving tropical rainforests, understand the costs and the benefits of oil drilling in the Arctic National Wildlife Refuge, and plan a mission to Mars.

2002 To give engineering students the opportunity to develop the skills they'll need to be leaders in the workplace, MIT introduces the Undergraduate Practice Opportunities Program (UPOP). The program involves a corporate training workshop, job seminars taught by alumni, and a 10-week summer internship.

2003 MIT Libraries introduce DSpace, a digital repository that gathers, stores, and preserves the intellectual output of MIT's faculty and research staff, and makes it freely available to research institutions worldwide. Within a year of its launch, DSpace material had been downloaded more than 8,000 times, and more than 100 organizations had adopted the system for their own use.

2003 MIT's Program in Computational and Systems Biology (CSBi), an Institute-wide program linking biology, engineering, and computer science in a systems biology approach to the study of cell-to-cell signaling, tissue formation, and cancer, begins accepting students for a new Ph.D. program that will give them the tools for treating biological entities as complex living systems.

2005 Combining courses from engineering, mathematics, and management, MIT launches its master's program in Computation for Design and Optimization, one of the first curriculums in the country to focus on the computational modeling and design of complex engineered systems. The program prepares engineers for the challenges of making systems ranging from computational biology to airline scheduling to telecommunications design and operations run with maximum effectiveness and efficiency.

2006 MIT creates the Campaign for Students, a fund-raising effort dedicated to enhancing the educational experience at MIT through creating scholarships and fellowships, and supporting multidisciplinary education and student life.

2007 MIT makes material from virtually all MIT courses available online for free on OpenCourseWare. The publication marks the beginning of a worldwide movement toward open education that now involves more than 160 universities and 5,000 courses.

2009 MIT launches the Bernard M. Gordon-MIT Engineering Leadership Program. Through interaction with industry leaders, faculty, and fellow students, the program aims to help undergraduate engineering students develop the skills, tools, and character they will need as future engineering leaders.

2009 MIT introduces a minor in energy studies, open to all undergraduates. The new minor, unlike most energy concentrations available at other institutions, and unlike any other concentration at MIT, is designed to be inherently cross-disciplinary, encompassing all of MIT's five schools. It can be combined with any major subject. The minor aims to allow students to develop expertise and depth in their major disciplines, but then complement that with the breadth of understanding offered by the energy minor.

2010 MIT introduces the flexible engineering degree for undergraduates. The degree, the first of its kind, allows students to complement a deep disciplinary core with an additional subject concentration. The additional concentration can be broad and interdisciplinary in nature (energy, transportation, or the environment), or focused on areas that can be applied to multiple fields (robotics and controls, computational engineering, or engineering management).

2011 MIT announces MITx, an online learning initiative that will offer a portfolio of free MIT courses through an online interactive learning platform. The Institute expects the platform to enhance the educational experience of its on-campus students and serve as a host for a virtual community of millions of learners around the world. The MITx prototype course—6.002x or "Circuits and Electronics"—debuts in March 2012 with almost 155,000 people registering for the course.

Education Highlights
(continued)

2012 MIT and Harvard University announce edX, a transformational new partnership in online education. Through edX, the two institutions will collaborate to enhance campus-based teaching and learning and build a global community of online learners. An open-source technology platform will deliver online courses that move beyond the standard model of online education that relies on watching video content and will offer an interactive experience for students. The University of California at Berkeley later joins edX. The three institutions offer the first edX courses in fall 2012.

2012 Lincoln Laboratory debuts a new outreach program—a two-week summer residential program for high-school students. The program, Lincoln Laboratory Radar Introduction for Student Engineers, focuses on radar technology. The project-based curriculum is based on a popular class offered during MIT's Independent Activities Period (IAP) and taught by Laboratory technical staff. While the instructors adapted the IAP course to suit high-school students, they retained the challenging nature of the original class. The goal of the program is that students take away not only an understanding of radar systems but also the realization that engineering is about problem-solving and applying knowledge in innovative ways.

Research Highlights

The following are selected research achievements of MIT faculty and staff over the last four decades.

1969 Ioannis V. Yannas begins to develop artificial skin—a material used successfully to treat burn victims.

1970 David Baltimore reports the discovery of reverse transcriptase, an enzyme that catalyzes the conversion of RNA to DNA. The advance, which led to a Nobel Prize for Baltimore in 1975, provided a new means for studying the structure and function of genes.

1973 Jerome Friedman and Henry Kendall, with Stanford colleague Richard Taylor, complete a series of experiments confirming the theory that protons and neutrons are made up of minute particles called quarks. The three receive the 1990 Nobel Prize in Physics for their work.

1974 Samuel C. C. Ting, Ulrich Becker, and Min Chen discover the "J" particle. The discovery, which earns Ting the 1976 Nobel Prize in Physics, points to the existence of one of the six postulated types of quarks.

1975–1977 Barbara Liskov and her students design the CLU programming language, an object-oriented language that helps form the underpinnings for languages like Java and C++. As a result of this work and other accomplishments, Liskov later wins the Turing Award, considered the Nobel Prize in computing.

1975–1982 Joel Moses develops the first extensive computerized program (MACSYMA) able to manipulate algebraic quantities and perform symbolic integration and differentiation.

1976 H. Gobind Khorana and his research team complete chemical synthesis of the first human-manufactured gene fully functional in a living cell. The culmination of 12 years of work, it establishes the foundation for the biotechnology industry. Khorana won the 1968 Nobel Prize in Physiology/Medicine for other genetics work.

1977 Phillip Sharp discovers the split gene structure of higher organisms, changing the view of how genes arose during evolution. For this work, Sharp shared the 1993 Nobel Prize in Physiology/Medicine.

1977 Ronald Rivest, Adi Shamir, and Leonard Adleman invent the first workable public key cryptographic system. The new code, which is based on the use of very large prime numbers, allows secret communication between any pair of users. Still unbroken, the code is in widespread use today.

1979 Robert Weinberg reports isolating and identifying the first human oncogene—an altered gene that causes the uncontrolled cell growth that leads to cancer.

1981 Alan Guth publishes the first satisfactory model of the universe's development in the first 10–32 seconds after the Big Bang.

1982 Alan Davison discovers a new class of technetium compounds that leads to the development of the first diagnostic technetium drug for imaging the human heart.

1985 Susumu Tonegawa describes the structure of the gene for the receptors—"anchor molecules"—on the white blood cells called T lymphocytes, the immune system's master cells. In 1987, Tonegawa receives the Nobel Prize in Physiology/Medicine for similar work on the immune system's B cells.

1986 H. Robert Horvitz identifies the first two genes found to be responsible for the process of cell death, which is critical both for normal body development and for protection against autoimmune diseases, cancer, and other disorders. Going on to make many more pioneering discoveries about the genetics of cell death, Horvitz shares the 2002 Nobel Prize in Physiology/Medicine for his work.

1988 Sallie Chisholm and associates report the discovery of a form of ocean plankton that may be the most abundant single species on earth.

1990 Julius Rebek, Jr. and associates create the first self-replicating synthetic molecule.

1990 Building on the discovery of the metathesis—the process of cutting carbon-carbon double bonds in half and constructing new ones—Richard Schrock devises a catalyst that greatly speeds up the reaction, consumes less energy, and produces less waste. A process based on his discovery is now in widespread use for efficient and more environmentally friendly production of important pharmaceuticals, fuels, synthetic fibers, and many other products. Schrock shares the 2005 Nobel Prize in Chemistry for his breakthrough.

1991 Cleveland heart doctors begin clinical trials of a laser catheter system for microsurgery on the arteries that is largely the work of Michael Feld and his MIT associates.

1993 H. Robert Horvitz, together with scientists at Massachusetts General Hospital, discover an association between a gene mutation and the inherited form of amyotrophic lateral sclerosis (Lou Gehrig's disease).

1993 David Housman joins colleagues at other institutions in announcing a successful end to the long search for the genetic defect linked with Huntington's disease.

1993 Alexander Rich and postdoctoral fellow Shuguang Zhang report the discovery of a small protein fragment that spontaneously forms into membranes. This research will lead to advances in drug development, biomedical research, and the understanding of Alzheimer's and other diseases.

1994 MIT engineers develop a robot that can "learn" exercises from a physical therapist, guide a patient through them, and—for the first time—record biomedical data on the patient's condition and progress.

1995 Scientists at the Whitehead Institute for Biomedical Research and MIT create a map of the human genome and begin the final phase of the Human Genome Project. This powerful map contains more than 15,000 distinct markers and covers virtually all of the human genome.

1996 A group of scientists at MIT's Center for Learning and Memory, led by Matthew Wilson and Nobel laureate Susumu Tonegawa, use new genetic and multiple-cell monitoring technologies to demonstrate how animals form memory about new environments.

1997 MIT physicists create the first atom laser, a device that is analogous to an optical laser but emits atoms instead of light. The resulting beam can be focused to a pinpoint or made to travel long distances with minimal spreading.

Research Highlights
(continued)

1998 MIT biologists, led by Leonard Guarente, identify a mechanism of aging in yeast cells that suggests researchers may one day be able to intervene in, and possibly inhibit, the aging process in certain human cells.

1998 An interdisciplinary team of MIT researchers, led by Yoel Fink and Edwin L. Thomas, invent the "perfect mirror," which offers radical new ways of directing and manipulating light. Potential applications range from a flexible light guide that can illuminate specific internal organs during surgery to new devices for optical communications.

1999 Michael Cima, Robert Langer, and graduate student John Santini report the first microchip that can store and release chemicals on demand. Among its potential applications is a "pharmacy" that could be swallowed or implanted under the skin and programmed to deliver precise drug dosages at specific times.

1999 Alexander Rich leads a team of researchers in the discovery that left-handed DNA (also known as Z-DNA) is critical for the creation of important brain chemicals. Having first produced Z-DNA synthetically in 1979, Rich succeeds in identifying it in nature in 1981. He also discovers its first biological role and receives the National Medal of Science for this pioneering work in 1995.

2000 Scientists at the Whitehead Institute/MIT Center for Genome Research and their collaborators announce the completion of the Human Genome Project. Providing about a third of all the sequences assembled, the Center was the single largest contributor to this international enterprise.

2000 Researchers develop a device that uses ultrasound to extract a number of important molecules noninvasively and painlessly through the skin. They expect that the first application will be a portable device for noninvasive glucose monitoring for diabetics.

2000 Researchers from the MIT Sloan School of Management launch the Social and Economic Explorations of Information Technology (SeeIT) Project, the first empirical study of the effects of information technology (IT) on organizational and work practices. Examining IT's relationship to changes in these models, SeeIT provides practical data for understanding and evaluating IT's business and economic effects, which will enable us to take full advantage of its opportunities and better control its risks.

2001 In a step toward creating energy from sunlight as plants do, Daniel Nocera and a team of researchers invent a compound that, with the help of a catalyst and energy from light, produces hydrogen.

2002 MIT researchers create the first acrobatic robotic bird—a small, highly agile helicopter for military use in mountain and urban combat.

2002–2005 Scientists at MIT, the Whitehead Institute for Biomedical Research, and the Broad Institute complete the genomes of the mouse, the dog, and four strains of phytoplankton, photosynthetic organisms that are critical for the regulation of atmospheric carbon dioxide. They also identify the genes required to create a zebrafish embryo. In collaboration with scientists from other institutions, they map the genomes of chimpanzees, humans' closest genetic relative, and the smallest known vertebrate, the puffer fish.

2003 MIT scientists cool a sodium gas to the lowest temperature ever recorded—a half-a-billionth of a degree above absolute zero. Studying these ultra-low temperature gases will provide valuable insights into the basic physics of matter; and by facilitating the development of better atomic clocks and sensors for gravity and rotation, they also could lead to vast improvements in precision measurements.

2004 MIT's Levitated Dipole Experiment, a collaboration among scientists at MIT and Columbia, generates a strong dipole magnetic field that enables them to experiment with plasma fusion, the source of energy that powers the sun and stars, with the goal of producing it on Earth. Because the hydrogen that fuels plasma fusion is practically limitless and the energy it produces is clean and doesn't contribute to global warming, fusion power will be of enormous benefit to humankind and to earth systems in general.

2004 A team led by neuroscientist Mark Bear illuminates the molecular mechanisms underlying Fragile X Syndrome and shows that it might be possible to develop drugs that treat the symptoms of this leading known inherited cause of mental retardation, whose effects range from mild learning disabilities to severe autism.

2004 Shuguang Zhang, Marc A. Baldo, and recent graduate Patrick Kiley, first figure out how to stabilize spinach proteins—which, like all plants, produce energy when exposed to light—so they can survive without water and salt. Then, they devise a way to attach them to a piece of glass coated with a thin layer of gold. The resulting spinach-based solar cell, the world's first solid-state photosynthetic solar cell, has the potential to power laptops and cell phones with sunlight.

2005 MIT physicists, led by Nobel laureate Wolfgang Ketterle, create a new type of matter, a gas of atoms that shows high-temperature superfluidity.

2005 Vladimir Bulovic and Tim Swager develop lasing sensors based on a semiconducting polymer that is able to detect the presence of TNT vapor subparts per billion concentrations.

2006 MIT launches the MIT Energy Initiative (MITEI) to address world energy problems. Led by Ernest J. Moniz and Robert C. Armstrong, MITEI coordinates energy research, education, campus energy management, and outreach activities across the Institute.

2007 Rudolf Jaenisch, of the Whitehead Institute for Biomedical Research, conducts the first proof-of-principle experiment of the therapeutic potential of induced pluripotent stem cells (iPS cells), using iPS cells reprogrammed from mouse skin cells to cure a mouse model of human sickle-cell anemia. Jaenisch would then use a similar approach to treat a model of Parkinson's disease in rats.

2007 Marin Soljačić and his colleagues develop a new form of wireless power transmission they call WITricity. It is based on a strongly coupled magnetic resonance and can be used to transfer power over distances of a few meters with high efficiency. The technique could be used commercially to wirelessly power laptops, cell phones, and other devices.

2007 David H. Koch '62, SM '63 gives MIT $100 million to create the David H. Koch Institute for Integrative Cancer Research. The Koch Institute opens in 2011. It brings together molecular geneticists, cell biologists, and engineers in a unique multi-disciplinary approach to cancer research.

2007 Tim Jamison discovers that cascades of epoxide-opening reactions that were long thought to be impossible can very rapidly assemble the Red Tide marine toxins when they are induced by water. Such processes may be emulating how these toxins are made in nature and may lead to a better understanding of what causes devastating Red Tide phenomena. These methods also open up an environmentally green synthesis of new classes of complex highly biologically active compounds.

2007 MIT mathematicians form part of a group of 18 mathematicians from the U.S. and Europe that maps one of the most complicated structures ever studied: the exceptional Lie group E8. The "answer" to the calculation, if written, would cover an area the size of Manhattan. The resulting atlas has applications in the fields of string theory and geometry.

2008 Mriganka Sur's laboratory discovers that astrocytes, star-shaped cells in the brain that are as numerous as neurons, form the basis for functioning brain imaging. Using ultra high-resolution imaging in the intact brain, they demonstrate that astrocytes regulate blood flow to active brain regions by linking neurons to brain capillaries.

2008 A team led by Marc A. Baldo designs a solar concentrator that focuses light at the edges of a solar power cell. The technology can increase the efficiency of solar panels by up to 50 percent, substantially reducing the cost of generating solar electricity.

2008 Daniel Nocera creates a chemical catalyst that hurdles one of the obstacles to widespread use of solar power—the difficulty of storing energy from the sun. The catalyst, which is cheap and easy to make, uses the energy from sunlight to separate the hydrogen and oxygen molecules in water. The hydrogen can then be burned, or used to power an electric fuel cell.

Research Highlights
(continued)

2009 A team of MIT researchers led by Angela Belcher reports that it is able to genetically engineer viruses to produce both the positively and negatively charged ends of a lithium-ion battery. The battery has the same energy capacity as those being considered for use in hybrid cars, but is produced using a cheaper, less environmentally hazardous process. MIT President Susan Hockfield presents a prototype battery to President Barack Obama at a press briefing at the White House.

2009 Researchers at MIT's Picower Institute for Learning and Memory show for the first time that multiple interacting genetic risk factors may influence the severity of autism symptoms. The finding could lead to therapies and diagnostic tools that target the interacting genes.

2009 Gerbrand Ceder and graduate student Byoungwoo Kang develop a new way to manufacture the material used in lithium ion batteries that allows ultrafast charging and discharging. The new method creates a surface structure that allows lithium ions to move rapidly around the outside of the battery. Batteries built using the new method could take seconds, rather than the now standard hours, to charge.

2009 As neuroscience progresses rapidly toward an understanding of basic mechanisms of neural and synapse function, MIT neuroscientists are discovering the mechanisms underlying brain disorders and diseases. Li-Huei Tsai's laboratory describes mechanisms that underlie Alzheimer's disease and propose that inhibition of histone deacetylases is therapeutic for degenerative disorders of learning and memory. Her laboratory also discovers the mechanisms of action of the gene Disrupted-in-Schizophrenia 1 and demonstrates why drugs such as lithium are effective in certain instances of schizophrenia. This research opens up pathways to discovering novel classes of drugs for devastating neuropsychiatric conditions.

2010 A new approach to desalination is being developed by researchers at MIT and in Korea that could lead to small, portable desalination units that could be powered by solar cells or batteries and could deliver enough fresh water to supply the needs of a family or small village. As an added bonus, the system would remove many contaminants, viruses, and bacteria at the same time.

2010 Yang Shao-Horn, with some of her students, and visiting professor Hubert Gasteiger, reports that lithium-oxygen (also known as lithium-air) batteries with electrodes with either gold or platinum as a catalyst have a higher efficiency than simple carbon electrodes. Lithium-air batteries are lighter than the conventional lithium-ion batteries.

2010 A team at Media Lab, including Ramesh Raskar, visiting professor Manuel Oliveira, student Vitor Pamplona, and postdoctoral research associate Ankit Mohan, create a new system to determine a prescription for eyeglasses. In its simplest form, the test can be carried out using a small, plastic device clipped onto the front of a cellphone's screen.

2010 MIT releases *The Future of Natural Gas* report. The two-year study, managed by the MIT Energy Initiative, examines the scale of U.S. natural gas reserves and the potential of this fuel to reduce greenhouse-gas emissions. While the report emphasizes the great potential for natural gas as a transitional fuel to help curb greenhouse gases and dependence on oil, it also stresses that it is important as a matter of national policy not to favor any one fuel or energy source in a way that puts others at a disadvantage.

2010 Michael Strano and his team of graduate students and researchers create a set of self-assembling molecules that can turn sunlight into electricity; the molecules can be repeatedly broken down and reassembled quickly just by adding or removing an additional solution.

2011 Elazer Edelman, HST graduate student Joseph Franses, and former MIT postdoctoral fellows Aaron Baker and Vipul Chitalia show that cells lining blood vessels secrete molecules that suppress tumor growth and prevent cancer cells from invading other tissues, a finding that could lead to a new cancer treatment.

2011 The Alpha Magnetic Spectrometer (AMS)—an instrument designed to use the unique environment of space to search for antimatter and dark matter and to measure cosmic rays—is delivered to the International Space Station. The AMS experiment, led by Samuel C. C. Ting, is designed to study high-energy particles; such study could lead to new theories about the formation and evolution of the universe.

2011 A team, including Karen Gleason, Vladimir Bulović, and graduate student Miles Barr, develops materials that make it possible to produce photovoltaic cells on paper or fabric, nearly as simply as printing a document. The technique represents a major departure from the systems typically used to create solar cells, which require exposing the substrates to potentially damaging conditions, either in the form of liquids or high temperatures.

2011 By combining a physical interface with computer-vision algorithms, researchers in MIT's Department of Brain and Cognitive Sciences create a simple, portable imaging system that can achieve resolutions previously possible only with large and expensive lab equipment. The device could allow manufacturers to inspect products too large to fit under a microscope and could also have applications in medicine, forensics, and biometrics. Moreover, because the design uses multiple cameras, it can produce 3-D models of an object, which can be manipulated on a computer screen for examination from multiple angles.

2011 Researchers, led by Daniel Nocera, have produced an "artificial leaf"—a silicon solar cell with different catalytic materials bonded onto its two sides. The artificial leaf can turn the energy of sunlight directly into a chemical fuel that can be stored and used later as an energy source.

2011 Lincoln Laboratory researchers, led by technical staff member Gregory Charvat, build a new radar technology system that can see through walls up to 60 feet away, creating an instantaneous picture of the activity on the other side. The system also creates a real-time video of movement behind the wall at the rate of 10.8 frames per second.

2012 NASA's Gravity Recovery And Interior Laboratory (GRAIL) twin spacecraft successfully enters lunar orbit. By precisely measuring changes in distance between the twin orbiting spacecraft, scientists will construct a detailed gravitational model of the moon that will be used to answer fundamental questions about the moon's evolution and its internal composition. GRAIL's principal investigator is Maria Zuber.

2012 Researchers, including Jeffrey Grossman, discover that building cubes or towers of solar cells—to extend the cells upward in three-dimensional configurations—generates two to 20 times the power produced by fixed flat panels with the same base area.

2012 Researchers, led by Ian Hunter, have engineered a device that delivers a tiny, high-pressure jet of medicine through the skin without the use of a hypodermic needle. The device can be programmed to deliver a range of doses to various depths—an improvement over similar jet-injection systems that are now commercially available.

2012 A clinical trial of an Alzheimer's disease treatment developed at MIT finds that a nutrient cocktail can improve memory in patients with early Alzheimer's. Richard Wurtman invented the supplement mixture, known as Souvenaid, which appears to stimulate growth of new synapses.

2012 Researchers, including Young Lee and PhD graduate Tianheng Han, have followed up on earlier theoretical predictions and demonstrated experimentally the existence of a fundamentally new magnetic state called a quantum spin liquid (QSL), adding to the two previously known states of magnetism. The QSL is a solid crystal, but its magnetic state is described as liquid: Unlike the other two kinds of magnetism, the magnetic orientations of the individual particles within it fluctuate constantly, resembling the constant motion of molecules within a true liquid.

2013 A new steelmaking process developed by MIT researchers, Donald Sadoway, Antoine Allanore, and former postdoc Lan Yin, produces no emissions other than pure oxygen and carries nice side benefits: The resulting steel should be of higher purity, and eventually, once the process is scaled up, cheaper.

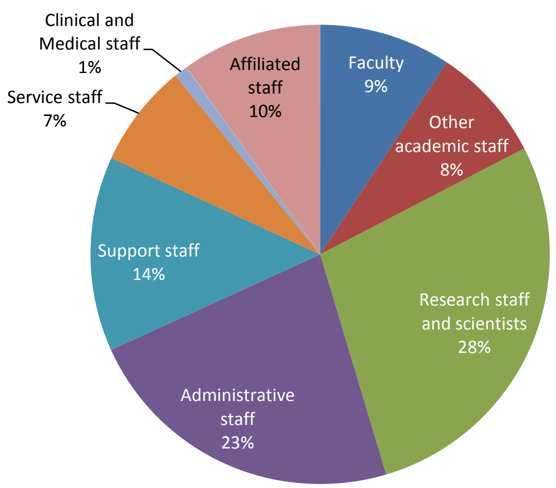
Faculty and Staff

MIT employs approximately 11,000 persons on campus. In addition to the faculty, there are research, library, and administrative staff, and many others who, directly or indirectly, support the teaching and research goals of the Institute.

Faculty and Staff, 2012–2013

Employee Type	Count
Faculty	1,022
Other academic and instructional staff	889
Research staff and research scientists (includes postdoctoral positions)	3,077
Administrative staff	2,509
Support staff	1,505
Service staff	804
Clinical and Medical staff	103
Affiliated faculty, scientists, and scholars	1,087
Total campus faculty and staff	**10,996**

Faculty and Staff, 2012–2013



Approximately 590 graduate students serve as teaching assistants or instructors, and 2,490 graduate students serve as research assistants.

MIT Lincoln Laboratory employs about 3,440 people, primarily at Hanscom Air Force Base in Lexington, Massachusetts. See page 76 for additional Lincoln Laboratory staffing information.

Faculty

The MIT faculty instruct undergraduate and graduate students, and engage in research and service.

Faculty Profile, 2012–2013

	Count	Percent of Total
Professors	659	65
Associate professors	206	20
Assistant professors	157	15
Total	**1,022**	**100**
Male	803	79
Female	219	21

See page 30 for a chart of faculty and students from 1865–2013.

Seventy-seven percent of faculty are tenured.

Faculty may hold dual appointments where they are appointed equally to two departments. Thirty faculty members have dual appointments.

Faculty by School, 2012–2013

School	Count	Percentage
Architecture and Planning	78	8
Engineering	383	37
Humanities, Arts, and Social Sciences	162	16
Science	274	27
Management	112	11
Other	13	1
Total	**1,022**	**100**

Sixty-four percent of the faculty are in science and engineering fields.

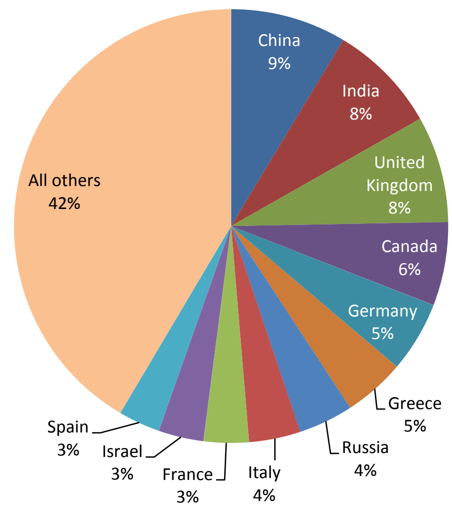
Nineteen percent of faculty are members of a minority group; seven percent are members of an underrepresented minority. Ethnicity is self identified. Faculty members may identify as part of multiple groups.

Faculty Minority Group, 2012–2013

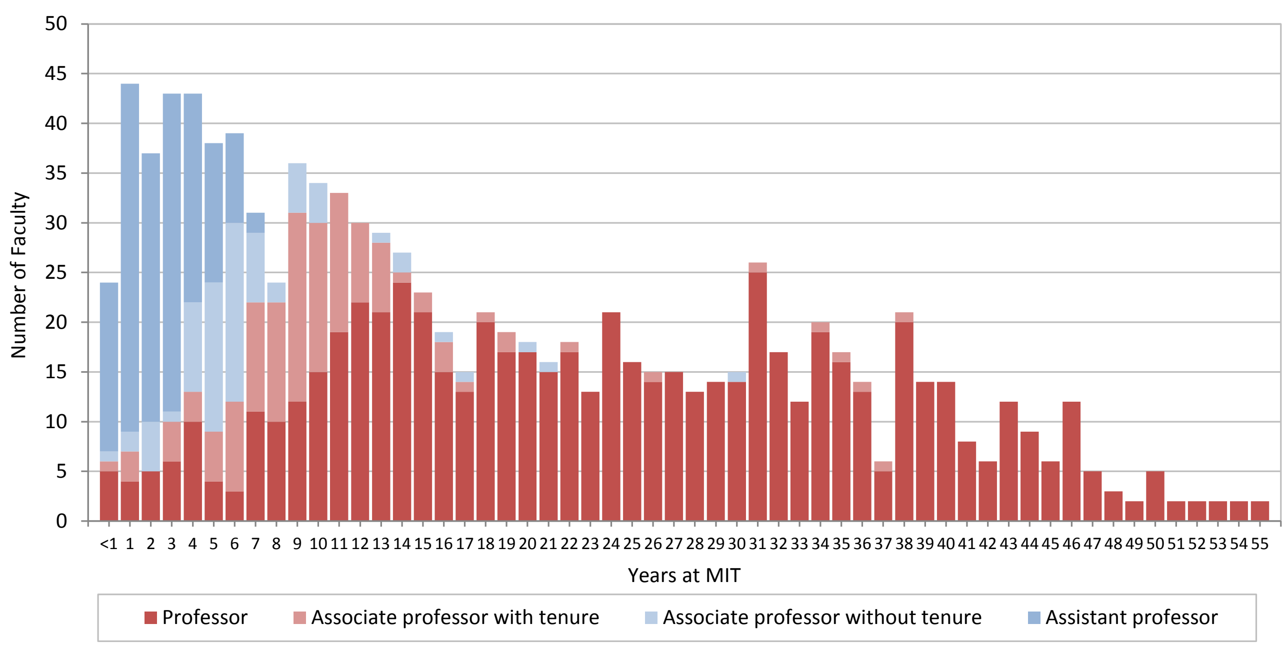
Ethnicity	Female	Male
Asian	29	97
Hispanic or Latino	4	34
African American	8	24
American Indian or Alaskan Native	1	2

Forty-one percent of current faculty are internationally born. Over seventy countries are represented by these faculty members.

Country of Origin of Internationally Born Faculty, 2012–2013



Years at MIT of Faculty, 2012–2013 (excludes time as student)



Researchers

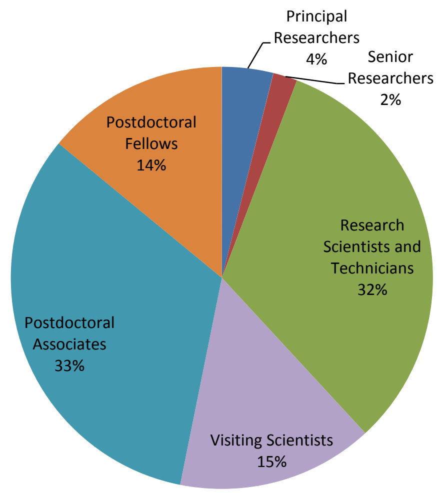
MIT campus research staff and scientists total 3,077. These researchers work with MIT faculty and students on projects funded by government, nonprofits and foundations, and industry.

Campus Research Staff and Scientists, 2012–2013

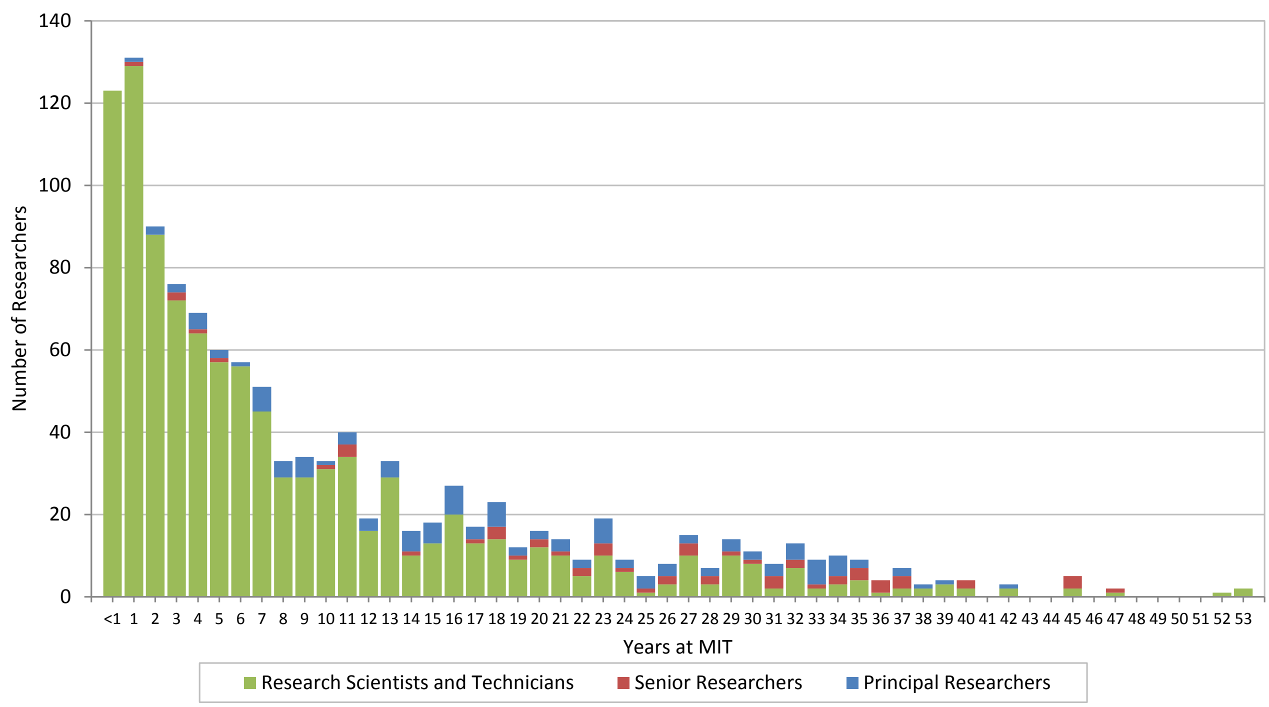
Employee Type	Count
Principal Researchers	121
Senior Researchers	57
Research Scientists and Technicians	995
Visiting Scientists	463
Postdoctoral Associates	1,009
Postdoctoral Fellows	432
Total	**3,077**

Approximately 2,490 graduate students received primary appointments as research assistants.

Campus Research Staff and Scientists, 2012–2013



Years at MIT of Campus Research Staff and Scientists, 2012–2013 (Principal Researchers, Senior Researchers, and Research Scientists and Technicians)



Postdoctoral Scholars

As of October 31, 2012, MIT hosts 1,441 postdoctoral associates and fellows—388 females and 1,053 males. These individuals work with faculty in academic departments, laboratories, and centers.

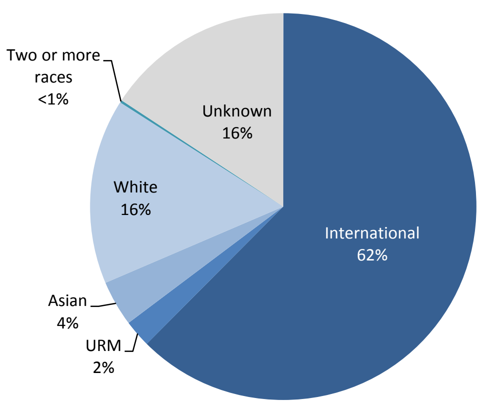
U.S. Citizen and Permanent Resident Postdoctoral Scholars, 2012–2013

Ethnicity	Count
Hispanic or Latino	25
African American	8
American Indian or Alaskan Native	0
Total underrepresented minorities (URM)	**33**
White	223
Asian	55
Two or more races	3
Unknown	227
Total	**541**

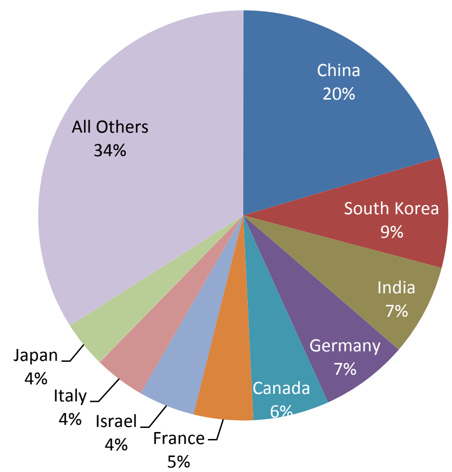
International Postdoctoral Scholars, 2012–2013

Country of Citizenship	Count	Percentage
China	184	20
South Korea	78	9
India	65	7
Germany	62	7
Canada	54	6
France	42	5
Israel	40	4
Italy	36	4
Japan	33	4
All other countries	306	34
Total	**900**	**100**

Ethnicity of Postdoctoral Scholars, 2012–2013

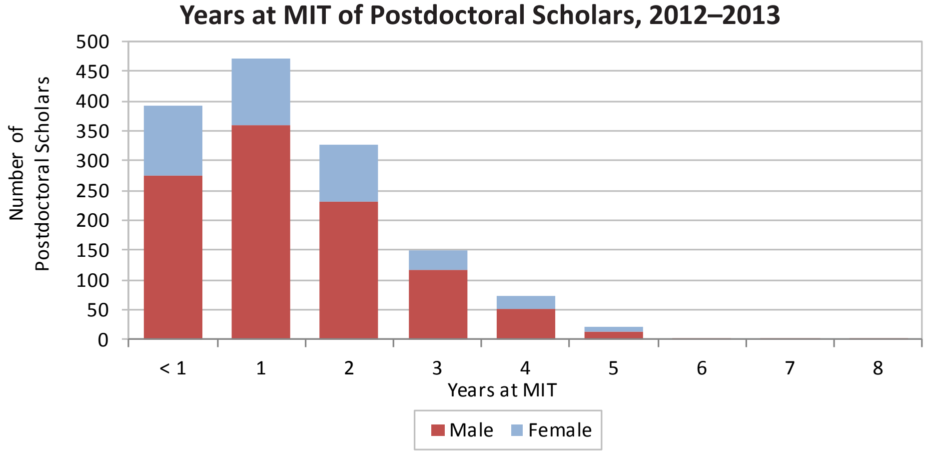


Country of Citizenship of International Postdoctoral Scholars, 2012–2013



Postdoctoral scholars come from 69 foreign countries.

Years at MIT of Postdoctoral Scholars, 2012–2013



Awards and Honors of Current Faculty and Staff

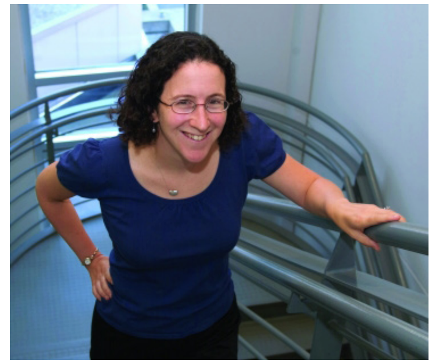
Nine current faculty members at MIT have received the Nobel Prize:

H. Robert Horvitz	Nobel Prize in Physiology or Medicine (shared)
Wolfgang Ketterle	Nobel Prize in Physics (shared)
Robert C. Merton	Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel (shared)
Richard R. Schrock	Nobel Prize in Chemistry (shared)
Phillip A. Sharp	Nobel Prize in Physiology or Medicine (shared)
Susan Solomon	Nobel Peace Prize (co-chair of Working Group One recognized under Intergovernmental Panel on Climate Change (IPCC), shared)
Samuel C. C. Ting	Nobel Prize in Physics (shared)
Susumu Tonegawa	Nobel Prize in Physiology or Medicine
Frank Wilczek	Nobel Prize in Physics (shared)

Below is a summary of selected awards and honors of current faculty and staff.

Number of Recipients	Award Name and Agency
142	American Academy of Arts and Sciences Member
88	American Association for the Advancement of Science Fellow
12	American Philosophical Society Member
85	American Physical Society Fellow
17	American Society of Mechanical Engineers Fellow
23	Association for Computing Machinery Fellow
4	John Bates Clark Medal, American Economic Association
3	Dirac Medal, Abdus Salam International Centre for Theoretical Physics
6	Fulbright Scholar, Council for International Exchange of Scholars (CIES)
7	Gairdner Award, Gairdner Foundation
68	Guggenheim Fellow, John Simon Guggenheim Memorial Foundation
16	HHMI Investigator, Howard Hughes Medical Institute (HHMI)
53	Institute of Electrical and Electronics Engineers, Inc. Fellow
33	Institute of Medicine Member, National Academies
1	Japan Prize, Science and Technology Foundation of Japan
2	Kavli Prize, Norwegian Academy of Science and Letters
20	MacArthur Fellow, John D. and Catherine T. MacArthur Foundation
2	Millennium Technology Prize, Millennium Prize Foundation
63	National Academy of Engineering Member, National Academies
77	National Academy of Sciences Member, National Academies
11	National Medal of Science, National Science & Technology Medals Foundation
1	National Medal of Technology and Innovation, National Science & Technology Medals Foundation
2	Rolf Nevanlinna Prize, International Mathematical Union (IMU)
31	Presidential Early Career Awards for Scientists and Engineers (PECASE)
3	Pulitzer Prize, Pulitzer Board
4	Royal Academy of Engineering Fellow, Royal Academy of Engineering
5	A. M. Turing Award, Association for Computing Machinery
1	Von Hippel Award, Materials Research Society
3	John von Neumann Medal, Institute of Electrical and Electronics Engineers, Inc.
3	Alan T. Waterman Award, National Science Foundation
3	Wolf Prize, Wolf Foundation

Award Highlights



Amy Finkelstein
Photo: Ed Quinn

Amy Finkelstein
2012 John Bates Clark Medal
MIT economist Amy Finkelstein, a leader in studying health insurance markets, is the 2012 recipient of the prestigious John Bates Clark Medal, an annual award given by the American Economic Association (AEA). The Clark Medal is given to an economist under the age of 40 "who is judged to have made the most significant contribution to economic thought and knowledge," according to the AEA.

From left, Mildred Dresselhaus, Ann Graybiel, and Jane Luu
Photos (L to R): Dominick Reuter; Kent Dayton; Kavli Foundation

Mildred Dresselhaus, Ann Graybiel, and Jane Luu
2012 Kavli Prizes
Mildred Dresselhaus, professor emerita, Ann Graybiel and Jane Luu are among seven pioneering scientists worldwide named as 2012 recipients of the Kavli Prizes. These prizes recognize scientists for their seminal advances in astrophysics, nanoscience, and neuroscience. The 2012 laureates were selected for their fundamental contributions to our understanding of the outer solar system; the differences in material properties at the nanoscale and at larger scales; and how the brain receives and responds to sensations such as sight, sound, and touch.

Pablo Jarillo-Herrero, Timothy K. Lu, Parag A. Pathak, Pawan Sinha, and Jesse Thaler
2012 Presidential Early Career Awards for Scientists and Engineers
Five members of the faculty are 2012 recipients of Presidential Early Career Award for Scientists and Engineers (PECASE), the highest honor bestowed by the U.S. government on science and engineering professionals in the early stages of their independent research careers. Pablo Jarillo-Herrero, Timothy K. Lu '03, MEng '03, PhD '08, Parag A. Pathak, Pawan Sinha SM '92, PhD '95, and Jesse Thaler are among 96 honored. Currently, 30 faculty members and one staff member are recipients of the PECASE award, including the 2012 recipients.

Michael Artin, left, and Robert Langer
Photos: Donna Coveney (left) and M. Scott Brauer

Michael Artin and Robert Langer
2013 Wolf Prize
Michael Artin, professor emeritus, and Robert Langer are among eight recipients worldwide of the 2013 Wolf Prize given by the Israel-based Wolf Foundation. The prestigious international prizes are awarded annually in in agriculture, chemistry, mathematics, medicine, and/or physics, as well as in the arts. Artin and Langer were cited for their contributions in mathematics and chemistry, respectively. More than 30 Wolf Prize recipients have gone on to win the Nobel Prize.