Section 2
Major MIT Initiatives

National Policy Initiatives

MIT has had major involvement in technology policy at the national level since before World War II, with MIT faculty and administrators frequently serving as advisors to national policymakers. Since 2005 more formal policy initiatives have been created to tackle science and technology issues with national, and often global, policy dimensions. Inherently cross-disciplinary, these initiatives draw on deep MIT expertise across science and engineering disciplines, the social sciences, economics, and management. A sampling of current policy initiatives include:

Work of the Future

In the spring of 2018, MIT President L. Rafael Reif established the MIT Task Force on the Work of the Future. Its goals are to understand the relationships between emerging technologies and work, and to explore strategies to enable a future of shared prosperity. More than twenty faculty drawn from twelve departments, as well as a dozen graduate students have participated in the task force's work. The Task Force has also been advised by boards of key stakeholders from industry, academia, education, labor, and philanthropy.

The world now stands on the cusp of a technological revolution in artificial intelligence and robotics that may prove as transformative for economic growth and human potential as were electrification, mass production, and electronic telecommunications in their eras. However, people throughout the industrialized world are pessimistic about the future of work.

In September 2019, the Task force published a preliminary report (https://bit.ly/2kuR8GZ) that outlines that "new and emerging technologies will have a profound effect on the work of the future and will create new opportunities for economic growth. Whether that growth translates to higher living standards, better working conditions, greater economic security, and improved health and longevity in the United States and elsewhere, depends on institutions of governance, public investments, education, law, and public and private leadership." These preliminary insights have been offered to help frame public debate and public policy as Task Force members conduct deeper analysis.

https://workofthefuture.mit.edu

Environmental Solutions Initiative

Launched in 2014, the Environmental Solutions Initiative (ESI) advances science, engineering, policy and social science, design, the humanities, and the arts toward a people-centric and planet-positive future. ESI pursues this mission by mobilizing students, faculty, and staff across MIT in partnerships for interdisciplinary education, research, and convening.

ESI's educational mission is to prepare and equip MIT's extraordinary students to steward a healthy planet in every career path. In September 2017, ESI launched a new, multidisciplinary minor in Environment and Sustainability open to undergraduates from all majors. ESI works closely with faculty who teach required undergraduate classes (General Institute Requirements) to incorporate problem sets and material on climate and environment.

ESI's agenda for advancing research and expanding work toward environmental solutions focuses in three key domains: climate science and earth systems, cities and infrastructure, and sustainable production and consumption. These domains are multidisciplinary and promote collaboration across MIT's five schools.

http://environmentalsolutions.mit.edu/

J-Clinic

In September 2018, MIT launched the Abdul Latif Jameel Clinic for Machine Learning in Health (J-Clinic). J-Clinic's mission is to incubate research at the intersection of computer science, big data, and the life sciences, and to drive the creation and commercialization of high-precision, affordable, and scalable machine-learning technologies to health care, ranging from diagnostics to pharmaceuticals. J-Clinic focuses on three main areas: preventative medicine methods and technologies with the potential to change or stop the course of noninfectious disease; cost-effective diagnostic tests to both detect and alleviate health problems; and drug discovery and development to enable faster and cheaper discovery, development, and manufacture of new pharmaceuticals, particularly those targeted for individually customized therapies.

This is the fourth major collaborative effort between MIT and Community Jameel, the social enterprise organization founded and chaired by Mohammed Abdul Latif Jameel '78. J-Clinic is also a key part of the MIT Quest for Intelligence.

https://jclinic.mit.edu

Abdul Latif Jameel World Water and Food Security Lab

The Abdul Latif Jameel World Water and Food Security Lab (J-WAFS) serves to organize and promote food and water research around campus, emphasizing innovation and deployment of effective technologies, programs, and policies in order to have measurable impact as humankind adapts to a rapidly changing planet and combats water and food supply scarcity.

The lab addresses the collective pressures of population growth, urbanization, development, and climate change—factors that endanger food and water systems in developing and developed countries alike. To accomplish this, the lab develops broad-based approaches employing MIT's interdisciplinary strengths and expertise in science, engineering and technology, climate and hydrology, energy and urban design, business, social science, and policy. These efforts are supported in part through seed grants distributed competitively to MIT researchers from J-WAFS' endowment, established in 2014 through a generous gift by alumnus Mohammed Abdul Latif Jameel '78.

J-WAFS also seeks to partner with other institutions, foundations, industry, philanthropists, and governments to develop regionally appropriate solutions and innovations, whether for fast-growing megacities or for the rural developing world. Water supply in urban settings, for example, may benefit from conservation policies and infrastructure-scale systems, whereas rural populations may need small-scale, locally powered water purifiers. Ensuring stable food supplies requires a similarly varied approach that engages technology, biological and environment science, policy, and business innovation.

http://jwafs.mit.edu/

Internet Policy Research Initiative

The Internet Policy Research Initiative (IPRI) works with policy makers and technologists to increase the trustworthiness and effectiveness of interconnected digital systems that support our economy and society. As global interconnectedness increases there is a need to bridge the gap between the technical and policy communities who are trying to neutralize threats and seize opportunities that a more interconnected world creates.

Under the umbrella of IPRI, MIT has taken a focused interdisciplinary research approach that draws on the best of MIT's expertise in engineering, social science, and management to tackle these grand challenges. Its goal is to help guide governments and private sector institutions around the world in framing sustainable, effective Internet and cybersecurity policies.

https://internetpolicy.mit.edu

Energy

The MIT Energy Initiative (MITEI), formally launched in the fall of 2006, is widely recognized as a leader in energy policy. It is a campus-wide energy program with important educational, research, and policy components. Its policy outreach component has prospered, encompassing core MITEI activities and those under the auspices of programs such as the Tata Center for Technology and Design, Center for Energy and Environmental Policy Research (CEEPR), and the Joint Program on the Science & Policy of Global Change. MITEI, the Tata Center, CEEPR, and the Joint Program each hold workshops at least annually to bring MIT faculty, research staff, and students together with outside experts to address current technological, economic, and political challenges in energy and climate.

MITEI's best-known policy products are the in-depth, multidisciplinary "Future of..." studies addressing solar energy, the electric grid, natural gas, and other areas (see energy.mit.edu/futureof). New studies in the series will continue to inform future decisions regarding energy research, technology choices, and policy development.

Now in its second decade, MITEI has reorganized its research around specific technology areas key to addressing climate change and meeting global energy needs. Eight Low-Carbon Energy Centers support sustained collaboration across academia, industry, government, and the philanthropic and NGO communities. The eight Centers are focused on carbon capture, utilization, and storage; electric power systems; energy bioscience; energy storage; materials for energy and extreme environments; advanced nuclear energy systems; nuclear fusion; and solar.

http://energy.mit.edu/lcec

Research Initiatives

Quest for Intelligence

The MIT Quest for Intelligence was launched in 2018 to discover the foundations of human intelligence and drive the development of technological tools that can positively influence virtually every aspect of society.

Housed within the new MIT Stephen A. Schwarzman College of Computing (http://computing.mit.edu/), the MIT Quest brings together more than 200 investigators working on the science and engineering of intelligence.

MIT is leading this work through two linked entities. "The Core," advances the science and engineering of both human and machine intelligence. A key output of this work will be machine-learning algorithms. "The Core" also seeks to advance our understanding of human intelligence by using insights from computer science.

The second entity, "The Bridge," is dedicated to the application of MIT discoveries in natural and artificial intelligence to all disciplines and will host state-of-the-art tools from industry and research labs worldwide. The Bridge will provide a variety of assets to the MIT community, including intelligence technologies, platforms, and infrastructure; rich and unique data sets; technical support; and specialized hardware.

The Quest researchers are also investigating the societal and ethical implications (https://bit.ly/2mEWpgl) of advanced analytical and predictive tools. There are active projects and groups at the Institute investigating autonomous systems, media and information quality, labor markets and the work of the future, innovation and the digital economy, and the role of AI in the legal system.

https://quest.mit.edu/

AI Accelerator

In May 2019, MIT and the U.S. Air Force launched a new program, the MIT-Air Force AI Accelerator. The program, a component of the new MIT Stephen A. Schwarzman College of Computing, will leverage the expertise and resources of MIT and the Air Force to conduct fundamental research directed at enabling rapid prototyping, scaling, and application of AI algorithms and systems. The goal is to make fundamental advances in artificial intelligence that could improve Air Force operations while also addressing broader societal needs.

MIT is forming interdisciplinary teams of researchers, faculty, and students whose work focuses on topics in artificial intelligence, control theory, formal methods, machine learning, robotics, and perception, among other fields. Teams will also include leaders in technology policy, history, and ethics from a range of departments, labs, and centers across the Institute. Members of the Air Force will join and lend expertise to each team.

The MIT-Air Force program will be housed in MIT's Beaver Works facility, an innovation center located in Kendall Square. MIT Lincoln Laboratory, a U.S. Department of Defense federally funded research and development center, will make available its specialized facilities and resources to support Air Force mission requirements.

Cybersecurity Initiatives

In 2015, MIT launched three campus-wide cybersecurity efforts aimed at addressing the technical, regulatory, and managerial aspects of cybersecurity. The three initiatives: Internet Policy Research Initiative (described above), Cybersecurity@CSAIL, and MIT Sloan's Interdisciplinary Consortium for Improving Critical Infrastructure Cybersecurity (IC)3, are intended to provide a cohesive, cross-disciplinary strategy to tackling the complex problems involved in keeping digital information safe.

Cybersecurity@CSAIL

Cybersecurity@CSAIL aims to identify and develop technologies that address the most significant security issues confronting organizations in the next decade. Presently, approaches to system security do not give overall security guarantees, but rather attacks are fought individually—"patch and pray" style. CyberSecurity@CSAIL strives to provide an integrated and formal approach to the security of systems, combining design and analysis methods from cryptography, software, and hardware. Cybersecurity@CSAIL's approach includes three key elements: collaborate closely with industry for input to shape real-world applications and drive impact; approach the problem from a multidisciplinary perspective; and create a test bed for our industry partners to implement and test our tools as well as have our researchers test tools developed by our partners.

https://cap.csail.mit.edu/members/initiatives/cybersecuritycsail

MIT Sloan's Interdisciplinary Consortium for Improving Critical Infrastructure Cybersecurity

MIT Sloan's Interdisciplinary Consortium for Improving Critical Infrastructure Cybersecurity (IC)3 addresses the important strategic, managerial, and operational issues related to the cybersecurity of the nation's critical infrastructure, ranging from energy and healthcare to financial services. An MIT interdisciplinary team, led by Sloan along with industry partners, looks to address issues, such as cyber risk analysis, return on cybersecurity investment, cybersafety models, more effective information sharing, better organizational cybersecurity culture, disrupting the cybercrime ecosystem, and metrics and models to better protect organizations.

https://cams.mit.edu

MIT.nano—Toolset for Innovation

With nano-scale advancements, we are reimagining Health and Life Sciences, Energy, Computing, Information Technology, Manufacturing, Quantum Science, and other fields. That is because nano is not a specific technology. It does not belong to a particular industry or discipline. It is, rather, a revolutionary way of understanding and working with matter, and it is the key to launching the next Innovation Age, the Nano Age.

A new nanoscience and technology center at the heart of the MIT campus opened in the summer of 2018 to support MIT researchers' work with nano technology. It is a comprehensive, 200,000-sq ft shared facility for nano-scale advancements. It is designed to give MIT researchers and innovators, as well as our partners, access to broad and versatile toolsets that can do more—from imaging to synthesis, fabrication and prototyping—entirely within the facility's protective envelope.

MIT.nano houses hands-on learning spaces and advanced teaching tools that are integrated throughout the facility. The top floor of MIT.nano contains a new undergraduate chemistry lab teaching complex. Also, on the top floor is the set of prototyping laboratories, designed to provide tools that could translate basic advances into hand-held technologies.

http://mitnano.mit.edu

MIT Clinical Research Center and Tufts-MIT CTSI

MIT has had a Clinical Research Center (CRC) since 1962 and remains one of two non-hospital institutions nationwide with such resources. The CRC has worked closely with internal MIT resources such as the Committee on the Use of Humans as Experimental Subjects—MIT's Institutional Review Board (IRB)—to ensure the safety of human subjects in the over 700 protocols run by MIT investigators and with external agencies and institutions.

In May 2018, the MIT CRC began a new collaboration with the Tufts Clinical and Translational Science Institute (CTSI) (https://www.tuftsctsi.org/). The T.5 Capacity in Medical Devices Program, co-led by Institute for Medical Engineering and Science (IMES) (http://imes.mit.edu/) Director Elazer R. Edelman, aims is to accelerate device development for clinical studies. It focuses on the early yet critical stage of translational science, when a medical device or diagnostic tool is still in its prototype stage.

http://crc.mit.edu/about