

## Report of the President

Experimentation sits at MIT's core and this year we celebrated one of the most forward-looking, risky, and important experiments in higher education—the creation of an institute of technology that would make scientific knowledge useful and the “useful arts” scientific. We honored the vision of MIT's founder, William Barton Rogers, during this sesquicentennial year with a 150-day celebration of the Institute's history and its contributions to science, technology, and innovation. At the time of MIT's founding in 1861, the word “technology” had not yet acquired its modern meaning, yet, the Institute has set a standard that continues to be admired and adopted worldwide. This year, MIT celebrated its accomplishments and envisioned its next 150 years, reminding all members of the MIT community how their work connects to Rogers' ambitious vision.

### Undergraduate and Graduate Education

#### Student Enrollment

The Institute received 17,909 applications for the class of 2015, an 8 percent increase from the prior year and another a record high for the Institute. Over the past six years, MIT has witnessed a steady increase in applications, each year breaking the prior year's record high, achieving a 72 percent increase in applications over six years. The Institute admitted 9.7 percent of the applicants to the class of 2015 and 1,126 of those applicants enrolled. Among this group, 45 percent are women, 24 percent are underrepresented minorities, and 14 percent are the first generation in their families to attend college. Forty-three percent of new students were valedictorians, and 90 percent graduated in the top five percent of their high school classes.

#### Financial Aid

MIT reached the successful conclusion this year of the Campaign for Students, a fundraising effort aimed to increase scholarships, fellowships, and infrastructure support for student life and learning. Publicly launched in October 2008, the two-year effort exceeded its \$500 million goal to raise \$780 million to support undergraduate financial aid and graduate fellowships, as well as to support student life initiatives. This was an important achievement on behalf of MIT students, especially in the midst of a global financial downturn.

#### Faculty

##### Faculty Honors

This year many among the faculty were recognized for their contributions to their fields of study. Among them, Institute Professor Peter A. Diamond PhD '63 won the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel for 2010. Diamond received the Nobel Prize with two co-winners, Dale T. Mortensen of Northwestern University and Christopher A. Pissarides of the London School of Economics. The Nobel Foundation cited the three scholars in part “for their analysis of markets with search frictions.” Diamond helped develop studies from the late 1970s onward to examine the ways markets function over a period of time. His contributions to “search theory” have

been frequently applied to labor markets to examine how the needs of individuals and employers are met. Diamond joined the Institute's faculty in 1966, where he has remained.

Professor Susan Lindquist, a member of the Whitehead Institute for Biomedical Research and the Department of Biology, was recognized this year as a recipient of the National Medal of Science, the nation's highest scientific honor. President Barack Obama cited Lindquist "for her studies of protein folding, demonstrating that alternative protein conformations and aggregations can have profound and unexpected biological influences, facilitating insights in fields as wide-ranging as human disease, evolution, and biomaterials." The annually awarded National Medal of Science was established by Congress in 1959 as a presidential award honoring those who have made "outstanding contributions to knowledge in the physical, biological, mathematical, or engineering sciences."

## MIT 150

This year, the Institute celebrated its sesquicentennial anniversary with a 150-day celebration that began on January 7 and concluded June 4. Over 800 members of the MIT community, including alumni, faculty, staff, students, and members of the Corporation, attended the opening reception at the MIT Museum where the [MIT 150 Exhibition](#) was unveiled. The most expansive show by the museum since its founding 40 years earlier, the MIT 150 Exhibition drew on a collaborative process in which the curators called on the MIT community for ideas of the most memorable points in MIT's history. One hundred fifty evocative objects were selected to represent MIT's rich history. Items included the world's first pocket-sized scientific calculator from 1972; an account of wind-tunnel studies following window failures in Boston's John Hancock Tower in the 1970s; research from the 1930s into the perfect cup of coffee; and geology studies in the last decades of the 19th century that informed the development of the Charles River Dam, the Boston and Cambridge subway tunnels, and the new MIT campus.

During the 150 days of celebration, MIT hosted an array of events, performances, and symposia to reflect upon the Institute's legacy of discovery and invention, as well as to explore its potential for future contributions to society and the world. Among the events were six academic [symposia](#), each focused on an important area of MIT research, including economics and finance; integrative cancer research; women in science and engineering; the age of computation; the exploration of earth, air, ocean, and space; and brains, minds, and machines. MIT also held a semester-long celebration of MIT's unique contributions to media arts, electronic music, art, and design through the [Festival of Art, Science and Technology](#) (FAST). A gathering of thousands of MIT students, faculty, staff, and alumni honored MIT's achievements at [The Next Century Convocation](#) on April 10, 2011. To include the greater Cambridge and Boston communities in the celebration, the [MIT Open House](#) invited members of the public to visit MIT labs, centers, and educational facilities, bringing more than 20,000 visitors to campus.

MIT 150 also offered an opportunity to reflect upon the founding experiment of MIT itself—an experiment designed and implemented by William Barton Rogers. Rogers had written and spoken widely about the imperative of making scientific knowledge useful and of making the "useful arts" scientific. He presciently anticipated that an integration

of the theoretical and the practical could accelerate the growth of America's industries and turn America into an industrial powerhouse. While MIT faculty revolutionized teaching and pioneered research in fields from physics to architecture to chemical engineering, MIT graduates used science and engineering to transform daily practice in factories, railways, mines, shipyards, and laboratories, in the United States and around the world. Some led in their professions while championing a more egalitarian ideal of American education, such as architect Robert R. Taylor (1892), MIT's first black graduate, whose vision still defines the campus of Tuskegee University, and chemist Ellen Swallow Richards (1873), MIT's first woman graduate, who directed the first comprehensive water quality testing in America and pioneered the new field of ecology. Some graduates, like chemistry students A.D. Little (1885) and Pierre DuPont (1890), and aeronautical engineers Donald Douglas (1914) and James McDonnell (1925), went on to shape entirely new industries. MIT made a decisive technological contribution to war efforts, including a critical role during World War II, developing radar and other new defense technologies. In the post-war years, the Institute set a new kind of model of an engine for technical, educational, and economic progress. Following the visionary blueprint of inventor, engineer, and former dean of the School of Engineering Vannevar Bush PhD 1916, the modern research university emerged, fueled by federal investments in peer-reviewed science and technology. The talent and ideas that flowed from MIT and other research universities helped drive decades of economic growth, the birth of new industries, countless medical advances, and the emergence of technologies that enable our modern quality of life.

The events and exhibitions throughout the MIT 150 celebrations demonstrated that MIT continues to embrace its mission to design the science, technology, and policy to address the greatest problems and challenges of our time. Today, MIT has taken on the challenges of energy, climate, water, poverty, megacities, and disease, among many others. In a new focus, MIT faculty, students, and staff, together with colleagues in industry and government, are working to identify and address the needs of American manufacturing with the ambition of accelerating a next wave of economic growth through innovative systems, processes, and materials.

## **Financial Constraint**

### **The Institute-wide Planning Task Force**

The [MIT Institute-Wide Planning Task Force](#) Coordinating Team released its final letter this year. The letter summarized the successes of the actions taken since the Task Force was created in December 2008. These successes included the collaborative structure, campus-wide participation, and effective implementation of the Task Force's work. The letter described the significant contribution the Task Force made to the Institute's overall budget-reduction goal, with Task Force ideas helping to realize \$12 million in budget savings. The letter also called out additional opportunities for further study, including employee benefits, expanding the educational use of the campus, e-learning, printing/digital archiving, controlling the cost of undergraduate education, and more efficient use of space.

## Research Initiatives

### Production in the Innovation Economy

President Hockfield launched the [Production in the Innovation Economy](#) (PIE) project to analyze how innovation moves ideas from research to the marketplace. The goal of the PIE project is to shed light on how America's great strengths in innovation can be deployed more effectively into new productive capabilities. The project will explore many facets of advanced manufacturing, including: What role do production capabilities play in bringing innovations to the marketplace? What kind of industrial ecosystem accelerates innovation and production? Does having manufacturing in proximity to innovation enhance economic returns? The co-chairs of the PIE Commission are Professor Suzanne Berger and Institute Professor Phillip Sharp; the executive director is Professor Olivier de Weck. Included among its contributors are MIT faculty and students from disciplines across the Institute, from economics and engineering to political science, management, and biology.

### Advanced Manufacturing Partnership

On June 24, 2011, President Barack Obama announced that President Hockfield would co-chair the nation's new [Advanced Manufacturing Partnership](#) (AMP) with Dow Chemical Co. CEO Andrew Liveris. President Obama described the scope of the new national effort to bring together industry, universities, and the federal government to identify and invest in key emerging technologies for American manufacturing. He charged this new partnership with helping US manufacturers lower the cost and improve the quality and speed of production to enhance the nation's global competitiveness. In launching AMP, President Obama highlighted the need to "reinvigorate" American manufacturing—once "the ticket to a middle-class life"—as well as to stimulate the domestic economy and ensure that the United States is not left behind in an age of increasing globalization. New technologies including robotics, solar energy, and automobiles were cited among many that may prove pivotal in the creation of new jobs and US export opportunities.

AMP emerged from the findings of a report by the President's Council of Advisors on Science and Technology (PCAST), which recommended, among other items, a partnership involving government, industry, and academia to identify the most pressing challenges and transformative opportunities to improve the technologies, processes and products across multiple manufacturing industries. A preview of the report and panel discussion was presented by the Brookings Institution and Math for America. President Hockfield was among the panelists. Eric Lander, PCAST co-chair and director of the Broad Institute of MIT and Harvard, summarized the report. The other three panelists were: former dean of the MIT School of Science and current chancellor of the University of California, Berkeley Robert Birgeneau; Tennessee congressman Bart Gordon, who chairs the House Subcommittee on Science and Technology; and Columbia University physicist Brian Greene. The discussion centered on the critical need to build a very large national cadre of expert teachers in math and science, as the competitiveness of US students in math and sciences is comparatively weaker than other nations.

## Intercollegiate Initiatives

### Harvard and MIT Library Alliance

The provosts of MIT and Harvard University charged their respective library systems to explore further collaborations to share library materials. This directive will advance digital preservation and collection, as well as develop future off-site storage facilities. Both MIT and Harvard indicated that increased collaboration among their libraries would be an essential element in the development of the research library of the 21st century. As the project unfolds, each library system will remain engaged with and guided by the respective missions and priorities of each university. Both formal and informal relationships already exist between the MIT and Harvard libraries. MIT has shared in the use of the Harvard Depository since its inception in 1985. An agreement between Harvard College Library and MIT in 1995 established reciprocal borrowing privileges to faculty, researchers, and graduate students at both institutions.

## International Initiatives

### China

MIT delegations visited several overseas nations this year. President Hockfield led an MIT delegation to Greater China for meetings with key government, business, and academic leaders, along with Institute alumni. In Beijing, President Hockfield met with several senior Chinese government officials to discuss potential collaborations between MIT and China in education, energy, and health. Earlier in the spring, Madame Ma Dexiu, chairperson of University Council at Shanghai Jiao Tong University, and Mr. Qi Liu, vice minister of the National Energy Administration (China), participated in the inaugural events of the MIT-China Low Carbon Energy Leadership Program. Each gave brief remarks at the program's opening reception at Gray House. The MIT-China Low Carbon Energy Leaders Program is a new three-year program in which high-level leaders from Chinese government, industry, and higher education will visit MIT periodically to discuss energy technology policy and climate change and its implications with faculty and members of the MIT Energy Initiative. They will also explore the energy challenges presented by urbanization and the impact of globalization on trade and commerce.

### Russia

MIT and the Skolkovo Foundation announced a preliminary agreement to collaborate in the establishment of the [Skolkovo Institute of Science and Technology](#) (Skoltech) in Skolkovo, Russia. Skoltech is a nonprofit organization acting on behalf of the Russian Federation. Charged by Russian President Dmitry Medvedev, Skoltech will be part of a new science and technology city in the Moscow suburb of Skolkovo. Skoltech is intended to integrate education and advance research and entrepreneurship through academic excellence and innovation, attracting outstanding faculty, researchers, students, and industrial partners from Russia and around the world. It aims to organize education and research around multidisciplinary technological challenges, rather than around traditional academic disciplines. It will combine education, research, and practice in entrepreneurship and innovation. The agreement, which was signed by Provost L. Rafael Reif on June 18, is a preliminary statement of shared intention.

MIT and the Skolkovo Foundation will work together to assess opportunities for MIT to conduct education and research activities in Russia in collaboration with Russia's leading universities and research institutes.

### Monaco

An MIT delegation traveled to Monaco as guests of The Futurum Association, a Monaco-based organization dedicated to futuristic projects in the arts and sciences at an international level. The Futurum Association was the sponsor of two MIT events in Monaco: an "Energy Futures" conference featuring MIT faculty among the invited speakers, and the world premiere of *Death and the Powers*, a robotic opera composed by music and media professor Tod Machover and developed at the MIT Media Lab, featured as part of the conference.

### France

Madame Valérie Pécresse, the French minister of education, visited MIT with a delegation on April 12 to discuss with President Hockfield and other Institute leaders ongoing and future collaborations between MIT and France. Ten years ago, the French government and MIT created the [MIT-France Program](#), which sends nearly 100 MIT students annually to intern and conduct research in French companies and labs. Following the minister's visit, she and President Hockfield announced at the MIT France Energy Forum in Paris on June 29, a joint international laboratory that would focus on multiscale materials science for energy and the environment. According to a memorandum of understanding, the *unité mixte internationale*, or UMI, will be located at MIT and co-sponsored by Le Centre National de la Recherche Scientifique (CNRS), France's national scientific research center.

### Abu Dhabi

President Hockfield and a delegation of MIT faculty visited the newly opened home of the [Masdar Institute of Science and Technology](#) (MIST), located in the new zero-carbon, zero-waste Masdar City. MIT serves as MIST's primary partner. The MIT delegation met with key faculty, students, and administrative leaders from MIST and with the Abu Dhabi leadership. President Hockfield also delivered a keynote talk at the World Future Energy Summit in Abu Dhabi as part of this visit. Professor Fred Moavenzadeh is currently on leave from MIT serving as MIST's president.

### Brazil

An inaugural meeting of the Brazil-MIT Forum/Conferência Brasil-MIT was held this year. It brought together leaders from Brazil and MIT to seek solutions to common challenges in energy, the environment, entrepreneurship, and social and technology policy innovation. The forum aims to develop scientific and technological advances of global significance through collaborations between Brazil and MIT. The forum was the capstone event of a two-year process building up MIT's engagement with Brazil.

## Saudi Arabia

A new [Center for Complex Engineering Systems \(CCES\)](#), a collaboration between MIT and King Abdulaziz City for Science and Technology (KACST), opened this year in the Saudi Arabian capital of Riyadh. The center's co-directors are Professor Olivier de Weck and KACST Professor Anas Alfaris. At MIT, the center will be located in the Engineering Systems Division, which will provide access to all five Schools through dual and joint faculty appointments. The MIT center will include CCES offices, collaborative and high-performance computing capabilities, and an instrumentation-prototyping lab. The portion of the center located at KACST will mirror this structure and will be located in Riyadh.

## Campus Development

### Sloan School of Management

The new building of the MIT Sloan School of Management was dedicated in May, marking an important new chapter in the school's history. The building's public spaces, study rooms, and meeting areas were designed to foster collaboration and group study and practice. The building has achieved the distinction of the "greenest" and most environmentally sensitive building on campus, featuring triple-insulated windows and significantly reduced energy use for lighting, heating, and cooling, compared to a standard office building. The new Sloan building opened its doors to students and faculty at the start of this academic year, with the formal dedication taking place at the start of Sloan's alumni weekend and as part of the MIT 150 celebration. The renovation and restoration of the adjacent Arthur D. Little Building, which is part of the Sloan School of Management, continued this year.

### David H. Koch Center for Integrative Cancer Research

In March, MIT celebrated the dedication of the [David H. Koch Institute for Integrative Cancer Research](#). The location of the Koch Institute in Kendall Square, across the street from both the Whitehead Institute and Broad Institute, makes it a new and important center of transformative collaboration. Researchers at the Koch Institute represent the fields of biology, chemical engineering, computer science, and materials science. These researchers will continue to build upon the decades of work that cancer biologists have done to investigate the molecular mechanisms of the disease. Given the critical importance of cancer research, the Koch Institute demonstrates MIT's longstanding commitment to pursue solutions to real world problems. Construction of the Koch Institute building began in 2008.

### Massachusetts Green High Performance Computing Center

A groundbreaking ceremony for the [Massachusetts Green High Performance Computing Center \(MGHPCC\)](#) was held this October. The facility, which is a state-of-the-art computing center in Holyoke, Massachusetts, will offer a computational infrastructure to support scientific discovery. MGHPCC will both help support the research missions of the participating institutions and strengthen partnerships with industry. It will also help the state of Massachusetts attract and retain leading scientists who will contribute to its innovation economy. President Hockfield, Massachusetts governor Deval Patrick,

and other leaders from academia, industry, and government participated in the groundbreaking ceremony.

### **Great Dome and E17 and E18 Building Renovations**

This year, the Great Dome was restored over Building 10 and the Barker Engineering Library. The project included the sourcing of 300 limestone blocks from the Indiana quarry that provided the original blocks, as well as restorations to the poured concrete portion of the dome and the steps below. This work was part of many improvement projects across campus. Renovations to buildings E17 and E18 also began this June and will provide swing space for departments that are temporarily displaced by large-scale renovations.

### **Kendall Square Development**

Novartis announced the expansion of its global research headquarters in Cambridge. The company will increase the size of its Massachusetts Avenue campus by more than 400,000 square feet and expects to add 300 new jobs. This news reflects the expansion of an agreement that MIT and Novartis signed in 2009, in which MIT granted a long-term lease of the former Analog Devices building and its adjacent surface parking lot. The expanded agreement includes a Novartis lease of MIT's Building N42 and its adjacent surface parking lot.

### **MIT 2030: Long-term Campus Planning**

In the fall of 2010 we presented to the MIT community the current state of a project designed to understand the MIT campus and immediately surrounding area. Through the MIT 2030 project, vigorous, comprehensive implementation of a wholly new commitment to campus renewal has begun, while also setting the foundational understanding (both physical and academic) for new building projects. MIT 2030 provides the groundwork for moving into an era of conscious stewardship of MIT's buildings and properties. MIT 2030 represents over three years of work by both administrative and academic offices across the Institute.

### **Closing Thoughts**

This year's sesquicentennial celebrations provided a compelling context to reflect upon what MIT has achieved since its founding and to consider directions for the future. MIT must continue to apply its strengths in interdisciplinary problem solving to the challenges of our planet, including sustainable energy and climate change, poverty and famine, the health of our oceans, and the future of our cities. This year's catastrophic earthquake and tsunami in Japan serve as a reminder of the unpredictable force of nature and the fragility of the structures upon which our societies rely. In the manner that MIT has helped in the aftermath of earlier environmental crises, the Institute also helped in Japan, applying creativity, knowledge, and resources to many areas of need.

The Institute's future will embrace research and education along the entire continuum from abstract theory to advanced applications, embracing curiosity-driven research as well as real-world implementation. Using these tools and perspectives MIT will contribute to the invention of new technologies and policies to catalyze economic



growth and to develop financial models to make our economies more resilient and less inequitable. Above all and in all fields, MIT must stay hungry for exploration. An effort to reach into the unknown is among the most important expressions of the human spirit; it was undoubtedly a driving impulse for William Barton Rogers and the many inspired individuals who have carried forward his vision for MIT.

**Susan Hockfield**  
**President**