

Report of the President

Celebrating Ingenuity

In this 100th anniversary year of the Institute's move from cramped quarters in the Back Bay to a magnificent new campus across the river in Cambridge, an exhibition at the MIT Museum reminded us that a spirit of play is *truly* MIT.

In 1916, Moving Day included the Bucentaur barge that brought the MIT charter across the Charles River. Built for the occasion, the mock-heroic watercraft included mermaids, cupids, a beaver, and the figure of Technology on the bow, leading the way with a torch and a T-square. The ceremonies included the famous Telephone Banquet that connected alumni at 34 clubs around the country to 1,500 revelers in Symphony Hall in what *MIT Technology Review* called "the most elaborate transcontinental telephone stunt ever staged."

A hundred years later, our May 7 Moving Day celebrations were similarly spirited, with a community parade making its way from Boston to Cambridge by land and water. More than 30 teams created tributes to MIT that included a pedal-powered floating platform in the shape of the Great Dome, an eight-foot-high brain model on wheels, and a new Bucentaur. Oliver Smoot '62—who in 1958 lent his stature to the measurement of the Harvard Bridge in a 5'7" unit now known worldwide as a "smoot"—served as grand marshal of the bridge crossing. Community dance parties followed, to the delight of all who attended.

Moving Day was far from the year's only occasion for celebration and wonder. On February 11, scientists from the Laser Interferometer Gravitational-Wave Observatory, or [LIGO](#), announced the first direct detection of gravitational waves, ripples in space-time arising from the collision and merger of two black holes over a billion light years away. Although Albert Einstein predicted gravitational waves a century ago, many doubted that instrumentation sensitive enough to confirm their existence would be possible.

The concept of LIGO arose first as a thought experiment MIT professor emeritus Rainer "Rai" Weiss proposed to his students in 1967. Decades of dedication on the part of Rai and his collaborators at Caltech followed. Now, LIGO has not only confirmed Einstein's physics but also given astronomers an entirely new way to use gravitational waves to detect events that would otherwise be out of reach.

Pioneering Online Learning

This year, MIT's commitment to online learning took a giant leap forward as we announced a [MicroMasters in supply chain management](#)—a new kind of credential that MITx students can earn by successfully completing a semester's worth of online graduate-level classes and passing a comprehensive exam. A pilot program for a traditional MIT master's in supply chain management will allow students to begin their studies online, apply for admission, and earn an MIT degree by completing a semester on campus. This is another example of how digital learning offers us new ways to reach students who truly belong at MIT.

Our work in online learning is also generating valuable new information about the nature of learning itself. In February, we launched the [MIT Integrated Learning Initiative \(MITili\)](#) to apply scientific rigor to the question of how people learn—a recommendation that emerged from the Task Force on the Future of MIT Education. MITili draws on fields that range from design to economics to cognitive psychology to explore ways to improve education at all levels and every stage of life.

We are also embarking on new collaborations to share the educational innovations we are developing for younger learners. This year, the Office of Digital Learning and the Woodrow Wilson National Fellowship Foundation announced the [MIT pK–12 Initiative](#), which will support teachers from pre-kindergarten through grade 12 in their efforts to use emerging digital tools and environments with a focus on STEM subjects.

And MIT and the [Tata Institute of Social Sciences](#) announced the launch of the [Connected Learning Initiative](#), a program to create new educational opportunities for students in India’s secondary schools, now entering in large numbers for the first time in the country’s history. More than 1,000 schools, with 165,000 students, have agreed to participate. The program will offer content in English, science, mathematics, and professional values.

Championing Research, Basic and Mission-Driven

LIGO reminded all of us of the value of basic science. In May, the \$3 million Special Breakthrough Prize in Fundamental Physics was awarded to LIGO founders Rainer Weiss ’55 PhD ’62 and his Caltech partners Ronald Drever and Kip Thorne, as well as 1,012 other contributors to the discovery. Of course, there would be no LIGO without decades of support from the National Science Foundation and its National Science Board, which recently elected Maria Zuber, MIT vice president for research, as its chair.

At MIT, we ask fundamental questions about the fabric of spacetime, but we also ask fundamental questions about *fabrics*—such as, why can’t they monitor a wearer’s health, or regulate body temperature, or store energy? This year, to answer those questions and to bring the answers to market, we convened [Advanced Functional Fabrics of America \(AFFOA\)](#), which won a federal competition to create the nation’s newest Manufacturing Innovation Institute.

Operated independently as a \$317 million partnership with the US Department of Defense, the Commonwealth of Massachusetts, and a nationwide consortium of academic, industry, nonprofit, and state economic development partners, AFFOA is poised to lead a manufacturing-based revolution by transforming traditional fabrics into sophisticated devices and systems. AFFOA is headquartered in Cambridge, MA, in proximity to MIT and its US Army–funded [Institute for Soldier Nanotechnology](#). MIT now plays a significant role in four of the eight national Manufacturing Innovation Institutes.

Finally, we announced this year that the MIT Computer Science and Artificial Intelligence Laboratory (CSAIL) and Toyota will launch the Toyota-CSAIL Joint Research Center, funded by Toyota, to further develop autonomous vehicle technologies, with the goal of making driving safer.

Accelerating Innovation and Entrepreneurship

This year, the Institute released a study called *Entrepreneurship and Innovation at MIT*, sponsored by the MIT Innovation Initiative, which estimates that, as of 2014, MIT alumni have launched more than 30,000 active companies, generating about \$1.9 trillion in annual revenues. This would make MIT, if it were a nation, the world's tenth largest economy by gross domestic product (GDP). The study was co-authored by Edward Roberts, the David Sarnoff Professor of Management of Technology, and Fiona Murray, the William Porter (1967) Professor of Entrepreneurship, associate dean for innovation, and co-director of the Innovation Initiative.

In October, to celebrate the region's excellence in entrepreneurship and innovation, MIT, *The Boston Globe*, Harvard University, and Massachusetts General Hospital co-sponsored HUBWeek, which included a four-day MIT-led event called *Solve*. Produced by *MIT Technology Review*, *Solve* brought together leaders in business and academia to explore solutions to challenges in education, health and medicine, sustainability, manufacturing, and the future of work.

To help our students explore and develop their ideas in new ways, this year we launched the *MIT Sandbox Innovation Fund Program*, which will provide initial funding, mentoring, and tailored educational experiences for student-initiated projects. We also announced a new undergraduate minor in entrepreneurship and innovation, and launched *Project Manus* to enhance the culture of making on campus. And a new collaboration with the Boston University School of Law established two clinics at which MIT students can seek advice about the legal issues associated with innovation and entrepreneurship.

Finally, we are making Kendall Square an even more magnetic and inspiring place to live, work, and launch new innovations into the world. Following a six-year regulatory process, the Cambridge Planning Board voted unanimously to approve special permits for the transformation of MIT-owned parking lots into six new buildings: three for research and development, two for housing, and one for retail and office space.

Heightening Our Global Impact

On May 6, 2016, we welcomed 700 MIT alumni, parents, and friends to campus for the launch of the *MIT Campaign for a Better World*. Beginning with a nucleus of \$2.6 billion, we announced our intention to raise \$5 billion to tackle humanity's greatest challenges in six priority areas:

- Discovery science
- The health of the planet
- Human health
- Innovation and entrepreneurship
- Reimagining education for the 21st century
- The MIT core: attracting extraordinary people and providing them with the resources they need to thrive

As we consider how to build a better world, we must do more to develop solutions to the urgent threat of climate change. This year, following a process of broad community engagement, we issued MIT's five-year plan for [action on climate change](#), which details steps MIT will take in the following areas:

- Research to further understand climate change and advance solutions to mitigate and adapt to it
- Acceleration of low-carbon energy technology via eight new research centers
- Development of enhanced educational programs on climate change
- New tools to share climate information globally
- Measures to reduce our own carbon use

We are committed to achieving a carbon-neutral campus as soon as possible and to solving intractable climate challenges well beyond our campus. MIT is the second university after Yale to join the Carbon Pricing Leadership Coalition, a partnership of 20 national and subnational governments, more than 90 major companies, and dozens of leading nonprofits, working together to expand the use of carbon pricing as an incentive to accelerate the world's movement toward a zero-carbon economy.

Cultivating a Caring Community

In April, we held the All-MIT Diversity Forum, a daylong conference to advance decency, humility, respect, and kindness at MIT, especially with regard to ethnicity, religion, gender, sexual orientation, and physical disability. More than 400 members of our community—students, faculty, staff, and alumni—set time aside to participate.

Our students continue to be our teachers, with the Black Students' Union and Black Graduate Student Association presenting a series of recommendations in December to help MIT become more inclusive. We also benefitted from another student-led initiative, a data-rich report titled *The Status of Undergraduate Women at MIT*, co-authored by seniors Caroline Chin and Kamilla Tekiela. Their study suggests that female MIT undergraduates experience negative stereotyping and feel less confident than their male peers. The report offered a series of recommendations for change, while coming to the sensible conclusion that women at MIT are as successful as their male peers and should feel equally confident about their accomplishments.

The students involved in such efforts have modeled the very best of MIT, addressing systemic problems with thoughtful analysis. They are the inspiration for our decision to ask Judy “JJ” Jackson to return to MIT as our first diversity and inclusion officer. Her leadership will help us move closer to the inclusive and welcoming community we strive to be.

Finally, this year we renamed the [MIT Public Service Center](#) in honor of another exemplar of MIT excellence: Priscilla King Gray. Priscilla cofounded the center—which promotes public service with grants, advice, and logistical support—in 1988, while her husband Paul Gray '54 was serving as MIT's president. As a longtime member of the MIT community, Priscilla shared her passion for volunteering with generations of MIT

students, encouraging them to learn and grow by rolling up their sleeves and helping others. In a year in which we celebrated many joyous aspects of our MIT culture, it is deeply gratifying to recognize Priscilla in this way.

L. Rafael Reif
President