

MIT Office of Sustainability

The [MIT Office of Sustainability \(MITOS\)](#) continues to build a campus sustainability model that both advances the mission of academic excellence at MIT and seeks to transform the campus itself into an active demonstration of the Institute's ability to address the world's great challenges.

Highlights of fiscal year 2018 include the launch of the first-of-its-kind Sustainability Data Pool, deeper analysis and understanding of the impact of climate change on the MIT campus in partnership with the city of Cambridge, an 8% reduction in employee parking transactions following the launch of Access MIT in 2016, a reduction of 9% in greenhouse gas (GHG) emissions, the launch of a food and sustainability working group that brings together campus stakeholders from dining to anthropology, and the release and endorsement of the *Pathway to Sustainability Leadership* by the Campus Sustainability Task Force.

MITOS staff continued to engage in campus, city, regional, and global networks as committee participants, leaders, advisors, and presenters. Also, we continue to seek thoughtful partners with whom we can create innovative strategies to address sustainability issues at the campus, city, and global scales.

This report details major accomplishments over the year and is organized around the four focus areas of the office:

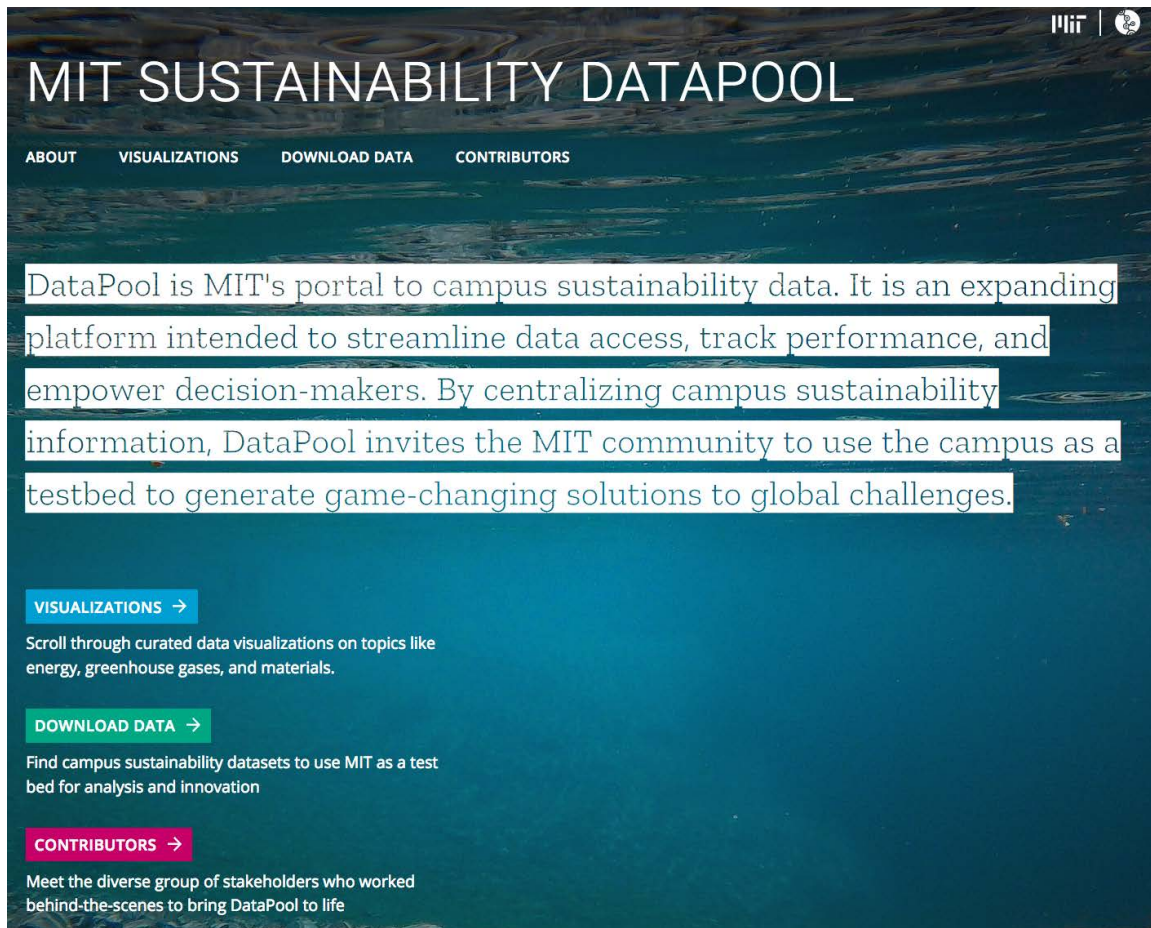
- Planning for and managing sustainable campus systems
- Building the leadership and capacity of the MIT community
- Transforming the campus into a living laboratory and test bed
- Forging collaborative partnerships

Planning for and Managing Sustainable Campus Systems

In FY2018, MITOS continued to work collaboratively across operational and academic departments to actualize MIT's commitment to developing and managing a sustainable campus.

Sustainability Data Pool Web Portal

In spring 2018, MITOS launched the [Sustainability Data Pool](#) website, which serves as the Institute's central portal to campus sustainability data and analyses powered by the MIT Data Hub. The Data Hub is a big data infrastructure developed by the Information Systems and Technology (IS&T) Data Science Team that enables departments to collect, store, and analyze information using industry-leading tools and techniques. The Sustainability Data Pool now provides a single point of entry to sustainability performance dashboards for the MIT community such as Energize MIT—which details MIT's energy use and carbon emissions—and Material Matters—which details recycling and solid waste materials collected and removed from campus. MIT users can view and download campus data, allowing the community to use the campus as a test bed to generate data-driven solutions in hackathons, classes, research projects, and more.



The Sustainability Data Pool website launched in 2018.

Assessing the Sustainability of Our Campus

MITOS completed a holistic sustainability performance assessment in FY2018 on behalf of the Institute. To conduct the assessment, MITOS sourced approximately 1,400 data points from more than 55 individuals across 36 departments, labs, and centers. FY2017 served as the baseline performance year for the assessment. The project culminated in a final report and presentation at the annual Sustainability Connect conference. Completion of the assessment enabled MIT to:

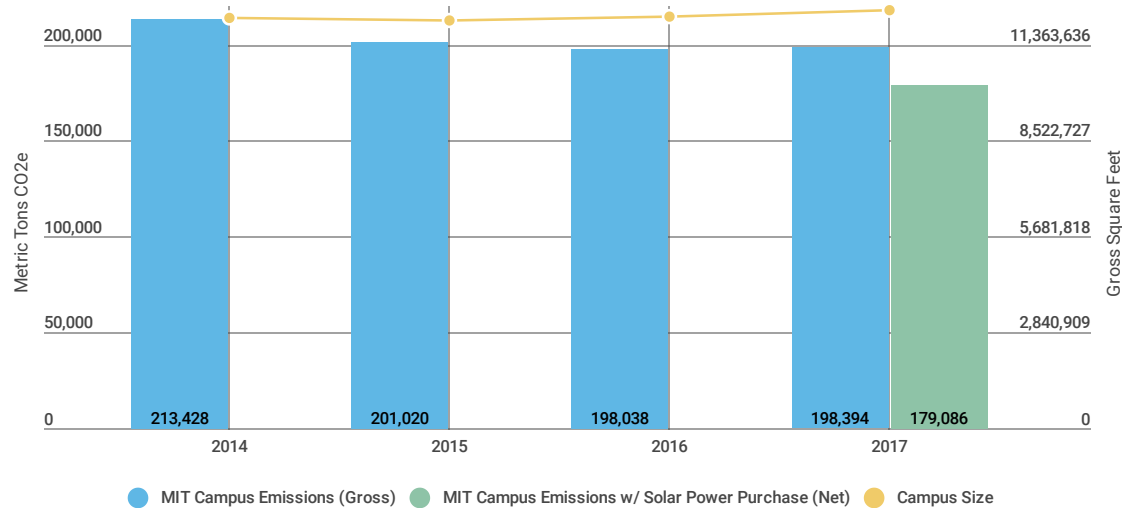
- Establish sustainability performance baselines
- Engage and strengthen the network of MIT professionals working in sustainability-related areas
- Identify sustainability achievements and opportunities for growth
- Understand how MIT's performance compares with that of peer institutions

The breadth and depth of the information captured in the process will help the Institute document its sustainability journey, identify strengths and weaknesses, and contextualize future performance.

Climate Action: Greenhouse Gas Mitigation

Over the course of FY2018, MITOS continued to help lead the implementation of MIT's campus commitments as outlined in the Institute's [Plan for Action on Climate Change](#). In October 2017, MITOS and the Department of Facilities published the Institute's FY2017 greenhouse gas (GHG) inventory, which outlined MIT's progress in advancing the goal to reduce campus GHG emissions by at least 32% in 2030 (from a 2014 baseline). The inventory showed that MIT reduced its GHG emissions by 9% from FY2016 levels and by 16% from the 2014 baseline year—half of the minimum reduction called for. The reduction was primarily due to MIT's solar power purchase agreement. Without accounting for the solar energy purchase, MIT's total GHG emissions in 2017 were flat relative to 2016 levels. Preliminary results from our GHG mitigation program through FY2018 show continued progress toward meeting our reduction goals, and the FY2018 GHG final report will be published in the first quarter of FY2019.

Total Campus Emissions By Year

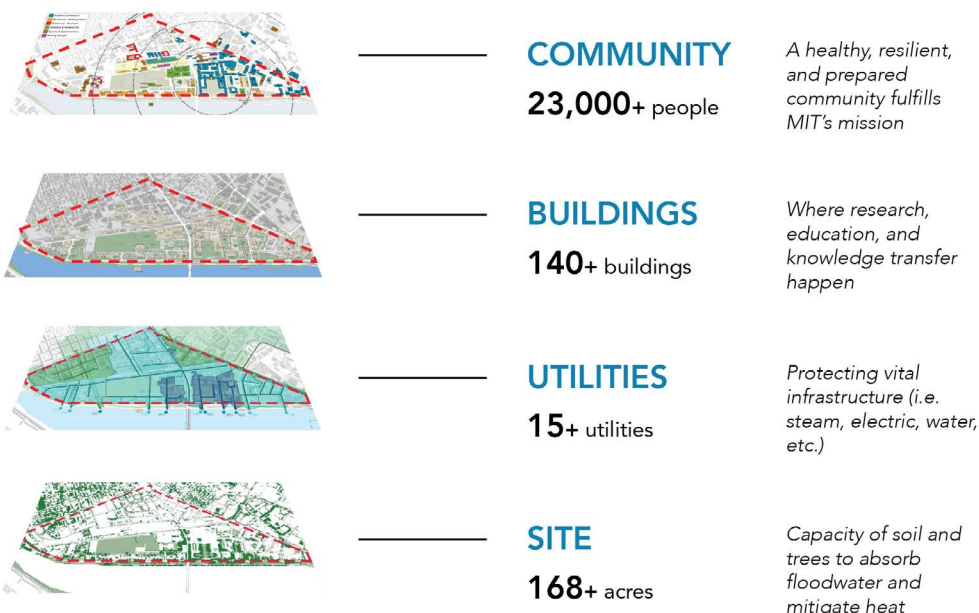


FY2017 emissions results, including greenhouse gas emission offsets from the solar power purchase.

Climate Action: Campus and Community Resiliency

MITOS continues to collaborate with partners across operational, academic, and city networks in order to address the risks of climate change and their anticipated impacts on the campus and the community. The Climate Resiliency Committee, led by MITOS, the Office of Emergency Management, and the Department of Facilities, made significant progress in FY2018 in assessing risks such as flooding, extreme precipitation, heat events, and rising sea levels. The committee laid the groundwork for a second phase of the MIT Flood Vulnerability Study—conducted in partnership with researchers from the Joint Program on the Science and Policy of Global Change—and completed a climate stress test of vulnerable utility, building, site, and community systems.

Layers of Resilience



MITOS views the MIT campus as four integrated layers of resilience.

Throughout the year, MITOS teamed up with partners such as the MIT Priscilla King Gray (PKG) Center and Terrascope, a first-year learning community, to engage students in hands-on climate resiliency learning during their spring break and as part of their courses.

Beyond the campus, MITOS and the Office of Emergency Management engaged with the Cambridge Compact for a Sustainable Future to host a citywide “tabletop” exercise that engaged representatives from Cambridge institutions in identifying collective actions that can jointly mitigate climate risks to research and business continuity. MIT has also partnered with the city of Cambridge in efforts to demonstrate the importance of a university-city model for climate resiliency planning around the region.

MIT's Solar Power Purchase Agreement

In 2018, MIT has been able to account more fully for the impact of the large Summit Farms solar energy purchase announced in 2016. In a unique collaboration, MIT, the Boston Medical Center, and the Post Office Square Redevelopment Corporation united to buy electricity via a power purchase agreement from a new solar power installation. This enabled the construction of Summit Farms—a 650-acre, 60-megawatt solar farm in North Carolina. The emissions-free power it generates every year represents an annual abatement of carbon dioxide emissions equivalent to removing more than 25,000 cars from the road.

Boston mayor Martin Walsh recently announced that his city will undertake a similar but much larger effort to purchase solar energy in conjunction with cities across the United States including Chicago, Houston, Los Angeles, Orlando, and Portland, OR. At the time of the announcement, Walsh called upon more cities to join in this collective renewable energy initiative. In describing the agreement, Boston officials said it is modeled on MIT's effort.

MIT can now evaluate the real-world impacts of our project by accessing real-time data on energy, emissions avoidance, and financial performance. These findings will influence our thinking going forward. We are considering questions such as the following: How can MIT continue to amplify its efforts? How can we shape our energy impact in the world? and What is the best way to pursue our interest in collectively transforming the energy market? We are continuously broadening our clean energy knowledge base, from multidimensional carbon-accounting frameworks to the exploration of new technologies.

Flexible Mobility and Parking Demand Reduction

The Institute launched Access MIT in fall 2016 with the initial goal of reducing parking demand on campus by 10% in two years through new commuting incentives and a shift for employees from annual to daily parking fees. In FY2018, MIT reported on its progress toward meeting this goal, backed by research and analyses conducted by the MIT Transit Lab.

The Transit Lab examined a variety of metrics based on parking activity on campus between September 2016 and September 2017—the first full year of Access MIT. The researchers found that employee parking transactions had decreased by 8% relative to the previous year and that there was a net reduction in parking frequency of 9%, down to an average of just 1.2 days per week among all employees. Additionally, estimated peak lot utilization dropped by 3% in gated lots. The research also showed that the number of employees using MBTA bus or subway services on a regular basis (at least two workdays per week) increased by 24%.

Efforts in FY2018 also focused on ensuring that more parking lots at MIT can shift to a daily parking fee system in the future rather than requiring annual permits. Daily parking provides MIT commuters with more flexibility to choose how they commute throughout the week.

Managing Materials Sustainably

MITOS has led the development of a data-driven materials flow analysis of campus procurement and waste generation through partnerships with the Office of Procurement and Sourcing and Office of Recycling and Materials Management along with an Institute for Data, Systems, and Society doctoral dissertation.

Together, MITOS and the Office of Procurement and Sourcing made MIT a member of the Sustainable Purchasing Leadership Council, a nonprofit organization with 180 member institutions representing \$300 billion in collective spending, in order to bring best-in-class practices into the design and implementation of a sustainable purchasing program for the Institute.

In addition to creating the Material Matters dashboard MITOS completed audits of five facilities across campus to better understand the composition of waste collection from dorms, dining halls, offices, and classrooms. Data on both campus volumes and waste behaviors help the Institute understand effects from MIT's material flows and help prioritize the waste reduction strategies that can have the largest impact.



MITOS staff and fellows work with Simmons Hall dining staff to conduct a waste audit.

Sustainability and the MIT Food System

In October 2017, with the support of the Office of the Executive Vice President and Treasurer (EVPT) and the Division of Student Life (DSL), MITOS launched a working group to explore the cultural, administrative, and environmental dimensions of the MIT food system and to recommend strategies for integrating sustainability. The group comprised representatives from offices across campus, including Anthropology, Dining, Capital Construction, the MIT Sandbox, and the Media Lab. The working group is preparing its final set of recommendations, which will focus on issues such as building community and promoting mindful eating through design of food spaces, procurement of sustainable food, and reduction of food waste.

During spring 2018, MITOS participated in a committee comprised of students, faculty heads of house, and DSL staff whose goal was to recommend a contractor to manage house dining, retail dining, and catering operations at MIT. Ultimately, Bon Appétit and Restaurant Associates were selected to take on the newly expanded contract. Sustainability criteria were a key component of the selection process, and MITOS will continue to work with the vendors under the new contract terms to meet sustainability goals.

Building the Leadership and Capacity of the MIT Community

The MITOS strategy seeks to build the leadership and internal capacity of the campus community to solve complex problems and meet the Institute's sustainability objectives.

Pathway to Sustainability Leadership

In October 2017, the Campus Sustainability Task Force published [Pathway to Sustainability Leadership by MIT: Incubation, Transformation, and Mobilization](#)—a report outlining a vision and plan of action for campus sustainability at MIT. Following a three-month open comment period, the final version of the report was endorsed and distributed to the MIT community.

The document outlines the five elements of a pathway by which MIT will formalize and build upon current efforts to address the challenges posed by sustainability and become a leader in this crucial arena. *Pathway to Sustainability Leadership* calls on MIT to become:

- An **exemplar** that incorporates sustainability considerations into campus infrastructure, operations, student life, and daily decisions
- A **model** of organizational transformation for sustainability leadership

- A **generator** of meaningful new sustainability ideas and research, building on our history and current capacity for contributing solutions toward vital global needs and priorities
- An **innovator** of deep educational experiences for the diverse communities on campus and beyond
- A **thoughtful partner** to the local and global communities in which we operate, a clearinghouse of good ideas, and a mobilizer of actors who can implement sustainability solutions

MIT now seeks to leverage this vision and act boldly to advance sustainability leadership and become an organizational standard bearer for a sustainable future. The Campus Sustainability Task Force invited the MIT community to attend a campus-wide implementation design forum in June 2018 that brought together more than 100 people. The implementation plan will be released in fall 2018.

Sustainability Connect

[Sustainability Connect](#), organized by MITOS annually, provides an opportunity for MIT community members working on sustainability issues across the campus to come together around a cross-cutting theme, celebrate accomplishments, and engage in collective brainstorming. The event furthers the office’s mission to transform MIT into a powerful model that generates new ways of responding to the challenges of a changing planet, starting by using our own campus as a test bed.

In May 2018, more than 80 faculty, staff, and students convened for the fourth annual Sustainability Connect to discuss the year’s theme: “Imagine. Incubate. Impact.” The event opened with a keynote from Joi Ito, director of the MIT Media Lab, and concluded with three workshops designed to gather input on campus-wide discussions of water management, food and sustainability, and the implementation of *Pathway to Sustainability Leadership*.



MITOS project manager Brian Goldberg moderates a panel at Sustainability Connect with Christina Lo (Strategic Sourcing and Contracts), Kate Trimble (PKG Center), and Amanda Graham (Environmental Solutions Initiative). Source: Ken Richardson.

Learning About Sustainability Over Lunch

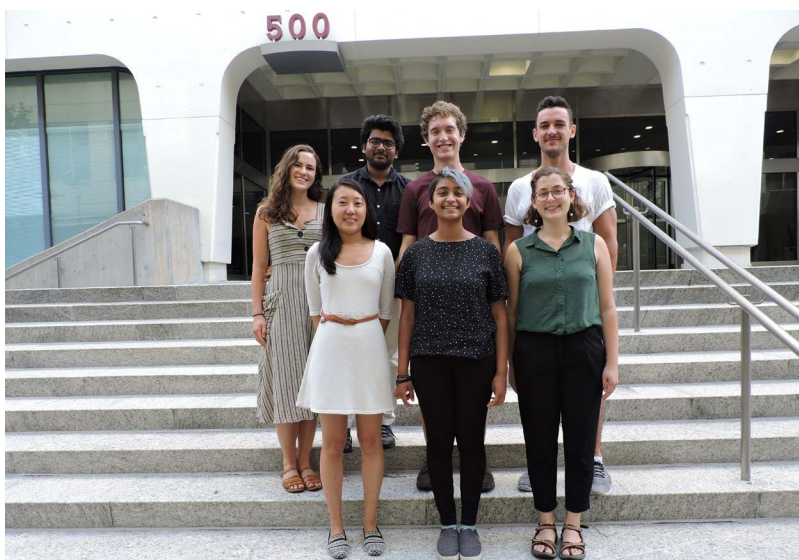
Over the course of 2017–2018, MITOS designed and hosted eight Sustainability Lunch and Learn sessions as a means of building community, sharing knowledge, and trading ideas among MIT administrative partners. Topics included campus energy data visualization, the MIT stormwater plan, sustainable materials management, high-performance building design, and the Sustainability Data Pool. Attendance at these sessions ranged from 60 to 75 people.

Working Green Committee

MITOS's senior administrative assistant co-chairs the MIT Working Green Committee (WGC), a subcommittee of the Working Group on Support Staff Issues. Efforts include identifying and addressing gaps in staff understanding about recycling as well as gaps in recycling resources and creating ways to increase recycling at MIT. This year WGC worked with the Office of Sustainability to host a sustainable purchasing practices discussion with MIT's Staples representatives. About 20 staff attended during Independent Activities Period (IAP) to learn about sustainable options and alternatives to purchasing office supplies for their departments, labs, and centers. WGC also hosted a lunchtime field trip to the MIT furniture warehouse and Furniture Exchange to educate support staff regarding furniture reuse opportunities on campus and ways to interact with the MIT Property Office.

Sustainability Fellowship Program for Students

MITOS administers a student fellowship program during the academic year and the summer term in which students develop meaningful work to advance a sustainable campus at MIT and to build their professional experience in institutional transformation. In academic year 2017, 16 undergraduate and graduate students from a range of MIT departments held positions in the office such as analytics and visualization fellow, sustainable procurement fellow, and communications, design, and digital strategy fellow. During the summer, MITOS opened its fellowship program to students at peer institutions to encourage cross pollination of student ideas and skills.



MITOS student fellows work full time during the summer on projects ranging from sustainable procurement to urban gardening.

Transforming the Campus into a Living Laboratory and Test Bed

A living laboratory exemplifies learning through practice—a tenet of MIT—by opening the doors of the campus to students and faculty to explore, experiment, and develop solutions in a real-world facility. MITOS supports living lab projects that bring staff, faculty, and students together around sustainability issues ranging from addressing carbon neutrality at the campus level to evaluating the benefits of recycling laboratory gloves.

Solving for Carbon Neutrality at MIT

MIT is working toward developing solutions to reduce its campus emissions by at least 32% by 2030 and aspires to achieve carbon neutrality as soon as possible. To tackle the carbon neutrality challenge in true MIT fashion, Director of Sustainability Julie Newman and Professor of Mechanical Engineering Tim Gutowski teamed up to offer a new class in spring 2018: 11.S938/2.S999 Solving for Carbon Neutrality at MIT. Their approach to the class included five major themes of the carbon conversation: technical services, buildings, outside services, policy and behavior, and accounting. Classes included a host of guest speakers from different facets of the action plan and a final project asking students to propose their own plan to reach carbon neutrality by 2080 at MIT.

Sustainability Incubator Fund

Thanks to a generous donor interested in leveraging the campus as a test bed, the first-of-its-kind [Campus Sustainability Incubator Fund](#) was established at MIT with the oversight of a faculty committee representing the five schools. The fund is designed to support groundbreaking research, prototyping, and applications that seek to solve our most pressing global challenges at the community level. Projects at this scale are designed to demonstrate modularity and connectivity as a manner by which to scale up.

In year one, three research projects were funded that cut across issues of energy, water, material life cycles, and building design and construction. At the Sustainability Connect conference in May 2018, updates on each project were provided by the award recipients: Jeremy Gregory, executive director of the Concrete Sustainability Hub; Randa Ghattas, Campus Construction sustainability project manager; and Kripa Varanasi, associate professor of mechanical engineering.

Course Support

MITOS continues to provide course support for instructors across academic and research units. Through support of experiential learning, students have the opportunity to grapple with real-world situations on the MIT campus. In FY2018, MITOS engagement included collaborations with the Terrascope first-year learning community, the 12.000 Solving Complex Problems course, and a graduate-level course on stormwater, trees, and sustainability. In each course, MITOS staff managed and supported interactions with the campus.

In the case of Terrascope, students applied their observations and reflections to create resiliency plans for the MIT campus and communities in Bangladesh as a part of course requirements. Using the MIT campus as a test bed, students were given access to emerging research, targeted flood mapping data, and several dozen operational experts, sustainability practitioners, campus planners, landscape architects, and external partners from the city of Cambridge.



Jennine Talbot, senior planner in Campus Construction, led a utility tour for Terrascope students that included stops within the underground tunnels on the MIT campus.

Campus Engagement

During AY2017, MITOS collaborated with a number of researchers, postdocs, scientists, operational experts, students, staff, and faculty in support of the mission to engage the community with campus-based research and leverage the campus as a living lab for sustainability. Highlights included the following:

- A collaboration with IS&T, the Recycling and Materials Management Office, and the Graduate Student Council's Sustainability Subcommittee to develop Responsible Waste and Disposal Practices, a new online training module for students and staff.
- A partnership with the MIT Energy Initiative in which an augmented reality software platform was used to engage incoming freshmen in making a location-based mobile game that takes place in the real world. The game introduced 36 incoming students, resident advisors, and volunteers to dynamic hands-on research that focuses on the campus as a test bed.
- Active engagement with the PKG Center, including small-group discussions with operational experts and a series of educational campus tours designed to introduce students to emerging frameworks for climate resiliency at MIT and expose them to career opportunities in sustainability-related fields.
- The second annual Sustainability LAB-O-RAMA, a gathering of academic and operational partners designed to provide a place to tell the stories of living lab research, to show recent findings and technologies, and to make connections for existing or new work. This year's event included the work of 21 research teams exploring the MIT campus as a test bed for innovation.

Forging Collaborative Partnerships

MITOS works strategically to build collaborative partnerships within and outside of MIT as a means of harnessing the collective intelligence of communities to solve shared problems. Below are a number of accomplishments that demonstrate the office's collaborative campus, city, and global partnerships.

Campus Connections

MIT is actively engaged in the Ivy Plus Sustainability Consortium. In this collaborative effort, sustainability staff from 14 schools advance the core research and teaching missions of the member institutions, share best practices, and advance the state of the art in campus sustainability management. In FY2018, the Consortium initiated a new project working directly with the executive vice presidents of peer institutions. MITOS staff co-chaired the launch of this Listening Post initiative and actively participates in the Ivy Plus data-sharing work group.

In October 2017, MITOS project managers presented two sessions at the annual conference of the Association for the Advancement of Sustainability in Higher Education in San Antonio, TX: "Nudging Commuters, Big Data and Bold Partnerships: A Research-Based Approach to Impacting Commuter Mode Choice at MIT" and "Riverbank Climate Collaboration: How MIT and BU Are Preparing for Climate Change from Both Sides of the River." At this conference, over 2,000 participants from campuses across North America exchanged effective models, policies, research, and transformative actions advancing sustainability in higher education institutions and surrounding communities.

City Partnerships

MITOS staff serve on a number of Cambridge and Boston committees as a means of aligning strategies, exchanging ideas, and creating greater impact with our city partners. Committees and initiatives with active MITOS participation include the following:

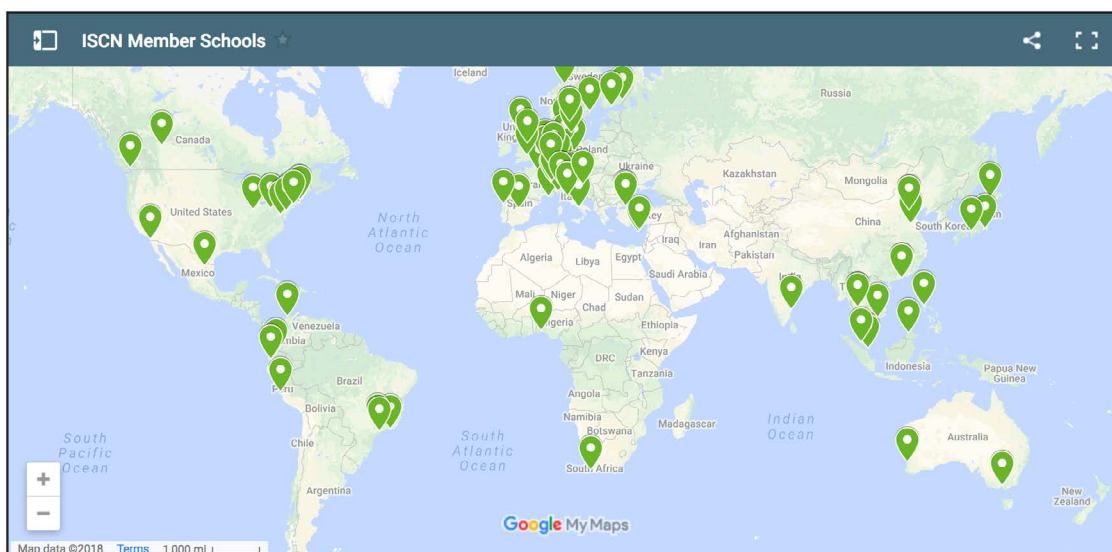
- Cambridge Campus Compact for a Sustainable Future
- Cambridge Climate Protection Action Committee
- Kendall Square Ecodistrict
- Cambridge Recycling Advisory Committee
- Boston Green Ribbon Commission
- Envision Cambridge

Notably, MITOS continued to help lead the collaborative Cambridge Compact for a Sustainable Future with a position on the group's board of directors and executive committee, actively working with the MIT Office of Government and Community Relations to strengthen the partnership and implement the compact's strategic plan. This past year, the compact organized several events and activities to share ideas and best practices, identify opportunities for collaboration on renewable energy purchase and storage, and create one of the first city-academic-industry collaborations to assess net zero lab feasibility.

MITOS also continued to support EVPT Israel Ruiz as a member of the Boston Green Ribbon Commission. MITOS project manager Steven Lanou participated in the commission's Higher Education Working Group to bring to bear potential climate solutions from the area's colleges and universities that could be applied to advance Boston's climate action plan. Priority areas in FY2018 included accelerating change through thought leadership and transparency, convening the community on key issues, and informing action with science and research.

Global Networks

To ensure that the office's work stays connected to global challenges, MITOS prioritizes its involvement with international networks of peer institutions, including the International Sustainable Campus Network (ISCN), of which MITOS director Julie Newman is a founding member. ISCN provides a global forum to support leading colleges, universities, and corporate campuses in the exchange of information, ideas, and best practices for achieving sustainable campus operations and integrating sustainability into research and teaching. MIT is now represented on ISCN's advisory committee and holds a chair position on Working Group 3: Integration of Teaching, Research and Facilities, which focuses on seeking common solutions for living labs at the global level. Throughout the year, MITOS hosts visitors from universities around the world interested in our sustainability efforts and vision.



The International Sustainable Campus Network is a nonprofit association of over 80 leading colleges and universities representing more than 30 countries, working together to holistically integrate sustainability into campus operations, research, and teaching. Source: ISCN.

Conclusion

At the Office of Sustainability, we recognize that the time has come to explore how to scale and accelerate progress in a manner that:

- Enables measured outcomes and impacts
- Demonstrates a robust model of campus- and urban-based research
- Informs our process of organizational transformation for sustainability and scalable solutions for sustainable development

Moreover, MIT is now positioned to address sustainability at all levels, from individual to campus, city, and globe while tapping into some of our most global thinkers to inform our analyses and our solutions. We have consistently found great excitement from our unique framing to solve for sustainability issues across scales.

In FY2019, MITOS will forge ahead to ensure continued success with the work seeded in FY2018 and previous years while informing a new vision. The office will continue to seek collective engagement and action in a number of priority areas, such as:

- Climate change: forging ahead with strategies for mitigation, adaptation, and resiliency
- Materials management: measuring, analyzing, and eventually managing the impact of the Institute's purchasing and waste systems in a manner that takes into consideration the full life-cycle costs and effects of materials and products
- Water: seeking a comprehensive understanding of our water use patterns in an effort to reduce overall demand and consumption across the campus
- Sustainable transportation: broadening and deepening MIT's commitment to and robust participation in Access MIT
- Data collection and analysis: launching a centralized sustainability data hub to inform and learn from our decision-making processes and institutional impacts
- Food and culture: exploring ways to connect food choices to community health, sustainable agriculture, and climate change
- Sustainable design and construction: continuing to ensure that we have access to the knowledge and processes needed to enable our campus growth while minimizing our impacts
- Living lab: leveraging the campus as a test bed for research, innovation, and teaching that lead to an improved understanding of the systems at hand and deeply informed decision making

Julie Newman
Director