

MIT Environmental Solutions Initiative

The mission of the [Environmental Solutions Initiative](#) (ESI) is to advance science, engineering, policy, design, the humanities, and the arts toward a people-centric and planet-positive future.

This report bridges the final months of Professor Susan Solomon's role as founding director and the first months of the new leadership team. Between July and October 2015, Solomon managed the inaugural ESI seed grants and the development of the undergraduate environment and sustainability minor. In addition, she led the process of selecting Amanda Graham as the new executive director and appointing Professor John Fernández as the second director of ESI (announced October 21, 2015). These two appointments mark the commencement of a period of expansion and acceleration of ESI's mission.

ESI is steadily building an active programmatic presence on the MIT campus. Fernández and Graham began their partnership in expanding ESI's mission with a broad and inclusive listening and learning tour encompassing all five Schools, many departments, several research labs and groups, and dozens of individuals, including deans, department heads, undergraduate and graduate students, faculty, staff, and others. After more than 90 meetings, this effort culminated in an ESI agenda. During the first half of 2016, ESI co-sponsored an Independent Activities Period Hackathon for the Climate, convened a campus-wide Earth Day celebration, incorporated the Martin Family Society of Fellows for Sustainability program, launched an ESI UROP (Undergraduate Research Opportunities Program), and convened a group of General Institute Requirements (GIR) instructors to seed their classes with topics dealing with the environment. The latter initiative was supported by an award from the Alumni Class Funds. ESI leadership also conducted an online survey of MIT undergraduates that captured 20% of the student body and found strong and broad interest in environmental studies and careers.

ESI leadership coordinated emerging activities with the Abdul Latif Jameel World Water and Food Security Lab (J-WAFS), the MIT Energy Initiative, the MIT Innovation Initiative, the Office of Digital Learning, the MIT Integrated Learning Initiative, the Office of Sustainability, the MIT Sloan Sustainability Initiative, the Joint Program on the Science and Policy of Global Change, Climate CoLab, the MIT International Policy Lab, and several departments. These include Civil and Environmental Engineering; Earth, Atmospheric, and Planetary Sciences (EAPS); and Urban Studies and Planning. Finally, ESI has been intimately engaged with the Office of Resource Development in attracting the substantial resources required to support the expansion of the initiative, and in particular with the launch of the MIT Campaign for a Better World.

Research

The ESI agenda articulates three domains for focusing research:

- Climate Science and Earth Systems
- Cities and Infrastructure
- Sustainable Society and Economy

ESI research program priorities include expanding the seed research program to provide funding for several additional research grants on an annual basis. The target is at least 10 new seed grants per year. An important element of the research program is to enlist interest from faculty to sponsor UROP students in their groups and labs, as well as to develop ESI-hosted UROPs. In order to achieve this, ESI has begun sponsoring UROP positions. We anticipate an annual cohort of 10–15 ESI UROP students by the beginning of the 2019 academic year.

Ten doctoral students from eight departments were selected as Martin Fellows for Sustainability for 2016–2017. Following the untimely death of Professor Judy Layzer in 2015, coordination of the Martin Society was assumed by ESI. The Office of the Dean for Graduate Education took on financial administration for fellowship appointments. Faculty oversight for the Martin Society rests with the governance committee, which includes Professors Jennifer Light (Science, Technology, and Society, and Urban Studies and Planning), Leslie Norford (Architecture), J. Taylor Perron (Earth, Atmospheric, and Planetary Sciences), John Sterman (Sloan School of Management), and Heidi Nepf (Civil and Environmental Engineering). ESI director John Fernández is an *ex officio* member of the governance committee. Professor Perron was the featured speaker at the committee's annual induction dinner in October.

Education

The main educational priorities continue to be the development of the environment and sustainability minor and the launch of an effort to seed current General Institute Requirements subjects with topics related to the environment.

ESI launched a series of community meetings in May to engage diverse faculty in shaping the format and content of the environment and sustainability minor. Communication with department heads—especially those in Urban Studies and Planning, Civil and Environmental Engineering, and Earth, Atmospheric, and Planetary Sciences—is ongoing. The general sequence of the minor is taking on a “2+3” model: two required classes followed by three electives. With the generous support of the Kabcenell Family Foundation, ESI issued four curriculum development grants for new and adapted classes in environmental justice, history, and health, and complex environmental issues.

Initial planning for the development of environmental content to be inserted into a set of GIRs is about to begin. AY2017 will see the first phase of this project, funded jointly through ESI and an award from the MIT Alumni Class Funds. This element of ESI's educational program holds the potential to bring topics of the environment to hundreds of undergraduates in a timely and cost-effective manner. While seed funding for the initial phase of the program is in hand, substantial funding will soon be required to expand the program to include as many GIRs as possible and maintain the constant development of material for years to come.

Convening

ESI convened diverse constituencies during its first Hackathon for Climate (co-organized with the MIT Climate CoLab) and at its first ESI Earth Day celebration in April. Recently,

ESI leadership formulated (and will be managing) a Climate CoLab contest for MIT SOLVE on how to remove carbon dioxide from the atmosphere. In coordination with the Office of the Vice President for Research, ESI is leading the development of a digital portal on the environment whose purpose is to connect the MIT community with alumni and communities across the globe in order to make progress on the most challenging environmental issues.

Resource Development

The focus of ESI's efforts to date has been to lay the groundwork for developing relationships with foundations and individuals, including MIT alumni. These efforts—especially since fall 2015 when both Fernández and Graham assumed their roles—have been buoyed by the launch of the MIT Campaign for a Better World. A major priority area for resource development in terms of the environment is the health of the planet. ESI has been instrumental in defining this priority area by highlighting recent and ongoing research work, educational initiatives, and events. A key product of this engagement with resource development was an ESI white paper used to broadcast MIT's broad agenda on the environment to a wide and diverse audience.

Activities

In February, ESI co-hosted a week-long visit by János Pásztor, the United Nations Assistant Secretary General for Climate Change.

Amanda Graham was appointed co-chair of the Academic Environment Working Group of the Mind+Hand+Heart Initiative in March. Also in March, ESI hired senior program assistant Hannah Loomis and moved into a suite of offices in E70 (One Broadway).

ESI visiting scholar Deborah Cramer's book *The Narrow Edge: A Tiny Bird, an Ancient Crab, and an Epic Journey* won the 2016 Reed Environmental Writing Award.

Professor Fernández published an article on ESI in the MIT Faculty Newsletter (May/June issue) and was profiled in the MIT Energy Initiative magazine *Energy Futures* (June). Fernández presented at the EAPS "MIT on Climate = Science + Action" symposium, at the campus-wide symposium "Beyond 2016: MIT's Frontiers of the Future," and at MIT's "Sustainability-oriented Innovation" summit. In May, he joined MIT Energy Initiative and J-WAFS directors for a session during MIT's 100 Years in Cambridge Celebration, moderated a panel at the Office of Sustainability's "Sustainability Connect" symposium, and moderated a Tech Day panel on the environment. Fernández also chaired an ad hoc subcommittee of the Faculty Policy Committee studying the emergence of sub-term subjects as part of the MIT undergraduate and graduate curricula. He is a member of the Campus Sustainability Task Force and serves on the Institute Planning Committee.

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