MIT Environmental Solutions Initiative

Introduction

Around the globe, regions, nations, states, and both urban and rural localities confront an array of environmental challenges: climate change; scarcity of potable water and other vital resources; food production and distribution; and chemical and biological inputs to the terrestrial, aquatic, oceanic, and atmospheric environment. Moreover, it is increasingly apparent that social systems are inextricably interwoven with environmental systems. To find solutions, the world needs researchers and institutions capable of tackling these trenchant problems with an integrated perspective. The establishment of an MIT initiative on the environment was announced in April, 2014, after almost a decade of discussion and planning. In its nascent year, a wide range of actions was needed to begin operations. Key needs were to establish a name and a welcoming initial focus that covered the distinctive characteristics of MIT and provided a point of entry for all of the diverse environmental activities on campus. The initial focus on advancing solutions to environmental challenges through interdisciplinary projects spanning not only science and engineering, but all corners of MIT, including policy, management, humanities, and social science, has been accepted across the MIT community. It is embodied in the newly established name, the MIT Environmental Solutions Initiative (MIT-ESI). An advisory committee for the initiative has been established, composed of distinguished faculty spanning all schools of the Institute, and an education committee including faculty, staff, and students has also been set up, again spanning all the schools of the Institute. Founding Director Susan Solomon has also served on the committee to advise the president on the Campus Conversation on Climate Change.

Seed Grants

The initial round of seed grants was highly successful. Nine projects were selected from among 59 proposals received by a panel review of the advisory committee. The nine proposals span four topic areas: sustainability, metals and mining, healthy cities, and climate risk and mitigation. They include, for example, research projects targeting improvements in air quality through advanced methods of data mining using high-resolution sensors on traffic flows and pollutants, approaches to advancing sustainability by management of common-pool resources, and a project to bring together MIT researchers and key stakeholders of the metal and minerals sector to propose innovative solutions that will shape a sustainable future for those materials.

Education

Student interest in environment and sustainability at MIT is long-standing—and growing. While MIT has a broad range of courses on topics relating to environment and sustainability, there is a critical need for expansion, adaptation, and integration in order to better prepare today's students to help confront the problems of today and to find solutions for tomorrow. The education committee of MIT-ESI is dedicated to

formalizing new pathways for integrative learning through the creation of a new minor in Environment and Sustainability, which will consist of the following elements:

- **Earth System and Climate Science** involves ecology and earth science, providing students with knowledge and understanding of the physical, chemical, and biological processes that are linked to our Earth and climate.
- **Human-Environment Interactions** reinforces the necessity to understand the position of humankind within our ecosystems and how the environment in turn shapes society. It also emphasizes anthropogenic transformation of the environment, social relationships, and the interface of nature and built environment.
- **Environmental Governance** imparts knowledge of and expertise in the laws, politics, policies, and strategies of environmental management, including the tools we have to address environmental concerns.
- **Engineering for Sustainability** addresses the critical importance of principles of sustainability and industrial ecology in engineering teaching and practice, as well as forward-looking analysis of emerging technologies.

A generous donor has agreed to provide an initial gift of $1 million towards the establishment of this new minor and work has begun to put together an educational program that will include the development of new courses as well as the adaptation of existing ones.

Susan Solomon
Founding Director
Ellen Swallow Richards Professor of Atmospheric Chemistry & Climate Science