

Terrascope

Terrascope, the newest of MIT's freshman learning communities, was established in academic year 2003 as part of the Earth System Initiative (<http://web.mit.edu/esi/>). The guiding philosophy of Terrascope is that students entering MIT should gain an appreciation of the relationships among science and engineering concepts and how interdisciplinary collaboration can be used to tackle pressing environmental problems. The earth system provides a particularly valuable context for interdisciplinary education; its evolution depends on the interactions among chemical, physical, and biological processes, and such interactions must be understood well if we are to design effective strategies for ensuring the future of earth's environment. Terrascope invites MIT freshmen to explore earth system processes and conceptually engineer solutions to complex environmental problems.

Beginning its third year next fall, the Terrascope curriculum continues to evolve. Currently, students enroll in a fall-semester subject (12.000), a spring semester subject (1.016), an optional Independent Activities Period (IAP) workshop (1.991), a one-week field experience over spring break, and a variety of community-building activities. Examples of these activities are luncheons, dinners, and special presentations. These get-togethers also serve the purpose of exposing students to current research conducted in earth system science and engineering at MIT. Faculty members in Courses 1 and 12, as well as Terrascope staff, serve as academic advisors for Terrascope students, resulting in the development of strong mentoring relationships. Six Terrascope students have continued their interest in earth systems research by undertaking Undergraduate Research Opportunity projects in summer.

Program Highlights

A total of 28 freshmen completed the Terrascope program last year. In addition, 17 non-Terrascope students also received credit for 12.000 Solving Complex Problems. A nine-unit subject designed to engage first-year students in project-based learning, Solving Complex Problems (sometimes referred to as the "Mission" subject) has a different theme each year keyed to the graduation year of the participants. Mission 2007 (for the Class of 2007) was to design a strategy to explore for and extract petroleum resources from the fragile Arctic National Wildlife Refuge (ANWR) in the most environmentally responsible way. As a second part of the problem, they were then asked to conduct a cost-benefit analysis to determine if the potential value of the petroleum would be worth the potential damage to the environment associated with even this most sensitive approach to resource extraction (<http://web.mit.edu/12.000/www/m2007/>). On December 4, 2003, the students formally presented their proposed solution to the problem before a panel of experts, and they amplified their work in a content-rich website. Links to the site and a video archive can be found at <http://web.mit.edu/12.000/www/m2007/finalpresentation/>.

The theme developed during the fall semester in 12.000 is carried through to both the IAP and spring components of Terrascope. During IAP, nine Terrascope students participated in a weeklong workshop (three units of academic credit) on the design and

construction of museum exhibits about Alaska as preparation for the spring semester subject (1.016). Students visited local museums and participated in seminar-style discussions with the museums' exhibit developers, designers, and educators in order to learn about the design process and to develop their own understanding of what makes an exhibit effective.

In the 6-unit spring semester subject, Introduction to Earth System Engineering and Science (1.016), students were asked to develop museum exhibits to communicate information about the Arctic National Wildlife Refuge and, more generally, the Alaskan experience to a general audience (<http://web.mit.edu/1.016/www/>). The subject included instruction and practice in designing, building prototypes, and constructing working examples of interactive exhibits. All students were required to write about their experiences in weekly journals. The semester culminated in a formal opening of their exhibits on May 11. Visitors from MIT, as well as professionals from museums in the Boston area, viewed their work.

During spring break, 35 students, including freshmen and upper-class teaching fellows, visited Alaska as a way to complement their Terrascope experience with firsthand explorations of the region. Their week, centered mostly in Fairbanks, included morning lectures by experts from around the state representing a variety of points of view on ANWR, followed by afternoon activities designed to acquaint them with the Alaskan environment and culture. Their trip included an appearance before the Fairbanks Chamber of Commerce in which they were able to discuss their project, evening visits with local families, and a trip to Denali National Park.

New Developments

In June 2004, we received word that the Henry Luce Foundation had awarded the Terrascope program a four-year, approximately \$440,000 grant to continue the spring break Terrascope field experience through 2008. We are delighted to have this kind of financial backing for our efforts to expand the definition of the MIT classroom, and plans are already under way for next-year's trip to the Galapagos Islands in Ecuador.

This past spring, we began discussions with Professor Henry Jenkins of Comparative Media Studies to create a new optional communications-intensive subject within Terrascope, operationally called "Terradio," in which the students would produce a series of radio programs on the environmental theme for Terrascope each year. Although this subject is still very much a work in progress, we hope to offer it for the first time in the spring semester of 2005.

Staff and Enrollment

The program's directors are professors Penny Chisholm (Civil and Environmental Engineering and Biology) and Kip Hodges (Earth, Atmospheric, and Planetary Sciences). The subjects were taught by professors Kip Hodges and Rafael Bras and by Dr. Ari Epstein. Debra Aczel is the program administrator, and Ruth Weinrib is the administrative assistant.

Of the students in AY2004, 20 were female and 8 were male. Their distribution by declared major was as follows:

School of Engineering	
Course 1	2 students
Course 1-E	5 students
Course 2	2 students
Course 3	2 students
Course 6.2	1 student
Course 10	1 student
Course 16.1	2 students
 School of Humanities	
Course 21-H	1 student
 School of Science	
Course 5	1 student
Course 7	2 students
Course 8-B	1 student
Course 9	1 student
Course 12	5 students
 Undeclared	 2 students

Kip Hodges, Codirector and Professor of Earth, Atmospheric, and Planetary Sciences
Penny Chisholm, Codirector and Professor of Civil and Environmental Engineering and Biology

More information about Terrascope can be found on the web at <http://web.mit.edu/terrascope/>.