

Experimental Study Group

The Experimental Study Group (ESG), now in its 36th year, continues to offer undergraduates at MIT innovative opportunities in teaching and learning. In keeping with our original mission, ESG provides first-year students at MIT with personalized instruction in the core subjects within a close-knit and informal community environment. This includes flexibility in pace and scheduling and small classes where students can easily ask questions and get to know fellow students and instructors. Over the years, students have consistently said that ESG's small group learning and community atmosphere were among the most rewarding aspects of their MIT education. We are also able to offer flexibility and individualized attention to students with unusual educational needs, such as international students and students with homeschooling experience.

Over the past 13 years, ESG has served as a center for educational innovation in the undergraduate program by offering a series of hands-on, interactive seminars in a variety of subjects that are not regularly offered elsewhere at MIT. These seminars provide all MIT undergraduates with the opportunity to participate in the ESG style of learning (small, interactive classes). Non-ESG students who take these seminars frequently say that these seminars are the only opportunity they have had since their freshman year to participate in a small interpersonal class with a hands-on focus. We are therefore strongly committed to continuing these seminars and promoting their growth by working closely with various parts of MIT, outside sources, and our own alumni to secure funding for them. This year we were able to run 13 seminars through a combination of funds from the dean of the School of Science and from our own alumni.

ESG also offers approximately 30 undergraduates each year the opportunity to assist staff in teaching the core subjects. All student instructors receive midterm and end-of-term evaluations from freshmen and meet regularly with staff members for supervision. New student instructors participate in the weekly teaching seminar (SP.231) run by senior ESG staff. Experienced student instructors who have demonstrated excellent teaching skills are able to develop their own pass/fail seminars under faculty supervision or work relatively independently in teaching core subjects.

We are proud of our history of educational experimentation and will be working over the next few years to substantially increase faculty and alumni involvement with ESG and to export successful ESG educational experiments to the regular curriculum and to educational settings outside of MIT.

Student Statistics

A total of 85 freshmen applied to ESG this year, the highest number in our history. Sixty freshmen enrolled for one or more terms in ESG this year, and 25 remain on our wait list. Forty-seven percent of our students were female, 18 percent were underrepresented minorities, and 11 percent were international students (including students coming from countries as diverse as Finland, Ghana, and Zimbabwe). Seventeen upperclassmen took one or two core science or Humanities, Arts, and Social Sciences (HASS) subjects in

ESG. Some 150 upperclassmen participated in our undergraduate seminar program (80 percent of whom had not been in ESG as freshmen). In total, we had over 200 students taking part in ESG-sponsored classes this year.

Staff and Faculty

ESG's administration was headed by Professor Alexander Slocum and included associate directors Dr. Peter Dourmashkin and Dr. Holly Sweet and program coordinator Graham Ramsay. The physics staff was headed by Dr. Dourmashkin and included Toby Ayer '96, David Custer '82, Craig Watkins, and graduate student Susan Brown. The mathematics staff was headed by Dr. Jeremy Orloff and included Dr. John Lewis, Craig Watkins, two ESG alumni (Alicia Hardy '99 and Nirav Shah '01), and three graduate students (Lou DeFrate, Leonide Saad, and Joshua Linn). The chemistry and biology offerings at ESG were headed by Dr. Patricia Christie.

ESG offered four HASS subjects to its students. In the fall of 2004, Mr. Custer taught 21W.730 Expository Writing, and Dr. Lee Perlman taught 24.00 Problems of Philosophy. In the spring of 2005, Dr. Perlman taught Philosophy of Love, and Marc Graham (a graduate student in Mechanical Engineering at MIT) taught SP.2H1 Poetry in Progress, a new HASS subject designed to incorporate principles of design into poetry.

MIT staff were assisted by 35 undergraduates who had been in ESG as freshmen and were interested in continuing to participate in ESG as teaching assistants, graders, and student instructors. These upperclassmen collectively maintained an impressive 4.6 grade point average.

Academic Initiatives

Because of ESG's small size and experimental educational focus, it provides an ideal environment in which staff, faculty, and students can develop new subjects and new approaches to existing subjects. This year we continued expanding the ESG Undergraduate Seminar Series with two undergraduate seminars in the fall of 2004 (SP.246 Current Events and Social Issues and SP.231 ESG Undergraduate Teaching Seminar) and 12 seminars in the spring of 2005. A third of the spring seminars were developed and taught by undergraduate students or ESG alumni under staff and faculty supervision. Three of the seminars included a public exhibition of the students' work in music and visual arts at the end of the term. Exhibition sites included the Wiesner Student Art Gallery, the Baker Lounge, and the ESG commons area.

Six new seminars were taught this year through ESG on topics as diverse as education, political science, music, mathematics, psychology, and religion. Dr. Perlman taught a performance-based seminar on the history of rhythm and blues (SP.241). The students learned about this genre by tracing the history, listening to a wide variety of artists from the 1920s through the 1970s, and, primarily, by trying to replicate the music in performance. Dr. Lewis and Dr. Orloff taught SP.250 Mathematical Problem Solving, in which they encouraged students to consider different ways of approaching solutions to mathematical problems in a hands-on fashion.

For the first time in its history, ESG staff (Dr. Christie) cotaught a seminar, SP.249 Alternative Education, with Wellesley faculty (Professor Kenneth Stevens). The seminar included Wellesley and MIT students and was held for the first half of the term at the MIT campus and the second half of the term at the Wellesley campus. Students and ESG alumni offered seminars in “Religion and Experience” (taught by Claudia Gold '05 and supervised for the first time by an MIT chaplain), “AIDS and Poverty in Africa” (taught by Raja Bobbili '08, a student from Namibia), and “Systems and Decision Making: Run the World for a Day” (taught by ESG alumnus James Rising '04, who is also an instructor at Olin College).

ESG offered a new performance-based HASS subject, SP.2H1 Poetry in Progress, which was taught by graduate student Marc Graham and supervised by Literature Section professor Mary Fuller. The intention of Poetry in Progress was to bring together the skills and structures associated with engineering design with those of aesthetic work and knowledge, along the lines already explored by one instructor in a multimedia textbook now in development (“Journey of the Lost Souls,” M. Graham). The course culminated in a poster exhibit and poetry slam held at the Wiesner Student Art Gallery.

Because of ESG's small size and interest in the synthesis of different subjects, it conducted several experiments with faculty and staff from different disciplines collaborating. In addition to the joint MIT-Wellesley offering mentioned previously (team-taught by a lecturer in chemistry and professor of education at Wellesley), ESG once again offered SP.240 Composing a Life: Exploration of Self through Photography, Art, and Writing in the spring of 2005. SP.240 was team-taught by a professional photographer (Mr. Ramsay) and a licensed psychologist (Dr. Sweet) and focused on exploration of identity through the synthesis of photography, art, and writing exercises. The material generated from the exercises culminated in end-of-term projects for students that were exhibited at the Wiesner Student Art Gallery.

In the fall of 2004, Dr. Dourmashkin and Dr. Orloff initiated a coordinated math and physics offering covering 18.02A and 8.01. The math syllabus was adjusted to introduce topics such as vector analysis earlier in the term to coincide with its immediate application in physics. Other topics in the math syllabus were also presented in coordination with their applications in physics. A set of problems was developed for both math and physics classes that emphasized applying concepts and analytic techniques from both disciplines. This facilitated student recognition of the importance of the transfer of knowledge between disciplines.

We have begun to develop our own textbook series based on new subjects developed and taught at ESG. D'Arbeloff funds are being used to support textbooks in the areas of (1) physics and sports and (2) philosophy and mathematics. The first textbook will be written by Professor Slocum, Noah Riskin (head coach, MIT Men's Gymnastics), and David Gessel (MIT physics alumnus). They are currently working on an 8.01 sports curriculum based on the 8.01 sports seminar taught in the fall of 2004. Problem sets and labs were developed and taught in this seminar with the goal of developing 8.01 Sports into a freshman physics option. The new curriculum will enable students in the fall of

2006 to fulfill their 8.01 requirements with a physics course whose problem sets, labs, and tests use sports as a theme.

“The Birth of Philosophy and Mathematics” by Dr. Perlman is the second textbook funded by the d’Arbeloff grant. It is based on a new HASS-D subject developed by Dr. Perlman over the past few years in ESG. This book presents passages from ancient Greek philosophy and mathematics and investigates the way in which ideas of definition, reason, argument and proof, rationality and irrationality, number, quality and quantity, truth, and even the idea of an idea were shaped by the interplay of philosophic and mathematical inquiry.

Mr. Ramsay and Dr. Sweet are working on a textbook, “From the Inside Out: Exploration of Self through Photography, Art, and Writing,” which is based on the seminar SP.240 offered through ESG for the past two years. The textbook will provide a structured guide for the exploration and expression of identity in a variety of contexts such as history, gender, and family. Using concepts of design as a model, this textbook will include a series of exercises that will integrate photography, writing, and art to create a cohesive narrative of self.

Awards

Several members of the ESG staff won Institute-wide awards, including Dr. Christie for the Graduate Student Council Teaching Award (May 2005) and Mr. Ramsay for Going Above and Beyond: Providing Excellent Client Service (March 2005). Dr. Christie was given the teaching award in part because of the excellent work she has done in developing and teaching an innovative undergraduate seminar, SP.287 Kitchen Chemistry, which she has run for the past five years in a variety of settings, including Random Hall, East Campus, and McCormick residences.

ESG gave its own set of annual cash awards, including the Peter and Sharon Fiekowsky Community Service Award (for outstanding contributions to the ESG community) and the Todd Anderson Excellence in Teaching Award (given to graduating seniors who have demonstrated excellence in teaching at ESG over a sustained period of time). Both Mr. Fiekowsky and Mr. Anderson are graduates of MIT and have established funding for annual ESG prizes. This year Jocelyn Rodal '06 and David Roe '06 were awarded the Fiekowsky Award for community service to ESG. The Anderson Award was given to graduating seniors Sie Hendrata Dharmawan, Finale Doshi, Anna Holt, Heather Jones, Christina Laskowski, and Kevin McComber.

Alumni Involvement

A reunion of East Coast alumni was held over the weekend of October 15–17, 2004, and an annual reunion (alternating between the East and West Coasts) will be held in future years. The ESG Alumni Steering Committee (Ian Eslick '91 [chair], Matthew Wilbert '80, Van Chu '99, Rich Hilliard '76, Peter Fiekowsky '77, and David Henkel-Wallace '86) met four times during the year to give input to the ESG staff about a variety of issues, including the new ESG seminar series, community events, and mentoring of freshmen.

Four ESG alumni (Aubrey Jaffer '04, Alice Leung '93, Alan Millner '70, and Stever Robbins '86) led an Independent Activities Period symposium for MIT undergraduates on "What I Didn't Learn at MIT but Wished I Had," focusing on the importance of entrepreneurship and networking through talks on topics including "A Solar Power Startup Company: Lessons Learned" and "Lunch: The Most Important Half Hour of Your Day."

Future Developments

The HASS Committee approved CI-H status (communication-intensive subject in the humanities, arts, and social sciences) for an innovative new course, SP.2H3 Ancient Philosophy and Mathematics, to be taught at ESG in the fall of 2005. The course was developed by Dr. Perlman over the last five years through a series of seminars funded by ESG. Though a few courses exist around the country on Greek mathematics and many on Greek philosophy, this is perhaps the first course in the country to consider the interaction of the two. We believe this course will create an unusual intellectual foundation for students for further work in mathematics, science, and philosophy.

We are interested in increasing the exposure of MIT students to performance-based subjects in the area of visual arts, music, and writing and will be using funding from our own alumni and the dean of the School of Science to support several seminars next year that will give students the opportunity to create and exhibit their own work.

The ESG Alumni Steering Committee has been active in working with the ESG administration to find ways to use ESG as a place for educational innovation, including sponsoring the ESG undergraduate seminar series, giving undergraduates the opportunity to teach at MIT, team-teaching with instructors from other institutions and from different disciplines, and finding more active ways in which alumni can connect with undergraduate education at MIT.

We are eager to continue to use ESG as a testing ground for experiments in experientially based education within an intergenerational and interdisciplinary setting and look forward to collaborating with MIT alumni, faculty, and staff, as well as instructors at other institutions such as Wellesley, in the area of educational innovation.

Alexander Slocum, Director and Professor of Mechanical Engineering

Peter Dourmashkin, Associate Director and Lecturer in Physics

Holly Sweet, Associate Director and Lecturer

More information about the Experimental Study Group can be found online at <http://web.mit.edu/esg/>.