

## Dean for Undergraduate Education

During the past year, the Office of the Dean for Undergraduate Education (DUE) has seen important progress in a number of areas critical to student life and learning at MIT. The first section of this report contains highlights of efforts in the dean's office. Many more highlights are contained in the sections relevant to the individual offices.

Through the excellent teamwork of the Admissions Office and the Student Financial Services Office, MIT yielded an outstanding group of students to comprise the class of 2010. MIT received national attention when we offered to match federal Pell Grants for all admitted recipients. This plan allowed us to increase the number of lower income students that will be coming to MIT, which strengthens an important tradition.

Through the Office of Academic Services, the Office of Minority Education, and other support offices, we are making important progress in enhancing advising and mentoring for undergraduates. We are collaborating with the Committee on the Undergraduate Program and the Committee on Student Life. For example, all freshmen may choose to continue with their network of advisers when they move on to their departments in the sophomore year.

Many members of DUE are involved in important ways in the activities of the Task Force on the Undergraduate Educational Commons. With the task force continuing to work through the academic year 2005, DUE staff have been deeply involved in supporting the work. The report, expected in fall 2006, will be an important contribution to the national discussion about the value of an education that centers on science and technology.

The DUE Visiting Committee met this spring. While complimentary of the students and the energy of the staff, it was critical of the lack of progress in establishing uniform standards for teaching assistants across MIT, and in minimum requirements for English competency for all teaching assistants. As a result of this input, the Teaching and Learning Lab developed a set of proposals to address these issues without imposing undue burdens on the departments. The proposals, which were twice presented to the dean's group, would require all teaching assistants to attend at least one workshop on how to teach, and to pass a test of written and spoken English.

The DUE leadership team, along with members of the faculty and other strategic partners, has been working intensively for the past six months on a DUE strategic plan. The team has identified several key issues on which DUE should focus its efforts, including: the changing demographics and interests of MIT students, the increasing pressure from accelerating technology, the increasing competition with other schools that also emphasize science and technology, and the ongoing work of the MIT Task Force on the Undergraduate Commons.

As part of this process, DUE has developed new mission and vision statements that anchor the DUE work and provide a collective identity for the organization.

### ***Mission Statement***

We enroll, educate, and inspire some of the world's brightest students with a passion for learning and sense of self so they become the next generation of creative thinkers and leaders in a global society.

We lead by promoting the excellence of a science and technology-centric education, ensuring access and opportunity without regard to financial resources, upholding rigorous academic standards, advancing innovation, developing mentoring relationships, strengthening respect for diversity, and serving as a catalyst for learning, exploration, and discovery.

### ***Vision***

We aspire to be the best in the world in shaping strategic partnerships and creating synergies to integrate learning and life at a research university.

### ***Strategic Themes***

In working on the strategic plan, the team identified six strategic themes that will guide DUE through the next several years.

*Theme A: Catalyze the undergraduate commons*

*Theme leader: Margaret S. Enders, Senior Associate Dean*

The Task Force on the Undergraduate Educational Commons will report its results to the president and be reviewed by the faculty in the fall. The implementation of the task force's recommendations will rely on the work of several faculty committees and key DUE offices. Theme A will focus on the task force's recommendations for the General Institute Requirements.

*Theme B: Champion information technology for the provision of information to the students and faculty*

*Theme leader: Mary Callahan, Registrar*

This theme helps DUE focus on developing our information technology in order to ensure efficient and timely delivery of information services. In addition to the hardware challenges, work on this theme includes developing a vision and strategy for student systems that meet the needs of students, faculty, and staff. Advancing this theme will involve collaboration with Information Services and Technology (IS&T).

*Theme C: Develop a holistic student experience*

*Theme leader: Julie Norman, Associate Dean, Academic Resource Center*

Since the time of the Task Force on Student Life and Learning (1996–1998), faculty, staff, and students have expressed the belief that interaction between students and faculty is critical to the development of a confident, well-educated graduate. MIT expects that its graduates will be prepared to make significant contributions in the global workplace and world community. Initiatives directed by this theme are intended to articulate a

holistic approach to the education of our students, to set the standard for undergraduate academic advising and mentorship, and to define collaborative initiatives and programs for student leadership development. This theme has critical connections with the Office of the Dean for Student Life (DSL).

*Theme D: Provide global educational opportunities that enable our students to appreciate and learn from other cultures*

*Theme leader: J. Kim Vandiver, Dean for Undergraduate Research*

This activity will be guided by the recommendations of the Task Force on the Undergraduate Educational Commons and the work of the Global Opportunities Committee, which is cochaired by Professors Hazel Sive and Linn Hobbs. The task force will recommend that the majority of our students have a global opportunity as part of their education; work on theme D will include figuring out how to make that happen.

*Theme E: Advance from teaching to learning in our classrooms*

*Theme leader: Lori Breslow, Director, Teaching and Learning Laboratory*

This theme focuses on institutionalizing the investment in educational innovation MIT has made over the last few years. In addition, it will bring best practices in learning to the faculty. MIT is at the forefront among peers in this area; theme E will ensure we remain there.

*Theme F: Champion and increase pipeline diversity*

*Theme leader: Karl Reid, Director, Office of Minority Education*

A diverse student body is critical for fulfilling the Institute's mission, and helps to position the United States for continued global participation and leadership. Consistent with a range of initiatives aimed at faculty issues, this theme focuses on ensuring that our minority students are well represented at every level of the educational pipeline at MIT. It also aims to advance the notion that diversity and quality are congruent. This theme has critical interactions with the Graduate Students Office (GSO).

The themes of DUE's strategic plan align with the anticipated task force recommendations while allowing DUE to be proactive in influencing the future of the MIT educational enterprise. The themes give our organization the focus necessary to marshal resources. Progress will require the work of interdisciplinary teams throughout DUE.

**Daniel E. Hastings**

**Dean for Undergraduate Education**

**Professor of Aeronautics and Astronautics and Engineering Systems**

*More information about the Office of the Dean for Undergraduate Education can be found at <http://web.mit.edu/duel/>.*

## Office of Academic Services

The Office of Academic Services (OAS) in 2005–2006 focused on building collaboration across numerous offices and on expanding the availability and delivery of academic information and data, thus enhancing advising and mentoring for our students.

In providing these services in support of MIT's academic mission, the Office of Academic Services is organized in three working groups: Academic Information and Communication (AIC), the Academic Resource Center (ARC), and the Academic Projects Group (APG).

### Academic Information and Communication

Academic Information and Communication collaborates with others in DUE to ensure the accuracy of academic information and to improve its delivery using technology, primarily web-based technology. AIC also supports the technology that underlies many of the programs offered throughout the OAS.

### New Initiatives

- AIC began work on a new advising website that implements the recommendation made by the Committee on the Undergraduate Program (CUP) and the Committee on Student Life (CSL) to improve information available to advisors and undergraduates. We are working with chairs of the CUP, CSL, and staff in ARC to develop content.
- Complementing the above item, AIC developed a web page for current students, to be linked from the MIT homepage, as requested by the CUP and CSL chairs. We worked with the DUE Special Programs staff member on this development.
- We provided support, analysis of data, and proposed recommendations for the Task Force on the Undergraduate Educational Commons. We expect to contribute to planning for implementation of the task force recommendations in fall 2006.
- AIC is investigating expanded use of the Who's Teaching What application to collect more data on instructors, particularly teaching assistants. Exploring possibilities for links to material in the Data Warehouse and in Subject Evaluation, which would enable more extensive analysis and evaluation of teaching.
- We worked with APG to support a pilot online Subject Evaluation system in the Department of Mechanical Engineering.

### Functional Enhancements

- AIC is managing the migration of the office's FileMaker databases to FileMaker 8. We began the FileMaker upgrade for the first year database in ARC.
- We implemented a new server that uses the OS X operating system, and upgraded the old one to support various FileMaker databases.

- AIC expanded and updated content for web sites, including U-Info, the Academic Guide for Undergraduates and their Advisors, and (with the DUE Special Projects staff) Scholarships and Fellowships. We are upgrading the HTML code and style sheets so that the sites comply with current web publishing practices.
- We are implementing Contribute, a content management system.
- AIC is developing two new databases: a stewardship tracking database for the Undergraduate Research Opportunities Program in ARC and an inventory database for OAS software licensing.

### **Academic Resource Center**

The ARC provides student-centered services to all undergraduates, especially freshmen, to enhance their academic success, social adjustment, and assimilation to the Institute. Our services recognize the many needs, diversity, and unique qualities of students at MIT. This office is responsible for freshman programming, including advanced placement or transfer credit processing, orientation, academic advising, choice of major, learning strategies, transition to sophomore year, and other academic support. Additionally, ARC manages, operates, and oversees the Undergraduate Research Opportunities Program (UROP), coordinates the Independent Activities Period (IAP), and provides staff support to the Committee on Academic Performance (CAP). The ARC continues to focus on programming that supports advising and mentoring initiatives, academic exploration and support, information delivery, and undergraduate research.

The ARC focuses on building collaborations across DUE, DSL, academic departments, laboratories, and centers in order to provide service and information at the highest level. Our intent is to improve academic support, advising, and mentoring of students. In addition to optimizing relationships in program development, the ARC looks to increase the delivery of the academic information and advice that is provided on 12 dynamic websites to first-year students, instructors, undergraduates, advisors, UROP supervisors, and other constituencies.

### ***New Initiatives***

ARC staff collaborated with Student Services Information Technology on a new system that will allow students to submit UROP research proposals via a web interface. Phase I is complete; Phase II is in progress and should be in place by late summer/early fall 2006. When fully implemented, most faculty and departmental administrators will have access to this system and will be able to review student proposals prior to final ARC review.

The ARC remains fully committed to the development and expansion of programming and resources that aid freshmen in exploring possible majors and in making the transition to sophomore year. The ARC organized and/or offered 10 IAP programs under the themes of major exploration/career services, undergraduate research, sophomore transition, and alumni and faculty connections/mentoring.

Sophomore transition efforts also included providing support and resources to both freshman and sophomore year academic advisors. In an effort to provide supplemental information to sophomore year advisors, freshmen were asked to complete an online questionnaire, “Providing Information to Your Sophomore Year Advisor,” which provides future advisors with background information on their new students and a sense of how these students prefer to be advised. Almost 80 percent of the current freshman class responded to the questionnaire.

As a further enhancement to the handoff of freshmen to their sophomore advisors, advisors of first-year students were asked to provide an end-of-year summary on each advisee. The freshman advisor’s perspective will complement the information provided by the student’s own information in the online questionnaire. Both of these summaries are included in the academic information passed from the ARC to the student’s major department.

MIT Medical, MIT Police, and the ARC received grant support from the Department of Justice for the MIT Violence Education, Prevention, and Response Project. In addition to the sexual assault program during Orientation, training to address aggressive, harassing, and stalking behavior against students has been implemented or is being designed for MIT Police, the Committee on Discipline, Medical staff, advisors, and peer mentors.

The ARC provides curricular support to the Freshman Science Core instructors. A new website was developed to allow instructors access to information related to the first-year curriculum, including a list of first-year instructors and subjects, quiz dates for freshman subjects, and dates of upcoming Learning Strategies and Study Sessions. The website links from the first-year site, <http://mit.edu/firstyear/advisors/lecturers.html>.

### **Functional Enhancements**

- Migrated the freshman database to FileMaker 8 and expanded the capabilities to provide data and reports on all subpopulations that ARC tracks, enhancing our ability to develop intervention strategies and programming to ensure end-of-term success.
- Faculty and administrators in other areas (Admissions, housemasters, faculty coaches, learning communities, Freshman/Alumni Summer Internship Program [F/ASIP], Reserve Officer Training Corps) were trained in resources and intervention on behalf of at-risk students. Ten (of 11) housemasters, faculty coaches representing 14 sports, learning community advisors, and all F/ASIP mentors have been trained. Flag data for their respective students is provided to them for their discretionary intervention or support to help engage freshmen in resources that can ensure recovery and success.
- In response to fifth week flag data, tutors were hired to offer study sessions two evenings prior to all math or science quizzes. Thirty-eight sessions were offered; attendance ranged from 10–70 students, depending on the subject.
- ARC converted the Committee on Academic Performance FileMaker database to FileMaker 8, which expanded the reporting capabilities. The new database

condenses into a single screen all CAP actions and history on an individual student, and includes “real time” updates of nonstatic student data directly from the Data Warehouse.

- We continued to offer a comprehensive professional development program for freshman advisors, including special workshops for new advisors and 10 professional development programs available to all advisors. Sixty-one faculty, 20 lecturers/instructors, and 95 administrators advised freshmen; this included 69 Freshman Advising Seminars offered to the Class of 2009.
- Completed the sixth year of the residence-based advising program for all freshmen living in McCormick and Next House, with 209 students, 29 advisors and 29 resident associate advisors (RAAs) participating.
- During IAP 2006, 628 noncredit activities and 88 for-credit subjects were approved by the ARC for listing in the online IAP guide and calendar. Thirty-two academic departments, 68 groups recognized by the Association of Student Activities, and seven non-student groups sponsored activities or subjects.
- The ARC Student Advisory Board (ARCSAB) provided content for the *Associate Link* newsletter, organized three freshman programs, participated in peer advice walk-in sessions in the ARC, served on UROP panels, and assisted with the Major Explorations Fair. Student members of both the Baker Foundation and the Student Committee on Educational Policy (SCEP) joined the ARCSAB with particular interest in advising.
- To facilitate freshman exploration, the ARC organized a department-wide fall Choice of Major fair; Class of '59 Luncheon featuring four alumni; programming with the ARCSAB (Deciding the Right Path for You); and, in coordination with associate advisors, Choice of Major fairs in the Burton-Connor, New House, McCormick Hall, and Next House residence halls. ARC expanded the coordination and communication of department open houses via the first year website and a weekly email.
- Fourteen freshman preorientation programs (FPOPs) were offered in 2005; this is an increase of five programs from 2004. Out of 502 first-year applicants, 440 students were placed in an FPOP. The academic programs (Mechanical Engineering, Civil and Environmental Engineering, Ocean Engineering, Nuclear Engineering, Biology, and History) were substantially oversubscribed.

### **UROP Activities**

Within the two academic terms 2004–2005 and summer 2005, 47 percent of UROP students were female and 53 percent were male. During the academic year, 42 percent of non-underrepresented students and 25 percent of the underrepresented students participated in a UROP. Almost 40 percent of first-year students participated in UROP during the academic year or the summer following their freshman year.

<b>UROP Funding Allocations</b>		
	<b>Summer 2004 &amp; AY2004–2005</b>	<b>Summer 2005 &amp; AY2005–2006</b>
Faculty allocations	\$3,352,341	\$3,366,086
UROP office allocation	\$2,092,926	\$2,080,734
<b>Total</b>	<b>\$5,445,267</b>	<b>\$5,446,820</b>

The total funding of undergraduate research projects remains level over this period. Faculty allocations have decreased by nearly \$1 million over the past three years. The continued challenge is that the number of proposals submitted by students has remained constant, while overall available funding has decreased.

ARC's annual UROP direct funding budget is comprised of endowment income (41 percent), expendable gifts (28 percent), Federal Work-Study (23 percent) and General Institute Funds (8 percent). The UROP book-value endowment is \$11 million, represented by 36 named endowed funds.

UROP's IAP 2006 Research Mentor Program continues to be a highly effective means of preparing freshmen for UROPs. Nineteen students experienced in the program and one faculty member provided guidance to 64 freshmen.

### **Academic Projects Group**

The Academic Projects Group provides services to support educational initiatives that serve faculty and students, including involving alumni in the education of our students. The group works closely with AIC to provide academic information to support educational efforts.

### ***New Initiatives***

- Successfully implemented the revised Science/Engineering and Humanities, Arts, and Social Sciences Subject Evaluation forms this year, following several pilots and extensive content revision.
- Worked with IS&T to develop an electronic report generation and distribution back-end application for Subject Evaluation. This application would work with numerous systems and be a step toward developing an online instrument.
- Coordinated with Professor John Lienhard to develop a pilot online Subject Evaluation instrument for Mechanical Engineering. This pilot may be helpful in working toward a common application that can meet MIT's future Subject Evaluation needs.
- Worked with AIC to investigate expanded use of Who's Teaching What application to collect more data on instructors, particularly teaching assistants. We are exploring possibilities for linkages to data in Data Warehouse and in Subject Evaluation.
- For the first time, APG coordinated all administrative functions for the Harry S. Truman Scholarship. One of this year's MIT nominees, Matthew R. Zedler '07, was named a Truman scholar.



- Provided support and advising to the Everett Moore Baker Foundation, devoted to the ideals of the former dean of students known for his concern for MIT students.

### **Functional Enhancements**

- Worked with AIC, the DUE Office of Special Projects, and the Graduate Students Office to update and create additional content for the scholarships and fellowships website.
- Completely revised and expanded web and brochure content for the alumni-sponsored funds for teaching and education. Managed alumni-sponsored funding process for the dean for undergraduate education and the Classes of '51, '55, '72, and '99. Three times as many proposals were submitted as were some years ago, and approximately \$180,000 was awarded in support of undergraduate education and teaching.
- Staff members provided administrative support and oversight to a number of scholarship and fellowship programs.
- Assumed further responsibility for supporting the growing service learning program in the areas of finances, budgeting, and donor support.

### **Staffing Changes**

One new hire was made in 2005–2006. Robert Schuman was hired as the web/database specialist for Academic Information and Communication, replacing Cecilia Marra, who left to join Information Services and Technology.

**J. Kim Vandiver**

**Dean for Undergraduate Research**

**Professor of Mechanical and Ocean Engineering**

*More information about the Office of Academic Services can be found at <http://web.mit.edu/acserv/>.*

### **Admissions Office**

The goal of the Admissions Office is to identify, recruit, select, and enroll the best students in science, engineering, and technology in the world. We admit all undergraduate students (freshmen and transfers) and serve as a clearinghouse for graduate application paperwork. At various times throughout the year, we work closely with the Student Financial Services Office, the Academic Resource Center, the Registrar's Office, the President's Office, the Alumni Association, the Office of Minority Education, and the Committee on Undergraduate Admissions and Financial Aid. During Campus Preview Weekend, we also coordinate with other offices in DUE, DSL, the Department of Facilities, and academic departments.

### **Accomplishments**

We had 11,373 freshman applicants, an increase of 9 percent over last year. This represents the first significant change in application numbers in more than five years. We

anticipated a slight increase in our yield this year and admitted a lower percentage of applicants than ever. We admitted 1,513 students (13 percent of the applicant pool) with an enrollment target of 1,005 freshmen. Our yield increased for the fourth consecutive year to reach 67 percent, an increase of 0.3 percentage points. We will enroll between 1,005 and 1,015 freshmen. We admitted 16 transfer students and expect to enroll 14.

Diversity in the incoming class is very strong. Their self-reported demographics tell us that:

- 21 percent are underrepresented minorities
- 28 percent are Asian Americans
- 37 percent are Caucasian
- 8 percent are international, representing 49 countries
- 45 percent are women
- 49 states, Washington, DC, and Puerto Rico are represented

Campus Preview Weekend (CPW) was large and successful, with 57 percent of admitted high school students (860) attending, along with 736 parents. Overall yield of the participants of CPW was 78 percent.

In 2006, we conducted an extensive marketing research project with Sloan School alumnus Bruce Enders as our advisor. This research involved surveying more than 2,000 outstanding high school juniors and focused on learning more about how they approach the college selection process and how they view MIT in relation to our peer institutions. The results of this survey will be used to improve our recruitment communications, including our website layout and content, publications, and in-person information sessions, both on and off campus.

The recruitment, admission, and enrollment of underrepresented minorities increased dramatically in 2006 due to improved outreach, bringing more applicants to campus, and increased personal contact. Enrollment of underrepresented minorities increased 34 percent. These students will comprise 21 percent of the class, versus 17 percent last year.

We began Phase II of the Admissions database project, which will replace our antiquated admissions database and computer systems with a custom solution that will improve information technology infrastructure, streamline administrative functions, eliminate shadow systems, and separate all admissions functions from the MIT mainframe. Initial development and equipment costs will exceed \$4 million.

The Educational Council saw success on two key priorities: improving access to interviewers for our applicants and providing applicants with a positive experience. The number of interviews increased 18 percent from last year. Fifty-seven percent of underrepresented minority students had an interview, compared with 55 percent last year and 47 percent in 2004. Furthermore, the number of applicants who said their interview experience was good or excellent increased to 93 percent last year, up from 88

percent in 2002. Of the more than 2,300 volunteers, 29 percent are women and 5 percent are underrepresented minorities. The Educational Council sponsored 55 admitted student receptions, planned 70 regional admissions information sessions, and attended 150 college fairs.

### **Staffing Changes**

The Admissions Office is made up of 15 administrative and 19 support staff, currently consisting of 21 females and 8 males. Of these, 22 are Caucasian, 3 are African American, 2 are Asian, and 2 are Hispanic.

**Marilee Jones**

**Dean of Admissions**

*More information about the Admissions Office can be found at <http://web.mit.edu/admissions/>.*

### **Edgerton Center**

#### **Highlights and New Directions**

The mission of the Edgerton Center is to uphold the legacy of Harold “Doc” Edgerton by promoting hands-on and project-based learning via subjects, student clubs and teams, international development projects and individual student inventors; maintaining MIT’s expertise in high-speed and scientific photography; and improving K–12 education at local, state, and national levels.

This spring, the Edgerton Center staff and 15 invited guests from within and outside MIT held a daylong retreat to review the programs of the Center. One of the goals of the retreat was to prepare the staff to engage in a review of the alignment of the Center’s programs with the principal themes that were emerging from the DUE strategic planning exercise. Four DUE strategic themes are particularly relevant to the goals of the Edgerton Center. They are:

- Enabling a global education for our students
- Delivering an MIT education as a holistic experience, with focus on leadership and confidence building
- Demonstrating diversity as a means of enhancing academic excellence
- Championing a shift in our educational philosophy from teaching to learning

A fifth theme, advancing K–12 education, was identified and included in our planning because it is aligned with an MIT goal to address critical issues in K–12 science education. The programs of the Edgerton Center are very well aligned with these themes. Each of our principal programs is described below.

#### **International Development Initiative**

For more than four years we have been developing a year-round cycle of international development activities in a joint effort with the Public Service Center. These activities

include D-Lab classes, grants to faculty, fellowships to students, and the IDEAS Competition. These four activities provide a variety of options for our students to engage in development projects in Asia, Africa, and Central and South America. Both IAP and summer are popular times for staff and student travel. The experiences provided our students are particularly relevant to fulfilling our goals for global experience, holistic education, and diversity. A few facts about two of these programs follow.

**D-Lab** is a sequence of subjects that educates MIT students about the challenges faced by communities in the developing world. Students get an opportunity to use their science and engineering skills to make a positive contribution to these communities. D-Lab has an annual cycle with four components:

- A fall subject in which students learn about international development and appropriate technology through case studies and guest speakers. They form country-specific teams to study the culture and language.
- A field trip during IAP in January to identify technical problems that are faced by communities in the target country. (In IAP 2006, 25 students worked in six nations—Brazil, Ghana, Lesotho, Zambia, India, and China.)
- A spring term design seminar in which students develop solutions to the problems identified during the IAP field trip.
- An extended trip back to the country over the summer to implement and test the solutions developed in the design classes.

The MIT IDEAS Competition (a joint project with the Public Service Center) encourages MIT students to work in teams to develop and implement projects that make a positive change in the world. Entries are judged by a panel of experts who focus on the innovation, feasibility, and community impact of the projects. The IDEAS staff provide feedback, assign mentors and give project development grants to all viable teams. Winning teams receive awards of \$2,000-\$5,000 to further develop and implement their projects, and they receive continuing support from the IDEAS staff as they carry out the work.

In this fifth year of the competition, \$32,500 in prize money was awarded to six teams. The winning projects included developing a safe and effective aerosol vaccine device that can operate without electrical power, restoring damaged coral reefs by coupling tidal electric power generation with a method of using small electrical currents to promote the growth of corals on metal structures, and a water purification technology (patent pending) that can rapidly purify water contaminated with bacteria, protozoa, and viruses without using chemicals or battery power.

We find that the students who take part in international development initiatives are extremely diverse (even by MIT's standards), with the classes becoming a veritable mixing pot of cultures and ethnicities. In addition, the subject inherently engages multiple learning modes, creating an environment that emphasizes learning (usually by doing) over lecture-based instruction. Finally, the combined experiences of

simultaneously grappling with the engineering design challenges while trying to grasp the culture of a new place (and how that culture affects the design constraints) is an effective way to educate our students holistically. They return from fieldwork confident and with a new sense of purpose in life. These are life changing experiences for many of our students.

### **K–12 Educational Outreach**

Our outreach program continues to be a window into MIT for local schoolchildren, with approximately 2,000 K–12 students (almost half from the Cambridge Public School system) visiting the Center during the 2005–2006 school year to conduct hands-on science activities. Since its inception over eight years ago, the Edgerton Center Outreach program has provided free programming at MIT for more than 13,500 children and teachers from the Greater Boston area. The program was created in response to an alarming fact. Ten to 15 years ago, MIT was receiving zero applicants from the local Cambridge Rindge and Latin High School (CRLS). One of our specific objectives was to make MIT accessible and achievable in the minds of middle school children. Today MIT receives eight to 14 applicants per year and has many CRLS students enrolled as undergraduates.

The outreach program is supported in part by the Center for Environmental Health Sciences. In turn, we provide a portion of the outreach programming that their grant requires. We also continue to partner with the Center for Materials Science and Engineering to provide two weeks of science day camps each summer. Each year we hire three to six MIT undergraduates to help staff our outreach program, providing them with a unique opportunity to view their own education through the lens of helping others learn.

The Edgerton Center hosts the engineering design component of the MITE<sup>2</sup>S program and hosts the Saturday enrichment program for high school students, known as SEED Academy. We continue to take an active role in coordinating the Institute-wide consortium of K–12 Educational Outreach Providers. The consortium is an effort to inform the community of the wide variety and depth of our offerings.

Our Engineering Design Series is an informal series of engineering design challenges for area high school students. The series began in December 2005 with an event called 'Bot Bowl. Student teams from five area middle and high schools took part in the inaugural event, held at MIT's Stata Center. The students received the rules for the event and a parts kit approximately one month in advance. Each school-based club used after-school sessions to develop their entries. Undergraduates from MIT, Boston University, and Northeastern University served as mentors to secondary school students. The event is designed to be low-key, with minimal pressure to win and an emphasis on the fun to be found in the process of engineering.

The MIT students involved in these programs get to experience life on the other side of the chalk, and they gain a better understanding of the fact that they hold the keys to their own education. They also gain confidence in their own knowledge and skills, and they get to exercise their leadership in front of a classroom. Also, the Engineering Design

Series and our work with SEED and MITE<sup>2</sup>S help to address the pipeline problem of getting more underrepresented minority students interested in science, technology, engineering, and math well before they consider college. The Edgerton Center's K–12 program is particularly relevant to the DUE themes of a holistic experience, from teaching to learning and diversity.

### **Academic Offerings**

Our regular offerings in electronics, robotics, and digital imaging are popular, and 6.163 Strobe Project Lab continues to be heavily oversubscribed. Longtime favorites 6.070/SP.75 Electronics Project Lab, SP.747 Creative Imaging, and SP.702 Intro to Digital Electronics are also regularly oversubscribed. Our staff oversaw several advanced undergraduate projects for Electrical Engineering and Computer Science students and assisted several student-initiated technical projects (e.g., entries into the Soldier Design Competition, the IDEAS Competition, and many student walk-in projects for thesis, UROP, or fun).

**Service Learning** classes at the Edgerton Center, another joint project with the Public Service Center, is in its fourth year. Service Learning classes are now available in many departments across campus. In the spring of 2005, the Edgerton Center offered eight subjects with public service goals to 60 students. These subjects included D-lab and the Public Service Design seminars.

The center is still the Institute's go-to place for high-speed imaging. Our high-speed video systems were used by seven research groups and several Institute subjects over the past year. In 2006, our weeklong summer short course subject 6.51s High-Speed Imaging hosted 33 attendees from government, academia, and industry. Our academic offerings are project-based and support the "from teaching to learning" theme.

### **Student Shop and Hands-on Resources for MIT students**

The Edgerton Center Student Shop is located in Building 44 across from the EECS buildings on Vassar Street. The shop is an important resource to MIT graduate and undergraduate students. Students can receive training at the shop, and (once trained) are able to use the shop resources for independent projects. The shop is open until 8 pm four evenings a week, and on Saturday afternoon (for a total of 56 hours of operation per week). With an annual grant to the shop from the Lemelson endowment funds, we continue to upgrade the shop's capital equipment.

Approximately 7,000 student hours are logged in the shop each year. These students typically represent 16 departments and programs from the Schools of Engineering, Science, Architecture and Planning, and the Health Sciences and Technology program.

### **Support for Student Clubs and Teams**

The "holistic education of the student" is a theme that includes the desire to increase the confidence and leadership abilities of our students. One of the most effective ways the Edgerton Center staff have discovered to accomplish this objective is to empower our students in the pursuit of their extracurricular passions. The Stratford Foundation

has offered generous financial support to expand the center's ability to support student-initiated hands-on projects and student competition teams. Over the last year, we have increased the number of **clubs and teams** we support from 12 to 19. We provide centralized institutional recognition and support for these teams, financial backing, access to a pool of common tools and resources, and space to carry out their work. We operate a club workspace in E60 and provide a garage shop for the Solar Electric Vehicle Team and the Formula SAE team. To receive Center support, each team must elect officers, prepare annual reports and budgets, conduct fund raising, and do great technical work. They do all these and more. The most recent example of the remarkable leadership, confidence, and initiative that these opportunities provide our students is unfolding as this report is being written. It is the Vehicle Design Summit, described below.

### **Vehicle Design Summit**

MIT's Solar Electric Vehicle Team (SEVT) was asked by the major world solar-racing event (the Trans-Australia World Solar Challenge) to envision a new rule set and direction for the race. In April, two student leaders, Anna Jaffe (sophomore) and Robin Allen (junior) began putting this together. They invited 60 solar car engineers from schools in 15 different countries to come to MIT on June 12, 2006, to begin an intense nine-week design summit—the Vehicle Design Summit—aimed at in-depth exploration of alternative transportation technologies. The undergraduates organizing the event consider it to be a direct response to President Susan Hockfield's call for MIT to bring "scientists, engineers, and social scientists together to envision the best energy policies for the future." Today we have 40 students from around the world on campus working with our students until August 13 on the energy efficient vehicles of the future.

### **Staff Changes**

Fred Cote ably managed the student shop from its inception in the spring of 1998 until his retirement this past July. The Institute presented him with the James N. Murphy Award in recognition of his dedication to helping MIT students. We send him our best wishes for a long and happy retirement. His replacement is Mark Belanger, formerly of the machine shop for the Lab for Manufacturing Productivity. Mark is off to an excellent start in his first year, revising the layout of the shop, updating its electrical system, and installing a new computer numerical control lathe purchased with funds from the Lemelson Program.

Stephanie Dalquist joined our staff in the past year as an instructor assisting with the International Development Initiative. In addition to writing newsletters and assisting with fund raising, she has been a team leader for development projects in Brazil.

### **J. Kim Vandiver**

**Dean for Undergraduate Research and Director  
Professor of Mechanical and Ocean Engineering**

*More information about the Edgerton Center can be found at <http://web.mit.edu/edgerton/>.*

## MIT Careers Office

The mission of the MIT Careers Office (MITCO) is twofold: to support students making career-related decisions by helping them develop the self-awareness, skills, life experience, and confidence to reach their goals; and to assist employers and graduate schools wishing to attract MIT students and alumni. The Careers Office provides counseling, self-assessment tools, career workshops, panels and symposia, recruiting opportunities, preprofessional advising, PhD transition groups, internships and other experiential learning venues, and coaching in job search skills and strategies. These resources help students make effective transitions from university to professional life.

We anticipate that the Careers Office will play an integral role in implementing several priorities identified through DUE's strategic planning process.

### Accomplishments

In 2005–2006, the Careers Office increased the use of counseling visits by the targeted cohorts: freshmen (up 10 percent), sophomores (up 56 percent) and doctoral candidates (up 11 percent). Sixty-four percent of 2005–2006 student visits were by undergraduates and 36 percent by graduate students. Appointments (including walk-ins and 18 undesignated appointments) increased 6 percent, to 3,998 in FY2006. Walk-ins increased 28 percent, to 1,582. Counseling sessions totaled 2,416. Of 2,117 undergraduate visits (up 7 percent), 518 were by freshmen, 650 by sophomores, 457 by juniors, and 492 by seniors. Of 1,195 graduate student visits (slightly fewer than last year), 594 were by master's degree candidates (down 13 percent from since last year), and 601 were by doctoral candidates (11 percent increase). The office also met with 89 postdoctoral associates, 364 alumni, and 96 MIT employees. Staff provided substantial email advising to students and alumni, an activity not reflected in the figures above.

We coordinated on-campus recruiting visits by 427 employers. The number of resumes submitted (33,496) increased by 2.71 percent, while the number of interviews (6,800) decreased by 2 percent. Financial services (14 percent), consulting (17 percent), investment banking (16.5 percent), and computers (6 percent) accounted for more than half of this year's recruiters.

This year, we raised the on-campus presence of underrepresented fields such as nonprofit, small business, and the social enterprise sector, and facilitated recruiting through student-run events. Increasingly, employers are reaching students through clubs and academic departments, in addition to or in place of traditional on-campus recruiting. While 9.9 percent fewer employers interviewed in the Careers Office this year, our Employer Relations team facilitated many recruiting contacts with the Science and Engineering Business Club (SEBC), the Sloan Undergraduate Management Association, and other career-minded groups. We collaborated with a new student organization, Design for Change, to pilot an "environmentally and socially conscious" career fair, created a small business advisory panel with SEBC, and continued strong support for Fall Career Week student coordinators, providing two weeks of programs leading up to the fair. We are working with Tau Beta Pi and SEBC to develop a nonprofit expo with the goal of a 10 percent increase in underrepresented employers at the 2006 Fall Career Fair.



This was the first year for Freshman-Sophomore Career Week (FSCW), a program of workshops, speakers, panels, and other activities, designed to increase awareness of opportunities inside and outside of MIT and to raise Careers Office visibility among undergraduates. Reaching and engaging students in career development early in their MIT education has been one of our highest priorities in recent years. Several hundred students participated, including 183 freshmen and 58 sophomores. FSCW presented sessions on UROP, service learning, the MIT International Science and Technology Initiatives (MISTI), networking with employers and faculty, and job skills, and helped students explore connections between classroom and nonacademic experiences. MITCO collaborated with the ARC; Alumni Association; the Department of Athletics, Physical Education, and Recreation; DSL; fraternities, sororities, and independent living groups; Class Councils of 2008 and 2009; academic departments; and employers representing a variety of industries. MIT alumnus Neil Robertson (EE/CS 1996) launched FSCW with a keynote speech that engaged students and set the tone for the rest of the week.

Eighty-eight percent of freshmen who completed the first half of the Freshman/Alumni Summer Internship Program (F/ASIP) found internships in such fields as computer science, finance, biotech, research/lab work, and teaching overseas. F/ASIP enabled 103 freshmen to develop the interpersonal and professional skills needed to find and succeed at summer internships, and paired them with alumni mentors at their internship sites. We saw an increase in international student participation this year: from 7 percent in 2004–2005 to 18 percent in 2005–2006. Selected US internship sites include Microsoft, Boeing, Thomson West, the National Institutes of Health, Gillette, FermiLab, the National Aeronautics and Space Administration, and Cambridge-based UROPs. Students are also working in other countries this summer, teaching at Tsinghua University in China through the MIT-China Educational Technology Initiative program, interning with Hellenic Aerospace Industries in Greece, completing a public service project in Tanzania, learning about the finance industry in Switzerland, and teaching at a school for Aborigines in Australia. To foster appreciation for diversity in the workplace, we sponsored a Communicating Across Cultures Seminar taught by Bernd Widdig, associate director of MISTI and Lori Breslow, director of the Teaching and Learning Laboratory.

We collaborated with the Office of Minority Education to develop a career development program for Interphase students. This summer our staff will teach Interphase students about self-assessment, resume writing, and goal communication. Our goals are to inspire these freshmen to think about what they want to do at MIT and how the experiences they choose connect to careers, and to provide them with tools and individual coaching to build confidence.

The Careers Office provided support to MIT applicants for 2005 entry to medical school; 185 MIT candidates applied (up from 158 in 2004), including 70 undergraduates, 19 graduate students, and 96 alumni. Acceptance rates were 75.7 percent for undergraduates, 79 percent for graduate students, and 71 percent for alumni. The national acceptance rate for all applicants was 48 percent. The average GPA for accepted undergraduates was 3.7/4.0 and the average MCAT score was 34. We recruited two new Prehealth advisors: a female physician and a minority health professional/faculty

member. Electronic transmission of recommendation letters, a practice we began two years ago, continued to save significant time and money. Eighty-three percent of MIT application packets were sent via electronic transmission this year.

Law school applications were down slightly to 111 from last year's 132. Of those candidates, 22.5 percent were seniors, and 79 percent of all MIT applicants were admitted. The average GPA for MIT applicants who were accepted to law school was 3.25/4.0 and the average LSAT was 163.8.

The office delivered graduate student career programs and services that attracted many students interested in both academic and nonacademic careers. Graduate student participation in workshops and special events rose 9 percent this year, to 2,170. We added a new workshop, Making Use of Hidden Resources, which emphasized the benefits of alumni networking. Many programs were offered through academic departments and tailored to the needs of their students. We partnered with the Alumni Association to sponsor the Graduate Student Career Symposium as part of the Graduate Alumni Reunion. Careers Office associate director John Nonnamaker collaborated with GSO associate dean Blanche Staton and GSO director of communications Barrie Gleason to present a panel about graduate student community at the conference of the National Association of Student Personnel Administrators. John Nonnamaker continued his longitudinal study of science doctoral student persistence and presented initial findings at Oregon State University this June. He will present the findings at MIT in October 2006.

The Careers Office designed and administered focus group sessions to assess student perception of MITCO services and programs. Findings were generally positive, especially among international and graduate students, who are heavy users of the office. Students praised the overall quality of workshops and one-on-one counseling. Their recommendations for improvements included better marketing and more customized programs for special cohorts.

MITCO staff were recognized by the Institute for their contributions to its initiatives. Deborah Liverman served on the MLK Celebration Committee. John Nonnamaker served on the Graduate Community Fund Review Board. The Graduate Student Team and director participated in the Dean for Graduate Students Collaborative-Network. Elizabeth Reed served on the Committee on Discipline, the Council on Family and Work, and the search committee for a new dean of undergraduate education. Three staff members served as freshman advisors. Bob Richard, Melissa Ackerman, Bill Rivers, and Jordan Siegel of the Employer Relations team were honored with an Infinite Mile Award for outstanding customer service in June 2006. Elizabeth Reed was selected as a 2006 Leader to Leader fellow. Staff also engaged in many outside professional and community service activities at the local and national level.

### **Administrative Initiatives**

The Careers Office increased revenue from employer fees for on-campus recruiting by 9 percent. We introduced Sponsor Week and Employer Advertising Banner programs to increase departmental revenue and to channel recruiting expenses away from small firms and nonprofits and toward larger, more financially stable firms.

We revised the Graduating Student Survey to include outcome measures related to DUE's emerging strategic priorities and the interests of academic departments. New questions provide better information on demographics, international educational experiences, factors contributing to job offer acceptance, timing of offers, and other factors. As of June 14, we had achieved a 74 percent response rate (1,545 students out of 2,089 June graduates). Forty-two percent of undergraduates reported plans to work, 49 percent planned to attend graduate school, and 9 percent said they will travel, take time off, get a second bachelor's degree, do public service, or finalize plans. The 2006 survey report will be available on our website in September.

Following an extensive bidding process, we initiated a database-backed web application with New Tilt Inc. This project will integrate all MITCO data and staff applications under a single, easy-to-use platform and will allow students to schedule appointments online. MITCO worked with Departmental Consulting and Application Development to create an extensive request for proposal and ensure good decision-making in the bidding and selection process. The project will begin in June and is due to be completed by December 2006.

This past year saw a number of administrative improvements in Prehealth Advising. We collaborated with the Institutional Research section of the provost's office to compile and analyze medical school applicant data provided by the Association of American Medical Colleges and supplemental data from the MIT registrar. This will allow for better trend analysis by providing detailed information on MIT premedical applicants by ethnicity, degrees, and academic departments. Staff developed a medical school locator tool, which provides average GPA and MCATs for 2005 applicants applying to 74 medical schools. This tool helps students and advisors develop a realistic application strategy that includes reach, target, and safety schools. Already, it has led to an increase in students coming in to discuss their method of selecting schools, and it has helped students prepare for the medical school application process. Finally, this was our first year of making e-commerce available for payment of credential service fees. Of 123 applicants who used the Prehealth credential service, 81 chose this approach, which greatly reduced the number of checks handled by our front desk staff.

### **Staffing Changes**

The Careers Office promoted one member of our staff and hired three new colleagues. Julie Cecil left MIT and moved out of the area, and Heather Bruskin was promoted to her position, assistant director for F/ASIP. Rachel Greenberg was hired to replace Bruskin as Freshman/Alumni Summer Internship Program and preprofessional advising counselor. Kathleen Haggerty joined the office as a career development counselor when Malaika Silcott moved to another institution. Kristina Nance was hired through a DUE Diversity Fellowship, and she will serve as assistant director for career development and special projects.

On September 1, 2006, Elizabeth Reed will assume a new role as senior associate dean for strategic communications and themes in the Office of the Dean for Undergraduate Education. She steps down as director on June 30, after 30 years in the Careers Office.

Associate director Shonool Malik has agreed to serve as interim director while the Institute undertakes a national search for a new director.

**Elizabeth Reed**  
**Director**

*More information about the MIT Careers Office can be found at <http://web.mit.edu/career/www/>.*

## **Office of Minority Education**

The mission of the Office of Minority Education (OME) at MIT is to recognize and propagate academic excellence among students of underrepresented minority groups, with the ultimate goal of developing leaders in the academy, industry, and society. OME supports MIT's academic mission to provide the best possible education for all students while serving the nation's need to have underrepresented and underserved students in science and engineering fields pursue higher education and success in these fields.

The OME saw significant staff turnover in the current academic year, beginning with the appointment of a new director, Karl Reid '84 in October 2005. An additional assistant director and two administrative assistants filled remaining vacancies. Finally, the OME appointed a faculty director to oversee two of our academic programs.

Mirroring its considerable staff transformation, the OME also launched an aggressive strategic plan. To organize its efforts, the office categorized program thrusts into two broad groupings: frontline services for students and infrastructure to support our prime directive (students). Our major frontline issues are academic excellence, leadership development, student diversity initiatives, and faculty engagement. In order to provide efficacious student services, we also had to improve research and staffing. The OME staff is positioned to increase the quality and effectiveness of services offered to underrepresented and other students at every juncture in the educational pipeline, from before college to the graduate levels.

## **Academic Excellence**

### ***Project Interphase***

Project Interphase is a rigorous residential academic bridge program for admitted freshmen in the summer preceding matriculation. The seven-and-a-half-week-long program builds community and confidence while enhancing academic and intellectual skills. It is specifically designed to foster high achievement and content mastery for underrepresented minorities (African Americans, Hispanics, Latinos, and Native Americans) and other students who demonstrate bright promise and have overcome significant odds to be admitted to MIT. Any student who has been offered and accepted admission to MIT may apply.

For Project Interphase 2005, 67 students applied and 58 were admitted; most of those (55) freshmen participated.

Project Interphase continues to attract MIT faculty members and graduate and undergraduate students who return each year to serve as instructors and teaching assistants. Fifteen instructors and 16 tutors comprised the 2005 instructional and residential staff.

### ***Seminar XL***

Seminar XL is an academic enrichment seminar for freshmen that utilizes an innovative and effective small-group learning concept. Modeled after Dr. Uri Treisman's Challenge Calculus Workshops, the program objective is to develop the participants' mastery of both core subject matter and analytical skills while helping them acquire essential collaborative learning strategies that lay the groundwork for future success in advanced coursework.

During AY2005–2006, a total of 85 students participated in Seminar XL across 11 facilitated groups in the fall, and seven participated in the spring. This year, in response to freshmen who were flagged in the fifth week, we developed XL Limited Edition (LE), a select group that met four times over a four-week period to close gaps in content understanding. The 85 freshmen who participated in Seminar XL and LE represent a 58 percent increase over the number of students served last year.

### ***Tutorial Service Room***

The Tutorial Services Room (TSR) offers tutoring services to undergraduate students by appointment. Student organized and managed (with close supervision by OME senior staff), the TSR provides one-on-one tutoring sessions, question and answer sessions, test reviews, and final exam reviews.

During the 2005–2006 academic year, the TSR provided more than 300 hours of tutorial services, with freshmen comprising the highest users. In addition, we converted our paper course notes to electronic format, making all course materials available on compact discs. Finally, we upgraded our student workstations with five new Athena and Windows workstations.

## **Leadership Development**

### ***OME Student Advisory Council***

We reinstated the OME Student Advisory Council, which is comprised of presidents of undergraduate student groups that primarily serve underrepresented undergraduate populations. The council began meeting biweekly in the fall, and moved to monthly meetings in the spring.

### ***Leadership Development Workshop Series***

We have begun planning a leadership development workshop series for executive board members of the 12 student groups that primarily serve underrepresented communities. The series will commence in the fall with an all-day retreat, followed by five workshops to be held during the academic year. MIT faculty, staff, alumni, and students comprise the steering committee.

### **UROP Fellowships**

There is consensus among faculty that, aside from its intrinsic academic and intellectual value, undergraduate research is beneficial to students because it provides a mechanism for forging closer ties with faculty. Yet, underrepresented minorities participate in UROPs at lower rates than the average undergraduate student population. The OME worked closely with the UROP office and our corporate partners to supplement 15 UROP projects in 2005–2006.

### **Student Diversity**

During the fourth quarter of 2005, the OME director interviewed a sample of faculty, administrators, and students to understand the challenges, opportunities, and most promising initiatives employed by departments and divisions to increase the number of underrepresented graduate students enrolled. The findings were presented to the chancellor, the dean for undergraduate education, and an ad hoc committee assembled by the DUE to increase the number of minority undergraduates who choose to pursue graduate studies at MIT.

### **Faculty Engagement**

The OME formed a faculty advisory council in the spring of 2006 to engage faculty and to address the full spectrum of educational outcomes for underrepresented students at MIT, from before college to the graduate level. The council, comprising nine faculty members from a variety of disciplines and departments, is cochaired by Professors Ceasar McDowell and Robert Redwine.

### **Infrastructure**

#### **Research**

The OME hired a research intern from the Harvard Graduate School of Education to commence new research and to do a comprehensive update of existing data to illuminate the experiences and determinants of persistence and academic decision-making at each educational level. These findings have informed several OME programs and Institute committees. In the coming year, we hope to expand this function to inform the teaching and learning enterprise at MIT.

#### **Staffing**

The OME added five new staff members in 2005–2006, four of whom filled four vacancies. Karl Reid '84 was appointed OME director and assistant to the chancellor for student diversity on October 1. Gabrielle McCauley joined us as the assistant to the director in January; Sekazi Mtingwa came on as faculty director of the Seminar XL and Tutorial Services Room programs in April. Sandra Gonzalez was hired as an administrative assistant in April. In June, Karina Vielma '01 joined the OME as assistant director for academic programs and advising.

#### **Karl Reid**

##### **Associate Dean and Director**

*More information about the Office of Minority Education can be found at <http://web.mit.edu/omel>.*

## Office of the Registrar

The Office of the Registrar promotes the educational goals of MIT by

- Conveying to the MIT community and beyond accurate, timely information and providing services related to enrollment, registration, and graduation
- Implementing and enforcing academic and administrative policies related to the above
- Creating, updating, preserving, and issuing academic records for past and current students and alumni
- Developing and communicating official subject, schedule, and curricular program information
- Managing and maintaining classroom space

In fulfilling its mission, the Office of the Registrar works with faculty members, Institute and faculty committees, departments, staff, and students to guide and assist in developing and modifying educational policies and procedures in accordance with Institute policy and local, state, and federal laws. The office will continue to gather, maintain, interpret, and share information through new technologies, broadened capacities, and enhanced communications in the areas that the Institute has entrusted to its charge.

### Accomplishments

The Institute continued to rely on the Registrar's Office in various and complex ways. The staff worked extremely hard to sustain educational initiatives and handle exceptions that arose. We continued to exploit the robustness of the MIT student information system, MITSIS, in meeting all of the challenges within this dynamic environment.

### Technological Highlights

In partnership with MIT Student Services Information Technology (SSIT), we

- Developed detailed test plans for the MITSIS migration project
- Implemented an online grade report on the web-based student information system (WebSIS) that allows advisors to access and print the academic records of their advisees
- Developed further enhancements to the degree tracking system, providing an application to the MIT Coop for the ordering of academic regalia

### Policy Work

This year, Registrar's Office staff worked with the Committee on Curricula (COC) in analyzing and approving course number 20 for the Biological Engineering program. Staff also advised senior administrators on several complex student issues involving tuition, registration, cross-registration, and/or degree programs.

## Operational Highlights

### Office staff

- Worked with the COC to approve 62 new undergraduate subjects, including six restricted electives in science and technology subjects and 10 communication-intensive subjects in humanities, arts, and social sciences (the COC also reviewed and approved 725 substantial changes to existing subjects, including four communication-intensive major subjects approved by the Subcommittee on the Communication Requirement)
- Worked with the Committee on Graduate School Programs to approve 94 new graduate subjects, as well as 720 substantial changes to existing subjects
- Worked with the COC on major curriculum changes for Courses 1, 2, and 16
- Worked with the COC on the approval of a new minor in Japanese, Course 21-F
- Scheduled and allocated rooms for approximately 2,400 subjects for both the fall and spring terms
- Developed a schedule plan to address the loss of a five more classrooms as a result of the Physics, Department of Materials Science and Engineering, Spectroscopy, Infrastructure project
- Developed, with the ARC, a coordinated first-year core exam/quiz website
- Developed the classroom reservation request website

## Classroom Management Highlights

### This year, we

- Led the effort as client for the renovation of classrooms 26-168, 26-204 and 26-210—renovations included modern room heating, ventilation and air-conditioning systems; new seating; new ceiling, wall, and floor treatments; and infrastructure for future fit-out of audiovisual systems
- Replaced or fixed seating, instructor's podium, carpeting, and acoustical wall panels in Room 2-105; installed new Level IV audiovisual system in instructor's podium
- Replaced tablet armchairs, carpeting, acoustical wall panels, ceiling grid, and lighting in Room 2-103
- Oversaw classroom upgrades to 3-343, 3-442, 12-102, 12-122, and 12-142, including new furniture, sliding chalkboards, tile floors, and motorized projection screens
- Installed new sliding chalkboards, paint, and tile floor in Room 35-225; new Level IV audiovisual system installed in instructor's podium
- Installed new sliding chalkboards, paint and carpeting in Room 37-212; new Level IV audiovisual system installed in wall rack
- Installed new Level IV audiovisual system in Room 66-160



- New video projectors and control systems were installed in Rooms 1-115, 1-132, 1-134, 4-364, 6-120, 14-0637, 26-100, 33-418, and 34-101
- Cost shared with the Department of Civil and Environmental Engineering for the installation of Level IV audiovisual systems in Rooms 48-308 and 48-316
- Installed new LCD video/data monitors in Rooms 56-167, 56-169 and 56-191
- Added images of classrooms to online classroom inventory

### **Data Requests**

Highlights include

- Providing data regarding graduate school diversity to the Provost's Office and the School of Engineering
- Providing data to programs under review, including Mechanical Engineering (Course 2A) and the Engineering Systems Division
- Providing data, including time-to-degree and gap, for analysis of the Cambridge–MIT Exchange
- Providing data to the Committee on the Undergraduate Program regarding exploratory subjects
- Developing student address history for housemasters

### **Registration**

In academic year 2005–2006, student enrollment was 10,206, compared with 10,320 in 2004–2005. There were 4,066 undergraduates (4,136 the previous year) and 6,140 graduate students (6,184 the previous year). The international student population was 2,518, representing 7.5 percent of the undergraduate and 36 percent of the graduate populations. These students were citizens of 110 countries. (Students with permanent residence status are included with US citizens.)

In 2005–2006, there were 3,550 women students (1,765 undergraduate and 1,785 graduate) at the Institute, compared with 3,601 (1,765 undergraduate and 1,836 graduate) in 2004–2005. In September 2005, 467 first-year women entered MIT, representing 47 percent of the freshman class of 1,001 students.

In 2005–2006, there were, as self-reported by students, 2,850 minority students (1,836 undergraduate and 1,014 graduate) at the Institute, compared with 2,934 (1,939 undergraduate and 995 graduate) in 2004–2005. Minority students included 349 African Americans (non-Hispanic), 80 Native Americans, 636 Hispanic Americans, and 1,785 Asian Americans. The first-year class entering in September 2005 included 417 minority students, representing 42 percent of the class.

## Degrees Awarded

Degrees awarded by the Institute in 2005–2006 included 1,129 bachelor's degrees, 1,457 master's degrees, 10 engineer's degrees, and 602 doctoral degrees—a total of 3,198 (compared with 3,358 in 2004–2005).

## Personnel Changes

Jeff DiNicola joined the Records Section in a promotion to administrative staff from the Schedules Office. Jessica Zdon joined the Schedules Office. Ri Romano was promoted to associate registrar.

### Mary Callahan Registrar

More information about the Office of the Registrar can be found at <http://web.mit.edu/registrar/>.

## Reserve Officer Training Corps

### Air Force Reserve Officer Training Corps

The mission of the Air Force Reserve Office Training Corps (AFROTC) is to produce leaders for the US Air Force and to build better citizens for America.

### Accomplishments

This was an outstanding year for AFROTC at MIT. Our cadre received several Air Force awards. The size and quality of our cadet corps improved and our cadets were rewarded by the Air Force for their performance. In addition, our cadets had several noteworthy accomplishments and performed community service activities for both MIT and the Cambridge area.

Over the past year, our staff was recognized by the Air Force with several individual and group awards. In October 2005, the Air Force's air education and training command inspector general visited our unit and rated us one of the best in the northeast region. We received the second highest rating attainable, an overall "excellent." In December, Technical Sergeant Vincent Meno was recognized as both the best unit personnel manager and the best noncommissioned officer in Air Force ROTC. In January, Major Gerard Sobnosky was recognized as the academic instructor of the year for the northeast region. In May, we received the High Flight Award for the best small detachment in the northeast region and are currently competing for the Right of Line Award, given to the best small detachment in Air Force ROTC. The Right of Line Award is the highest award that our detachment can win from the Air Force.

The overall size of our cadet corps has increased 15 percent since this time last year. While our goal of 20 percent total growth was not achieved, we did achieve that level of growth at MIT, Tufts, and Wellesley. Harvard remains the single biggest challenge for our detachment. This year, we lost two cadets at Harvard and were unable to replace them. However, the Air Force has emphasized some nontechnical majors recently, and we are hopeful that will improve our student numbers from Harvard.

**Year-end Enrollment in AFROTC as of June 2006**

	Freshmen	Sophomores	Juniors	Seniors	Total
MIT	14	10	1	3	28
Harvard	1	0	1	0	2
Tufts	2	1	1	3	7
Wellesley	1	1	0	1	3
<b>Total</b>	<b>18</b>	<b>12</b>	<b>3</b>	<b>7</b>	<b>40</b>

While we have focused on increasing the size of our cadet corps, we have not sacrificed the quality we expect from our cadets. Overall, the academic and fitness scores of our cadets have increased, which has in-turn made them more competitive candidates for Air Force opportunities. In fact, 23 of our 31 eligible cadets have been selected to attend Air Force summer intern programs, and 100 percent of our junior applicants were selected for flying positions. Half of our cadets who returned from field training last summer earned honors from their individual camps, and the overall field training scores for our cadets improved 40 percent from the previous year.

During the fall term, our cadets started the new academic year with the third annual cadet wing staff offsite, completing drafts for 19 documents that defined how the wing would operate for the year. In September 2005, we held new student orientation for 13 new cadets at Fort Devens Army Reserve Forces Training Area. The Army Reserve provided terrific support, especially in dining and lodging. We were able to use their confidence course this year and also took advantage of their leadership reaction course and physical training area. In November, we sponsored a Veterans Week program, starting with a tri-service prisoner of war/missing-in-action (POW/MIA) ceremony and 24-hour vigil on the steps of MIT's Stratton Student Center. We also participated in the Boston Veterans Day ceremony at City Hall Plaza. Also in November, we held our annual base visit for freshmen students at Hanscom Air Force Base. The base visit is an all-day event with nine active-duty speakers, a base tour, and lunch with personnel from the medical and services organizations. In December, we sent 19 students to Nellis Air Force Base in Nevada to see the Air Force Thunderbird and training range facilities. We also held our annual dining-in in December with guest speaker Col. Stephen A. Clark, an Air Force national securities fellow at Harvard.

During the spring term, we had several tri-service events with our Army and Navy ROTC counterparts. These included the Tri-service Military Ball, a guest speaker leadership lab, a field day sports competition, a pass-in-review, and an awards ceremony. In March, former secretary of the Air Force and Institute Professor Sheila Widnall provided the keynote speech for our Tri-Service Military Ball. Admiral William J. Fallon, commander of US Pacific Command, provided a very interesting presentation for the Tri-service Leadership Lab. The pass-in-review was very successful, and attendance was improved by an Air Force flyover of two A-10 attack planes to start the ceremony. We also sent six cadets to Westover Air National Guard Base for an orientation flight on a C-5 transport aircraft in March.

In extracurricular activities, we inducted 10 new cadets into the Arnold Air Society, sponsored the Silver Wings student organization at MIT, and sent two cadets to the

annual National Conclave. In addition, both of these student organizations conducted more than a dozen community service activities, volunteering more than 100 hours. In addition, we flew 10 sorties in the Flight Orientation Program out of Hanscom Air Force Base, which continues to be a huge hit with the freshmen. We also involved nearly 40 Air Force graduate students in our cadet physical training sessions—a great motivator for all cadets involved.

Our forecast for next year looks great. We are working with a large number of interested freshmen and are hopeful that we will again meet or exceed our goal of 20 percent growth. Our cadets continue to excel, and we are certain that their work ethic will produce more awards and honors for our detachment in the year to come.

### **Staffing Changes**

Captain Kristin Hort from Hanscom Air Force Base will replace Major Justine Cromer as an assistant professor of aerospace studies in July 2006. Major Cromer plans to accept a position with the National Guard headquarters in Washington, DC.

Captain Melissa Keller from Hill Air Force Base in Utah will replace Major Gerard Sobnosky as an assistant professor of aerospace studies in July. Major Sobnosky has been reassigned to Los Angeles Air Force Base.

### **Lieutenant Colonel Timothy Slauenwhite United States Air Force**

*More information about the Air Force Reserve Officer Training Corps can be found at <http://web.mit.edu/afrotc/www/>.*

### **Army Reserve Officers Training Corps**

The mission of the Army Reserve Officers Training Corps (AROTC) is to be recognized as the best university leader development program in the nation, honing the leadership and management qualities of the gifted young Americans who will lead our armed forces in the 21st century. We aim to transcend institutions so that future leaders of government, industry, business, and academia carry with them our values and are armed with the experience of service to the nation through ROTC.

We commissioned nine officers this year. As of May 2006, 52 students were enrolled in the Army ROTC program. We are a diverse organization. Of our 52 students, 12 are members of minority groups (23 percent), and 14 are women (26 percent).

### **Accomplishments**

The improved visibility of our program has increased enrollment by 29 percent this year. We assigned our instructors to be liaison officers to each of our schools in order to facilitate student interest and faculty awareness of our program. Harvard, in particular, has made great strides in increasing participation in ROTC, especially with freshmen. MIT student participation has remained steady.

Our instructors participated for a third consecutive year in the IAP Leadership and Management session, accredited by the Sloan School. We received many positive comments, including “The inclusion of the ROTC guys was a very great idea. Their examples were both very simple and relevant. They also handled the class very well. I have visited other leadership classes, but the contribution of the captain and the sergeant were invaluable. Military people should be always included in such classes.”

We also participated as subject matter experts for the Bosnia simulation exercise conducted by the Sloan School.

Fifty percent of our graduating seniors achieved “best qualified,” which is the highest rating a senior can achieve in the Army summer training program. Our percentage surpassed those of all other ROTC units nationwide.

#### **Year-end enrollment in AROTC as of June 2006**

	<b>Freshmen</b>	<b>Sophomores</b>	<b>Juniors</b>	<b>Seniors</b>	<b>Total</b>
MIT	3	1	2	1	7
Harvard	8	2	2	3	15
Wellesley	0	1	0	1	2
Tufts	5	4	2	2	13
Other	4	7	2	2	15
<b>Total</b>	<b>20</b>	<b>15</b>	<b>8</b>	<b>9</b>	<b>52</b>

AROTC enrolled two student nurses into the program this year from our North Shore schools, which will help fill a critical Army-wide nurse shortage. These are the first nurses ever enrolled in the MIT AROTC program.

In November 2006, we participated in the annual tri-service POW/MIA ceremony and 24-hour vigil on the steps of MIT’s Stratton Student Center.

In the fall and spring we conducted our field training exercises with all of our cadets at Camp Edwards (Otis Air Force Base) and Fort Devens. During this weekend training the cadets participated in a wide variety of activities, including leadership reaction exercises, land navigation, military tactics and patrol training, rifle marksmanship, and a helicopter orientation ride.

In February 2006, we conducted our annual combat water survival test. The purpose of this test and training is for cadets to gain confidence in the water while wearing military equipment. This is required training for all cadets and serves as a commissioning requirement for future officers. This event was planned and successfully executed by our cadets, serving as an excellent example of the leadership training provided by our department.

Senior Cadet Caroline Kennedy received the George C. Marshall Leadership Award, which recognizes the best cadet in the battalion. She participated in a four-day leadership seminar hosted by the Army in Lexington, VA, in April 2006.

The Army ROTC detachment ended the year by hosting the Tri-service Award Ceremony in Kresge Auditorium.

### **Individual Achievements**

Master Sergeant Raymond Nunweiler was named Instructor of the Year for our region, which has 20 other Army ROTC instructors.

The Army assigned two new instructors: Major Diana Gibbs and Captain Dana Hudson.

### **Plans for the Future**

Army ROTC's biggest challenge is to raise the number of MIT cadets in the program. Of the seven current MIT cadets in AROTC, only four are currently contracted to join the Army as officers upon graduation (the others are "participants", who may or may not decide to contract). With only seven cadets (four contracted), MIT places among the lowest "host" Army ROTC institutions of the 272 the nation in terms of number of cadets enrolled. This is a significant issue, and one noted by US Army Cadet Command.

### **Lieutenant Colonel Leo McGonagle United States Army**

*More information about the Army Reserve Officer Training Corps can be found at <http://web.mit.edu/armyrotc/>.*

### **Naval Reserve Officers Training Corps**

The mission of the Naval Reserve Officers Training Corps (NROTC) program at MIT is to develop midshipmen mentally, morally, and physically. We imbue them with the highest ideals of duty and loyalty and with the core values of honor, courage, and commitment so that we commission college graduates as naval officers who possess a basic professional background, are motivated toward careers in the naval service, and have the potential for future development in mind and character. We expect them to assume the highest responsibilities of command, citizenship, and government.

At MIT, the officers and staff assigned to the Naval Science Department are committed to ensuring that every midshipman balances his or her time and energy to realize the tremendous benefits of an education at MIT, Harvard, or Tufts, along with the professional development opportunities afforded by the NROTC program.

During the 2005–2006 academic year, 18 midshipmen from MIT, Harvard, and Tufts were commissioned as ensigns and second lieutenants (one midshipman projected to commission in December 2006).

The Navy's financial assistance for MIT NROTC students totaled \$742,900 for the year. We are expecting approximately 15 new freshmen to enter the program this year.

### **Accomplishments**

Academic year 2005–2006 was successful in many regards.

During the summer, all scholarship midshipmen participate in active duty training with deployed naval units. Last summer, midshipmen served aboard submarines, maritime patrol aircraft, aircraft carriers, and amphibious assault ships. This training provides invaluable experience for future naval officers.

MIT's NROTC completed instruction in nine naval science courses. These classes are convened at 7:30 am so as not to interfere with the academic schedules of the host and affiliate universities. These classes are monitored by the visiting professor of naval science at a frequency appropriate to ensure a high quality of instruction. Harvard and Tufts provides van transportation to and from our MIT unit for their respective students.

#### Year-end enrollment in NROTC as of June 2006

	Freshmen	Sophomores	Juniors	Seniors	Total
MIT	5	4	5	9	23
Harvard	6	1	10	6	23
Tufts	6	0	5	4	15
<b>Total</b>	<b>17</b>	<b>5</b>	<b>20</b>	<b>19</b>	<b>61</b>

The MIT NROTC unit hosted various Navy and non-Navy guests, including Admiral William J. Fallon (commander, US Forces Pacific), Commander Robert I. Douglass (commanding officer, USS Albuquerque, SSN 706), William Kristol (Harvard visiting professor and news commentator), Stephen Rosen (Harvard professor), and Captain Nathaniel Fick (author, *One Bullet Away*, and the command master chief petty officer from Naval Station, Newport, RI).

MIT midshipmen are involved in numerous activities throughout the year. During the last two weeks of the summer, the midshipmen are in town preparing for the arrival of the incoming class. A 10-day training event is held in Newport to orient the high school graduates to life as a student-military member. This program is designed, coordinated, and implemented fully by the midshipmen. In the fall, an annual formal ball was held to celebrate the birthdays of both the Navy and Marine Corps. Midshipmen participated in the Veterans Day parade and POW/MIA day in Boston, as well as the 24-hour POW/MIA vigil held each year at MIT. The midshipmen battalion was also active in community service, including cleaning up and planting flowers along the Charles River Esplanade, cleaning up after a NASCAR racing event, running in local races that support veteran organizations, and hosting a military excellence competition for area Navy junior ROTC high schools.

Midshipmen participated in military excellence competitions at Villanova, Cornell, Boston University, and at the George Washington Sailing Regatta. An annual sailing regatta was held at the MIT sailing pavilion in April, and NROTC units from the entire East Coast competed. Purdue and Ohio State University also sent teams to the event. The Marine Option midshipmen completed four field training exercises in preparation for future service in the Marine Corps. The annual Tri-Service Ball was held in the spring in coordination with the Air Force and Army ROTC units.

The midshipmen battalion ended the year by hosting the Tri-Service ROTC pass-in-review ceremony on Barry Astro turf Field. The guest speaker was Lieutenant General David H. Petraeus (commanding general, US Army Combined Arms Center and Fort Leavenworth; commandant, US Army Command and General Staff College; deputy commanding general for combined arms, US Army Training and Doctrine Command; director, Joint Center for International Security Force Assistance).

We completed another year of leadership experience gained from participating in a largely self-run organization. The MIT NROTC midshipmen are responsible for handling all the operational, financial, and other core responsibilities that any large organization requires. This provides valuable leadership lessons and tools, which midshipmen also must learn how to pass on as they are rotated through the organization.

Midshipmen utilize their leadership and management skills in ways that have benefited their respective school communities. Midshipmen were teaching assistants for classes, held executive board positions on their schools' chapters of national organizations, served in leadership positions within their dormitories and fraternities to build community within their living groups, led Bible study and church groups, and played key roles in such school athletic teams as soccer, crew, lacrosse, ballroom dance, squash, swimming, basketball, and football.

The culmination of four years of training was reached on Commencement Day in June, as nine MIT Naval ROTC students, along with the MIT Army and Air Force ROTC cadets, were commissioned as ensigns and second lieutenants in a service that took place alongside the USS Constitution at Charlestown Navy Yard. The guest of honor, Rear Admiral (Select) Thomas J. Eccles (program manager, Advanced Undersea Systems) gave an inspiring speech to the new officers at the ceremony.

### ***Staffing Changes***

#### *Hails*

Lieutenant Yulee Newsome, a submarine officer (nuclear), arrived in October 2005 to assume the position of junior class advisor and to instruct weapons and naval engineering. Lieutenant Scott Esher, a surface warfare officer (nuclear), arrived in January 2006 to assume the position of senior class advisor and to instruct navigation. Gunnery Sergeant Ismael Sagredo, assistant marine officer instructor and Silver Star recipient for his actions in the Battle of Fallujah (April 2004), arrived in May 2006. Janice Kopacz arrived in February 2006 to assume the position of government secretary.

#### *Farewells*

Venessa Manzano departed in October 2005 to become assistant director of a charitable organization in New York City. Lieutenant Aaron Taylor departed in December 2005 to make his transition to civilian employment. Lieutenant Ryan Eul departed the area in February 2006 to make his transition to civilian employment. Master Sergeant Don Oliveira departed the command in May 2006 and was assigned as the base operations chief at the Marine Corps Air Station in Beaufort, SC.



Naval Service Training Command has deactivated all enlisted billets of NROTC beginning October 2006 and plans to replace the billets with civilians beginning in October 2007 (funding not yet secured). Duties and responsibilities will be borne by staff onboard.

**Captain Robert D. Holland**  
United States Navy

*More information about the Navy Reserve Officer Training Corps can be found at <http://navyrotc.mit.edu/>.*

## **Office of Special Projects**

The Office of Special Projects assists with the development of new DUE initiatives and supports a number of special educational activities and faculty committees.

### **Administration of the MIT Communication Requirement**

The Office of Special Projects coordinates the administration of the Communication Requirement—now in effect five years—and supports the work of the faculty Subcommittee on the Communication Requirement (SOCR). We continue working with other offices within DUE—especially the Registrar’s Office and Academic Services—to improve procedures and clarify policies associated with the requirement. We work closely with the undergraduate offices in the departments to ensure that the communication intensive subjects in the major (CI-M) are running smoothly and that students are satisfying the requirement as specified by the faculty. We interact regularly with the Humanities, Arts, and Social Sciences (HASS) Education Office and with the associate dean of the School of Humanities, Arts, and Social Sciences (SHASS) on matters pertaining to the communication intensive subjects in HASS.

Since effective collaboration among SOCR, the Committee on Academic Performance, and our office is an important aspect of tracking and enforcing students’ progress toward completion of the requirement, we work to maintain strong communication among these constituencies. The office has primary responsibility for auditing students’ progress in the requirement and spends considerable time on this activity.

The office continues to receive proposals for new CI-M subjects and coordinates their review by SOCR before forwarding them to the Committee on Curricula for final approval. The office also receives petitions from students seeking exception to some aspect of the requirement and advises students on all aspects of its satisfaction. We work with the dean for undergraduate education to assess budget requests associated with CI-M subjects and other components of the requirement, and to allocate the support necessary for their delivery.

During 2005–2006, a program evaluation was launched to study the effectiveness of implementation of the requirement. This effort involved issuing a request for proposals in early October and continued through interviews with possible outside consultants and the decision to begin the assessment using in-house expertise. These activities are discussed in more detail in SOCR’s report. The evaluation is expected take place in three phases over approximately 18 months.

More information about the Communication Requirement can be found at <http://web.mit.edu/commreq/>.

### **Office of Study Abroad and Foreign Scholarships**

After several years' effort to make the case for a more visible and dedicated study abroad office, we are pleased to report that in February 2005, MIT's Office of Study Abroad and Foreign Scholarships was opened in a temporary location in Building 26. For the coming year, the goals of this office are

- To serve as the focal point of information for undergraduates and their advisors about study abroad and foreign scholarship opportunities
- To provide support to students as they investigate and plan a term or year away from MIT, while they are away, and when they return to MIT
- To stimulate the development of new study abroad programs beyond the opportunities that currently exist for MIT undergraduates
- To provide proactive support and guidance to students applying for certain distinguished foreign scholarships and to the faculty Committee on Foreign Scholarships
- To serve as the home for the Cambridge-MIT Exchange Program (CME), the Killam Fellowship program (an exchange program with a number of US and Canadian universities), and the new MIT-Madrid Program

In spring 2005, our budget request for additional staff to support this effort was approved in part, and we hired a staff member to serve as MIT's first full-time assistant dean to oversee MIT's first dedicated study abroad office. As noted above, we recently introduced a study abroad option for MIT students at the Universidad Polytécnica de Madrid; in the spring of 2006, five MIT students participated in this new program.

In 2005–2006, 72 undergraduates studied abroad for either a term or a year, most of them in Western European countries. Thirty-six of these students spent a year in England through the Cambridge-MIT Exchange Program.

During the year, we continued to work with Professor Linn Hobbs to improve the advice and guidance provided to students throughout the application and interview process for a number of the distinguished international study grants that require endorsement by MIT. This year 92 students indicated an interest in applying for one or more of the foreign scholarships supported through this office. Twenty-four students made 37 applications; 10 were invited for national interviews or were short-listed. Six students won scholarships: two Fulbright, three Gates, and one Mitchell (for study in Ireland).

Professor Hobbs has assembled MIT's history with respect to the major foreign scholarships. His report summarizes the status of applications to and awards of major foreign scholarships to MIT students. It includes an assessment of the success of MIT students in competing for these scholarships and of the effectiveness of the Committee on Foreign Scholarships (and of the fledgling office now attached to that committee)

in shepherding MIT students through the major foreign scholarship competitions. The report proposes additional modes of recruiting deserving students to these unique opportunities and, most important, recommends a more integrated approach to scholarship and fellowship opportunities throughout the Institute.

Compared with peer institutions, MIT has not done a good job of providing the sort of support for undergraduates that prepares them for eligibility in these programs. An additional role envisioned for the new Office of Study Abroad and Foreign Scholarships is to improve the provision of advice and guidance to students—well in advance of when they would apply to such programs and throughout the application and interview process. We recently completed a search process for a temporary, one-year staff member to serve as a program advisor for the distinguished foreign scholarships. This individual will start in July and continue the work begun last year to strengthen MIT students' competitiveness for these distinguished awards.

More information about the Study Abroad Office can be found at <http://web.mit.edu/studyabroad/>.

### **Cambridge-MIT Undergraduate Student Exchange Program**

MIT is in the fifth full year of an undergraduate student exchange program that began as an initiative of the Cambridge-MIT Institute (CMI). The Cambridge-MIT Exchange (CME) has received substantial financial assistance from the government of the United Kingdom. From the first year of the exchange program, management of CME has been a responsibility of the Office of the Dean for Undergraduate Education, the staff of which work with partners at Cambridge University. By the end of this academic year, about 350 students from both sides will have participated in the full-year program. Fourteen MIT departments currently offer this option to their students, including most major engineering and science departments. There have been considerable administrative challenges to developing effective processes that worked for both Cambridge and MIT systems. We are pleased that most of these issues have been resolved and that both institutions remain optimistic and enthusiastic about the long-term prospects for the program.

The experiences of both MIT and Cambridge exchange students revealed that we had a fairly shallow understanding of the differences between the two educational systems. MIT students going to Cambridge were sometimes disoriented by the more self-directed and independent teaching and learning environment, one in which the burden of learning is much more on the individual student. Since typical MIT subjects have frequent and graded homework and tests, MIT students must adjust quickly to a very different style at Cambridge—one that provides them more apparent free time. The best MIT candidates for this exchange are ones who are personally resilient and adaptable and who don't mind the challenge of learning in a relatively unstructured but equally demanding academic environment.

Each year we introduce improvements in the way we prepare both groups of students for their exchange year. MIT students are now given mock exams in January to help them prepare for the year-end exams at Cambridge. Our students participate in

seminars held at MIT to prepare them for their Cambridge coursework. For the last three years, the MIT Program in Writing has offered a weeklong workshop to prepare MIT students for the sort of writing and library research they will be expected to do at Cambridge. This workshop is a required activity for students who will need to satisfy the Communication Requirement while at Cambridge.

The exchange experiences of MIT and Cambridge students have stimulated a number of faculty members and departments to think about ways to build on what has been learned to date about the strengths of the educational systems of both institutions. Several engineering departments at Cambridge and at MIT are part of a CMI-underwritten “intercultural experiment in pedagogy” that attempts to draw on the strengths of each system and combine the best of both.

A number of fund-raising initiatives continued this year both at MIT and at Cambridge, and with the help of MIT chancellor Phillip Clay, we are working more closely with Resource Development at MIT to establish a successful fund-raising strategy.

More information about the Cambridge-MIT Exchange can be found at <http://web.mit.edu/cmi/ue/>.

### **MacVicar Faculty Fellows Program**

The dean for undergraduate education is responsible for the programs associated with the MacVicar faculty fellows, including the monthly meetings of the MacVicar faculty fellows, the yearly call for nominations for new fellows, and the events held on MacVicar Day in honor of the new fellows.

This office, working closely with the DUE and the provost, has assumed the bulk of the organizational responsibility for the MacVicar programs, including planning the agenda for the monthly lunch meetings, working with departments as fellows are being nominated, and working with Office of the Secretary of the Corporation to plan and organize the MacVicar Day program. This year, MacVicar Day featured programs that have developed in recent years, involving UROP, the Public Service Center, and MIT’s international development initiatives. “UROP and Beyond: MIT Students in the Lab and in the World” featured student poster sessions in the Stata Center’s Student Street. The new MacVicar fellows are Professors Samuel Bowring, Dennis Freeman, and Leslie Norford.

More information about the MacVicar Faculty Fellows Program can be found at <http://web.mit.edu/provost/macvicar/>.

### **d’Arbeloff Grants Program**

The dean for undergraduate education chairs the d’Arbeloff Grants Committee, a group that oversees the resources provided through the Alex and Brit d’Arbeloff Fund for Excellence in Education. This area of the DUE supports the work of that subcommittee, working closely with academic departments and the CUP as well as with the Council on Educational Technology. On behalf of the Task Force on the Undergraduate Education Commons, we issued a call for d’Arbeloff Grant proposals and reviewed 33 preliminary

proposals. Three educational areas were of particular interest to the task force: freshman project-based experiences; the first-year HASS experience; and initiatives to broaden the fundamental offerings in science and engineering. Ten proposals received partial or full funding for projects to be piloted during the 2006–2007 academic year. In May and June our office, working closely with staff in the Teaching and Learning Lab, convened regular meetings with the principals involved in the six initiatives with a view to supporting the implementation of these activities on behalf of the task force and the CUP.

More information about the d'Arbelloff Grants Program can be found at <http://web.mit.edu/darbelloff/>

### **Support to Faculty Governance**

Many offices within DUE provide special support to standing committees of the faculty by virtue of the relationship between their administrative responsibilities and associated faculty policy issues. For example, the Registrar's Office supports the work of the Committee on Curricula, and the Admissions Office supports the work of the Committee on Undergraduate Admissions and Financial Aid. These responsibilities strengthen the relationship between DUE and the faculty and assure that efforts are as aligned as possible. As noted above, this area of DUE provides support to the Subcommittee on the Communication Requirement as a consequence of our administrative oversight of the Communication Requirement.

The Committee on the Undergraduate Program is also staffed and supported by the Office of Special Projects, which provides valuable links between the work of the DUE and that of the faculty committee that has the most responsibility for the MIT undergraduate program. At present, the office is working closely with the committee to monitor the experimental Sophomore Exploratory Subject Option (in the third of five years); implement the recommendations of the CUP/CSL Report on Advising and Mentoring of Undergraduates, which was issued in 2005; develop further advising initiatives; and provide input to the work of the Task Force on the Undergraduate Educational Commons as well as prepare for the implementations of that group's recommendations.

Staff in this office worked closely with the DUE and with Professor Margery Resnick as the new faculty Committee on Academic Integrity wrote and published the *Handbook on Academic Integrity* for students. The handbook was issued to all faculty members and graduate and undergraduate students this past term, and plans are under way to provide a handbook for faculty with advice on addressing academic integrity issues.

We sponsor periodic meetings on behalf of the DUE to bring together faculty undergraduate officers in all departments to keep them up to date on Institute activities that affect them and to provide them with a forum to discuss issues of common concern.

More information about the Committee on the Undergraduate Program can be found at <http://web.mit.edu/committees/cup/>.

## **Staff to the Task Force on the Undergraduate Educational Commons**

Again this academic year, we provided high-level staff support to the work of the Task Force on the Educational Commons, now in its second year of deliberations. This group, under the chairmanship of professor of chemistry and dean of the School of Science Robert Silbey, has reviewed the goals, content, and structure of MIT's current core educational requirements as well as other aspects of the undergraduate experience that are common to all MIT students. Over the past year, the office has worked closely with the executive committee of the Task Force and with the working groups that have been charged to focus on specific commons issues and areas. A considerable quantity of MIT educational data has been assembled by office staff to inform these deliberations. The office maintains an extensive website for members only that contains an entire record of task force deliberations; there is also an open site that chronicles the work of the task force and its subcommittees.

In addition to working with the task force proper, we advised and supported the work of the Student Advisory Committee (SAC), whose report to the task force was presented in the late spring.

Through the auspices of the task force, we have reestablished regular meetings between faculty teaching in the science core and those engineers and scientists involved in core departmental subjects. It is the wish of the task force that more be done to open lines of communication between and among departments and schools, so we plan to expand our efforts in this area over the next year.

The task force reported its findings and likely recommendations to the MIT faculty in a number of meetings in the spring; among them were meetings with Academic Council, all MIT department heads, and an open meeting for the entire MIT community. A report will be released at the end of this summer that will stimulate further discussions among the faculty and begin an organized implementation effort. We are in the process of identifying on behalf of the DUE those aspects of the task force recommendations that will be either the full responsibility of offices or individuals within the Office of the Dean for Undergraduate Education, or where assistance with implementation will be expected of DUE offices or staff members.

More information on the Task Force on the Undergraduate Educational Commons can be found at <http://web.mit.edu/committees/edcommons/>.

## **Staff of the Office of Special Projects**

At the start of the fall 2005 term, Anne McLeod resigned from her position with the Task Force on the Undergraduate Educational Commons to start a new position as a secondary school educational consultant. Stephanie Gayle left later in the term to take up a new position within the Alumni Office. In February, we welcomed Genevieve Filiault, administrative assistant, and Malgorzata Hedderick, assistant dean for study abroad. Joanne Straggas is retiring at the end of this academic year but will continue to assist the office with the development of the MIT-Madrid Program.

Jennifer Cook was recognized with a DUE Infinite Mile Award for her extraordinary efforts on behalf of the Office of Special Projects during its multiple relocations during this past academic year. Our offices continue to be housed in temporary quarters.

Staff members are: Anna Frazer, assistant dean for the Communication Requirement; Malgorzata Hedderick, assistant dean for study abroad; Joanne Straggas, senior project manager (part-time); Jennifer Cook, administrative assistant; Nancy Crosby, administrative assistant; Genevieve Filiault, administrative assistant.

**Margaret S. Enders**

**Director**

**Senior Associate Dean for Undergraduate Education**

### **Student Financial Services**

Student Financial Services (SFS) enables all students to meet their financial obligations while ensuring access to an MIT education without regard to their financial need. We strive to work collaboratively with other MIT offices by creating a focal point for student contact and making all administrative tasks, not just those associated with financing an MIT education, less time-consuming for students so they can concentrate on their studies, research, and extracurricular activities.

Our core responsibilities concern five functional areas—Student Accounts, Student Financial Aid, Student Employment, Student and Parent Loans, and Student Resource Development. We bill and collect tuition, fees, and other Institute charges, and we counsel students and families on payment options and financial management. We administer need-based financial aid programs from institutional, federal, state, and private sources for undergraduates and graduate students, counseling them and their families on financial aid and financing options. We develop term-time and summer student employment opportunities for undergraduate and graduate students, serve as the human resource office for students and their employers and administer the Federal Work-Study Program, including community service jobs. We manage undergraduate, graduate, and parent educational loan programs, including MIT's Educational Loan Plan for faculty and staff, providing borrowers with advice on debt management strategies. We maintain the stewardship program for institutional scholarship and loan funds.

### **Operating Activities**

#### ***Tuition, Fees, and Other Major Institute Charges***

Tuition, fees, and other major Institute charges assessed through Student Accounts totaled \$403,197,601 in 2006, a 2.3 percent increase over the previous year, while tuition assessed totaled \$349,893,938, a 3.9 percent increase.

Graduate tuition comprised \$221,134,555, accounting for 63 percent of tuition, and undergraduate tuition was \$128,759,383, or 37 percent.

## **Tuition, Fees, and Other Major Institute Charges**

Tuition	\$349,893,938
Student activity fee	\$ 957,200
Housing	\$ 36,486,367
Dining	\$ 2,886,403
Health insurance	\$ 11,045,803
Medical/dental	\$ 479,597
MIT payment plan finance charges	\$ 81,313
Late payment fees	\$ 366,980
<b>Total</b>	<b>\$403,197,601</b>

### ***Student Refunds***

In 2006, 5,813 refund checks totaling \$17,721,534 were issued to students. This represents a 23 percent decrease in the number of checks and an 18 percent decrease in total dollars refunded. Refunds are issued only when credits exceed charges. This decrease in refunds issued is the result of the earlier billing of freshmen housing, the result of a successful partnership initiated by SFS with Housing and Student Services Information Technology (SSIT), which was completed prior to the start of academic year 2005–2006.

### ***Student Accounts Receivables***

The student accounts receivables balance as of June 30, 2006 was \$3,970,811, of which \$1,258,275 is for the current summer term. This leaves outstanding student accounts receivables of \$2,612,536—the lowest year-end balance since SFS developed a financial dashboard to track its metrics in 2003. Of the outstanding balance, 55 percent is for periods prior to spring 2006.

### ***Educational Loan Notes Receivables***

From 2002 to 2006, educational loan notes receivable for all Institute educational loan programs—including Federal Perkins Loans, MIT Technology Loans, the MIT Parent Loan Plan, and MIT Educational Loans to faculty and staff—declined 31 percent from its high of \$81,107,639 to \$56,171,154. As a result, SFS did not need to borrow funds from the Institute to support its educational loan portfolio. Two factors continue to account for the decline in educational loan notes receivables. The first is less usage of the MIT Technology Loan by graduate students, since the Institute no longer lends to them from this program. The second is increased consolidation of federal loans, which results in full payoff of Federal Perkins Loans for some borrowers. As of July 1, 2006, the interest rate for federal consolidation loans will change from a variable to a fixed rate. As a result, we expect fewer consolidations in the immediate future.

### ***MIT Educational Loan for Faculty and Staff***

In 2006, \$1,340,301 was loaned to MIT faculty and staff, \$1,094,811 was collected, and the year-end receivable balance for that program was \$4,349,251. In the past six years, the year-end receivable balance in this Institute benefit program has increased 73 percent.



## **Undergraduate Financial Aid**

### ***Overview***

MIT recruits and enrolls the most talented and promising students without regard to their financial circumstances. MIT awards aid only for financial need. It does not award undergraduate scholarships for academic or athletic achievements or for any other nonfinancial criteria. MIT guarantees that each student's demonstrated financial need is fully met.

MIT considers that parents and students have primary responsibility, to the extent that they are able, for paying the costs of an undergraduate education. In 2005–2006, the annual cost of an MIT education totaled \$45,000 per student: \$32,300 for tuition and fees, \$9,500 for room and board, an estimated \$2,800 for books, supplies, and personal expenses, and an average of \$400 for travel. With 4,053 undergraduates enrolled, the total cost for all undergraduates was \$182.4 million. Of this amount, families paid \$97.5 million, or 54 percent.

Financial aid covered the remaining 46 percent with 3,827 undergraduates, or 94.5 percent of the 4,053 registered undergraduate students, receiving \$83,231,294 in need- and merit-based financial aid. This includes scholarships, grants, student loans, and employment from institutional, federal, state, and private sources.

### ***Sources of Undergraduate Financial Aid***

MIT continued to be the largest source of undergraduate financial aid, providing 72 percent, 3 percentage points higher than the prior year. Ninety percent of the MIT financial aid was scholarships, 1 percent loans, and 9 percent employment.

The US Department of Education remained the second-largest source of financial aid to MIT undergraduates. Fifty-two percent of the federal aid that MIT undergraduates received was in the form of a loan, either a Federal Direct or a Federal Perkins Loan. Thirty-nine percent was grants or scholarships (a Federal Pell Grant, a Federal Supplemental Educational Opportunity Grant, a Robert C. Byrd Scholarship, or an ROTC scholarship). The remaining 9 percent of federal aid was employment under the Federal Work-Study (FWS) Program, including FWS Community Service.

Private sources of financial aid—including charitable and civic organizations, corporations, foundations, banks, and other financial institutions—were the third-largest source of financial aid to MIT undergraduates. This aid included private scholarships and alternative student loans (so-called to distinguish them from federal loans). Eighty-one percent of the private aid was in the form of scholarships and 19 percent in loans.

State aid is not a significant factor in the financing of an MIT education even though several states, including Massachusetts, allow their residents to receive a state scholarship while attending MIT.

## Forms of Undergraduate Financial Aid

Scholarships and grants from all sources totaled \$67,299,963, a 4.75 percent increase over the prior year, with 2,949, or 73 percent of the undergraduates, receiving scholarships. MIT scholarships rose \$4,233,835 (8.5 percent) to \$54,273,183, with 58 percent of the undergraduates receiving an average MIT scholarship of \$23,283. The increase in the average scholarship was 7.5 percent from 2005 to 2006. Approximately 65 percent of MIT scholarships were funded from restricted sources and 35 percent from the general Institute budget or unrestricted sources.

During the 2005–2006 academic year, 43 percent of undergraduates borrowed \$9,247,470 (a 5.6 percent decrease) and the average loan was \$5,238. From 1998 to 2006, undergraduate borrowing decreased significantly, a consequence of lowered self-help expectations and a change in financial aid policy that allowed private, or outside, scholarships to replace loans and work. Median debt at graduation decreased 43 percent from \$23,640 in 1998 to \$13,616 in 2006. Approximately 45 percent of the undergraduates in the graduating Class of 2006 borrowed at some point during their education. For those borrowing, the range of debt was \$1,000 to \$194,250 with the 90th percentile at \$34,225. The average debt was \$17,956.

Student wages from on-campus employment and employment under the Federal Work-Study Program, including both on- and off-campus programs, totaled \$6,683,861 with 2,688 students, or 66 percent, earning an average of \$2,486. While student loans are decreasing, student employment is increasing. There was an increase of approximately 4 percent in the number of undergraduates working and an 11 percent increase in total earnings, for a 7 percent increase in average earnings.

### Undergraduate Financial Aid

Source	Scholarships/Grants		Loans		Employment		Total*	
	Amount	Students	Amount	Students	Amount	Students	Amount	Students
Institutional	\$54,273,183	2,331	\$627,555	194	\$5,426,802	2,081	\$60,327,540	3,203
Federal	\$5,046,766	956	\$6,747,430	1,575	\$1,257,059	607	\$13,051,255	2,237
State	\$242,125	147	\$0	0	\$0	0	\$242,125	147
Private	\$7,737,889	1,367	\$1,872,485	127	\$0	0	\$9,610,374	1,449
<b>Subtotal*</b>	<b>\$67,299,963</b>	<b>2,949</b>	<b>\$9,247,470</b>	<b>1,745</b>	<b>\$6,683,861</b>	<b>2,688</b>	<b>\$83,231,294</b>	<b>3,827</b>

\*The student subtotal and totals are unduplicated numbers of students.

## **Undergraduate Parent Loans**

Approximately 9.5 percent of undergraduate families, or parents of 383 students, borrowed through a loan program for parents administered by MIT. Total parent loans were \$7,197,755 and Federal Direct PLUS loans accounted for 78 percent of the dollars borrowed. For those parents borrowing, the average loan was \$18,793, a 2 percent increase from last year.

## **Family Incomes of Undergraduate Students**

This is the second year in which we are tracking the distribution of undergraduate family incomes according to the quintiles from the US Census Bureau Current Population Survey. In 2005, 15.5 percent of MIT families were in the first two income quintiles. That percentage dropped to 14 percent in 2006. Those income quintiles and the percentage of MIT undergraduate families in each quintile are as follows.

A number of our peer institutions, including Harvard, Stanford, Yale, and the University of Pennsylvania, enhanced their undergraduate financial aid programs for families with incomes below a certain threshold. Harvard no longer expects parents with incomes of less than \$60,000 to contribute to the cost of their children attending Harvard. In addition, Harvard will reduce the contributions of families with incomes between \$60,000 and \$80,000. Yale and Stanford eliminated a financial contribution from parents with incomes under \$45,000 and significantly reduced the expected contribution of families with incomes between \$45,000 and \$60,000. The University of Pennsylvania replaced student loans with grants for students from economically disadvantaged families with incomes below \$50,000.

### **Income Distribution of MIT Undergraduates**

<b>Income quintile</b>	<b>Income range</b>	<b>Percentage of MIT undergraduates</b>
First	\$0–24,780	7.5
Second	\$24,781–43,400	6.5
Third	\$43,401–65,832	9
Fourth	\$65,833–100,000	16
Fifth	\$100,000 and up	61

## **Graduate Financial Aid**

### **Overview**

Graduate students are provided with tuition support in connection with research assistant, teaching assistant, and fellowship appointments. These awards are supported by either MIT funds (general Institute budget or nonsponsored funds) or a sponsored program (research projects or sponsored funds). Tuition revenue support from MIT funds is considered financial aid for purposes of reporting under generally accepted accounting principles. In addition to these sources of financial aid, which are not administered or reported by SFS, graduate students are eligible for need-based financial aid, including student loans and employment under the Federal Work-Study Program, both of which are administered and reported by SFS.

In 2006, 1,091 graduate students (17.8 percent of the 6,140 registered graduate students) received need-based financial aid totaling \$38,010,874. Loans totaled \$37,202,925, an increase of less than 1 percent from the prior year, with 992 students (16 percent) borrowing an average of \$37,502. The average amount borrowed rose 7 percent in the past year. Graduate student employment under the Federal Work-Study Program, including on- and off-campus programs, totaled \$807,949, with 115 graduate students (2 percent) earning an average of \$7,026.

### Graduate Need-Based Financial Aid

Source	Loans		Employment		Total	
	Amount	Students	Amount	Students	Amount	Students
Institutional	\$2,150	1	\$0	0	\$0	0
Federal	\$14,825,095	779	\$807,949	115	\$15,633,044	809
State	\$893,503	40	\$0	0	\$893,503	40
Private	\$21,482,177	384	\$0	0	\$21,482,177	384
<b>Subtotal</b>	<b>\$37,202,925</b>	<b>992</b>	<b>\$807,949</b>	<b>0</b>	<b>\$38,008,724</b>	<b>1,044</b>

SFS tracks the on-campus employment earnings, including stipend payments, associated with research assistant, teaching assistant, and fellowship appointments, as well as wages for hourly employment positions. In 2006, 4,371 graduate students (approximately 71 percent) received \$69,712,824 in on-campus employment earnings, most of which is not need-based. According to the Payroll Office, approximately 5 percent of the graduate students paid were hourly workers.

### Other Accomplishments

SFS is committed to expanding its organizational and technological capabilities; fostering high ethical standards; being accountable; achieving continuous improvement; administering human, financial, material, and information resources in a manner that accomplishes its mission while instilling Institute trust; and developing an expansive professional network with other internal and external organizations that impact SFS work. Significant accomplishments in addition to those cited include the following.

*Student Accounts*—SFS ended its second full year of electronic billing and payments, continuing the trend of increased usage of the electronic payment option by students and their families. Seventy percent of all student account payment transactions are done electronically, 12 percent through the lockbox, 17 percent at the Student Services Center (SSC), and 1 percent through wire transfers. However, the percentages differ when tracking by dollars received as opposed to number of transactions. More than \$65.6 million (53 percent) of the dollars are paid electronically, 23 percent through the lockbox, 19 percent at the SSC, and 5 percent through wire transfers.

*Student Financial Aid*—SFS led the effort to create the MIT Pell Grant Matching Grants Program. Acknowledging the decline in federal funding for student financial aid, MIT announced it will match Federal Pell Grants for all eligible students starting in September 2006. MIT's Pell Matching Grants Program will have the effect of doubling

Pell Grant funds for eligible students. Because the doubled Pell Grant is over and above any need-based MIT scholarship, this new Pell Grant match will limit, or in some cases eliminate, student loan debt for Pell Grant recipients. Pell Grants, administered by the US Department of Education, are need-based, providing funds for higher education that students are not required to repay. The grants are typically awarded to those whose family income is less than \$40,000. Approximately 14 percent of MIT undergraduates receive Pell Grants, for a total of \$1.5 million.

*Student Employment*—SFS achieved its vision of an electronic process for hiring MIT students as employees on the Institute’s hourly payroll. Under the auspices of the SAP HR-Payroll Project, Student Employment worked with SSIT to develop an electronic student personnel action form (eSPAF) to simplify the process of placing MIT students on the Institute’s hourly payroll. Existing information in MITSIS is used to verify employment eligibility and provide the prospective employer with the necessary information to hire students. This innovation eliminates a cumbersome paper process and its associated time delays.

*Student Loans*—SFS lowered the Federal Perkins Loan cohort default rate from 3.46 percent to 2.02 percent through participation in the Cohort Right Track option offered by the Institute’s student loan servicer, Campus Partners. This option increases outreach to borrowers during the critical period when they are beginning repayments.

*Student Resource Development*—SFS enhanced WebSIS so an undergraduate receiving an MIT scholarship can access the names of the fund(s) contributing to his or her scholarship total. Each named fund has a link to a web page that includes some biographical information about the fund and (when available) the donor. Approximately one third of the more than 900 scholarship funds are stewarded actively, meaning there is a living donor or family member associated with the fund. Partnering with Resource Development, SFS hopes to contact as many of these donors and family members as possible for details about how and why the funds were established and to encourage the sharing of donor information with scholarship recipients.

## **Staffing**

With the exception of one position, SFS was fully resourced during academic year 2005–2006. An administrative staff position remained vacant while SSIT within IS&T reached a decision regarding the level of technical support it will provide SFS, especially in regard to the financial aid system, PowerFAIDS.

There were staffing changes in Student Financial Services during the past year. Five staff members left and three new staff members arrived. There was one internal promotion. Staff who left our office were: Elva Green, assistant director of financial aid; Sophya Gudelman, student account counselor; Amanda Romero, student account counselor; Jane Smith, director of student resource development and employment; and Carmen Velez, assistant director of financial aid. New staff members are: Dwayne Daughtry, student account counselor; Robyn Harding, student services representative; and Jackie Robinson, assistant director of financial aid. Jason Marsala was promoted from student services representative to student account counselor. While three underrepresented

minority members left SFS—two African American women and one Hispanic woman—the three new hires are all members of underrepresented minority groups: two African American men and one African American woman, resulting in no net difference in the diversity of the office.

**Betsy Hicks**  
**Executive Director**

*More information about Student Financial Services can be found at <http://web.mit.sfs/>.*

## **Teaching and Learning Laboratory**

The Teaching and Learning Laboratory (TLL) was founded in 1997 as a resource for faculty, administrators, and students who share a desire to improve teaching and learning at MIT. Its mission is to collaborate with MIT's faculty, administration, and students to promote excellence and innovation in teaching and learning throughout the Institute and to contribute to MIT's standing as a leader in science and engineering education.

This year has seen the start of what promises to be an extraordinarily exciting time for TLL. Under the leadership of the new dean for undergraduate education, TLL is being asked to play a major role in several of DUE's strategic goals to strengthen undergraduate teaching and learning at the Institute. This opportunity coincides with the first public release of the recommendations of the Task Force on the Undergraduate Educational Commons. We hope that the educational expertise of TLL staff members can make important contributions to the implementation of the task force's recommendations. The creation of a new TLL staff position, associate director for teaching initiatives, and the addition of a postdoctoral researcher will help us to play an increasingly significant role in the improvement of undergraduate education at the Institute.

TLL has three broad and interrelated functions: (1) to provide expertise in teaching and learning, (2) to design and implement assessment and evaluation studies, and (3) to conduct research into university learning, particularly in science, technology, engineering, and math subjects.

## **Teaching and Learning**

TLL staff members worked closely with MIT faculty in AY2005–2006 on projects related to educational innovation, while maintaining regularly scheduled programs and services.

## **Educational Innovation**

We continued to play a major role in the CMI-sponsored experiment in pedagogy. This initiative, which began as a collaboration between MIT's Department of Mechanical Engineering and the Engineering Department at the University of Cambridge (CU), sought to transfer successful pedagogical methods between the two institutions: small-group teaching at MIT, and active learning pedagogies at CU. In summer 2005, the Department of Plant Sciences at Cambridge joined the project, and in summer 2006, the

Department of Electrical Engineering and Computer Science at MIT became a partner. The project has now expanded to explore ways in which teaching and learning can be strengthened systematically at both institutions. Funding is in place through the 2008 spring term, and there are plans to at least double the number of departments both at MIT and CU that are engaged in the project by the end of the 2006 fall term.

### ***National and International Collaborations***

We continue to expand our involvement in national and international projects whose objectives are to improve teaching and learning primarily in research-intensive universities. These collaborations include:

- Network for Enhancing Teaching and Learning in Research Intensive Environments, organized by Professor Graham Gibbs, Oxford University
- Forum on Excellence in Higher Education, organized by Professor Richard Light, Harvard University
- Departmental Leadership for Quality Teaching: An International Comparative Study of Effective Practice, a research project led by Professor Graham Gibbs, Oxford
- Center for the Advancement of the Scholarship of Engineering Education (CASEE), National Academy of Engineering
- Social Dynamics of Campus Change, a research project cosponsored by CASEE and the American Sociological Association
- Journal of Engineering Education (Lori Breslow, TLL director, is a member of the Strategic Review Committee and the Editorial Advisory Board)
- Cape Peninsula University of Technology, Cape Town, South Africa (TLL and CPUT teaching and learning staff are participating in an exchange; Lori Breslow has also begun a student exchange.)

In addition, we hosted our colleagues this year at the Ivy+ Teaching and Learning Consortium's annual meeting, and we met with visitors from a number of international delegations who wish to learn more about MIT's efforts in teaching and learning.

### **Grants**

TLL received a \$25,000 grant from the Spencer Foundation to organize a workshop that will bring together faculty from math, physics, and engineering in the fall of 2006 to create strategies to strengthen the integration of those subjects. TLL staff will facilitate the implementation of the ideas developed in the workshop.

As in past years, we again acknowledge with gratitude the support of Steven Kaufman '63, who supports the Kaufman Fund for Teaching and Learning.

### **Continuing Programs and Services**

TLL maintained the services and programs in instructional support that it has offered since its inception. These include:

- The IAP Better Teaching @ MIT series of workshops. Thanks to the continued efforts of Cindy Tervalon, who coordinated the series, and Katy Hurley, who was responsible for publicity, Better Teaching continues to be well-attended, with an audience of about 100 people.
- The Orientation for New Graduate Teaching Staff. Coordinated by Cindy Tervalon, this program draws an audience of about 125 teaching assistants (TAs) from all schools.
- We provided six consultations as part of the classroom videotaping and consulting program.

In addition, we designed and led workshops on teaching and learning for TAs in Course 6, Course 9, and SHASS, as well as those TAs leading small groups as part of the Course 2 pedagogy experiment, MITE'S instructors, Mission 2009 undergraduate teaching fellows, and the library staff. We gave talks on teaching and learning and/or assessment and evaluation to the Committee on the Undergraduate Program, the MacVicar faculty fellows, the d'Arbeloff grant writers, and the Sloan Undergraduate Management Association.

We wish to acknowledge the support of Brenda Blais and Sandy Cyr in these and other activities.

### Assessment and Evaluation

TLL staff members were responsible for a number of assessment and evaluation studies during the academic year. Two major efforts should be highlighted: the assessment of the Communication Requirement and the CMI pedagogical experiment. Other studies are listed in the table below.

<b>Teaching and Learning Laboratory Assessment and Evaluation Efforts AY 2006</b>			
<b>Subject/Study</b>	<b>Scope of Investigation</b>	<b>Status</b>	<b>Researcher</b>
2.001	Studies of the use of discovery learning strategies	Complete	R. Mitchell
6.188	Qualitative analysis of Robotics: Science and Systems I & II	Complete	A. Lipson, T. Clay
iLabs	Two survey studies were conducted for the Heat Exchanger and two for WebLab	Complete	R. Mitchell, J. Fischer
Mission 2004	Qualitative analysis of seniors who took Mission 2004 as freshmen	Complete	A. Lipson
Terrascope	Qualitative analysis of sophomores and juniors who took Terrascope as freshmen	Complete	A. Lipson



### **Communication Requirement**

Rudolph Mitchell, associate director for assessment and evaluation, has been asked to lead the programmatic evaluation of the Institute-wide Communication Requirement. Working with the Subcommittee on the Communication Requirement, Dr. Mitchell is formulating the organizational structure, conceptual framework, and implementation strategy for the program evaluation. Phase I, which was completed spring 2006, included 40 faculty interviews, 30 student interviews, and the development of both faculty and student surveys.

### **CMI Pedagogical Experiment**

TLL staff members have played a significant role in the assessment of the CMI pedagogical experiment. In this we have collaborated with our CU colleagues in the Centre for Applied Research in Educational Technology. This assessment, which utilized both quantitative and qualitative methodologies, has been reported on at the annual meeting of the Center for the Scholarship of Engineering Education.

### **Other Assessment and Evaluation Studies**

#### **Surveys Developed**

Surveys for the following initiatives were developed as part of assessment and evaluation studies: Communication Requirement (faculty and student surveys), WebLab and WebLab2, In-class Discovery Learning, Heat Exchanger, 10.032 Heat Conduction, Classroom Learning Partner, Terrascope, and Interphase.

#### **Consultation**

TLL staff members provided consultation to a number of faculty members, doctoral students, and representatives from the Student Committee on Educational Policy on assessment, including developing assessment plans for proposals to the National Science Foundation and the National Institutes of Health.

### **Research and Scholarship**

#### **Papers and Articles**

- Barak, M., Lipson, A., and Lerman S., "Wireless Laptops as a Means for Promoting Active Learning in Large Lecture Halls," *Journal of Research on Technology in Education*, 38(3), 2006: 245-264.
- Breslow, L., Garroway, J., Winberg, C., Wright, J., and Wyrley-Birch, B., "Learning from Integrated Tasks in Mechanical Engineering," *Journal of Engineering, Design and Technology*, 2005.
- Breslow, L. and Tervalon, C. D., "Strengthening TA Training," *Faculty Newsletter* (MIT), May/June 2005.
- Clay, T. and Breslow, L., "Why Students Don't Attend Class," *Faculty Newsletter* (MIT), March/April 2006.

- Epstein, A., Lipson, A., and Bras, R., "Terrascope: A Project-Based Team-Oriented Freshmen Learning Community with an Environmental/Earth Focus," annual meeting of the American Society for Engineering Education, Chicago, June 2006. Best Paper, Freshmen Programs Division.
- Halme, D. G., Khodor, J., Mitchell, R., and Walker, G. C., "A Small-Scale Concept-Based Laboratory Component: The Best of Both Worlds," *Cell Biology Education*, 5:41-51, 2006.
- Winker, T., Michell, R., Venegas, J., "Computer Simulation and Realistic Simulator in Conjunction with the New Educational Style: How People Learn to Improve Learning Achievements," annual meeting of the American Society for Engineering Education, Portland, OR, June 2005.

### **Conference and Workshop Presentations**

- Breslow, L. and Mitchell, R., "An Intercultural Experiment in Pedagogy: MIT Adapts the University of Cambridge's Small-Group Teaching Model," poster session at the Center for the Advancement of the Scholarship of Engineering Education annual meeting, Indianapolis, October 2005.
- Breslow, L., "Lessons Learned: Findings from Ten Formative Assessments of Educational Initiatives at MIT," World Conference on Computers in Education, Stellenbosch, South Africa, July 2005.
- Breslow, L., "Faculty Development and Teaching Effectiveness: American Experiences," presented as part of a two-day workshop for the Cultural Division of Taipei Economic and Cultural Office, Cambridge, MA, June 2005.
- Breslow, L. and Widdig, B., "Communicating Across Cultures," Argonne National Laboratory, Illinois, April 2005.
- Breslow, L. Interdisciplinary Teaching and Pedagogies of Engagement, workshops for the faculty of Cape Peninsula Technical University, Cape Town, South Africa, July 2005.
- Dori, Y. J., Hult, E., Breslow, L. and Belcher, J. "How Much Have They Retained? The Retention of Concepts from a Freshman Electromagnetism Course by MIT Upperclass Students," National Association of Research in Science Teaching Annual Conference, Dallas, TX, April 2005.

### **Staff Changes**

Sanjoy Mahajan has joined TLL as associate director for teaching initiatives, and Julia Khodor has accepted a one-year postdoctoral position as the CMI educational researcher. Katy Hurley resigned from her position as research assistant.

**Lori Breslow**  
**Director**

More information about the Teaching and Learning Lab can be found at <http://web.mit.edu/tll/>.