MIT Faculty Newsletter

this issue features an editorial on "Promotion and Tenure for Interdisciplinary Junior Faculty (page 3); an "Open Letter to the MIT Faculty" concerning the Medical Care Task Force by Dr. Ed Seldin (page 9); another edition of "MIT Profiles" featuring Millie Dresselhaus (page 12); and an article on "OpenCourseWare at Home" by Shigeru Miyagawa (page 14).

Life Sciences at MIT: A History and Perspective

Phillip A. Sharp

MIT, AS A TECHNOLOGY-ORIENTED INSTITUTE, initially considered life sciences from the perspective of engineering and public health. The MIT faculty, in collaboration with Harvard Medical School faculty, was part of the origin of the Harvard School of Public Health. Food processing and toxicology were also important in the early stages of life sciences at the Institute and came to be organized into departments related to food and nutrition. The recruitment of Frank Schmitt to the Department of Biology in the 1940s expanded biological research in biophysics and biochemistry.

Then, with the discovery of the structure of DNA in 1953 by Watson and Crick and the birth of molecular biology, MIT reoriented much of its life sciences to this new area with the recruitment of senior faculty, such as Salvador Luria and Boris Magasanik, and the development of a large number of junior faculty. The Department now has approximately 55 primary faculty and has outstanding programs in many areas including genetics, biochemistry, and cell biology.

The "War on Cancer" was launched by the Nixon administration, and with the leadership of Salvador Luria and David Baltimore, MIT applied for funds for a center, associated with

Reflecting on the Report of the Task Force on Medical Care

William M. Kettyle

THE CHARGE TO THE Task Force on Medical Care for the MIT Community was ambitious and the work prodigious. It was an extremely thoughtful and thorough endeavor. I appreciate the opportunity to comment on the process, the report and the next steps as I see them. The last edition of the *Faculty Newsletter* (Vol. XVIII No. 2, November/December 2005) contained an excellent summary of the work of the Task Force and of the findings.

The process was a major time-consuming commitment for Task Force members (especially the Chair, Paul Joskow), the advisors, and those who supported this endeavor (especially, Janet Snover and Israel Ruiz). The meetings, discussions, and related activities were well organized, focused, and driven by the need to fully understand the communities served, the services offered, and the flow of funds that support the care of this special community. Over a year of very hard work resulted in the production of a very informative, helpful report that is, in my view, very supportive of the Medical Department and our model of care. The Task Force report also acknowledged and supported our increasing role in the health and wellness of the community. To have these activities appreciated and encouraged is very gratifying.

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Editorial
Promotion and Tenure for Interdisciplinary Junior Faculty

MIT HAS A TRADITION of systems thinking – performing research with real-world impact – and therefore attracts faculty in boundary-crossing areas. This commitment to interdisciplinary research was reaffirmed by President Hockfield in her May 6, 2005 inaugural address: "*. . . With our expertise in interdisciplinary problem-solving, MIT is uniquely equipped, and obliged, to make a critical difference: to do the analysis, to create the innovations, to fuel the economy, and to educate the leaders the world needs now.*" (*web.mit.edu/hockfield/speech-inauguration.html*). There are many examples of successful interdisciplinary projects and faculty around campus. However, the question is whether MIT's procedures and attitudes towards interdisciplinary faculty are consistent with these objectives. The core question here is whether the criteria and processes for promotion and tenure of interdisciplinary faculty are appropriate and effective.

Framing the Problem

By interdisciplinary research, we are referring to scientific investigation of questions that require assumptions, methods, and tools from fields or disciplines that are traditionally distinct and not formally connected. In other words, if one attempted to trace the reference network of such fields, the intersection of both keywords and authors would be very small, relative to the size of the parent fields themselves.

Some examples of interdisciplinary research currently in process around the Institute include:

- Studying the effect of natural sunlight and air quality on building architecture and technology as well as human physiology
- Examining the interactions among government policy, regulations, and new technologies on public and private transportation systems
- Exploring the mechanical, chemical, and kinetic interactions of both man-made and natural materials at nanometer resolution levels
- Performing research at the intersection of internet technology and networks, new media, and privacy issues
- Examining technology hurdles, regulatory schemes, and economic incentives in the evolution of new renewable energy sources
- Studying bioinformatics, a discipline at the conjunction of biology, genetics, and information sciences.

Almost by definition, an interdisciplinary field of research is one where a community of researchers is newly forming and not yet well established. In common parlance, it represents a departure from "normal science" and tends toward emerging logics. So the first question is how do we identify senior colleagues and researchers that are challenged by evaluating new contributions and interdisciplinary work, rather than comparing candidates to junior colleagues working in traditional, single disciplinary fields?

The second question pertains to journals. Of course there are *Science* and *Nature*, but in many emerging interdisciplinary fields the journals do not exist (yet), or are not yet highly rated. In some instances, interdisciplinary work gets published in the "other" categories of traditional journals and is tolerated, but recognized as not being in the main stream. By definition, the "other" is relegated to residual status.

Further Defining Interdisciplinarity

Generally speaking, there are really two types of interdisciplinary fields. One involves research in the domains of interest of two or more science or engineering fields. Examples are: the study of biomaterials, chemistry of pollutants, biotechnology, hazardous waste and its remediation, etc. This type of interdisciplinary research, by and large, has been going on for many years at MIT, and journals in any of these disciplines would be interested in publishing research results. In this case, each of the fields is fully established, and linkages are made between the two. The Institute seems quite comfortable with evaluation and promotion of individuals who work in these areas.

The second type of interdisciplinary research, which is really the concern of this editorial, is that which resides at the cross-section of science and technology with social sciences and management. These are the research domains which have been evolving over the past several years, and MIT still has difficulty coming to grips with the issues of evaluation and promotion of the faculty in these fields. This type of research is frequently large scale, addressing problems that exhibit a great deal of systems complexity, and usually involving relatively large numbers of faculty from different disciplines. The number and variety of faculty working on a single project further increases the difficulty of delineating individual contributions. Some examples of this type of interdisciplinary study include large-scale weapons development and acquisition, transport systems (especially in urban areas, which often involves multi-model transport and a great deal of political and economic considerations), and similarly large-scale energy systems which concern not only production distribution, but also user interfaces and global warming. These are all examples of important research initiatives in relatively, if not entirely, uncharted terrain.

Although lip service is often given to the value of interdisciplinary research, there seems to be reason for concern by junior faculty working interdisciplinarily. On January 26, a group of about 15 junior untenured faculty met with Provost Rafael Reif, because of their concern about precisely this issue. There are also numerous examples of former, interdisciplinary colleagues who were unsuccessful in the tenure process at MIT. We do not question the outcomes, but we do suggest that in some cases the decision might have been arrived at through a flawed process that did not properly review and value contributions at the intersections of well-established, traditional fields.

From The Faculty Chair

Lorna J. Gibson

Reviewing the Committee on Graduate School Programs

AMONG THE IMPROVEMENTS TO faculty governance considered by the Faculty Policy Committee (FPC) last year was a suggestion to reorganize the Committee on Graduate School Programs (CGSP). CGSP has representatives from each department (along with several other members) authorized to recommend candidates for advanced degrees; currently there are 38 members of the Committee.

This large group works well in evaluating the performance of graduate students at the end of each term, in approving changes to graduate subjects, and in approving requests from students for minor departures from the general requirements for advanced degrees, but is too unwieldy for policy deliberations. As a result, Dean for Graduate Students Ike Colbert reports that often policy decisions are delegated to the Dean, with little faculty input. Last fall, FPC started discussing ways that CGSP might be improved. We met with Dean Colbert as well as with several faculty responsible for departmental graduate programs (Professors Steve Bell (Biology), Art Smith (EECS), Michael Piore (Economics), and Joe Ferreira (DUSP)).

We believe that there are a number of broad, Institute-wide policy issues that should be considered by a smaller standing committee of the faculty, including:
• approval of new graduate degree programs
• collection and dissemination of best practices for:
   - teaching research ethics
   - recruiting of minority graduate stu-

dents (in collaboration with the Council on Faculty Diversity)
  - resolving conflicts between students and advisors (e.g., the Department of Chemistry Resources for Easing Friction and Stress (REFS) program: *web.mit.edu/chemistry/refs*)
  - improving advisor/advisee relationships (assisting in implementing recommendations from the Graduate Student Council's report from last year)
• policies related to international graduate students (e.g., visa issues, proposed federal deemed export rules)
• global competition for graduate students
• increased use of the ad hoc interdisciplinary PhD
• tuition structure relative to our competitors (this has recently been discussed by the Provost's Committee on Funding of Graduate Students)

We recognize that departments operate with much more autonomy at the graduate level than at the undergraduate level, in particular in admitting and supporting students, and believe that this is appropriate. Each department has its own culture that must be respected.

This spring, we plan to meet with Alice Gast (Vice-President for Research), Emilie Slaby and Sylvain Bruni (GSC President and Vice-President) and Mary Rowe (Ombudsperson). In addition, the Faculty Officers (me, Bruce Tidor, Associate Chair, and Diana Henderson, Secretary) plan to meet with faculty responsible for the departmental graduate programs in each School.

Our goal is to produce a white paper with proposed changes to the CGSP for a vote at a faculty meeting either later this spring or next fall. I welcome your comments and suggestions (*ljgibson@mit.edu*).

Other FPC Discussions

In other business this past fall, FPC discussed:
• the final report of the Special Committee to Review the Discipline System from Professors Lorna Gibson and Margery Resnick
• an update on the Task Force on the Educational Commons from Dean Robert Silbey
• the final report from the Task Force on Medical Care for the MIT Community from Professor Paul Joskow
• a request for a course number for Biological Engineering (Professor Doug Lauffenburger); a faculty vote is planned for the February faculty meeting
• a report from the Council on Faculty Diversity (Professors Nancy Hopkins, Rafael Reif, and Ken Manning)
• a report from the Graduate Student Council on Task Force on Diversity (Mr. Hector Hernandez)
• a range of topics with President Susan Hockfield, including academic integrity, cross-disciplinary work, diversity, graduate student recruiting, faculty rewards structure, faculty retirement, and OpenCourseWare. ■

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Promotion and Tenure

So what is to be done; how should this be addressed? What can MIT do to recognize the contributions of its junior (and senior) interdisciplinary faculty? How can MIT facil-

itate, not impede their work? Some solutions might include mentoring (formal and informal) and consideration of interdisciplinarity during promotion and tenure reviews.

We do not have all the answers. But one thing is abundantly clear: This issue is critical to MIT's future, to retaining its leader-

ship position at the forefront of science and technology, and to the continued role of the Institute in addressing the myriad of problems in an increasingly complex and interdisciplinary world. We welcome your thoughts on this most important issue. ■

Editorial Sub-Committee

Life Sciences at MIT
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the Department of Biology, to conduct basic research related to cancer. The remodeling of an old candy factory as the new Center for Cancer Research was aided by funds from the Seely Mudd Foundation and the building was occupied in 1974. Establishing the Center led to an expansion of the faculty in the Department of Biology by about 10. Even though the faculty initially received 75% of their salary from the National Cancer Institute's Center Grant, everyone volunteered to carry a full teaching load in the Department.

The Division of Health Sciences and Technology (HST), formed in the 1970s and led by Irving London, solidified a long-standing relationship between faculty at MIT and those at MGH and the Harvard Medical School (HMS) complex. HST has been tremendously successful in both research and teaching. One major focus of HST is to encourage physical scientists and engineers to do research at the interface of technology and clinical medicine.

Negotiations led by David Baltimore between Jack Whitehead and MIT resulted in the creation of the Whitehead Institute for Biomedical Research in 1982. This free-standing Institute with its own endowment, space, and investigators is closely associated with the Department of Biology and, more recently, with other departments at MIT. All of the permanent investigators at the Whitehead Institute have academic appointments at MIT. The intellectual focus of the Whitehead Institute started with an emphasis on developmental biology but this was defined in the broadest of terms. The Institute is widely recognized as being amazingly successful with an outstanding staff and training program. The addition of the Whitehead Institute expanded the biological research community at MIT by about 16 faculty-level investigators.

The '80s brought several other major changes in the life sciences community at MIT. This included the controversial closing of the Department of Applied Biological Sciences (formally Nutrition and Food Science) and the merging of its faculty into other departments. In the mid-80s, following the early vision of Hans-Lukes Teuber to study the brain as the source of the mind, a group of faculty renamed the Department of Psychology to Psychology and Brain Sciences. In 1986, this group merged with the neuroscience program of Whitaker College and HST to form the Department of Brain and Cognitive Sciences (BCS). Subsequently, additional faculty slots were committed to joint appointments between BCS and Biology. During this period, the NSF-funded Biotechnology Processing and Engineering Center was established in the Department of Chemical Engineering. This Center involved many faculty members in other departments, particularly Biology, and encouraged the expansion of biotechnology on campus.

In 1993, BCS was moved to the School of Science. The Center for Learning and Memory was established in 1994 in association with BCS and Biology with a grant from the Fairchild Foundation. Research in BCS ranges from cognitive science to the molecular genetics of processes important in learning. The Department has continued to grow with the development of two new institutes (see below). The 1990s also brought the establishment of a core course in biology as a General Institute Requirement. This and related educational activities, even week-long courses for faculty, greatly expanded the appreciation of advances in life sciences across campus.

Pat and Lore McGovern came to an agreement with MIT in 2001 to establish the McGovern Institute on Campus with a profile similar to that of the Whitehead Institute. However, unlike the Whitehead, the McGovern Institute is part of MIT. This Institute will ultimately have 16 faculty composed of six existing faculty and 10 new slots. The latter are to be funded from the endowment of the McGovern Institute. The McGovern Institute seeks to advance the understanding of brain functions such as recognition, perception, and decision making.

Barbara and Jeffry Picower came to an agreement with MIT in 2002 to establish the Picower Institute for Learning and Memory. This Institute incorporated the earlier Center for Learning and Memory with an expansion of its investigators. The Picower Institute is also part of MIT. One objective of this Institute is to explore learning, memory, and cognition, including the molecular basis of these processes.

The above two institutes and BCS are now housed in a spectacular new complex of three buildings connected by a Mediterranean atrium crossing the railroad tracks. All faculty in the three units have appointments in BCS, and many also have joint appointments in other departments. Including faculty slots yet to be filled in the new complex, the final number is projected to be 45. With associated undergraduate, graduate, and postgraduate researchers, the total complex will probably contain about 500 people. This is believed to be the largest contiguous research space devoted to the study of neuroscience in the country.

Many faculty members at MIT contributed to the creation of the Human Genome Initiative at NIH, which ultimately led to the sequencing of the human genome. Eric Lander, investigator in the Whitehead Institute, who was among these faculty, applied for a Genome Center Grant in 1990 to begin to develop the technology and computational tools for the sequencing. The Genome Center also produced both a genetic map and a physical map of the genome to make interpretation of the short tracts of sequences possible. For the first few years, the Center was housed in space in the Center for Cancer Research and then moved off campus into the Technology Square area. During this time, the Whitehead Institute managed the Genome Center's research funds. The Center was a major part of an international effort that produced the public sequence ahead of schedule and under budget. This success was matched by a multifaceted research program utilizing large-scale experimental methods and

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computation to investigate problems that can best be addressed in an interdisciplinary fashion.

As a research institute for large-scale life science projects, particularly in genetics, the Broad Institute was established in 2003 with a gift from Eli and Edythe Broad. The Broad Institute is associated with MIT, Harvard University, and the hospitals in the Harvard Medical School

58 associate faculty active in interactions with the Broad. It is anticipated that there will be eight new full-time investigators hired in the Broad, who will have appointments mirroring those of its current staff, including about five with primary appointments at MIT. The research funds of the Broad Institute will be administered through MIT and, at present, these funds sum to about $83 million.
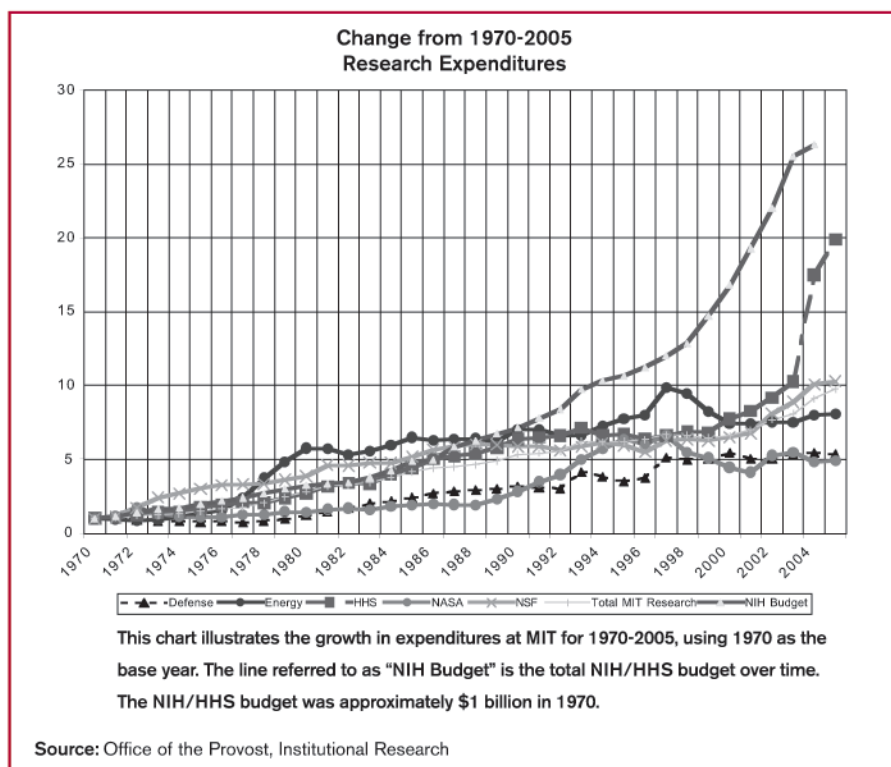
An important question about the history of life sciences at MIT is its success in providing a strong educational experi-

of the total on-campus volume. This HHS on-campus research volume has grown rapidly over the past two years due to inclusion of the Broad Institute. For example, before 2003, the HHS support was $93 million, about 20% of the total volume. The rate of growth of the total NIH budget is shown for comparison to that of on-campus research. Obviously it has grown much more rapidly over the last two decades. The 2005 research volumes for some of the above units are approximately: Biology, $25 million, Center for Cancer Research, $16 million, Whitehead Institute, $29 million, Brain and Cognitive Science, $4 million, Picower Institute, $12 million, HST, $10 million, and the McGovern Institute, $7 million. Some of these research volumes should grow significantly during the next few years with completion of staffing.

There have always been a large number of research programs in life sciences at MIT in departments and centers other than those mentioned above. In 1998, a new departmental academic unit was formed, Biological Engineering (BE), to promote the fusion of molecular life sciences with engineering. At this interface, BE integrates molecular and cellular life sciences with a quantitative, systems-oriented engineering analysis and synthesis. The Computational and Systems Biology Initiative, CSBi, as a virtual center is closely associated with BE and Biology and includes faculty from eight other units. Among its objectives is the further development of systems-level analysis of cells and more complex organisms. In 2005, the Institute's faculty approved the offering of an undergraduate major in Biological Engineering.

The history of life sciences at MIT is similar to that of other areas, a series of significant advances and continued evolution to remain at the forefront of the discipline. A wonderful celebration of this history is the appointment of the neurobiologist Susan Hockfield as President. ■

**Change from 1970-2005
Research Expenditures**

Legend: -▲- Defense ●—● Energy ■ HHS ●—● NASA ✕ NSF Total MIT Research — NIH Budget

This chart illustrates the growth in expenditures at MIT for 1970-2005, using 1970 as the base year. The line referred to as "NIH Budget" is the total NIH/HHS budget over time. The NIH/HHS budget was approximately $1 billion in 1970.

Source: Office of the Provost, Institutional Research

complex. There are faculty in the Broad Institute with primary appointments in all of the three academic and medical organizations. The new home of the Broad Institute on Main Street adjacent to the Whitehead Institute is scheduled to open this coming spring and additional faculty are being recruited. The Institute has an unusual structure with the appointment of many associated faculty from across the three sponsoring organizations. These investigators will collaborate with each other and potentially with the faculty of the Broad to address problems that are too complex for individual labs. There are now

ence for the next generation. I believe MIT has met this challenge and in fact leads the academic community in this regard. One indication of this was the inclusion of biology as a GIR. The campus has also helped to create the biotechnology community in Boston and enhanced the educational programs in the nearby medical community. One quantitative indication of the scale of biological and biomedical research at MIT is the research volume on campus supported by the Department of Health and Human Services through NIH (see graph). In 2005, this amounted to approximately $180 million or about 32%

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The Challenge and Rewards of Faculty-Student Interactions in the Residence Halls

Terry Orlando

CHALLENGE I: Our students want to share experiences with us outside of the classroom and the lab.

Challenge II: How do I find the time to schedule this into my already over-full schedule?

These two challenges summarize our dilemma: we would like to spend time outside the classroom with our students, but finding the time can be difficult. The trick is to start with a small time commitment of once a year and do something you enjoy with a group of students. If each faculty attended one event a year with a student group, the amount of faculty-student interaction outside of the classroom would increase exponentially.

One of the best ways to have a more personal encounter is to attend a dinner in one of the many MIT dormitories, fraternities, sororities, or living groups. Students – undergraduate and graduate –

enjoy chatting informally with professors. It is their chance to see you as a person, in addition to your role as a teacher or researcher. Don't worry about the conversation topic; our students are naturally inquisitive, engaging, and most appreciative of the chance to talk.

Another way to be involved with a group of students in a residence hall is to become a House Fellow. Here you receive a budget to support an activity, such as going to a concert or a ball game, apple-picking or a movie. The size of the group is usually from 10 to 20 students, and the students help organize the event.

I recognize that the "down time" for a relaxing dinner or other event is nights and weekends; the same time that is often family time. However, bringing your family to an event can add an extra dimension – after all, life on campus often restricts students to their own age group,

so having the family there can be fun for all. For example, stopping by a Sunday brunch with your family on your way to an event in Boston is a convenient way to combine both activities.

If you would like to explore being invited to a dinner, a brunch, or an event at a residence hall, contact me or one of the Housemasters directly (a list of the housemasters can be found at *web.mit.edu/dsl/resources/housematers_tutors.htm*). A more extensive list of ideas for interacting with students can be found at *web.mit.edu/dsl/faculty/interaction.html*. (Some of these other activities will be highlighted in future *Newsletter* articles.) Try it: The company and the experience will be most rewarding.

Challenge III: Taking the first step . . . ■

Terry Orlando is a Professor of Electrical Engineering; Housemaster, Ashdown House (*orlando@mit.edu*).

letters

Troubling whistle-blower article

To The Faculty Newsletter:

I WAS HORRIFIED BY the article in the *Faculty Newsletter* Vol. XVIII No. 2 written by David G. Wilson, entitled "Tyranny Against a Whistle-Blower at MIT." I have no personal knowledge of the atrocities alleged in that article, but if only half of the allegations are true it points at a serious problem in our treatment of staff.

I have been at MIT for 41 years (undergraduate + graduate + faculty), and I have not heard any similar story at MIT. I have heard from a friend about a similar case of mistreatment of staff at Caltech. Until I read David's article I thought that this was

a one-of-a-kind event: that somehow there was a special problem at Caltech.

If we assume that the allegations are true in both cases, perhaps this is a symptom of a structural problem. Since the "bad" people in both cases usually seem to be "good and honorable" humans, I am having a great deal of trouble trying to figure out the forces that cause their awful behavior. Indeed, I have a fear that if I were an administrator (a position which I never intend to be in!), I might be driven to act in a similarly horrible way. So I wonder what is the mechanism by which all these "good people" are led to act in such an obviously nasty manner. If they are indeed lying, do they

really believe the lies that they spout, or are they being intentionally dishonest? If it is the former, what makes them believe the lies? If it is the latter, how can they live with themselves? It seems like "Recovered Memory Syndrome," where people "remember" things that did not occur.

I know that I am being utopian, and perhaps silly, but if we could figure out the mechanisms, perhaps we could learn how to reform the organizational structures and/or social systems to prevent such bad situations in the future.

Gerald Jay Sussman
Matsushita Professor of
Electrical Engineering

Reflecting on the Task Force Report
Kettyle, from page 1

There are 42 recommendations enumerated in the ~27,500 word, 120-page report. Within the body of the report there are additional recommendations and suggestions for change or support for continued provision of services. Many of the recommendations overlap with each other and several are aligned with efforts already underway within the Medical Department, within Human Resources, and within the Offices of Finance and Budget.

President Hockfield has asked Executive Vice President Sherwin Greenblatt to lead a process to review and assess the recommendations of the Task Force. Quoting President Hockfield's e-mail to the community:

"*The report of the task force (http://web.mit.edu/task-force/medical/) makes clear that high quality, accessible and affordable health care is a matter of great importance to the members of our community. While the task force makes a number of recommendations, it concludes that the basic model of health care and insurance that has been in place for several decades has served MIT very well.*

I want to assure you that we intend to retain the present basic model of on-campus health care for our community, even as we examine the specific recommendations of the task force. As a next step I am asking Sherwin Greenblatt, our interim Executive Vice President, to undertake an analysis of the financial and operational implications of the report's recommendations."

Sherwin has launched a coordinated approach to this charge from President Hockfield. He has convened a working group – Laura Avakian, Israel Ruiz, Patricia Brady, and me – to review and assess the recommendations, to consider implementation strategies, and to provide reports to the community on progress. Representation from the Medical Department, Human Resources, the Office of Finance, and Senior Administration will power a process that can deal with the widely ranging recommendations of the Task Force. The group has already met on four occasions. At the end of the first meeting we got to recommendation number six (and President Hockfield had already begun work on items one and three)! I could see that there was an enormous amount of work ahead. By the end of the fourth meeting the recommendations of the Task Force and the associated endeavors and projects had been sorted and assigned with timelines providing a measure of prioritization, coordination, efficiency, and structure.

Within the Medical Department, several initiatives are and have been in place to improve accessibility, to better understand our fiscal operations, and to expand our health and wellness activities; some of these activities anticipated the recommendations of the Task Force, and others will meet or exceed those recommendations. Importantly, the Task Force report was delivered in time to have significant impact on the generation of the Medical Department's Fiscal Year 2007 budget request. As part of an ongoing process, the clinical and administrative staffs of the Medical Department have renewed their commitment to enhance the services we provide to everyone in our community.

Over the next several months, the operational and fiscal analyses needed to implement the recommendations will be well underway. My hope is that the work of the Task Force will evolve into an ongoing process, not simply a campaign to enhance some services or to repair identified issues. We need to establish a set of feedback loops that allow the Medical Department to meet the needs of the community with agility and timeliness. My wish is that as we analyze and work on the implementation of the recommendations of the Task Force we can, together with Senior Administration, integrate the roles of the Medical Management Board, the Medical Consumers' Advisory Council and the Student Health Advisory Council.

There are some questions I believe we need to address:

• Going forward, how can we be sure that the Medical Department remains in tune with the needs of our community?

• How will the Department's evolving role as a community health center play out?

• How can we continue the work and the spirit of the Task Force process going forward so that feedback loops are chronically in place and in play?

Our model is uncommon and some might say anachronistic, but it is largely effective and appreciated. It is not gold-plated, nor is it a concierge practice. Our role is to provide access to high-quality care while also working with the communities of MIT to enhance the wellness that is essential to our health as individuals and to the health of the entire MIT community. We clearly must also provide these services in an effective, efficient, accessible, and financially responsible fashion.

We are and should be held to a very high standard; a standard that supports a very special community – providing convenient, on-site, high-quality care that enables the work of the Institute to be carried out. In my 30 years of teaching on the faculty of HST and the over 13 years I have worked at the Medical Department, I have grown increasingly passionate about the importance of the work MIT does as a center of learning, research, innovation, and scholarship, and the work we do to keep the MIT community healthy and well.

I very much appreciate the work of the Task Force and all those who supported this major effort, all those who responded to the surveys, and all those who provided input. Thank you. ∎

William M. Kettyle is Medical Director and Head, MIT Medical *(kett@med.mit.edu).*

An Open Letter to the MIT Faculty

Edward B. Seldin

Regarding the Report of the Task Force on Medical Care for the MIT Community

I WISH TO SHARE with you a reaction to the Report of the Task Force on Medical Care for the MIT Community (the Report) from the perspective of a member of MIT's Dental Service. I have been a Medical staff member and MIT's oral and maxillofacial surgeon for the past 28 years. (I have also led a Freshman Advising Seminar for 11 years and have participated in pre-professional advising for about 25 years. I have served on numerous committees and have had the honor to represent the Medical staff as its Elected Staff Representative to the Medical Management Board during a recent three-year term of office. I am deeply attached to the MIT Community and very pleased to have played a number of roles over the years.)

The small portion of the Report that deals specifically with the Dental Service (no more than two pages out of 120) is disappointing in its lack of substance and its dismissive treatment of the Service. I believe it demands a response.

In sharing some written thoughts about the Medical Department with the Task Force in January of this year [2005], I proposed the following goals for an On Campus Medical Department:

- To support MIT's mission by preventing commonly occurring disease processes from detracting from the productivity and quality of life of the members of the Community.

- To insure seamless continuity of care when referral to outside specialists is called for.

- To participate in the intellectual life of the community and educate it as regards practices and behaviors that enhance long-term health maintenance.

The small portion of the Report that deals specifically with the Dental Service (no more than two pages out of 120) is disappointing in its lack of substance and its dismissive treatment of the Service.

- To enable MIT to live up to certain responsibilities – acknowledged or otherwise – that fall on Institute shoulders when it attracts to the United States foreign students, fellows, and other individuals with limited means and unmet healthcare needs.

- To foster a satisfactory level of productivity while avoiding excesses that can occur when the profit motive is allowed to be a driving force in the delivery of health care.

With these general goals in mind, I find it incongruous that, while strongly advocating re-investment in on-campus health care in general, the Task Force does not consider the Dental Service to be "a high priority for the Medical Department." The Report reflects a particularly unenlightened attitude towards dental health as a component of health in general – almost as if a different set of rules apply to the prevention and treatment of disease processes

of the oral cavity, which diseases are amongst most prevalent afflictions of human beings and disproportionately disruptive for young people. The Report, almost in a single breath, indicates that students do not make full use of the Dental

Service even while noting that MIT does not provide any dental insurance for students. Did the Task Force see a connection between these facts? It's impossible to tell by reading either the ponderous, on-line, 120-page Report or the 22-page Executive Summary. The Report suggests that there are "convenient alternatives" for the dental care of students. I assume this is a reference to the current stop-gap measure which allows MIT students to get lower-cost care by being treated by *undergraduate dental students* at one of Boston's three dental schools. This mechanism is certainly helpful but it is, by report of students themselves, very time-consuming and inconvenient, geographically and in other ways. It also means that a class of individuals within our community with limited resources is singled out for a second tier of care.

I submit to you that, despite the historical accident whereby Medicine and Dentistry became separate realms, the mouth and teeth are legitimate compo-

nents of the human body and that dental care is inseparable from health care, current insurance practices notwithstanding. I hope you will agree that the goals stated above apply to all aspects of health care – *including* dental health.

I wish to share with you the belief that not having a (capitated) dental insurance

such a plan, the Institute should marshal the resources and take the lead in developing an enlightened capitated plan that provides a base-line level of dental care sufficient to prevent the loss of restorable teeth from being a part of the price of a degree from MIT.*

One other point:

In the Report, the Dental Service is denigrated as being unprofitable, suggesting, perhaps, that other divisions of the

mandated employee benefit package. These requirements would render any outside, for-profit dental practice non-viable. The Dental Service adheres to a mildly permissive, non-punitive approach to resolving conflicts between dental care and academic life. Part of our job, after all, is to educate students how to interact with the health care establishment. *I believe that it is unrealistic to expect the Dental Service to do its job properly without a modest subsidy. Such a subsidy could consist of MIT simply continuing the entirely reasonable practice of not charging the Dental Service "rent" for the space it occupies.*

> ### As was true for the entire Medical Department, over the last several years the Dental Service sustained many curtailments to achieve short-term tactical advantages at the expense of sound, long-term strategic objectives.

plan is a disservice to the MIT student body and that the lack of such a plan handicaps the Dental Service in its efforts to meet the needs of the very segment of the Institute's population that should be its principal focus. The superb educational opportunities for which the Institute is famous induce graduate students from around the world to come and study in Cambridge. *Many foreign students arrive with top-flight academic credentials sadly conjoined with egregious unmet dental needs and no experience in negotiating care for themselves and family members, some of whom may not speak English upon arrival.* Students find themselves in an environment that is, at once, confusing, expensive, and occasionally predatory. For a significant number of foreign and even domestic graduate students, one of the hidden costs of an advanced degree from MIT can be the loss of potentially salvageable teeth for want of convenient, appropriate care at a manageable price. *On-campus care delivered by providers who are sensitive to the needs of our students is the best way of addressing this problem.*

I believe that MIT has an unmet responsibility to its student population – especially foreign students. I would argue that, even if no other university in the United States had

medical service are self-supporting. May I point out that the Service is one of but two "fee-for-service" divisions of the Medical Department (the other is Optometry). As such, the Dental Service is held to a very different standard of financial performance and accountability than any other division. All other divisions work under a system of capitated care in which profitability depends upon careful regulation of the flow care delivered. I do not believe that any other clinical division of the Medical Department could duplicate the financial performance of the Dental Service if operated on a fee-for-service basis.

I hope you will agree that it is fair to ask the larger question, i.e., *whether any division of a university health service should be run on a "for profit" basis.* I believe that a university health service – especially MIT's Medical Department – should exercise a patient-focused moderation, contrasting with the national pattern of care that is largely driven by the profit motive. Such moderation does not preclude goals of high productivity and efficiency. The fee schedule of the MIT Dental Service remains modest. It is obliged by MIT to accept Delta Dental fee profiles, a 10% student discount, and it must pay for a very generous Institute-

MIT has just appointed a capable new Chief of its Dental Service. We currently have a technically skilled, hard working group of providers and support staff, fine-tuned and enthusiastic about working to meet the needs of the MIT Community. I believe that the Dental Service is worthy of the Institute's full support as an integral and necessary part of the Medical Department.

As was true for the entire Medical Department, over the last several years the Dental Service sustained many curtailments to achieve short-term tactical advantages at the expense of sound, long-term strategic objectives. Our previous Chief, for example, waited in vain for a promised computerized management system for our Dental Service of the sort that is now the rule rather than the exception in well-run dental offices. I hope our new Chief is given this modern management tool of proven efficacy without further delay.

I sincerely hope that, as MIT expresses its confidence and re-invests in Health Care for the MIT Community, it will take an enlightened approach to dental care and allow us to do our part on a level playing field with other divisions of the Medical Department and with other providers of health care.

I plead with you: "Give us the tools and we will finish the job." ■

Edward B. Seldin is Chief of Oral Surgery, MIT Medical Department *(seld@med.mit.edu).*

MIT Poetry

by Stephen Tapscott

Valentine: Faith

Of course I believe in the soul.
Did you think I never loved anyone so strongly?
I think, rather, it is the souls in the other life
whose faith is tested: feeling themselves fade,
the memories of the living turning
from blood to milk, from milk to cloud.
They stand at the corners of the room,
the dead. They have learned to enter
soundlessly, not calling
attention to themselves. Why should they make trouble?
They are even more themselves now
than children. Do we think they should stop
being fallible, and foolish,
only because they are completed? Dead is not
an education, nor a rapture.
Did you think I had never been lifted?
Neither is it a door. Afterwards
is a lighted room
where the dead stand around, guests
at an awkward party: restless and longing
toward some visible guest, handsome and laughing,
as though through a silk window.
Because he is not yet old enough to see them clearly,
he sees if anything a fog-shaped
fog in the corner. Did you think I had never been there,
attentive, seen-through? I who am
only a voice to you now,
speaking from one world into another,
but we believe in one another.
Of course I believe. I choose to.
Did you think we had no choice?

Valentine: Invention

Shakespeare invents his Lover, in the Sonnets.
The Psalms, too, postulate their god. Why should I not

make you real? There is enough
depletion to go around.

I choose instead to celebrate
the roundness of your absence.

It suits me
and it turns me kinder, knowing

this is what we have in common,
the others and I – each being

twirling enclosed in time, each body
longing for its other

and singing, recklessly.

Stephen Tapscott, Professor of Literature, is a critic, poet and translator. His books of poetry include From the *Book of Changes* and *Another Body*. His most recent publication is a translation of work by the Chilean writer Gabriela Mistral, who won the Nobel Prize in Literature in 1946.

MIT Profiles
Mildred Dresselhaus

Mildred Dresselhaus was born and grew up in New York City. She received her PhD degree at the University of Chicago in 1958. She joined the MIT faculty in the Department of Electrical Engineering and Computer Science in 1967 and the Department of Physics in 1983, and was named Institute Professor in 1985. Her research has covered a wide range of problems in the physics of solids with special attention to nanoscience.

The following interview of Prof. Dresselhaus (**MD**) by the *Faculty Newsletter* (**FNL**) was conducted on January 20, 2006.

FNL: I see that you're an Institute Professor. How does that differ from a regular professorship?

MD: One of the great things about being an Institute Professor is that you're encouraged to do state-of-the-art research and to do other things that will have an impact on science, society, and whatever. Obviously we have MIT values and needs that are utmost on our radar screen, but I think Institute Professors are given a message that we should try to do unique things.

And what happened to me personally that gave me even more emphasis to go into unique things recently was the Heinz Award that I got last year. That award was for science and research that I've done. Yet the work that I do is science-oriented but with an impact on tech-

nology. My award was in two other areas as well, areas you would think I have no impact on at all. One of them is economics and the other one is employment. It's a three-prong award, and it's the only science award given by the Heinz Foundation. And although they never tell you what they have in mind, I think that the work that I've done over the years promoting women in science was something that grabbed the fancy of the selection committee. But I think it's not only that; I think that it's also work I do in public policy, science policy issues, and general service to the nation.

FNL: So your work is really quite interdisciplinary in nature.

MD: That's right. It's sort of physics based, but I work on advanced materials and nowadays what is called nanomaterials. And then I have electrical applications. Regarding academic departments, I also have students from Chemistry in addition to Physics, EECS, and Materials Science and Engineering. And I'm on thesis committees for Mechanical Engineering because I study nano heat transfer. I do like seeing the differences in the workings of these departments. Interdisciplinary research is a good thing for the students and it's a good thing for the faculty, because they get a broader view.

FNL: One thing that's changed over the last several years are the alliances we form with industry, where the people who are giving us money are really looking for some kind of end product rather than more basic research.

MD: Well, I'd like to address that, because that's not so much an MIT thing alone. That's a national thing at the moment or even international because other countries look to us often with envy regarding technology transfer. And we at MIT should understand what we're doing in this arena and also how our policies and procedures protect us and protect the students, so that we give them what we think is a good foundation. I'm a firm believer that students have to have some roots in some discipline or get some mastery of material that they know in

some depth, so that they are very comfortable there and can branch out into many different directions from that focal point.

I think that all these new types of research sponsors that we have now are the trend of the times. When we look at the national figures on who's supporting research in this country, we see that R&D support used to be two-thirds federal and now it's probably less than half federal, and industry and other entities, foundations and so forth, are putting in a very significant amount of money. And even foreign countries are putting in money for the work that we do here. And they may have their own interests in mind, not necessarily the interest of our students. But we're here to educate students. That's our primary goal.

FNL: Earlier you mentioned your work with women in science. How do you think that has changed over time?

MD: When I first came to MIT and was appointed as a professor here, 4% of the undergraduate student body were women. And for the graduate students it was less than that. So you can imagine that you saw very few women in the daily classroom. And we had almost no women faculty. We were less than 10, I think, when we started. We were really a minority. What was so important for the students that I met was that during their classroom time or in their research groups they never saw another woman. Most of the classes that I taught were comprised of all men. And if we had a woman student, she would be isolated in the classroom with empty seats around her. And so the women felt isolated from the other students in the class, and the professors were not comfortable and familiar with them either. The feedback I got was that many male faculty in the 1960s didn't know how to work with women as research students. So I used to have mentoring sessions in my office and discuss what do you do when this or that happens. And I was working hard to get networking for them to meet each other across departments, across different areas of research.

FNL: What about the early '90s and the Women in Science report by Nancy Hopkins and her colleagues?

MD: At the time of the study I personally had thought we had overcome most of the earlier barriers. But when we sat down around the table before that committee ever was formed – and these women at the table were tenured women faculty with quite a bit of impact on their professions both inside and outside of MIT – people were saying how our lives were not equivalent, that our experience here was just second class to male faculty in some ways. And then the report showed that our impressions had some basis. The outcome was different than I expected. I thought we had gotten further in reaching equality than what the data showed. And the administration stepped up to the plate, I thought, to give us more equal status.

FNL: Why do you think you were so surprised by the results of the Women in Science report?

MD: For those of us who had been here for a long time, we just saw the changing scene and we thought that we had reached a very comfortable level, primarily because the academic performance of women students was equal to men in every department, and the probability for women faculty to get tenure was equal. I thought that after we had a critical mass of students in each and every department (at least 15%), which we had by the mid '80s – I thought that that would be enough to make things happen. But it turned out that Nancy was right, that it wasn't enough.

What came back to us was that women faculty were not getting the information from their departments that they got when we got together in the 1970s and 1980s and talked – information about what the tenure process was and what was important, how to get grants, and those kinds of issues.

FNL: And how would you assess the situation now?

MD: Well, I think that what happened is that the Nancy Hopkins report and what the Institute has done in response to the report has just had a huge impact, because I think women students and faculty are much more respected now as equal members of the establishment here.

FNL: I'm interested in your thoughts about President Hockfield.

MD: I think she's very thoughtful. She keeps sending us our own faculty email. And she seems very open. When she was starting out she interviewed quite a few of us – I was one of them – and we spent a lot of time together talking about MIT. She was trying very hard to learn our culture. I was a little surprised, actually, that we would have a woman president while I was still here, because when I came to MIT we were so far from ever thinking about a woman president or even a woman dean. And now we have women department heads and many on Academic Council.

And Susan Hockfield is committed to promoting all students. I know she takes an interest in women students, but not only women students. And she participates in life at MIT, because she's kind of one of us, in a way. At least in her early career she went through a time when we didn't have so many women in the academic line. And so she's been through much of what I described before.

FNL: I understand that you are in your office 5:00 o'clock, 5:30 every morning.

MD: Oh, maybe more like 5:45. [LAUGHTER] But yes. My schedule is a little bit unusual for an MIT professor. I'm an amateur musician; I play violin, mostly, but also viola as a pinch hitter. And most evenings I have a musical event going on that's usually at my house. And if you have a musical commitment at night you have to leave the lab around 5:30 to get it all in. And then I also have to get some work done, and after 9:00 a.m. this place is crazy and there are few opportunities for serious work. So I have to add some time, like three hours before 9:00 a.m., to get some of my own things done. So, that's how I have the schedule that I do.

FNL: I know you work with many international students and travel internationally, and I was wondering if you've seen much impact since 9/11 and the Patriot Act.

MD: I think that the students from other countries, at least to some degree, are in some ways discouraged from coming here. At the same time there are also more opportunities in other places than before. It still is the case for many countries that if you want to be an academician they pretty much expect that you've had a couple of years either in the U.S. or some other really good place in your field. And it used to be that the U.S. was the predominant place that people came, but now going to another European Union country is easier and it's encouraged. And there are funds for doing it; there are many incentives offered. And we don't have those incentives for them here. Now we have even some discouragement, but still students from abroad like to come here and seem to do well once they are here.

There are, however, factors that are working against the U.S. maintaining a high level at the cutting-edge. Our funding situation, at least in my field, has not been very attractive. And it discourages people from going into the field because they see how we struggle to make ends meet. So I think that we're headed for some serious problems in the future and I think that this is a topic that needs the highest level of attention from our country, our national leaders, because the research that we do brings new industry to the U.S. It isn't just that we're in an ivory tower here.

FNL: And what are you working on now?

MD: I'm now leading a national study – I'm always involved with some national study or other. I'm chairman of the Board of the American Institute of Physics so I have a lot of responsibilities for that. But I'm now just starting a new study on condensed matter and materials physics, one of the decadal studies that the National Academy has been doing for many years. But I'm also doing a lot of other things. I'm very busy, but I have a good life.

That's the other thing; it's that I think most of the people here on the faculty really love what they're doing. We wouldn't do it otherwise. I like doing a certain amount of these various service kinds of things. I think most MIT faculty apply the uniqueness criteria: What can I do that's special? When I'm asked to do something and if I think somebody else can do it, I usually don't do it. But when something comes along and I think I might have a special knack for it. . . . And here is another place where the women faculty look at things differently. It's that I might be the first woman that has been asked to do this ever. It's important for us to get these things going, to show that we can do it too.

FNL: Well, thank you very much.

MD: OK.

OpenCourseWare at Home
While OCW idea takes off globally, project provides tangible benefits to the MIT community

Shigeru Miyagawa

IN NOVEMBER 2005, I had the privilege of representing MIT and the OpenCourseWare project at the United Nations' World Summit on the Information Society in Tunis. More than 10,000 people from 120 countries attended the WSIS event, including more than 100 who participated in the parallel event on OpenCourseWare (OCW), which I co-hosted with the William and Flora Hewlett Foundation, and the United Nations University.

What I saw at that meeting was the enormous momentum that has developed around the notion of openness and educational sharing. It has truly become a global movement. One UNESCO official told me that with OCW, "MIT is a trailblazer," and that MIT had set the world in motion with "the OpenCourseWare movement . . . Nothing can stop it now."

The possibilities of OCW are truly global in nature, but after returning to MIT from Tunis, I was careful to remind myself that we should not forget the benefits that OCW is providing to the MIT community on many levels as well. From students to faculty, the benefits and possibilities of OCW are starting to take shape across the Institute.

As a member of the OCW Faculty Advisory Committee, I have had the opportunity to read through the data (such as that on the back page of this issue of the *MIT Faculty Newsletter*) and case studies that OCW has gathered that demonstrate the value of this project here at MIT. The following are just three of the case studies documenting the benefits of OCW to the MIT community.

Finding a global audience

Professor Charles Stewart III, head of the MIT Department of Political Science and a colleague of mine on the SHASS faculty, is a specialist in the fields of American politics and behavior, political institutions, and research methodology.

Stewart, who has long been a proponent of using technology as a teaching aid, and also of the open access to ideas, was an early supporter of the OCW concept. "I think that OCW serves the higher purposes that have been touted for it," Stewart told OCW recently. "It really does provide opportunities for people around the world to see what we do at MIT, and perhaps learn from it. There are heartwarming stories of faculty, out in the middle of nowhere, who somehow get to the OCW site, discover our stuff, and use it to teach classes."

But in addition to these global benefits, Stewart has found that OCW can provide important exposure for faculty from Course 17, and across the Institute. "I think the opportunities include getting your name associated with a particular subject area," Stewart elaborated. "After all, for faculty at MIT, one of the things you're supposed to do is establish that you are one of the world's preeminent experts in a particular field. And OCW is a way of highlighting what you do, and how you do it. It gives you a broader audience than just purely an academic audience."

In the early days of OCW, Stewart often found that he had to defend OCW to peers who were uncertain about what all this public exposure might mean. More recently, however, he has found most members of Course 17 are eager to participate. "These days, all I really do to promote OCW is encourage them to participate whenever there's a call for new material," Stewart said.

Making the connections explicit

Professor Karen Willcox has been teaching a required subject in aeronautics and astronautics to juniors since 2001. Willcox told OCW that, in her first year at MIT, she was surprised to find that many of her students were less proficient in math than she expected.

"I really had the impression coming here that all the students would just be fantastic in math," Willcox explained. "When I realized this was not the case, I started talking to math faculty and I realized that there was a disconnect between the math department and the engineering departments. For example, even though I relied heavily on material from Course 18.03, I had no idea how it was being taught – or for that matter, what was being taught."

Once Willcox better understood the relationships between her course and related math subjects, she said, she began working with Professor Haynes Miller of the Department of Mathematics to make those connections clear to her students. "The next step was to make these links explicit for the students," she explained. "So in my first lecture, I'd say, 'This is what we're talking about today in aeronautics, and this is directly related to what you learned in this math class.' And then with the pointer, I could show them the OCW Website, and the lecture, and the problem sets related to what we're learning."

Willcox said she has already seen improvements among her students, but in her opinion, the benefits of encouraging students to "flashback" to OCW are only the beginning.

the Institute, Walker heard about the site from a friend soon after his arrival in Cambridge, and quickly found that it was a valuable resource.

"As far as a practical use," Walker told

advantage of OpenCourseWare is that it brings into focus the things that you can only find here at MIT, and not on the Web," he said. "It moves the educational focus back toward the intangibles, rather

OpenCourseWare Site Traffic Since October 2003
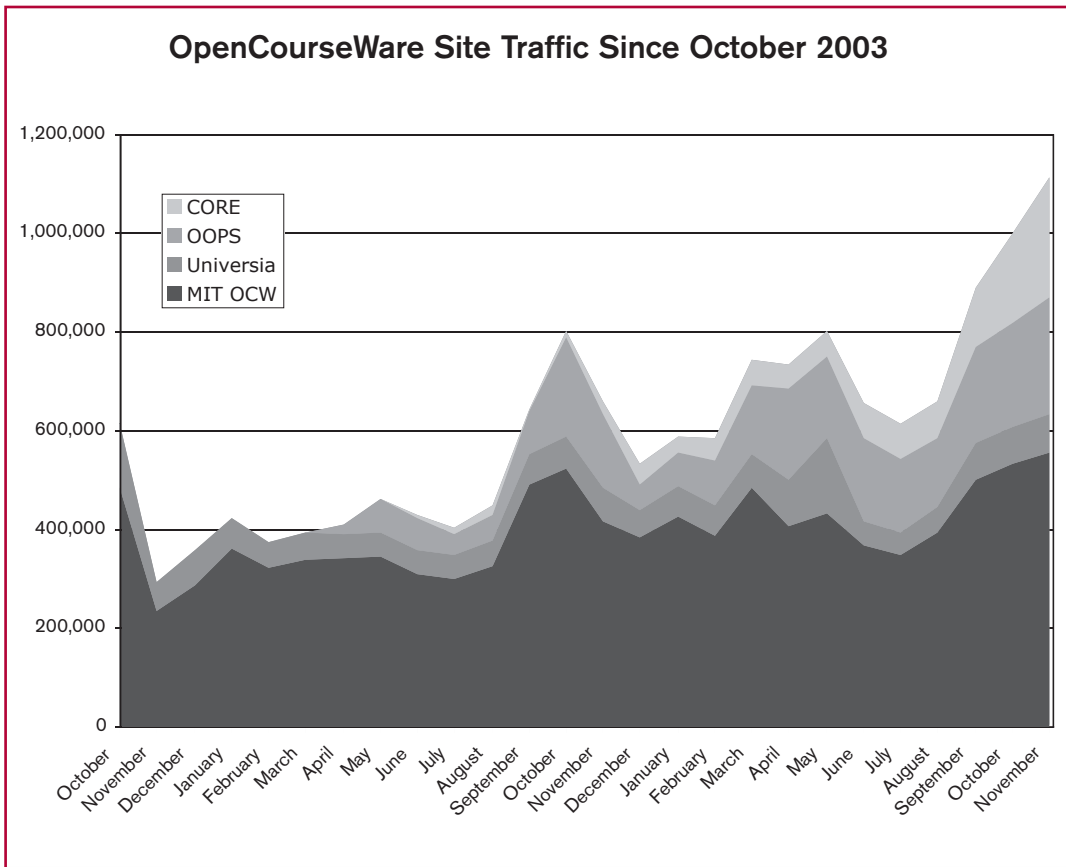
KEY
CORE = China Open Resources for Education (Simplified Chinese Translations)
OOPS = Opensource Opencourseware Protocol System (Traditional Chinese Translations)
Universia = Spanish and Portuguese

"Down the line, I hope to bring more of the technology into the classroom, so that while I am giving a lecture, I will be able to give them a flashback to something they had seen in a previous course – a visual reminder up on the screen of something from their math class," she said. "My sense is that this will really enable us to create better linkages, and to fully integrate the learning experience. Our students will have the opportunity to look broadly across their education, and that will have enormous implications for learning."

The intangibles of an MIT education
MIT junior Aron Walker is an environmental science and chemical engineering major from San Francisco. Though he had never experienced OCW before coming to

the OCW staff in the fall, "MIT students visit OCW to get a sense of what a class is like. Yes, MIT also has course evaluations, which are compiled, quantified, and put online – and people definitely use those. But the evaluations don't offer much information about the actual content of the class. It's more, 'What have my peers thought of this professor?' The OCW course sites are more detailed because they include the actual course material."

Students also visit the OCW site to find materials for review purposes, Walker explained. "I think students also use it if they're taking some class one year, and they want more practice doing things."

But for Walker, the most valuable aspect of OCW is that the Website calls even more attention to the unique aspects of an MIT education. "For me, the biggest

than just, 'Here's a sheet of paper with some problems on it, and I want you to do them.' There's a very strong community of ideas here, and a lot of energy in that community. That's what really sets MIT apart."

With 1259 courses now available at *ocw.mit.edu*, OCW continues to evolve as a resource for educators and learners abroad – and more and more, for the unique MIT community of educators and learners, as well.

These case studies, and the data on the back of this newsletter, provide a glimpse into the potentialities of the OCW resource. For more information, I encourage you to contact Jon Paul Potts, OCW communications manager, at *jpotts@mit.edu* or 617-452-3621. ∎

Shigeru Miyagawa is a Professor of Linguistics *(miyagawa@mit.edu)*.

MIT Retirement Plans: A Brief Summary

Kimberly Soroko Forness

MEMBERS OF THE FACULTY often acknowledge that they lack the time to monitor their progress towards retirement on an ongoing basis. The good news is information regarding MIT's Retirement Benefits is becoming increasingly accessible and assistance is simply a phone call away. Whether you are just starting to save for retirement or retirement is imminent, MIT's retirement counselors are available to provide you with information that will help you make informed decisions.

MIT's retirement plans can help you build long-term savings and provide you with sources of income when you retire from the Institute. Both the MIT Basic Retirement Plan and the MIT Supplemental 401(k) Plan provide opportunities for you to plan for your future.

Basic Retirement Plan

The MIT Basic Retirement Plan is a defined benefit plan that provides you with monthly lifetime income at retirement. MIT pays the full cost for the plan and, if you are eligible, enrollment in the plan is automatic. You are vested in the Basic Retirement Plan after you are employed by MIT for five years. Your accrued benefit is determined in two ways and you receive whichever is greater:

1. Cash Balance Benefit (the 5% Account Method)

Under this method, a bookkeeping account in your name is credited with 5% of your pay each month. The account is also credited with interest. When you elect to receive your benefit, the balance in your bookkeeping account is converted to a monthly lifetime benefit (known as a single life annuity) which is based on certain assumptions about interest rates and life expectancy.
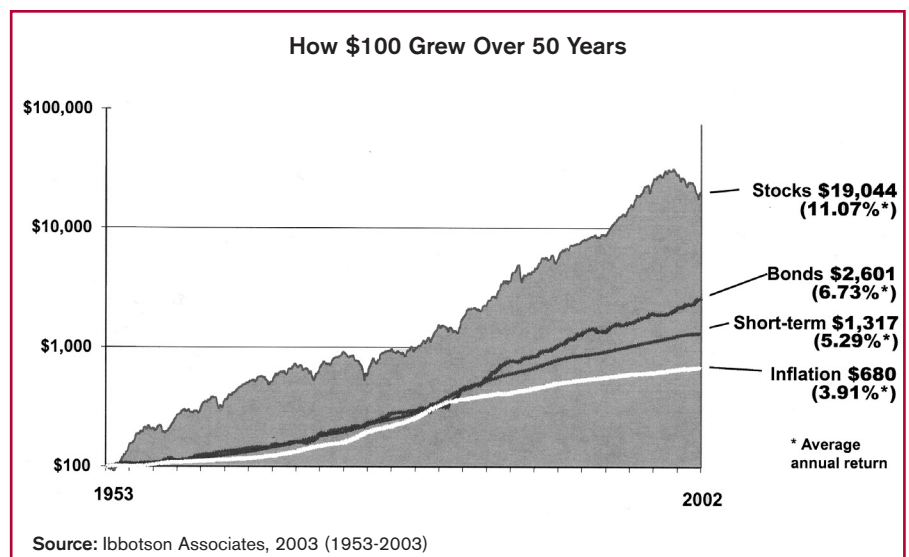
2. Career Average Benefit (the 1.65% of Pay Method)

Under this method, you earn an annual benefit equal to 1.65% of your pay received while participating in the Plan. This annual benefit assumes your benefit

How $100 Grew Over 50 Years

Stocks **$19,044 (11.07%*)**
Bonds **$2,601 (6.73%*)**
Short-term **$1,317 (5.29%*)**
Inflation **$680 (3.91%*)**

* Average annual return

1953   2002

Source: Ibbotson Associates, 2003 (1953-2003)

payments will start on your normal retirement date and will be paid to you for as long as you live, with no survivor benefits. Your normal retirement date from MIT is the first of the month following or coinciding with your 65th birthday.

If you have more than 10 years of service with MIT, you must take your benefit as monthly lifetime income (an annuity). There are many forms of annuities available to you when you retire, some of which allow you to have all or a portion of your benefit continue to another person (usually a spouse) after your death. The actual benefit payments you receive will depend on your age when benefits begin and the form of annuity you choose.

Supplemental 401(k) Plan

The MIT Supplemental 401(k) Plan is a voluntary plan that allows you, if you are eligible, to contribute a percentage of your pay. MIT matches your contribution dollar-for-dollar up to 5% of your pay. You are always 100% vested in all 401(k) Plan contributions made by you and MIT. Federal law imposes annual dollar limits on your contributions: $15,000 for 2006 if you are below age 50 and $20,000 if on December 31st you are age 50 or older.

Similarly, it is important to note that federal law also limits the pay that can be considered for qualified retirement plans. In 2006, MIT only considers the first $220,000 of pay you receive.

Prior Retirement Plan for Staff Members (RPSM)

If you are a faculty member who worked at MIT prior to July 1, 1989, you may have contributed to the Retirement Plan for Staff Members. In the RPSM Plan, you were required to contribute 5% of your pay while MIT contributed 10% of your

your 65th birthday. Although the amount of the ERS is determined by your termination date, the benefit is paid for the rest of your life, provided that you are not rehired at more than 50% effort.

RPSM Qualified Spousal Benefit (QSB): A QSB is paid as a monthly lifetime annuity to your "qualified" surviving spouse upon your death. The QSB is independent of the annuity option you elect for the MIT Basic Retirement Plan. Generally, your

> If you are a faculty member who worked at MIT prior to July 1, 1989, you may have contributed to the Retirement Plan for Staff Members. In the RPSM Plan, you were required to contribute 5% of your pay while MIT contributed 10% of your pay.

pay. The balances that accumulated under this Plan transferred to the 401(k) Plan at Fidelity Investments. In fact, if you look at your most recent quarterly statement, you'll see your RPSM balances are listed as separate sources.

There are two important provisions of the RPSM plan that exist today as part of the Basic Retirement Plan. If you are eligible, you are considered "grandfathered" for these benefits:

RPSM Early Retirement Supplement (ERS): An ERS, payable as a monthly lifetime annuity, is available to participants who earned benefits under the RPSM if they retire on or after age 60, but before age 65. You must have at least 20 years of MIT employment to be eligible for this benefit. The amount of the ERS will depend on your age when you terminate employment. The ERS benefit is $625 per month if you terminate employment anytime after attaining age 60 until the June 30th coinciding with or following your 60th birthday. Thereafter, the amount of the ERS decreases by $10.42 each month and is $0 after the June 1st following

spouse is eligible to receive a QSB upon your death if you participated in the RPSM, and are at least age 55 with 10 years of retirement plan eligible service on the earliest of (1) your termination date, (2) your date of death or (3) the July 1st following your 65th birthday. Your spouse is considered "qualified" if you were married at least three years prior to the earliest of (1) your termination date, (2) your date of death, or (3) the July 1st coinciding with or following your 65th birthday. In addition, you must not be legally separated or divorced at the time of your death for your surviving spouse to receive this benefit. The amount of this benefit will depend on prior RPSM balances.

A reminder on Minimum Required Distributions . . .

Federal law states that you must begin receiving benefits from the MIT Basic Retirement Plan and the MIT Supplemental 401(k) Plan by the later of the April 1st following the year you turn 70 1/2 or the April 1st following the year in which you terminate employment from MIT.

New Pension Calculator

The Retirement Programs Office is pleased to introduce a new Web-based tool called *Pension Calculator*. This new system allows you to:

- Customize projections of your monthly benefits for the MIT Basic Retirement Plan;
- Project your 401(k) balance using different assumptions; and
- Access links to Fidelity's NetBenefits and the Social Security Administration Website.

How Pension Calculator Works

Pension Calculator allows you to create different projected Basic Retirement Plan benefits based on your own assumptions by entering:

- A last day of work;
- Changes to your annual base salary (including overtime); and
- Annual percent increases in pay.

Pension Calculator can be accessed on the internet at ***web.mit.edu/hr/benefits/calculator*** or by clicking on the "Pension Calculator" link located on the MIT Benefits Website (***web.mit.edu/hr***).

If you would like to learn more about this tool or receive a set of instructions, please send an e-mail to *retirement@mit.edu*.

MIT's Retirement Counselors are available to meet with you individually to discuss your MIT benefits as they relate to your overall retirement planning. We are located at the Benefits Office in E19-215. Please call 617-253-4272 to schedule an appointment. Paul Gunning, a Fidelity Investments senior retirement counselor, is also available to discuss your MIT Supplemental 401(k) Plan. To meet with Paul, please call him directly at (617) 258-8872. ■

Kimberly Soroko Forness is a Retirement Counselor, Department of Human Resources *(ksoroko@mit.edu).*

MIT Rated 7th in Latest *U.S. News* Ranking

LAST YEAR, *U.S. News & World Report* published its 2006 edition of "America's Best Colleges." Among the top PhD-granting institutions, MIT ranked seventh, tied with CalTech.

MIT is consistently in the top group of schools. The chart shows MIT's ranking for the last 10 years, alongside the rankings of other top schools. MIT's highest ranking was in 2000, when it ranked third. Its lowest ranking came this year. While there are invariably year-to-year fluctuations, the rankings have been largely consistent over time; for the 10 schools in our sample, none fell below 13 over the last decade.
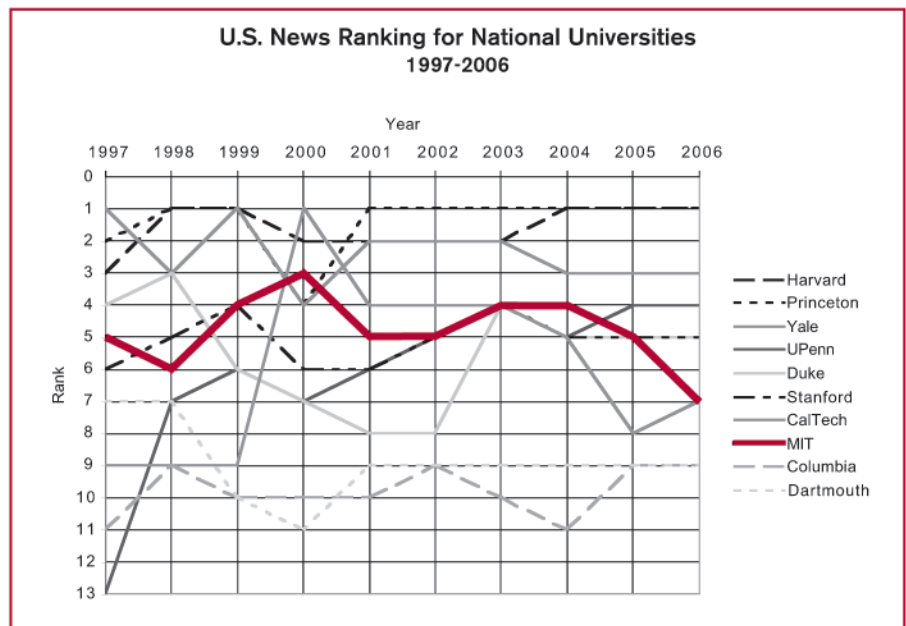
U.S. News uses a weighted average of 16 numerical factors to rank schools. These factors fall into seven broad categories: peer assessment, student selectivity, faculty resources, graduation and retention rate, financial resources, alumni giving, and graduation rate performance. Peer assessment is the largest factor, worth a quarter of the total score. Each year, *U.S. News* sends surveys to presidents, provosts, and deans of admissions asking them to rate the undergraduate academic programs of peer schools. These ratings range from 1 (marginal) to 5 (distinguished). MIT consistently ranks number one on this measure, often tied with Harvard, Princeton, Stanford, and Yale. The chart on the next page presents the 2006 average rating for MIT by type of administrator. While provosts, on average, rate MIT slightly higher than presidents and deans of admissions, the differences are negligible.

Another important factor in the rankings is faculty resources, worth 20% of the

total score. Forty percent of this factor is based on undergraduate class size, a proxy for the value an institution places on undergraduate teaching. *U.S. News* measures class size two ways: the proportion of classes under 20 and the proportion of classes 50 or above. Compared to other

top ranked schools, MIT reports the lowest percentage of small classes and the highest percentage of large classes. The tables on the next page show the proportion of small and large classes at MIT and peer schools for the last five years. Beginning with 2005, the methodology includes all classes with at least one undergraduate student enrolled and excludes subjects that could be classified as research, thesis, and independent study/directed readings. MIT will continue to refine its definition of what con-

stitutes a classroom subject and what constitutes a section.

Defining ideal class size as 19 or less certainly favors smaller colleges. It also makes the assumption that small classes are optimal in all contexts, ignoring the role of discipline. For example, a writing

course may benefit more from small classes than an introductory course in biology or physics. Finally, the *U.S. News* methodology for calculating class size excludes some highly-valued educational experiences at MIT, such as independent studies and UROP. Roughly a third of MIT's classes are taught outside of the traditional classroom environment.

A less important factor in the *U.S. News* weighting scheme, worth 5% of the total score, is a school's graduation rate performance. This measure is the differ-

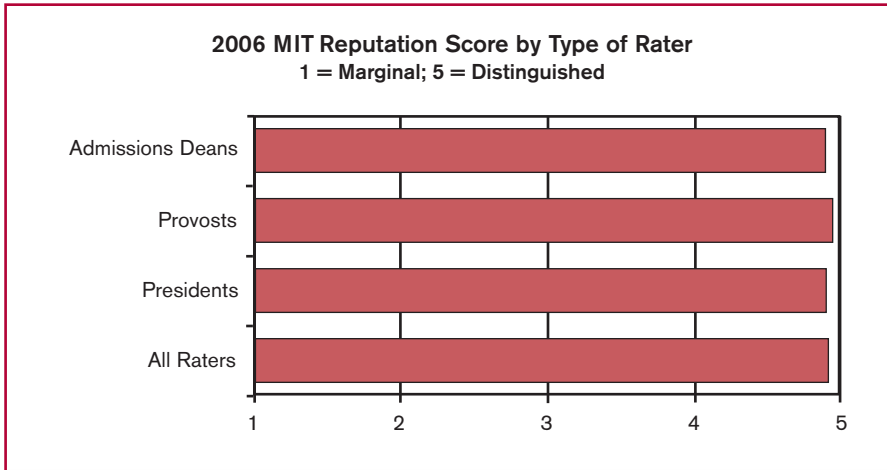U.S. News Ranking for National Universities 1997-2006

ence between a school's actual six-year graduation rate and the predicted graduation rate. *U.S. News* predicts each school's graduation rate based on two student

2006 MIT Reputation Score by Type of Rater
1 = Marginal; 5 = Distinguished

characteristics (SAT and high-school rank) and two institutional characteristics

formers included the University of Chicago (three-point deficit) and CalTech (two-point deficit). While these schools share a reputation for making students work hard for their grades, it's unclear whether there's a relationship between

schools into groups, as opposed to ranking schools individually. In *TheCenter's* most recent rankings (2004), MIT is clustered in the top group of three research universities, alongside Harvard and Stanford.

Washington Monthly, in contrast to *U.S. News* and *TheCenter*, measures success by how well a school is an engine of social mobility, drives economic growth through research, and demonstrates a commitment to national service. Measures include the percentage of students on Pell grants, the number of PhDs awarded in engineering and science, and the percentage of students enrolled in ROTC. MIT tops the list as the most highly ranked national university in 2005, followed by UCLA and UC-Berkeley.

Lastly, *The Times Higher* published its second annual "World University Rankings" in October 2005, in which MIT placed second to Harvard. The methodol-

% of Classes under 20	2002	2003	2004	2005	2006
UPenn	70%	71%	73%	74%	75%
Princeton	71%	73%	69%	72%	74%
Yale	75%	76%	77%	75%	74%
Duke	69%	68%	71%	72%	72%
Harvard	69%	70%	75%	73%	70%
Columbia	68%	68%	70%	73%	69%
Stanford	69%	68%	69%	69%	69%
CalTech	76%	69%	64%	63%	63%
Dartmouth	57%	59%	57%	56%	61%
MIT	58%	59%	72%	63%	61%

% of Classes 50+	2002	2003	2004	2005	2006
Duke	7%	7%	5%	6%	5%
UPenn	8%	8%	7%	7%	7%
Yale	8%	9%	8%	8%	8%
CalTech	5%	6%	7%	9%	9%
Columbia	9%	9%	9%	8%	10%
Dartmouth	11%	11%	9%	9%	10%
Princeton	11%	10%	11%	11%	11%
Stanford	14%	14%	12%	14%	12%
Harvard	13%	13%	13%	13%	13%
MIT	16%	15%	11%	15%	16%

(whether the institution is public or private and average educational expenditures per student). Generally, schools have higher predicted graduation rates if their students have strong high-school grades and SAT scores and the schools are private and spend a lot of money on education. In the 2006 rankings, MIT was expected to graduate 96% of its students within six years, compared to its actual performance of 92%. This four percentage point deficit placed MIT in the bottom third of schools on this measure – 165 out of 248 total national universities. Other under-per-

academic rigor and graduation rate.

In addition to *U.S. News*, MIT has been featured in a number of other college rankings publications, including the *TheCenter's* "Top American Research Universities" (**thecenter.ufl.edu**) and *Washington Monthly's* "College Guide" (**www.washingtonmonthly.com**).
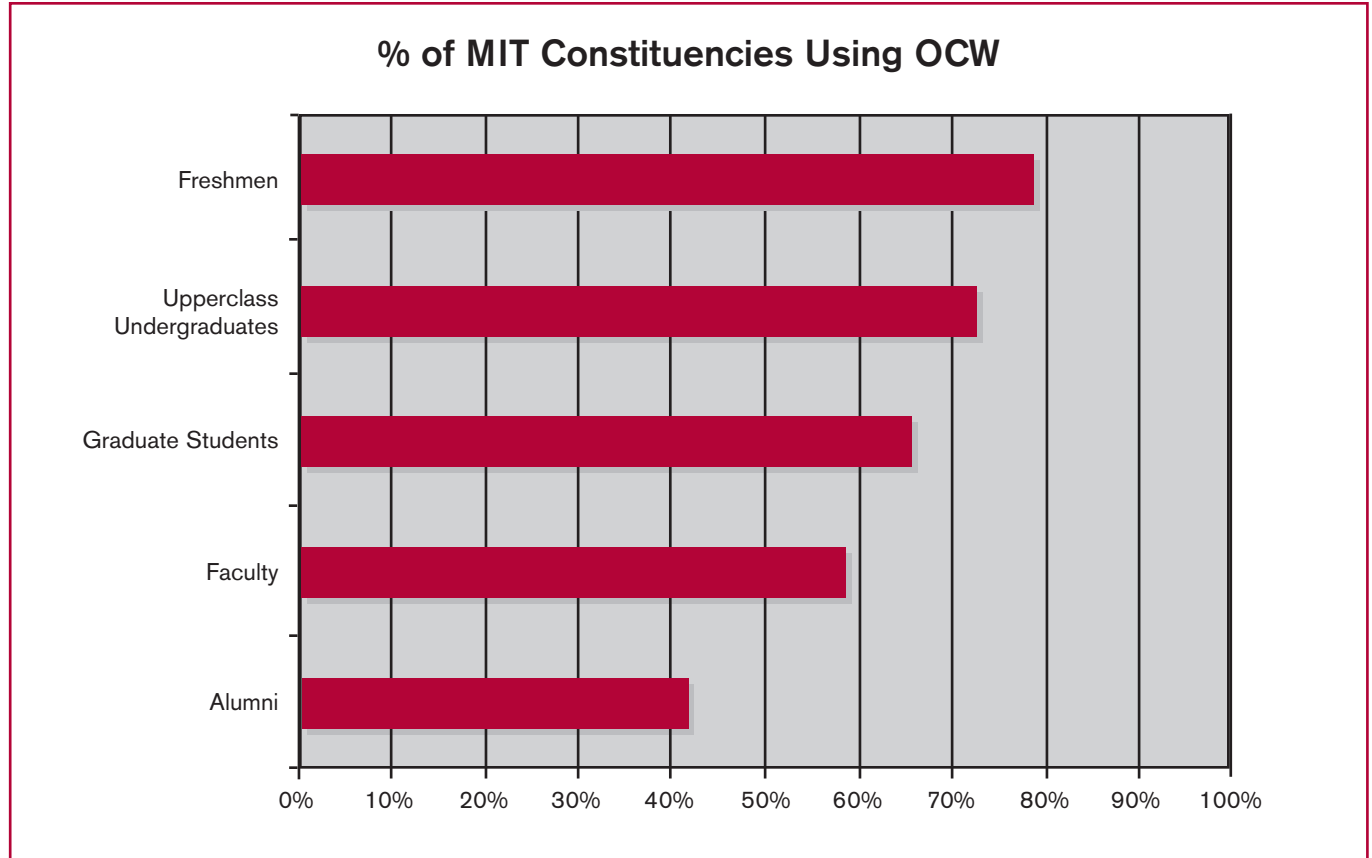
TheCenter, a research enterprise associated with the University of Florida, ranks research universities based on their performance on nine measures, including research volume, faculty awards, and student selectivity. TheCenter clusters

ogy for this ranking relies heavily on opinion surveys from research academics (40% of overall score) and graduate recruiters (10% of overall score).

Each ranking system has its own unique mission, methodology, and audience. Regardless of the ranking system, it seems MIT figures prominently. ■

M.I.T. Numbers
OpenCourseWare

% of MIT Constituencies Using OCW

Bar chart showing:
- Freshmen: ~79%
- Upperclass Undergraduates: ~73%
- Graduate Students: ~66%
- Faculty: ~59%
- Alumni: ~42%

(x-axis: 0% to 100%)

OpenCourseWare Impact on the MIT Community

- **73% of MIT faculty are participating in OCW**
- **35% of MIT freshmen aware of OCW before deciding to attend MIT indicate the site was a significant or very significant influence on their choice of school**
- **96% of MIT students using the OCW site report it has a positive or extremely positive impact on their student experience**
- **40% of faculty using OCW report that the site is a helpful tool in revising/updating courses; 38% use the site for advising students**
- **Averaging more than 1 million visits per month to OCW content**
- **56% increase in traffic to OCW over the last calendar year**