Massachusetts Institute of Technology

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MIT Faculty Newsletter

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in this issue we offer Faculty Chair Tom Kochan on the Institute's promotion and tenure process (page 1); an article supporting the new START treaty (page 6); Deans Hastings and Ortiz on "Affordable Course Materials" (page 12); and a piece on implementing the MIT faculty open access policy (page 14).

From The Faculty Chair

MIT Promotion and Tenure Processes

Thomas A. Kochan

IN SPRING 2009, my predecessor Bish Sanyal asked Bob Silbey and me to co-chair a special faculty committee on MIT's Promotion and Tenure Processes. A brief summary of our report follows, along with some thoughts on several longer run challenges facing our profession at MIT and in our peer institutions. The full report of our all-star committee is available at: ***web.mit.edu/faculty/reports/pdf/promotionandtenure.pdf.***

Our charge was to review the full range of processes used in promotion and tenure decisions. Note, however, we were not asked to reconsider the intellectual and educational standard for making these decisions. Our committee reviewed the hiring, mentoring, and promotion/tenure decision-making processes followed in different MIT departments and Schools, examined the recent Faculty

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Student Support Services: Reorganized, Reviewed, and Redefined

Daniel Hastings

IN AUGUST 2009, Chancellor Phillip Clay and the Chair of the MIT faculty, Professor Tom Kochan, charged the Task Force on Student Support Services (S^3) to "to assess and recommend (1) ways to improve the operations of Student Support Services (S^3), and (2) how to best position the functions of S^3 within the MIT organizational structure to improve coordination among offices, faculty, and other stakeholders that work with S^3 in serving students who need academic, social, and mental health support." We have moved ahead on the final recommendations of the Task Force, which were issued in December 2009. Consequently, there has been a reorganization and an intensive strategic planning process which has strengthened S^3's role as a central element of the support services provided to the MIT community.

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Editorial

MIT's Foreign Policy?; S^3 & Institute Committees; Landscaping

MIT'S INTERNATIONAL ACTIVITIES – research programs, educational initiatives, and collaborative projects – continue to expand as part of the Institute's increasingly global reach. We need some quantitative sense of the scale and scope of this reach, and a clear sense of the qualitative criteria used – or not used – in evaluating which opportunities to pursue. Here we concentrate on the former. In a future editorial we hope to address the question of criteria, as described by Provost Reif at the December 15 faculty meeting, and how we ensure that MIT's resources are not simply up for sale in the international marketplace.

Among the well known "data" upon which we base our understanding of MIT's international activities are the number of foreign students; organized international internships (with the MISTI

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MIT's Foreign Policy
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Program as a flagship program); collaborative research institutional developments (such as the Technology and Development Program); the OCW institutional initiative; the large research programs focusing on global, rather than simply international, challenges (such as the Joint Program on Climate Change); and the international endowment (or seed) for frontier research (the Poverty Center).

These are only the educational aspect of the Institute's international activities, one that provides a necessary but far from sufficient view of an increasingly complex whole. Further, it highlights only activities whose scale and scope are captured by the Institutional radar. These formal programs may underestimate – or overestimate – the actual state of MIT's international activities and influence. For example, such lists leave out the very large number of international collaborations that proceed through faculty academic and research activities, but are not explicitly sanctioned or supported by the Institute.

Perhaps a "census" of such reach would be a useful addition to the institutional data collection. Would this provide an overarching and integrated view of international activities? Would the information in such a "census" be worth the costs incurred? Some assessment of the range of international activities that capture the actual richness is essential if we are to have a principled and systematic analysis of which sectors MIT should promote and invest in at the institutional level.

More practical, however, might be a "semi-census" drawn from all Institute-wide summaries of various types of international activities, whereby the individual "parts" are compiled and integrated into an overarching "whole." Perhaps this "semi-census" will show facets of activities that have remained below the radar. Most likely of all we would get a better picture of MIT's contribution to the international community. It is unlikely that we have overestimated MIT's international activities. It is far more likely that we do not yet have a full vision of MIT's global reach. The more accurate the description of what is – and is not – in play in the international arena, the better we will be able to decide on how to invest MIT resources.

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S^3 and the Importance of Serving on Institute Committees

The *Faculty Newsletter* editorial board notes with approval Dean Hasting's article in this issue (see page 1) describing the reorganization of Student Support Services. In particular we think the expansion of available appointment hours for S^3 to include walk-in hours from 9-10 am Monday-Friday is a wonderful idea. All faculty and staff at MIT dealing with students *in extremis* should be aware of these walk-in hours. If you have strong opinions or comments about the S^3 reorganization, good or bad, we urge you to communicate them to Professor Eric Grimson, who chairs the S^3 Faculty Advisory Committee.

On balance, these changes are an example of MIT faculty and administration sorting through a difficult situation and coming up with a strong set of reforms. This is MIT at its best. Unfortunately, this was precipitated by an example of MIT at its not-so-good – an action with far-reaching consequences taken without consultation with faculty serving on standing Institute advisory committees. We note in particular that the ultimate outcome in this case was driven in part by the enormous pushback of faculty serving on the Committee on Academic Performance (see editorial containing timeline, "Turmoil at Student Support Services," *MIT Faculty Newsletter*, Vol. XXII No. 1, September/October 2009).

We urge faculty to embrace service on Institute committees. It is only by serving on such committees that we can influence the outcome in these kinds of cases, and it is only through such service that we can form a balanced opinion of what the issues are and what is best for the Institute from the viewpoint of the faculty, and act appropriately.

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Landscaping

In otherwise difficult times, the appearance of a green carpet of grass together with trees, paths, and benches, is a welcome addition to the Kendall Square end of the campus. The completion of the Koch Center, establishing a quadrangle, creates a distinct sense of community and coherence previously lacking in this corner of the campus. Faculty who do not ordinarily pass this way should take a winter stroll and encounter it, perhaps visiting also the new Koch Center.

The presence of a space with human dimensions highlights how barren the corner of the campus has been for decades. Though most of the major campus building projects are complete, there remains considerable room for fine-tuning and additional landscaping. Perhaps it is time to establish a faculty, staff, student committee on the Campus, as so many other colleges and universities have. Maintaining campus quality of life often doesn't bring direct costs or overhead, and so it is even more important that some groups of our colleagues have responsibility for trying to make our physical surroundings more supportive of the social and psychological fabric benefitting our university community.

Editorial Subcommittee

MIT Promotion and Tenure Processes
Kochan from page 1

Quality of Life Survey data relevant to these processes, reviewed practices at peer institutions, and discussed drafts of the report with department and School Councils and with the Academic Council. We also reviewed the appeals processes available to candidates who believe MIT processes have been violated in their case.

The committee found considerable variation in processes across the departments and Schools. Some of this is natural and needs to be preserved, given differences in disciplines and department size. The variations observed, however, also helped identify several common problems and a number of benchmark practices that other departments might consider adopting. For example:

Clear Communication at Point of Hire. We found that the processes and expectations for tenure are not always communicated clearly to new faculty at point of hire. We recommended that:

- Department heads should communicate promotion and tenure expectations orally and in writing when extending job offers to faculty candidates, and again once the faculty member is at MIT.
- Special care should be taken to communicate clearly expectations regarding the timing of possible promotion and tenure reviews for faculty hired with several years of prior academic or professional experience, since the standard timeline may not apply in these cases.
- In cases of dual departmental appointments (a growing phenomenon at MIT) the distribution of teaching and service expectations, along with the promotion and tenure processes and criteria that will be used by each department, should be communicated clearly.

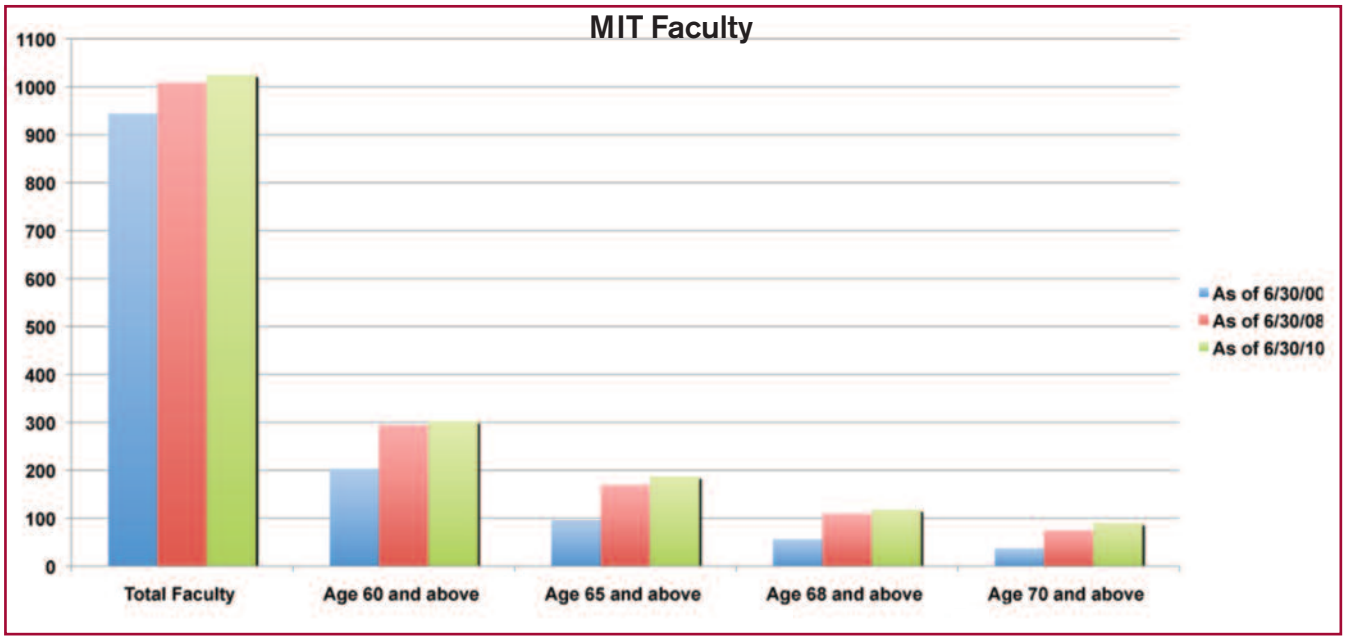
Mentoring. We found wide variations in the methods and effectiveness of junior faculty mentoring and generally low rates of faculty satisfaction with their formal mentoring experiences. At the same time, we identified a number of very good mentoring policies from which we derived the following recommendations:

- Mentoring should begin at the point of hire with clarity about the responsibilities and expectations of both the mentor and the mentee;
- Departments might consider creating a mentoring committee (e.g., 2-3 mentors, one of whom is the principal mentor);
- The faculty member should be allowed to change mentors, in consultation with the department head;
- The mentor should have a voice in the promotion review process either as a member or a non-voting member;
- The department head has the responsibility for ensuring that there is good communication between the mentor and faculty member;
- Schools should recognize excellence in mentoring;
- The mentoring process should be highlighted at the New Faculty Orientation;
- The department head's letter to the School Council proposing promotion or tenure should include the name(s) of the mentor(s) as standard information.

Given the clear need for improvement in mentoring, Associate Provosts Wesley Harris and Barbara Liskov and I have brought together some of our best and most experienced faculty mentors to learn from their experiences and to develop a new faculty mentoring guide that will be disseminated across the faculty. I hope that we see significant improvements in the quality and uniformity of mentoring.

Letters. The number, gender differences, and use of letters generated considerable discussion and the following recommendations:

- MIT calls for reference letters from external peers for promotion to associate without tenure, associate with tenure, and full professor. Few other universities require letters for three promotion levels, and some outside reviewers resent being asked to write about the same candidate three times. The committee recommended the Academic Council consider whether it is necessary to continue requiring outside letters for promotion of tenured associate professors to full professor.
- There is considerable empirical evidence (from studies done outside of MIT) suggesting that letters for successful men and women candidates differ in significant and gendered ways: more personal commentary (with potential positive or negative connotations) for women than men; shorter letters with less specificity for women than men; more emphasis on ability in men's letters compared to effort for women. In general, there are more "standout" words in letters for men and more doubt raisers in women's letters. [These findings are based on a discourse analysis of over 300 letters for successful professors of academic medicine: Trix, F, and C. Psenka (2003) "Exploring the color of glass: letters of recommendation for female and male medical faculty," Discourse and Society, 14(2), 191-220. See also, Watson, C. (1987) "Sex-linked differences in letters of recommendation," Women and Language, 10(2), 26-8.] We recommend that this evidence be communicated to promotion and tenure committee members and department heads. Care should be taken to not allow such differences to influence their judgments.
- There is no standard practice among departments and Schools regarding who is able to read the letters (both internal and external). The committee felt that all tenured faculty in the department should be able to see the full dossier and express their opinions of candidates for promotion without tenure and promotion to tenure. Full professors should be able to see the full dossier and express their opinions of all candidates in all cases.
- A number of departments reported difficulties obtaining a sufficient number of letters for some interdisciplinary candidates. There are fewer people to ask for a letter; the return rate can become small, and; committee members may lack sufficient knowledge of the different fields involved to determine the appropriate mix of letter writers. These problems may cure themselves with time; however, until then, special attention should be given to these issues by decision-makers at all levels.



Review Process. The process for reviewing a promotion or tenure decision as spelled out in Section 9.6 of *MIT Policies and Procedures* was found to be too general and was not well understood. With the able assistance of the General Counsel's office, we therefore developed a more detailed statement of the practice that has been in place for such reviews and discussed it with School and departmental leaders, the Faculty Policy Committee, and the Academic Council. It has now been adopted and has become Section 3.3 of *MIT Policies and Procedures*. We hope this makes the process clear, transparent, and accessible in the event it is needed in the future.

I encourage you to read the full report to learn more about these and several other issues covered such as recommendations for shortening the increasingly lengthy personal statements written by candidates and eliminating use of candidate pictures (based on considerable social science evidence on their potential biasing effects). In the end, the fairness of our decisions depends on how diligent we are in following the professional standards and Institute and department-level policies guiding promotion and tenure processes.

Broader, Long Run Questions for Thought

Looking beyond these process issues I see at least two important strategic concerns that warrant further discussion among MIT faculty and in the profession at large. The first is the aging of the faculty and the increasing challenges associated with that euphemism we have called "faculty renewal," aka encouraging faculty to retire at a reasonable age. We all share the goal of opening up opportunities for new faculty hires. There is no better way to refresh our departments and to forge into the newest intellectual territories being explored by the best of the next generation's scholars. But the accompanying chart illustrates the growing challenge we face. The MIT faculty is aging and more faculty members appear to be postponing retirement to a later age. Thirty percent of us are 60 years or older; seven percent are 70 or older. These numbers are up considerably from a decade ago [see chart].

What, if anything, should we do about this? Faculty in several departments have fostered a norm of retiring at or around age 70, specifically to open opportunities for new hires. An Institute-wide retirement incentive program has been in place for several years. Other strategies could be considered. I encourage dialogue and comments on this issue.

A second and more general issue relates to the attractiveness of our profession to young, talented students, and particularly to women and underrepresented minorities. Just consider the hypothetical question: Would you recommend your daughter pursue a faculty career at one of our peer institutions knowing that it will require five or more years of PhD study followed by three to five years of post-doc employment, followed by seven to eight years pursuing tenure? Add up the years, the uncertainty of success in gaining tenure at our best universities, and the family life sacrifices required. Then compare these against her options outside of the academy. Given the opportunity costs involved, it is not surprising that we lose significant numbers of talented women and men at different stages of the pipeline, but particularly at the post-doc stage. Perhaps we need to rethink how we structure academic careers and the way we bring people into the academy.

These longer-term issues are just food for thought before you take time to relax with your families and friends for the holidays. In those pursuits, let me extend my best wishes to you all.

Thomas A. Kochan is a Professor of Management and Faculty Chair *(tkochan@mit.edu).*

Support the New START Treaty

Aron Bernstein

THE NEW START (Strategic Arms Reduction Treaty) agreement is a critical and essential step in strengthening U.S security.

The new START establishes a state-of-the-art verification process that allows us to track Russia's nuclear activities and verify the reductions they've committed to. These verifications lapsed on December 5, 2009 when the 1991 START 1 treaty expired, and will not resume until the new START treaty is ratified. The on-site inspections and protocols that are part of the new START treaty are essential for our security, as they remove the uncertainty that goes with a lack of knowledge of what the other side is doing.

The new START establishes 30% lower, legally binding, verifiable limits for both sides on deployed strategic warheads, reducing their treaty limited numbers from 2,200 to 1,550. These are levels not seen since the days of the Eisenhower and Kennedy administrations. This Treaty will last 10 years and can be extended for five more.

Even more important, the new START improves U.S. intelligence on Russia's nuclear capability, while securing and reducing the Russian nuclear stockpile significantly enhances American national security. This Treaty enhances international stability as well; it is a necessary step in gaining the critical Russian (and other international) cooperation needed to prevent nuclear terrorism, forestall more nuclear weapons states, and address hostile nuclear programs in places like Iran and North Korea. Indeed, anyone who supports greater stability, transparency, and predictability of the world's other major nuclear power should be supportive of this Treaty. This is why Admiral Mike Mullen, chairman of the Joint Chiefs of Staff, and many former secretaries of state and defense, and European leaders at the recent NATO meeting, have endorsed START.

Recently, Senator Jon Kyle (Arizona, Republican Whip) expressed his opposition to passing this critical treaty during the lame duck session. The schedule has already been delayed, acceding to his previous requests, and over 20 hearings have been held. Another request is an increase in funding for maintenance of the nuclear weapons stockpile. The Obama administration has already gone along with this request, increasing the proposed budget from $6.4 B to $7.0 B (10% increase) for the next fiscal year and from $70 B to $85 B on a 10-year basis (20% increase). The reliability and safety of our nuclear stockpile has been independently verified in studies conducted by the JASON group and the National Academy of Science.

There is no further reason to delay passage of this vital Treaty, particularly since each day we delay is a day that we are not able to inspect the Russian nuclear forces and get on with our other important business!

Aron Bernstein is a Professor Emeritus in the Department of Physics *(bernstein@lns.mit.edu).*

Student Support Services
Hastings from page 1

The first outcome of the Task Force recommendations was the transfer of S^3 from the Division of Student Life (DSL) to the Office of the Dean for Undergraduate Education (DUE) effective February 1, 2010. Specifically, S^3 is now part of the Office of Undergraduate Advising and Academic Programming (UAAP). S^3 is a natural addition to UAAP whose central mission is to provide quality student-centric services to enhance the academic success and personal growth of undergraduates.

Due to the "dual nature of S^3" in providing both student life and academic support, the Task Force noted the need for DUE and DSL to take a collaborative approach to student support. During the transition of S^3 from DSL to DUE, a DUE/DSL Working Group was established to jointly address any challenges and ensure a smooth, successful transfer. The Working Group was composed of deans Chris Colombo, Daniel Hastings, Julie Norman, Barbara Baker, and Arnold Henderson. A subset of this Group continues to meet regularly to foster continual collaboration.

The Task Force also recognized the importance of an ongoing exchange between S^3 and the faculty. Based on a recommendation by the Task Force, the Chancellor appointed the S^3 Faculty Advisory Committee, chaired by Professor Eric Grimson, to provide guidance and advice on policy changes that will affect the delivery of student services and act as a conduit for faculty issues with the delivery of student services. In the short term, this Committee worked to ensure that the recommendations of the Task Force were addressed in the strategic planning exercise.

S³ Mission

To promote the academic success and holistic experience of students, especially undergraduates. S³ reinforces the core values of MIT by providing support in an accessible and respectful environment. We further provide advice and advocacy for students and act as a hub of resources, referrals, and information across the MIT community.

In order to move ahead on the operational recommendations of the Task Force, DUE initiated a strategic planning process in March 2010. The Strategic Planning Group brought together a diverse set of faculty, administrators, undergraduate, and graduate students who represented the key stakeholders and resources supporting students. The Group reviewed S³ programs and services in the context of the Task Force recommendations which included:

- Develop a clearer definition of the mission and scope of services of S³
- Establish a clearly defined process for readmission
- Define and communicate the processes for excused absences and converting grades of O to OX
- Establish policies on confidentiality and communication of information
- Define appropriate outreach and programming
- Assess Nightline

Further input and insight was gained through a two-day external review, recommended by the Task Force, which was conducted by colleagues from Brown, Harvard, and Boston Universities. They shared best practices, identified areas of strength, and suggested possible areas for future improvement in S³.

The strategic planning process was completed in May, providing a clear articulation of the mission and changes in both processes and services, having positioned S³ to better serve students and maintain close, collaborative relationships with faculty, DSL, and MIT Medical. Through the work of the Group, the following was accomplished:

1. A mission statement was defined for Student Support Services.
2. The Excused Absence and Excuse note protocols were clarified, refined, and documented to ensure consistency in application and communication.
3. The Undergraduate Withdrawal and Readmission Processes were modified and clarified with the input of the Committee on Academic Performance, which has oversight for all readmission. Changes include new deadlines for applications to give students more time to process a decision; courseload planning for each semester until graduation; and a Returning Students Group to help students' assimilation.
4. A confidentiality statement was defined and guidelines were developed for consistent implementation.
5. Available appointment hours were expanded to include walk-in hours from 9-10 am Monday-Friday. The office also added extended hours on Tuesdays until 7 pm.
6. The S³ Website was redesigned to be more informative for students and faculty. All updated S³ guidelines and protocols are available at: ***web.mit.edu/uaap/s3/index.html***.
7. Outreach and programming efforts were reassessed and future efforts will be focused on collaborations with other student-oriented offices and campus resources including DSL, MIT Medical, Office of Minority Education, and LBGT.
8. A Nightline Review Committee was established in June to assess the efficacy and relevancy of Nightline. Based on their findings, a planning group is being formed to define a peer support service that addresses the needs of MIT students. While S³ will be involved in the planning process, MIT Mental Health and Counseling Service will take the lead in working with the current Nightline student staff to define the future program. Due to the relatively low utilization of Nightline by MIT students and the availability of alternative support options, Nightline has been suspended until a redefined service is established.
9. Since S³ is focused on supporting undergraduates, a recommendation was made to provide additional resources to support graduate students via the Office of the Dean for Graduate Education.

The Task Force also recognized the importance of an ongoing exchange between S³ and the faculty. Based on a recommendation by the Task Force, the Chancellor appointed the S³ Faculty Advisory Committee, chaired by Professor Eric Grimson, to provide guidance and advice on policy changes that will affect the delivery of student services and act as a conduit for faculty issues with the delivery of student services.

As we move ahead, the Office of Undergraduate Advising and Academic Programming, including Student Support Services, is working very closely with DSL, the Dean on Call System, and the MIT Mental Health and Counseling Service to provide comprehensive support for the personal growth and academic success of MIT undergraduates. Embedded in this support system is the commitment to working closely with faculty and administrators to support the academic enterprise.

Daniel Hastings is Dean for Undergraduate Education *(hastings@mit.edu)*.

MIT +150 INVENTIONAL WISDOM

MIT Open House Follows a Long Tradition

David A. Mindell

ON APRIL 30, 2011 MIT will hold an "Open House" as part of its 150th anniversary celebration. Opening our campus to visitors was an MIT tradition that began as early as 1922, when the Steam and Compressed Air Laboratories and Machine Tool Laboratory welcomed students and their friends under the auspices of the Mechanical Engineering Society. The second Open House was held on April 27, 1923. On this occasion, the whole Institute was open for inspection to "technical and business men" and nearly 1,000 guests attended. After that, it became a regular event (interrupted by World War II), held biennially until the early 1980s.

As we revive this tradition in celebration of the sesquicentennial, the objects of the event reflect twenty-first century priorities: to educate visitors about the work we do, to say thank you to our neighbors and host city, and to demystify MIT in general, presenting our research and education as exciting and accessible in a "science fair" atmosphere. The Open House will take place from 11 am to 4 pm on Saturday, April 30, 2011. This is also the first day of the Cambridge Science Festival (CSF), which regularly draws crowds in the thousands; we can expect attendance at the Open House to be upward of 15,000. Given the K–12 focus of the CSF, the Open House is also an opportunity to attract young people from Cambridge, Boston, and New England to our fields. We are making special efforts to include minority students and those from disadvantaged schools who might not ordinarily be exposed to such an event.

A planning group has been set up under the leadership of Professor Paul Lagace and Elizabeth Cogliano Young, associate dean in the Office of the Dean for Undergraduate Education. You will hear more from that team in the coming months but in the meantime, I'll address some frequently asked questions about the Open House.

We invite all departments, labs, centers, student clubs, and other special interest groups to create programming. Alumni of your department may ask to be involved with your program and we welcome their participation. If your group would like to participate, please appoint a representative with whom we can coordinate. Contact information is at the end of this article. Here are some programming suggestions:

- Highlight a particular lab or center for public tours
- Present short-format lectures or workshops in classrooms
- Stage demos of experiments and exciting machinery (new and old)
- Feature graduate student poster presentations
- Showcase innovation and invention through demonstrations
- Display student work that may inspire the next generation
- Design poster presentations for lobbies or exhibit halls
- Create hands-on projects for public participation, especially for the K–12 demographic
- Organize trivia contests, scavenger hunts, or other games

Some have asked how to participate if they have experiments in progress or if there isn't much to see in their labs. Be assured that you do not have to use your own space to participate in the Open House nor do you have to suspend regular operations or endanger delicate work. We are planning exhibition areas in which many DLCs and groups may set up activities, and we encourage you to get in touch with the Open House planning team who can help reserve appropriate space.

The Institute Events will supervise the organization, staffing, publicity, and management of the Open House. As is done for Commencement, volunteers will be recruited from the campus community to assist guests and answer questions. Volunteers may include alumni, staff, and students; please note that hourly paid staff who work as representatives of MIT on the day of the Open House, whether in your department or as visitor service volunteers, must be paid at their regular rates or overtime, if applicable.

Individual activities will be staffed by their planners. Please plan to have people from your own department monitoring your space if it is open; you will be responsible for recruiting the faculty, staff, and students needed to present your activity.

DLC representatives may e-mail the Open House planning team: *mit150openhouse@mit.edu*.

We seek your interest in what promises to be an extraordinary event. By showcasing MIT, we aim to inform the public about the purpose and impact of a research university and to inspire the next generation to join us in our work.

David A. Mindell is Chair, MIT150 Steering Committee; Director, Program in Science, Technology, and Society; Dibner Professor of the History of Engineering and Manufacturing; and Professor of Aeronautics and Astronautics *(mindell@mit.edu)*.

A Missed Opportunity: Saving Oil and Foreign Exchange with a Great Reduction in Emissions

Ernst G. Frankel

How large-scale use of water transport could reduce U.S. oil consumption by 10%, oil imports by 20%, while reducing highway congestion, maintenance, and construction costs.

AMERICA, UNLIKE MOST DEVELOPED countries, uses road transport for most freight transport. China, Japan, Korea, and Western Europe all make extensive use of water transport (rivers, inland canals, and coastal shipping). In fact, China moves about 80% of its freight transport by water versus 20% for the U.S. and about 40-50% for Western Europe. Though freight transport by rail has become more popular in the U.S. in the last 40-50 years, road transport continues to dominate at a huge additional cost in fuel and environmental impact. Waterborne freight transport is not only much more fuel efficient, but also has much lower direct and indirect costs.

America has coastlines of significant length and a very extensive navigable river system. Though we make extensive use of our rivers such as the Mississippi, Missouri, Tennessee – and more recently the Hudson and Sacramento rivers for barge transportation – our coastal shipping is practically defunct and consists mainly of integrated tug-barge oil transport. The main reason for this dearth of coastal shipping is the lack of affordable coastal vessels; mainly because under the archaic, obsolete, 80-year-old Jones Act, ships serving the U.S. coastal or cabotage trade must be built in U.S. shipyards, must be U.S. owned, manned, and registered or flagged. The original purpose of this law was to support the U.S. shipbuilding industry, which it did. The Act actually assured a large American shipbuilding industry before World War II, allowing the U.S. to mass-produce thousands of ships for the Allies. However, after the war, this industry was largely abandoned, as there were few orders, and newly industrialized countries such as Japan, Korea, and then China developed large-scale shipbuilding.

America's commercial shipyards became largely defunct and inefficient, as fewer and fewer ships were built. In fact, soon after World War II, American commercial shipbuilders required government subsidies to be able to match the price of ships built in East Asian shipyards. The government did provide such "cost differential" subsidies for some years, but such funding soon evaporated and shrunk to a few ships per year, insufficient to even replace the declining U.S. flag cabotage fleet.

Today this fleet is not only very old and small, but it has an average age of over 27 years, making it actually antiquated. As a result, very little domestic freight is carried by coastal water in the U.S. In fact, while China moves about 80% of its domestic freight movements in ton miles by water, we carry about 20%, with the bulk of movements by road (about 52%), and the rest by rail.

Cursory evaluations show that if most of the goods moving from Florida to New England, for example, were carried by coastal shipping instead of by truck, we could readily save about one million barrels of oil per day, or about 5% of U.S. oil consumption and 10% of U.S. oil imports. Savings on a national scale are likely more than twice as large.

Today this fleet is not only very old and small, but it has an average age of over 27 years, making it actually antiquated. As a result, very little domestic freight is carried by coastal water in the U.S.

Considering the effects of the Jones Act, which was supposed to assure maintenance of a vibrant and healthy U.S. shipbuilding industry and a commercial fleet adequate to support shipping needs of our military, the Act by now is a failure. Not only do we have very few commercial shipbuilders left in the U.S., but a large number of those remaining are now foreign owned. Similarly, practically all the ships used by our military to provide logistic services to the Middle East and South Asia are now foreign built and owned vessels, all contrary to the objectives of the Jones Act.

We could readily import a few hundred modern foreign-built vessels and revitalize our coastal (cabotage) trade in a short period. In fact, the savings in fuel costs alone would readily pay for such an acquisition within 2-3 years. It is curious that while no "built in America" requirements exist in aviation, road, and rail transport for which we import foreign-built equipment, cabotage shipping continues to suffer under the archaic, obsolete, counterincentive Jones Act, which serves no national interest and causes significant economic and environmental damage.

Ernst G. Frankel is a Professor Emeritus in the Department of Mechanical Engineering *(efrankel@mit.edu).*

Teach Talk

Looking at the Numbers

Patrick Henry Winston

EACH WEEK, STUDENTS IN 6.034, Introduction to Artificial Intelligence, attend, or are supposed to attend, two lectures, a recitation section, a tutorial, and a quiz preparation session. Lectures introduce the big picture and editorialize; recitations provide opportunity for discussion; tutorials focus on the homework; and the quiz preparation sessions explain how to work past quiz problems.

We have argued, over the years, about how the four very different elements correlate with performance, and wondered which element, if any, we could drop. During the 2009 final, we asked students to estimate the percentage of the lectures, recitations, tutorials, and quiz sessions he or she attended. About 85% of approximately 200 students gave us their estimates.

It wasn't a scientific study, because the students were just guessing and perhaps did not trust our assertion that the estimates would have no effect on grades. Also, we have a highly nonstandard and nonlinear way of computing scores (see ***web.mit.edu/fnl/volume/204/winston.html***).

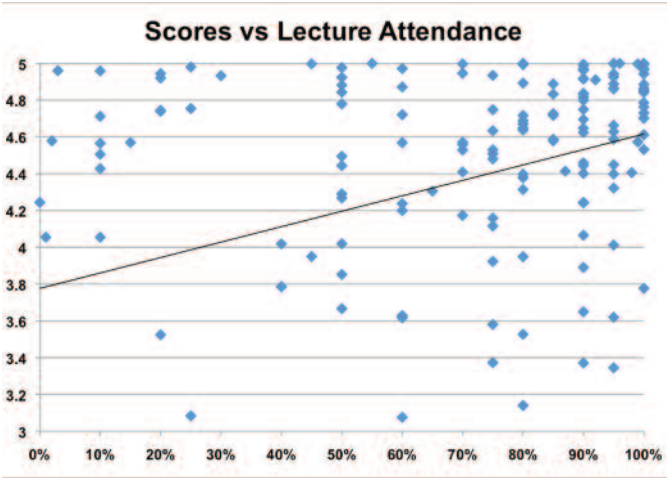
Nevertheless, points of interest emerged. For example, we noted that recitation and tutorial attendance were plainly bimodal, in line with our previous impressions. Curiously, quiz session attendance was less sharply bimodal and lectures not at all.

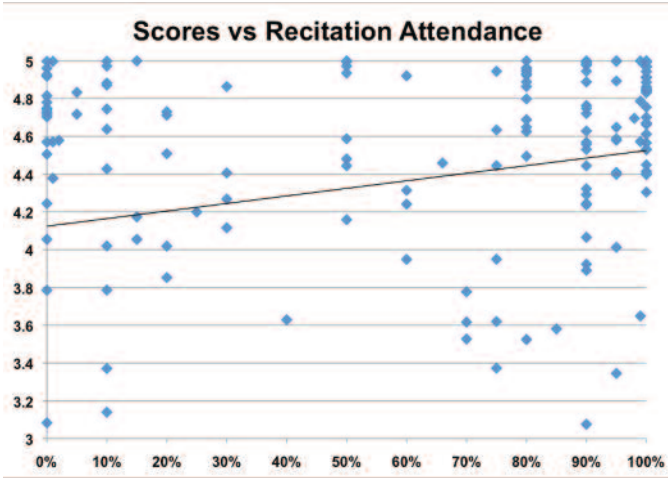
We were pleased to see there was a positive correlation between scores and the percentage of each type of element attended. We had braced ourselves against the possibility that the regression lines would be flat or nearly so.

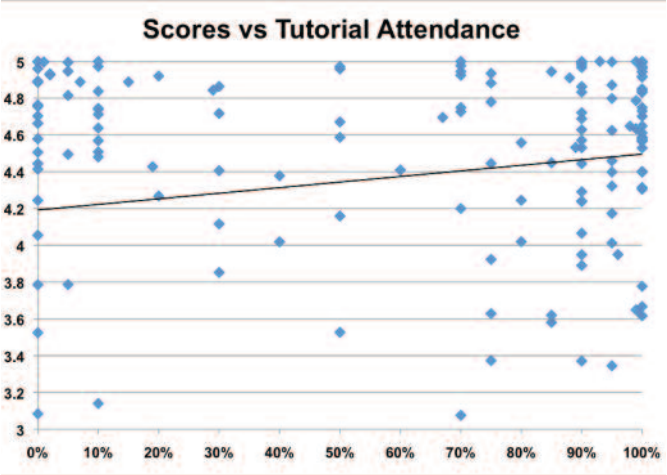
Of course, we reminded ourselves not to confuse correlation with cause. A likely explanation for the positive slopes is that those who take the subject more seriously are more engaged in general, and that more engaged means spending more time studying as well as dragging oneself out of bed for a 10 am lecture.

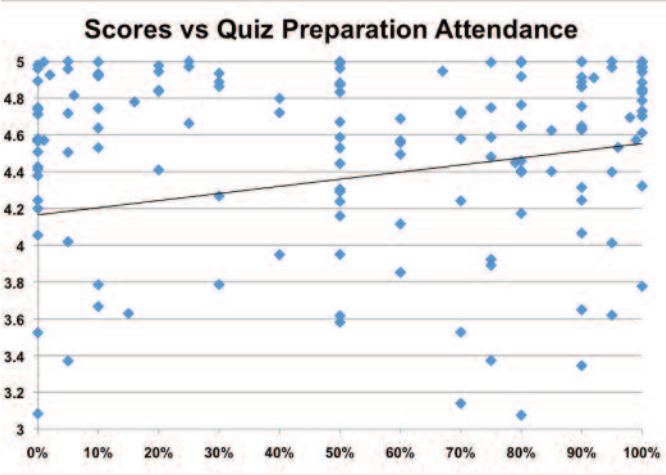
On the other hand, we would not have been all that crushed if a more careful study produced gentler slopes. All that the lines measure is problem-solving skill demonstrated on examinations. We don't know how to measure, for example, whether a powerful idea gets conveyed or a passion develops. Feedback on that comes in only anecdotally, sometimes decades later.

Patrick Henry Winston is a Professor in the Department of Electrical Engineering and Computer Science *(phw@mit.edu)*.









Edgerton Award: Call for Nominations

Ed. Note: Following is a reprint of an e-mail sent to all MIT faculty.

December 6, 2010

Dear Colleagues:

I AM WRITING TO REQUEST your assistance in identifying candidates for the 2010–2011 Harold E. Edgerton Faculty Achievement Award, which is given each year to an outstanding non-tenured member of the MIT faculty.

The award was established in 1982 as a permanent tribute to Institute Professor Emeritus Harold E. Edgerton for his great and enduring support for younger faculty members over the years, and it recognizes exceptional distinction in teaching and in research or scholarship. Faculty members are, however, ineligible in the year that their tenure decision is mandatory. The winner will receive an honorarium of $10,000.00 as well as Institute-wide recognition for his or her achievements.

Nominations should include a letter summarizing the candidate's contributions to teaching and research or scholarship, and his or her current curriculum vitae. The letter of nomination can include brief quotations from other MIT faculty or staff members, but no other additional supporting letters are needed and should not be submitted. A list of previous award recipients is attached [***see web.mit.edu/fnl/232/edgerton.pdf***].

Nominations are due by January 28, 2011 and should either be emailed to Aaron Weinberger (*aweinber@mit.edu*) or delivered to the Edgerton Award Selection Committee, Room 7-211.

Thank you in advance for your help in identifying appropriate candidates for this distinguished award.

Sincerely,

Andrea L. Campbell
Chair, Edgerton Faculty Achievement Award Selection Committee

Affordable Course Materials

Daniel Hastings
Christine Ortiz

ON JULY 1, 2010, the Textbook Information Provision (TIP), in the Higher Education Opportunity Act of 2008 (HEOA), put new legal requirements on all universities. As of this date, MIT is expected to disclose required and recommended readings as part of the pre-registration process. Specifically, this information must be available via Web-based course schedules. In passing this law, Congress intended to reduce the cost of textbooks by ensuring students have access to information on required course materials as early as possible. Armed with details, including the ISBN and list purchase price, students will have more time to compare prices and find potential savings.

MIT has responded to this mandate by developing a straight-forward process that simplifies the submission of textbook information for faculty and makes the information available to students via the MIT Online Subject Listing. The process was defined and implemented through a collaboration among the Offices of the Dean for Undergraduate and Graduate Education, the Deans of each of the five Schools, IS&T, the MIT Libraries, and the COOP.

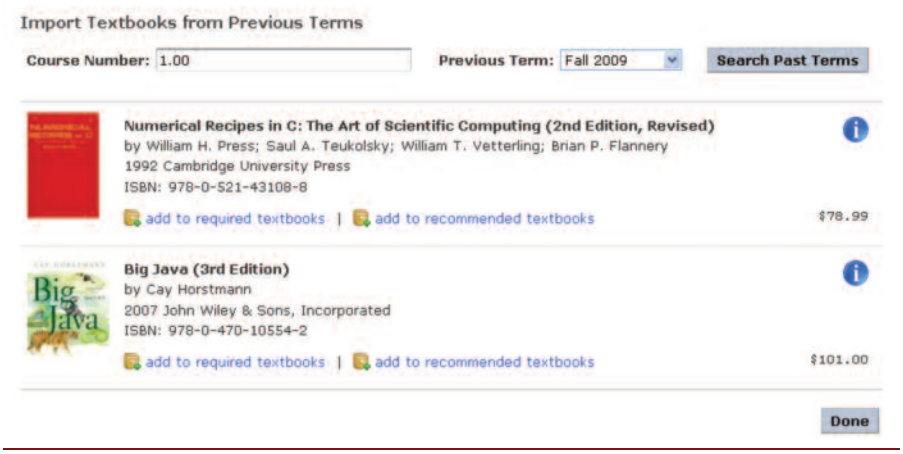
The TIP form to enter textbook information: http://tip.mit.edu

One Form for All Course Materials

Historically, each academic term faculty submitted textbook information to both the COOP and the Libraries through a variety of avenues, including internal forms, databases, COOP forms, Web forms, Stellar, e-mail, and phone. This multistep process has been replaced by a single on-line TIP form which enables faculty, or their designees, to:

- Select required and recommended textbooks – this information is automatically sent to the COOP and will drive the ordering process.
- Select books to put on reserve – this information is automatically sent to the Libraries who will take action accordingly.
- Provide information on required and recommended textbooks and course packets that is viewable by students via the MIT Online Subject Listing.

This streamlined process of managing textbook ordering reduces the burden on faculty in ensuring all the proper course materials are available to students at the start of the term. At the same time, it serves the purpose of meeting the requirements of the Textbook Information Provision and providing students with detailed, timely information on course materials.



Making Data Entry Simple

The TIP form is used for both graduate and undergraduate courses and has been

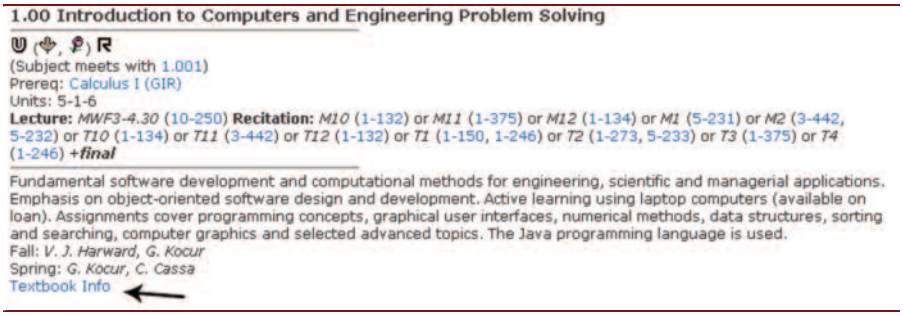
Upcoming pre-registration dates, as agreed to in the academic calendar set by the faculty:

Spring 2011: Pre-registration: December 1, 2010

Fall 2011: Pre-registration: May 1, 2011

designed to minimize data entry. Through a link to Bowker's ***ISBN.org***, it provides textbook lookup by title, author, and ISBN number, and shows all current editions in print so faculty can select the desired edition. Once a course is in the system, the textbook information is available for future semesters, eliminating the need to reenter the information for each academic term.

The new system was launched on October 11, 2010, and is being used by departments to enter textbook information for 2011 Spring Term pre-registration on December 1, 2010. While pre-registration is the target date for entering textbook information for all courses and meeting the compliance requirement, the system is available for faculty, or their designees, to enter and update information through the Add Date for that semester.



Making Textbook Information Available to Students

Once the textbook information for any course is entered into the system, the information is stored in the MIT Data Warehouse and available to course-related applications and services via the Online Textbook Information (OTI) Web service. The OTI was developed by IS&T in 2008 as a first step toward providing online access to information on required textbooks.

As the official MIT course schedule, the MIT Online Subject Listing (***student.mit.edu/catalog/index.cgi***) now provides a link to required and recommended textbook information as part of the course description. The link appears only after the textbook information for that term has been entered.

The same textbook information will also be available through the applications students have historically been using to view textbook information including Stellar, Coursepicker, Bookspicker, and the COOP. By accessing common information via the OTI, these applications will not only provide students with detailed information by pre-registration, but also ensure the information is consistent across all the course-related applications and systems at MIT.

Support from Faculty is Key

Meeting the requirements of the Textbook Information Provision requires the support of all the faculty. While this federal mandate compels us to provide required and recommended textbook information, what is truly compelling is the fact that we can make the cost of attending MIT more affordable for our students by giving them more options to reduce their costs. Through the use of the new streamlined process, we hope that all faculty will help MIT champion the cause of affordable course materials by providing textbook information by pre-registration when requested.

Daniel Hastings is Dean for Undergraduate Education *(hastings@mit.edu);*
Christine Ortiz is Dean for Graduate Education *(cortiz@mit.edu).*

Maintaining our Resolutions: Implementing the MIT Faculty Open Access Policy

Richard Holton

IN MARCH 2009 MIT FACULTY voted unanimously to make their scholarly articles freely available on the Web. That vote, however, was just the first step. The task remained of making the Policy work: of getting the faculty's articles into DSpace@MIT, MIT's on-line repository, and of making access to them as straightforward as possible. Although the Faculty Committee on the Library System has overall responsibility for policy, the real work has been done by staff in the MIT libraries.

One aspect of that work is largely complete. The DSpace@MIT Open Access Collection came on-line in October 2009, and provides the necessary structure for the Policy. It is designed to work seamlessly with Google Scholar, so that articles can be found even by people who have never heard of MIT, using a wide variety of search criteria.

With the structure in place, the focus has now turned to getting as many faculty papers as possible into DSpace@MIT – no easy task since over 6000 are published each year. There are several issues here. One concerns the attitude of the publishers. The Policy automatically gives MIT necessary rights for openly sharing the articles, and many publishers have been cooperating with the Policy. Others, however, including Elsevier/Cell Press, Nature, Oxford University Press, Science (AAAS), and Wiley have been less cooperative. Nevertheless, if there is an inconsistency between the Open Access Policy and a subsequent publisher's agreement, then it is the first agreement – the Open Access Policy – that takes priority. So even if a publisher's agreement states that they have the sole copyright in an article, and even if they refuse to accept the copyright amendment form, a copy can still be legally deposited on DSpace@MIT. It is only if a publisher insists that an author must opt-out of the policy that it will lack force; and so far few publishers have insisted on this. (A full list of publishers with whom the Libraries have had discussions, including many who are cooperating in various ways, appears on the scholarly publishing Website at: ***libraries.mit.edu/publisherpolicies***.)

The policy automatically gives MIT necessary rights for openly sharing the articles, and many publishers have been cooperating with the Policy. Others, however, including Elsevier/Cell Press, Nature, Oxford University Press, Science (AAAS), and Wiley have been less cooperative.

But even if there are few legal barriers, the job of acquiring so many articles is daunting. Over the past year the libraries have been targeting a small number of departments in an attempt to devise policies that can be applied across the Institute. Three methods have been pursued: working directly with publishers; identifying faculty papers from MIT Websites; and asking authors for the final manuscripts of their papers. In developing these methods, library staff have been guided by the Policy's requirement that things be made as "convenient for the faculty as possible."

A case in point is the Physics Department, where, by a combination of methods, nearly 60% of recent faculty articles have been obtained. An agreement with the American Physical Society allowed the library to download directly all the articles by MIT faculty that appeared in APS publications. Personalized e-mails from the library to Physics faculty allowed the collection of articles

The MIT Faculty Open Access Policy

The MIT Faculty approved a Policy in March 2009 that makes their scholarly articles openly available on the Web. The Policy calls for the final author's version of articles to be shared for the purpose of "open dissemination." It calls for the Faculty Committee on the Library System to implement the Policy, and the MIT Libraries have been administering the Policy under their guidance and leadership.

Hal Abelson, co-chair of the committee that put the Policy forward for a vote, speaks about the Policy in a video recently released by the Libraries [*techtv.mit.edu/collections/mitlibraries/videos/8744*].

that had been identified from databases. And a system has been put in place whereby faculty who deposit final versions of their papers in arXiv can alert the library so that they can be incorporated directly into DSpace@MIT.

Library staff hope to extend similar methods across MIT. One hope is that the collection of articles could be incorporated into procedures that already exist, such as the annual submission for the President's Report. Both the library staff and the Faculty Committee on the Library would welcome suggestions for other methods. In the meanwhile, MIT faculty are strongly encouraged to submit the final manuscript of their papers to DSpace directly: ***dspace.mit.edu/handle/1721.1/49433/submit.***

The Open Access Policy provided a tremendous start in making the fruits of MIT research available to those who do not have the luxury of a large university library. But voting on the Policy was the easy part. The DSpace collection now contains over 2,100 articles, and received over 63,500 downloads in the first year – approximately 10,000 per month since June 2010. Nearly 30% of available articles are being collected. If faculty will support the library staff's work by submitting their papers, we can catch the remaining 70%.

Richard Holton is a Professor in the Department of Linguistics and Philosophy and Chair of the Faculty Committee on the Library System *(holton@mit.edu).*

Text of the MIT Faculty Open Access Policy

Policy adopted by unanimous vote of the faculty on 3/18/2009:

"The Faculty of the Massachusetts Institute of Technology is committed to disseminating the fruits of its research and scholarship as widely as possible. In keeping with that commitment, the Faculty adopts the following policy: Each Faculty member grants to the Massachusetts Institute of Technology nonexclusive permission to make available his or her scholarly articles and to exercise the copyright in those articles for the purpose of open dissemination. In legal terms, each Faculty member grants to MIT a nonexclusive, irrevocable, paid-up, worldwide license to exercise any and all rights under copyright relating to each of his or her scholarly articles, in any medium, provided that the articles are not sold for a profit, and to authorize others to do the same. The policy will apply to all scholarly articles written while the person is a member of the Faculty except for any articles completed before the adoption of this policy and any articles for which the Faculty member entered into an incompatible licensing or assignment agreement before the adoption of this policy. The Provost or Provost's designate will waive application of the policy for a particular article upon written notification by the author, who informs MIT of the reason.

To assist the Institute in distributing the scholarly articles, as of the date of publication, each Faculty member will make available an electronic copy of his or her final version of the article at no charge to a designated representative of the Provost's Office in appropriate formats (such as PDF) specified by the Provost's Office.

The Provost's Office will make the scholarly article available to the public in an open-access repository. The Office of the Provost, in consultation with the Faculty Committee on the Library System, will be responsible for interpreting this policy, resolving disputes concerning its interpretation and application, and recommending changes to the Faculty. The policy is to take effect immediately; it will be reviewed after five years by the Faculty Policy Committee, with a report presented to the Faculty.

The Faculty calls upon the Faculty Committee on the Library System to develop and monitor a plan for a service or mechanism that would render compliance with the policy as convenient for the faculty as possible."

Finding Appropriate Support for Students with Disabilities

Mary J. Ziegler
Kathleen Monagle
Ari Epstein
Srikanth Bolla

TEACHING STUDENTS WITH DISABILITIES is often not much different from teaching students without disabilities. Yet sometimes a student's specific disability makes it especially challenging for him or her to take a particular subject. Fortunately, MIT has a number of resources to help faculty who find themselves confronted with such a situation. In this article we hope to acquaint faculty members with some of the resources that are available, and to describe the factors that generally go into making the most effective use of them.

A Case Study

To make the discussion more concrete, we will use a specific example as a case study: the experience of Srikanth Bolla, a blind student who took Terrascope Radio (SP.360) in the spring semester of his freshman year.

At first glance it might seem that Terrascope Radio would be an ideal class for a blind student. Much of the work involves highly analytical listening sessions, in which students are asked to identify the elements that go into creating effective audio stories. The subject's central project involves gathering sound for, then writing and producing, an audio program on the year's theme Terrascope topic. All of these require skills that would seem to come naturally to someone who relies on his ears more than on his eyes. But audio-gathering equipment is generally menu-driven and not very accessible to blind users, and, more importantly, modern audio-editing software is based on visual analogies, in which editors use a mouse to manipulate sound clips on a computer screen. Thus it was not immediately clear how to make such a class accessible to a student who is blind.

The process began near the end of the fall semester, when Srikanth's academic advisor, Professor Sam Bowring (EAPS), learned of Srikanth's interest in the class and informed Dr. Ari Epstein, the class's primary instructor. Epstein met with Srikanth, and then he, along with Debra Aczel and Ruth Weinrib from the Terrascope office, met with Kathleen Monagle (Student Disability Services [SDS]) and Mary Ziegler (Adaptive Technology Information Center [ATIC], part of Information Services and Technology), who were already working with Srikanth and the instructors of some of his fall-semester classes. That meeting began with an in-depth discussion of the nature of the academic experience of Terrascope Radio, the standards students are expected to meet, and the kinds of work they are expected to carry out. Then Epstein created an inventory of the tools and materials used by students participating in the class, and ATIC staff reviewed those tools' accessibility. They found that the standard sound-recording equipment had key functions that could be accessed only through a visual LCD display, and that the standard sound-editing software was known not to work with screen-reading software (software that produces audible versions of information displayed on a computer screen, in order to make the computer accessible to a user who is blind).

Then followed the key discussions, in which Terrascope, ATIC, and SDS staff developed a plan for what steps should be taken to make the class accessible. As often happens, the instructor and the disability/technology experts began the discussion with very different perspectives. Epstein felt that Srikanth would need specialized equipment and software, as well as semester-long access to an aide familiar with radio-production techniques. ATIC staff felt that specialized equipment and software were indeed called for, but that constant dependence on an assistant would be more harmful than helpful to Srikanth's experience. They stressed that the goal is to put the student on an equal but not advantageous footing with respect to other students. Both parties agreed that Epstein and the undergraduate teaching fellows who assist in the class would need instruction and practice on standard screen-reading software and whatever special equipment and software Srikanth was to use. ATIC staff evaluated the hardware/software alternatives suggested by Epstein, and together the group settled on what to purchase for Srikanth's use. But all participants were unsure how to help Srikanth develop the skills necessary to use the specialized equipment, particularly if he did not have access to regular outside assistance.

One breakthrough came when Epstein located Jean Parker, an experienced radio producer who is also blind and who lives in Pune, India, a relatively short plane ride from Srikanth's home town of Hyderabad. He proposed that Parker be engaged to give Srikanth specialized instruction during IAP, when Srikanth already planned to be at home. Monagle and Ziegler wanted to be sure that any instruction supported by their offices would meet clear MIT standards. The

solution was for Epstein to design a special IAP-long independent-study class for Srikanth, with specific assignments, deadlines and expectations. Parker would be engaged to assist Srikanth during the first few days of the class, during which she and Epstein would be in close communication via Skype and e-mail. Srikanth would e-mail his daily assignments back to MIT, and Epstein would evaluate them quickly and send them back to India. After the first few days of intensive tutorial Srikanth would return to his home; he would complete the rest of his IAP assignments on his own, with regular Skype and e-mail check-ins and evaluation. Also during IAP, Epstein and the undergraduate teaching fellows, with assistance from ATIC staff, would learn how to use screen-reading software and familiarize themselves with the audio hardware and software Srikanth would be using.

The program was a success. Srikanth began the class with a small head start on his fellow students, most of whom had little or no audio experience. That head start vanished in the first week or two, as the other students learned the basics of the class's standard equipment and software, and through the rest of the semester Srikanth was an ordinary participant in the class, making strong contributions to in-class discussions and exercises. He also was able to be a full participant in the Massiah Foundation-Terrascope Field Experience, a trip to Abu Dhabi over spring break during which he and other Terrascope Radio students gathered sound, found and interviewed potential subjects and strategized about their work. After the group's return, Srikanth participated fully in producing the class's final project. (The project, "The Heated Future: A Timely Tale" can be found at: ***web.mit.edu/terrascope/www/radio_archive.html***. It was broadcast on WMBR and has recently been licensed for rebroadcast on KUT, the NPR station serving Austin, Texas.)

A number of key factors contributed to the success of this collaboration:

- **Early intervention.** Instructional staff and disability/technology staff met well before the class began in order to begin mapping out alternatives.
- **Full sharing of perspectives.** Disability staff need to have a complete picture of the desired student experience in order to be of best assistance, and instructional staff must become aware of MIT's general goals for students with disabilities. In this case, for example, instructional staff originally wanted a very high level of support for Srikanth, while disability/technology staff felt it was important that the level of support not be too high, so that Srikanth could have the same educational experience as his fellow students. The more the faculty member can tell ATIC/ODSS about the nature of the class and the way in which it is taught, the easier it is to create and implement reasonable accommodations.
- **Full assessment of needs and goals.** ATIC staff tested class equipment and software, enabling disability/technology staff and instructional staff to develop recommendations for alternatives (and in some cases for alternative classroom procedures).
- **Assistance and training.** In some cases, as in this one, instructional staff will need training in appropriate hardware and software.
- **Adapatability.** Because of the flexibility of his appointment in the Terrascope program, Epstein was able to take on the effort involved in this particular approach to preparing for Srikanth's full participation in Terrascope Radio. Each faculty member's circumstances are different, and so each will need to assess his or her own role in meeting MIT's obligation to accommodate students with disabilities. One of the key functions of ATIC and SDS is to help each faculty member find the solution that works best for his or her specific situation and subject, while simultaneously meeting the student's needs and MIT's obligations.
- **Ongoing discussion as new issues arise.**

How to Find Support Resources

For consultation, advice and support in working with students with disabilities, contact:

Kathleen Monagle
Associate Dean, Student Disability Services
Office of Undergraduate Advising and Academic Programming
Room 7-145
3-1473
monaglek@mit.edu

For accessibility reviews of class resources (e.g., Websites, multimedia, software) and for training and support in the use of assistive technologies, contact:

Mary J. Ziegler
IT Manager, Accessibility and Usability
MIT Information Services & Technology
ATIC Lab Room 7-143
8-9328
maryz@mit.edu

Once accessible products and materials are selected or created and a plan is in place to make use of them, faculty and student can concentrate on academics. Disabilities Services and ATIC are experts on the accommodation needs of students with disabilities and on techniques for meeting those needs, and faculty are experts on the academic goals and standards of their classes. The ultimate goal is the same as for any student at MIT: independence, problem-solving ability, and the skills to conceive and complete complex projects, both alone and with a team.

Mary J. Ziegler is IT Manager, Accessibility and Usability, Information Services and Technology *(maryz@mit.edu);*
Kathleen Monagle is Associate Dean, Student Disability Services *(monaglek@mit.edu);*
Ari Epstein is a Lecturer, Terrascope and Civil and Environmental Engineering *(awe@mit.edu);*
Srikanth Bolla is a sophomore *(bolla@mit.edu).*

From a Whistle to a Hum: Facilities Upgrades Enhance the Resilience of the Campus Steam Distribution System

Joseph Gifun
Susan Leite

Editor's Note: This article is a followup to an earlier piece published in the *MIT Faculty Newsletter*, January/February 2009.

HYPOTHETICAL CONVERSATION overheard between two students at the Lobby 7 coffee shop during Fall Term:

Elizabeth:"Hey Alex. Where are you headed?"

Alex: "Oh, hey Elizabeth. I'm on my way to Building 66 for 10.302."

Elizabeth:"Oh, you're Course 10? I thought you were 7?"

Alex:"No, Course 10 but I'm thinking of doing both 10 and 7 since I'm pre-med anyway. Depends on if I can manage 60 units a term for the next 4 terms. Did you decide to stick with 16?"

Elizabeth: "Yeah. Unified was pretty tough – it felt like 100 units of work for 48 units of credit. But I got through it ok and I think it's helping me understand 16.07 this term. Speaking of ok, how is Building 66? Didn't some big flood or something happen there a year or two ago?"

Alex:"There was a steam line rupture on Halloween night and some of the sprinklers activated, so that's how the flooding happened. Sub-basement had to be redone. I remember UROPing in 66 that IAP. Second floor lounge was closed and there were a bunch of contractors around. But almost everyone seemed to be able to keep working in the labs from what I could tell. People in 10.26 and 10.29 had to do lab somewhere else that spring, and there was some scrambling to finish out 10.28, since the lab space was closed and the fall term was more than half over. Other than that it sounds like we got lucky. No one was hurt and I don't think any of the grad students lost their work."

Elizabeth:"Sure, but don't you wonder if something like that could happen again? Or even somewhere else in the Institute? Look at all those steam lines along the tunnels in the Infinite Corridor and 18 and E25. Was the actual problem fixed?"

Alex:"Well, it seemed like there was a lot of effort to fix things and I heard Facilities worked through that weekend to make sure people would be able to get back in the building. I'd be surprised if MIT risked that kind of thing happening again. From what I've been told, it was a close call. But for now, my worry is staying awake through recitation and making it through the rest of this week. I have an exam on Friday, a fencing tournament Saturday, and am going on 3-1/2 hours of sleep from finishing a lab report."

Elizabeth:"No kidding. I have a 24.00 paper due Friday on top of my 16.07 exam. If I'm lucky I'll be able to recharge before my house's fall semi-formal on Saturday. Good luck on Friday."

Alex: "Good luck to you too. See ya."

On any given day at MIT, conversations like this take place, and it may be one reason that MIT is often described as a place where numbers rule. But our cultural fixation is not just about numbers, it is the relationship between numbers and the great systems built upon them that fuels endless discussions and academic debate.

Our friends Elizabeth and Alex are two of among approximately 21,000 individuals who can be found in various corners of the Institute, going about their daily lives at MIT – in lecture halls, in meeting rooms, in recreational facilities, in academic offices dotted throughout more than four dozen buildings, and in administrative offices and living groups spanning all four corners of the MIT campus. For most of us, our typical daily routine may involve visiting a handful of buildings – possibly six or even 10 out of the more than 150 buildings that comprise the entire MIT Cambridge campus. If you are a member of the Repair and Maintenance staff in the Department of Facilities, however, chances are you have walked through nearly each and every one of these 150 buildings, sometimes covering more than a dozen buildings in one day. That equates to approximately 12.1 million square feet of building space, powered by electricity and whose heating, ventilation, and air conditioning systems run on steam that circulates through approximately 16,000 linear feet of distribution line. If one considers the 12.1 million square feet of building space as a skeleton that frames the physical body of MIT, then the three miles of steam piping, together with miles of water/wastewater distribution lines, and telecommunication and electrical cable form a circulation system for critical campus infrastructure. The various sensors and alarms are its nervous system, signaling when the system is functioning at steady state and when there is cause for concern.

Two years ago at 8:30pm on Friday, October 31, 2008, the condensation-induced water hammer that occurred in 200 psi, high-pressure steam piping in the Building 66 sub-basement mechanical room generated enough force to cause catastrophic failure of pipe anchors secured to the concrete ceiling slab. These pipe anchors supported the steam distribution line, which included an expansion joint designed to allow the system to handle movement due to temperature changes. With the pipe anchors uprooted, the energy contained in the pipe was of enough intensity to transfer movement from the pipe to the expansion joint,

pulling it apart and creating a release point for the steam. When the Department of Facilities staff inspected the line on Saturday morning, they discovered that a steam trap – a simple mechanical device designed to collect condensation and thereby prevent the temperature differential that can lead to water hammer – had failed. While Facilities staff worked ceaselessly over more than 24 hours to return the building to normal operation by Monday morning and the Environmental Health and Safety Office surveyed the building for re-occupancy, it was clear to Facilities leadership that an incident investigation and renovation of damaged spaces in various areas of Building 66 would not be enough. On the contrary, specific risk prevention measures would be necessary to ensure the events of October 31, 2008 would be lessons learned and not chronic recurrence.

One of the overarching lessons learned was that any risk prevention measures needed to be systematic in nature: Not only did the measures need to consider all of the contributing causes to the incident in Building 66 specifically, they also needed to consider the entire campus distribution system. Engineering improvements to the steam distribution system in Building 66 would only be as resilient as its weakest point. Ultimately, corrective and preventive actions followed a three-pronged strategy of Review, Repair, and Re-engineer.

Review

The Department of Facilities retained a consultant to undertake a review of the entire distribution system. The scope of work focused on the high pressure and medium pressure steam system in buildings, with the specific deliverable to locate all steam traps and expansion joints and report on their function and condition. Additionally, the Department of Facilities also undertook an inspection of the structural systems that attach the steam system to the building, and the results were compiled in a report that also included a prioritized list of deficiencies for mitigation. The ranking scheme assigned highest priority to evaluating expansion joints, a now recognized failure point in the distribution system, in those locations with the potential to expose people in the event of a catastrophic malfunction.

Repair

In recognition of the root cause of the incident, i.e., the failed steam trap, the Department of Facilities Repair and Maintenance (R&M) group expanded its preventive maintenance program to include all steam traps and expansion joints. In the preventive maintenance program, work requests are automatically generated on a recurring schedule that is preset by the individual in charge of that operation; thus, the Department of Facilities work order request system will automatically and periodically generate a work request for an R&M tradesperson to inspect and perform maintenance. The effort effectively represents a "no steam trap or expansion joint left behind" approach to removing this potential route for a steam line failure.

Further recognizing the potential risk posed to a Repair and Maintenance tradesperson who is commissioned to inspect and repair steam traps, the Department of Facilities engaged faculty expertise to learn whether and how we could make conditions safer should a repair person attend to a situation like the one present in Building 66 just before the steam release. [See the original article on this topic: ***web.mit.edu/fnl/volume/213/leite.html***.]

Re-engineer

A critical lesson learned from the October 31, 2008 steam incident is that expansion joints can catastrophically fail. In the ensuing incident investigation and corrective action review, original engineering design assumptions were questioned and tested. One conclusion resulting from this analysis was that since the local steam distribution system would require repair, this might be a prime opportunity to re-engineer the steam system in the sub-basement of Building 66 to eliminate the need for an expansion joint. As a followup to this steam distribution re-engineering project, the Department of Facilities now has underway the removal of the expansion joints in the tunnel between Buildings 16 and 54 and in Building 16 proper. Engineering design of the expansion loop, which will replace the joints, is completed. The Building 16 and Building 54 locations were determined to be of highest priority and the intent is to progress to other buildings throughout campus that are also served by high and medium pressure steam piping.

Finally, Repair and Maintenance has underway a pilot program to test the value of monitoring all high-pressure steam traps in Buildings 66, 68, 56, and 54. The software uses remote sensors at each trap to assess its effectiveness and report, on an hourly basis, its status to the supervisor responsible for these steam systems. This information enables the appropriate staff to evaluate the potential for incident precursors and to intervene before a problem manifests.

In aggregate, these individual projects will help ensure that the campus steam distribution system, and the infrastructure it supports, is more resilient and does not succumb to circumstances that may be foreseeable and preventable. The Department of Facilities motto is "Making MIT Work." The January/February 2009 edition of this newsletter chronicled the events of October 31, 2008 as "When a Whistle in the Wind is the Sound of Steam: Lessons Learned from a Building Emergency." In November 2010, the Department of Facilities is proud to announce our progress in transforming the whistle to a hum, the hum of systems that operate – resiliently – at steady state and allow our campus community members like Elizabeth and Alex to worry about exams, papers, semi-formals, fencing, etc. and not about the overall safety of the buildings through which they walk and in which they work.

Joseph Gifun is Assistant Director of Engineering, Department of Facilities *(jgifun@plant.mit.edu);*
Susan Leite is Officer, Environment, Health and Safety Office *(smleite@mit.edu).*

ICIS: International Center for Integrative Systems

V. A. Shiva Ayyadurai

Going local with systems thinking and practice

THE INTERNATIONAL CENTER for Integrative Systems (*www.integrativesystems.com*) will be launched later this fall in Cambridge, a few miles from MIT. The Center, started by MIT alumni and local volunteers, aims to bring systems thinking and practice to the local community through research and educational programs in health and sustainability. The hope is that the Center will serve as a community laboratory for local universities and researchers to collaborate, test, and refine their ideas for healthcare and sustainability, here and now, among our own community.

The Center, with nearly 20,000 sq. ft. and 85 parking spaces (a real boon in Cambridge), is located at 701 Concord Avenue, a few blocks up from the Fresh Pond "Whole Foods," accessible from MIT via the MBTA. Three key activities define the Center's work: (1) Clinical: working with community members to nurture health through nutrition, movement, and diagnostics; 2) Research: collecting data and publishing research on integrative medicine and sustainability for national and international audiences; and 3) Business: being a full-service incubator where for-profit business models that encourage sustainability and health can emerge.

To accomplish these aims, the Center will perform scientific research integrating systems biology and traditional medicines; provide a community space for coffeehouse, lectures, and open forums; enable integrative diagnostics from both Eastern and Western perspectives; build and run a state-of-the-art rooftop garden; integrate technologies to make the Center fully energy self-sufficient; and build partnerships and links with local institutions.

> . . . the Center's goal is twofold: one, to provide immediate and rapid assessment to an individual; and second, to create an integrative database from which the Center can conduct clinical studies to understand co-relation across East-West, Ancient and Modern, science and tradition.

One-half of the first floor will house a 5,000 sq. ft. business incubator space with professional managers, some graduates of the MIT Sloan School, as well as staff support in accounting, administration, human resources, sales and marketing, so emerging entrepreneurs can focus on converting ideas to businesses through a well-defined process of ideation, customer acquisition, and scaling up. The other part of the first floor offers an auditorium for lectures, educational events and performances. All such events will be videotaped and streamed on-line.

On the first floor is also a fully functioning, N+1, state-of-the-art data center, secure, and completely redundant. The data center will support both research as well as marketing and outreach programs.

The second floor will have one portion of it dedicated for movement and meditation. Here the Community will be introduced to modern and ancient, eastern and western forms of movement therapy as well as meditative exercises. Local practitioners will run these classes. Another portion will house the Center's coffeehouse that will be fueled by infinitely locally grown produce from the Center's rooftop garden.

A third portion of the second floor will be focused on providing diagnostics to the local community for better understanding their state of health. In modern medicine, we use expensive instruments and new technology to understand what is going on inside of us. Most hospitals today provide Magnetic Resonance Imaging (MRI) scanning, Computed Tomography (CT) scanning, Electroencephalogram (EEG), Electrocardiogram (EKG), and detailed blood analysis. Apart from these wonderful methods, there are other approaches, which can

also help with diagnosis. The Center will offer traditional methods of diagnosis, including face diagnosis, pulse diagnosis, and in an ongoing manner, bring in practitioners from across the traditional world to offer new diagnostic methods. In addition to offering traditional methods, the Center will continue to offer access to modern methods of diagnosis including blood analysis and neuropsychology analysis with a collaborative group of partners.

Through such integrated diagnosis, the Center's goal is twofold: one, to provide immediate and rapid assessment to an individual; and second, to create an integrative database from which the Center can conduct clinical studies to understand co-relation across East-West, Ancient and Modern, science and tradition. This will support one of the main research goals of the Center: to bridge understanding across East and West, Ancient and Modern, Mind and Body by developing a new lingua franca, linking the Molecular Age with the Yogic Age.

One of the central tenants of the Center is the belief that healthy food is integral to healthy bodies. In keeping with this belief, one of the first elements to be constructed in the Center will be the rooftop garden. The rooftop garden will be a cutting-edge facility, which will source the in-house café with fresh, local vegetables, serve as an educational forum for community members interested in food production, and provide a best-practices research model for others to follow.

Space for gardening is scarce in urban settings; rooftop gardens are a way for cities to reclaim agricultural space. As a trend, rooftop gardens are catching on – and it is no wonder. The benefits of a rooftop garden are immense: they reduce heating and cooling costs by providing building insulation, they absorb heat that would otherwise go into the atmosphere and thus have a cooling effect on cities, they absorb storm water, they reduce the distance food travels from farm-to-fork, they get vegetables to urban communities surrounded by fast food, and the list goes on. But there are many issues to work out in the rooftop garden model, and questions about their feasibility and yields are unresolved.

The Center also wants to push the envelope here and now on energy sustainability. To this end, the Center will work to make the building fully sustainable year-round, day and night. Wind, solar, and geothermal devices will be installed and integrated to meet this challenge.

For instance, can a rooftop support the added weight of a garden? How economically feasible is the model and what sort of yields can a rooftop garden produce? How much labor will be required to move supplies and product up and down from the building? What about the logistics of having water on a rooftop? Here too, the list could go on. Clearly, more research is needed to build on this type of innovative urban agriculture. MIT students and faculty can contribute immensely to this development.

To get the project off the ground, the roof will need new flooring (waterproof membrane), as well as a geodesic dome greenhouse. New stairs will need to be put in place to make the roof more accessible. Some of the main considerations of roof gardens are the amount of food that can be produced compared to the initial and operating costs. The Center will explore several methods of rooftop gardening, including modular intensive gardens (the approximate equivalent of raised bed gardens on a roof) and hydroponics, in and out of the green house.

The Center also wants to push the envelope here and now on energy sustainability. To this end, the Center will work to make the building fully sustainable year-round, day and night. Wind, solar, and geothermal devices will be installed and integrated to meet this challenge.

Many new integrative approaches and learnings will come from this Center. Many questions will also emerge such as: How do you engage the community in healthful and sustainable practices? What will fuel a local movement so change is accelerated? What are the real and viable technologies and processes that can be implemented? How can we integrate learnings of the East and West to deliver a new type of low-cost and far higher-quality health care? – to name a few. The Center hopes to be a sandbox from which new ideas and activities will emerge.

The Center offers MIT faculty, students, and staff a real place to work, hands-on, to perform research and engage our local community. We welcome your support and feedback.

V. A. Shiva Ayyadurai is a Lecturer in the Department of Biological Engineering *(vashiva@mit.edu).*

MIT EMS: A Student-Run MIT Jewel

Matthew Meisner

LAST SPRING, AS THE MIT ambulance was responding to an emergency medical call on campus, a separate emergency call was placed to the MIT Police for an ill faculty member in Building 4. As the MIT ambulance crew was responding to the first call, they heard an ambulance from Cambridge dispatched to the call in Building 4. The only problem was that the Cambridge dispatcher told the responding ambulance that the best way to access Building 4 was through 77 Mass. Ave. Imagine an ambulance crew trying to navigate a stretcher and equipment through throngs of students down the length of the Infinite Corridor at class-change time. How much time could have been saved had the ambulance parked outside Building 4 instead?

While it is exceptionally rare to get two emergency calls from campus simultaneously, this example is a good reminder of how MIT-EMS can save precious time in an emergency. MIT-EMS is staffed entirely by student volunteers, so everyone who works on the ambulance knows the campus extremely well and can respond to any location on campus quickly (typically within 2–3 minutes).

MIT-EMS is available 24/7 (except during the summer and Institute breaks) and is dispatched by the MIT Police, who can be contacted at 617-253-1212, or x100 from a campus phone. Calling 911 from a cell phone on campus will eventually result in MIT-EMS being dispatched, but it takes much longer.

Partnership with MIT Medical

One of the most unique aspects of MIT-EMS is its partnership with MIT Medical. Elected student leadership manage all aspects of the service's day-to-day operations, including staffing, ambulance maintenance, CPR and other training, documentation, quality monitoring, purchasing, representation on MIT's Emergency Operations Committee, and external relations (with the City of Cambridge and other ambulance services). MIT Medical holds our state license and MIT-EMS leaders benefit from their administrative, financial, and technical support and guidance.

The student-volunteer EMTs staffing the MIT ambulance have the same certification from the state Office of Emergency Medical Services as EMTs on any other basic life-support (BLS) ambulance. During IAP, MIT-EMS offers a state-accredited EMT-B class that provides the training required to obtain EMT-B certification, which allows students to start working on the ambulance. MIT-EMS also provides its EMTs with additional training after the class and maintains high standards for the level of experience required on every crew.

The fact that MIT-EMS does not bill for its services has a resounding impact on access to medical care on campus. Calling 911 can feel like a big deal and is often something people feel they should avoid unless absolutely necessary. Calling MIT-EMS isn't like that. While MIT-EMS is equipped to respond to life-threatening medical emergencies such as chest pain and difficulty breathing, we're also accustomed to responding to less serious medical emergencies. Many calls are simply for patients who are ill and not feeling up to walking to MIT Medical on their own. Because MIT-EMS is free, fast, and staffed by students, people are more willing to call than they might otherwise be.

Who Uses MIT-EMS?

When picturing a student-run ambulance serving a college campus, many assume that most calls are for intoxicated students. Nothing could be further from the truth. During the 2009–2010 school year, MIT-EMS responded to about 400 medical emergencies on campus; fewer than 10 percent were alcohol related. We more often get calls for sports injuries, fainting, and general illness. In addition, MIT-EMS also ran about 200 non-emergent transfers of patients to and from MIT Medical and other local hospitals last year. About 25 percent of the patients transported by MIT-EMS were current or former MIT faculty and staff.

Another misconception is that MIT-EMS only transports patients to MIT Medical. While MIT-EMS transports patients to MIT Medical when possible, historically only about 30 percent of our calls end up there. More seriously ill patients are transported to emergency rooms at local hospitals.

As MIT Medical prepares to close its Inpatient Unit, modify its hours for Urgent Care, and open the new Community Care Center, MIT-EMS will be an integral part of this new health care model. As MIT Medical transitions away from offering overnight urgent or inpatient care, MIT-EMS will play a critical role in transporting MIT affiliates to other medical facilities.

Matthew Meisner is Chief of the MIT Medical Services and a senior in the Biology Department *(mmeisner@mit.edu)*.

Stellar Next Generation

Faculty Advisory Committee on LMS

DURING THE 2009-10 ACADEMIC YEAR, the Faculty Advisory Committee on Learning Management Systems (LMS) evaluated several options for meeting the Institute's requirements for a robust but flexible LMS. The Committee focused on solutions that could effectively improve on Stellar's aging architecture. The Committee's final recommendation was to implement a limited "Stellar Next Generation" evaluation using a representative sample of MIT departments and courses.

Spring Experiment

IS&T will be implementing this limited evaluation of Stellar Next Generation in the upcoming spring 2011 term. During this program, selected DLCs will be testing the core functionality of Stellar NG, as well as features that satisfy specific pedagogical needs not yet met by the current course management system. Specific features include streaming video, video conferencing, image handling, and Google Docs integration. During this evaluation, IS&T will continue to fully support the existing Stellar application.

Success Criteria

IS&T will collect data from the participating DLCs in the experiment in order to determine Stellar NG's ability to provide the following:

- User-friendly, familiar workflow.
- User-facing functionality that the current Stellar architecture cannot provide.
- Easy integration of popular third-party services, such as Google Docs.
- User-managed customizations and enhancements for those who require them.
- Low barrier to adoption for instructors and students.

How to Provide Input

IS&T continues to encourage input from community members on MIT's next LMS. Please send your comments on this or the Stellar NG experiment to: *stellar-support@mit.edu.*

Reference

For more background information on the Stellar NG project, please see the FNL article published earlier this year at: ***web.mit.edu/fnl/volume/223/stellar.html.***

To learn more about the project, visit the LMS Evaluation wiki at: ***https://wikis.mit.edu/confluence/display/STLRNG.*** ■

Work-Life Resources Now Available 24/7

THE CENTER FOR WORK, Family & Personal Life announces an enhancement to their resource and referral service. Provided by Workplace Options, Work-Life Resources 24/7 consultants offer information and referrals to support personal, professional, and family life, on issues including child care, elder care, schools, legal and financial matters, relocating to Boston, volunteering, and more. This service is available to all MIT faculty, staff, postdocs, and graduate students at no charge. The MIT community can access the service by phone (877-847-4523) 24 hours a day, 7 days a week to reach a consultant. Consultants can also be contacted via e-mail and live chat by logging onto the Work-Life Resources 24/7 Website at: ***hrweb.mit.edu/worklife/worklife-resources***. In addition, the site has articles, tools, tip sheets, provider listings, and searchable databases on a broad range of work-life issues.

One of the benefits of Work-Life Resources 24/7 is that it is a 24/7 service. However, the MIT community continues to have the option of contacting the Center for Work, Family & Personal Life directly and meeting with Center staff. "We're delighted we can offer this new program to the MIT community," says Rae Simpson, PhD, the Center's Senior Program Manager for Parenting and Work-Life Communications and Resources. "But we want faculty to know that we're always here for consultations, especially for urgent and complex issues."

For more information on contacting the Center see their Website: ***hrweb.mit.edu/worklife/contact***. Or contact them directly at: *worklife@mit.edu*, 617-253-1592. ■

letters

Cost of Nuclear Energy is Misrepresented

To The Faculty Newsletter:

THANK YOU FOR YOUR EFFORTS in the latest *MIT Faculty Newsletter* (September/October 2010). And thank you for your comments about clean energy. I write to correct the misperceptions you appear to hold in respect of nuclear energy. It is not painting a true picture to say (as you do) that "nuclear energy is still costly." Nor is it correct to imply that dismantling facilities and used fuel disposal is a significant additional economic cost.

The operating costs of producing electricity by existing nuclear plants have for several years now been lower than those of the cheapest fossil fuel, coal plants. They are far lower than the operating costs of natural gas (which are dominated by volatile fuel costs. Gas generator capital costs are low.) Moreover, if you were to consult the MIT Nuclear Power report (2003) or the recent update (2009), ***web.mit.edu/nuclearpower/***, you would discover that current estimates of total Cost Of Electricity (including capital) from new nuclear plants are already practically competitive with new fossil, and require only the most minimal internalization of fossil's true costs, such as a moderate carbon tax or the requirement for CO2 or further particulate emission reduction by coal, to make nuclear economically clearly the most attractive option. This is, of course, one reason why utilities are proposing new nuclear plants and why approximately 25 new reactors are under license review by the Nuclear Regulatory Commission. Incidentally, China is moving rapidly forward with nuclear plant construction that bids fair to equal the nuclear capacity in the U.S. within a couple of decades.

There are, of course, serious political challenges to used fuel storage and disposal. Political challenges. However, since the 1980s, the costs of disposal have been set aside by a 0.1¢ per kWhr tax on nuclear electricity, totaling $35B so far, fully sufficient to build a repository such as Yucca Mountain. Similarly, most utilities have set-asides for reactor dismantlement that are more than sufficient. The only remaining necessity to bringing closed nuclear plants back to green field, is for the Federal Government to obey the law and accept the spent fuel currently stored on power plant sites. By the way, the environmental impact of nuclear electricity generation is undoubtedly the smallest per kWhr of any of our current options, including those that are uneconomic.

Nuclear energy has challenges, especially with respect to anti-proliferation concerns. But as far as the economics are concerned, the main issues for new reactors are to demonstrate that their actual capital construction costs can be kept within acceptable bounds, by building on budget and schedule, and to convince the capital markets that the big outlay is a manageable financial risk. Since we have not built new reactors in the U.S. for a while, people naturally want to see a demonstration before they are going to believe this will all work. But as far as existing reactors are concerned, which are all going to be running for a long time, there's no financial downside. Nuclear generators are making money, and consumers are benefitting from low nuclear rates.

Finally, I'd like to offer a more general remark of personal opinion, in contrast to the facts that I feel you have misrepresented. MIT's reputation is made by the Institute being able to address the big picture with quantitative analysis that takes the realities of science, engineering, and policy into account. Idealism is all very well, and I'm as idealistic as the next person, but in the end, the nation's and the world's energy challenges are going to have to be addressed by government policy, setting the economic balance, not by individual idealists, however passionate and clever. The call should therefore be not for us individually to be willing out of idealism to pay more, but rather for us to work for and advocate that the full (including environmental) costs of all energy sources should be internalized. That's not happening right now because the special interests of for example fossil energy and industry have too much influence over legislators and over public opinion.

Sincerely,

Ian Hutchinson
Professor of Nuclear Science
and Engineering

letters

No Mention of Geothermal Energy

October 1, 2010

MIT Faculty Newsletter
Editorial Subcommittee Vol. XXIII, No. 1

Dear Editorial Subcommittee:

I JUST RECEIVED THE *Newsletter* and read some of the articles, including your editorial, and I was very surprised about what you wrote. There is not a single mention of geothermal energy. This is in a way ironic, since of the major contributions to assess the potential of this domain is the 2006 report, "The Future of Geothermal Energy," which was developed at MIT. This report is widely cited in the geothermal community and is usually referred to as the "MIT REPORT"!! It is like the other "clean energies" not without its problems, but given its potential and sustainability, it should have at least been mentioned.

I realize that it is not easy to write a brief editorial about such a complex problem, but a somewhat wider perspective might have been appropriate.

I am looking forward to getting your reply.

Sincerely yours,

Herbert H. Einstein
Professor of Civil and Environmental Engineering

Connect with MIT's Global Community

Anne Street
Judith M. Cole

ARE YOU AWARE THAT 15 percent of MIT's alumni population lives abroad? And many of them may be professionals in your field or your former students. The MIT Alumni Association and our new Web feature, PlanetMIT, can help you connect with regional alumni before or during your travels.

MIT has approximately 16,660 alumni living in international locations, most in areas served by MIT clubs. Through these clubs, the MIT Alumni Association has a long history of welcoming MIT faculty and administrators through formal events and informal gatherings. You may have the opportunity to dine with club leaders, talk to former students, and give presentations to local alumni – all activities that help strengthen MIT's global community.

Faculty visits are highly valued by alumni clubs. The value to you is significant as well. Given the stature of MIT alumni in many parts of the world, they can often provide entrée to influential companies and government officials. In addition, alumni club volunteers may be helpful in spotting potential research or consulting opportunities for you or just welcoming you to their city and providing local knowledge.

How can you find more information on our international alumni clubs? Your first stop is PlanetMIT – ***alum.mit.edu/maps/planetmit.dyn*** – a visual snapshot of our MIT population worldwide, launched in February 2010. This mapping system is located on the Networks page of the MITAA Website – ***alum.mit.edu/networks/***. Pins are located in every state or country where alumni live. Clicking on the pin will give you a snapshot of local information:

- # Alumni in the state or country
- # Students from the state or country
- # Parents of current students in the state or country
- # Volunteers in the state or country
- Listing of alumni clubs, Enterprise Forum chapters, and area representatives

PlanetMIT will lead you to MIT's domestic and international club contacts. Just click on a country pin to find the link. Contact the clubs in cities you plan to travel to and arrange meetings and get-togethers in advance. We hope you will explore these Web pages and join our cadre of international ambassadors for MIT who grow and strengthen the global community.

International Faculty Engagement by the Numbers

- Four-year total of international faculty club seminars: 122
- Four-year total of faculty participating in international club seminars: 61

Anne Street '69, SM '72 is the President of the MIT Alumni Association *(annestreet@alum.mit.edu);* **Judith M. Cole** is Executive Vice President and CEO of the MIT Alumni Association *(judycole@mit.edu).*

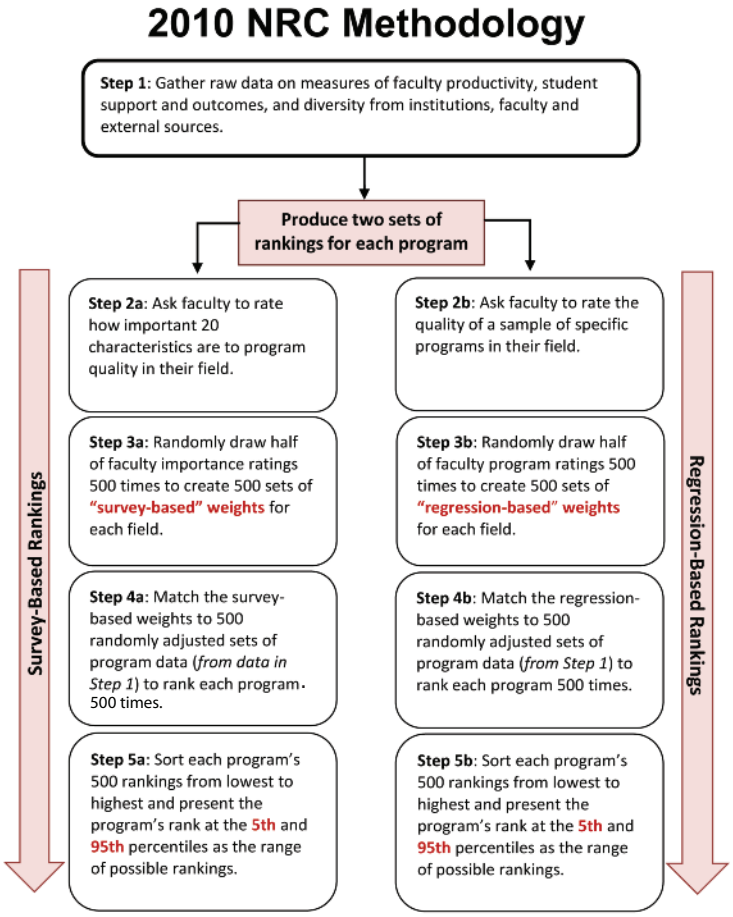
National Research Council (NRC) Finally Releases Doctoral Program Rankings

THE RESULTS OF THE National Research Council (NRC) assessment of U.S. research doctoral programs were released in September. The much-anticipated results were based on a new approach, which produced ranges of rankings for programs in each discipline rather than a single ranking. Overall, MIT's participating doctoral programs fared well as can be seen from the chart on the next page.

The approach of the current study addressed criticisms of the NRC's previous study (1995) that was viewed as overly simplistic and inadequate in capturing the uncertainty associated with measurement of program quality. In tending to these concerns, however, the new approach has elicited a new wave of criticisms, directed at both the project's extended timeline and its methodological complexity.

The study, which was to be more heavily reliant on quantitative, objective measures, was conducted using data that was in many cases from the 2005-06 academic year. From an expansive data set compiled after institutions invested a great deal of time and effort in preparing submissions, the NRC study committee selected 20 key program characteristics (variables) and developed *ranges* of rankings from these data using two distinct approaches. The ranges were intended to represent – at a 90% confidence level – the range within which the program's true ranking falls.

The first approach, for the survey-based (S) rankings, was based on how faculty weighted – or assigned importance to – the 20 characteristics that the study committee determined to be factors contributing to program quality. The weights of characteristics varied by field, based on faculty survey responses in each of those fields.



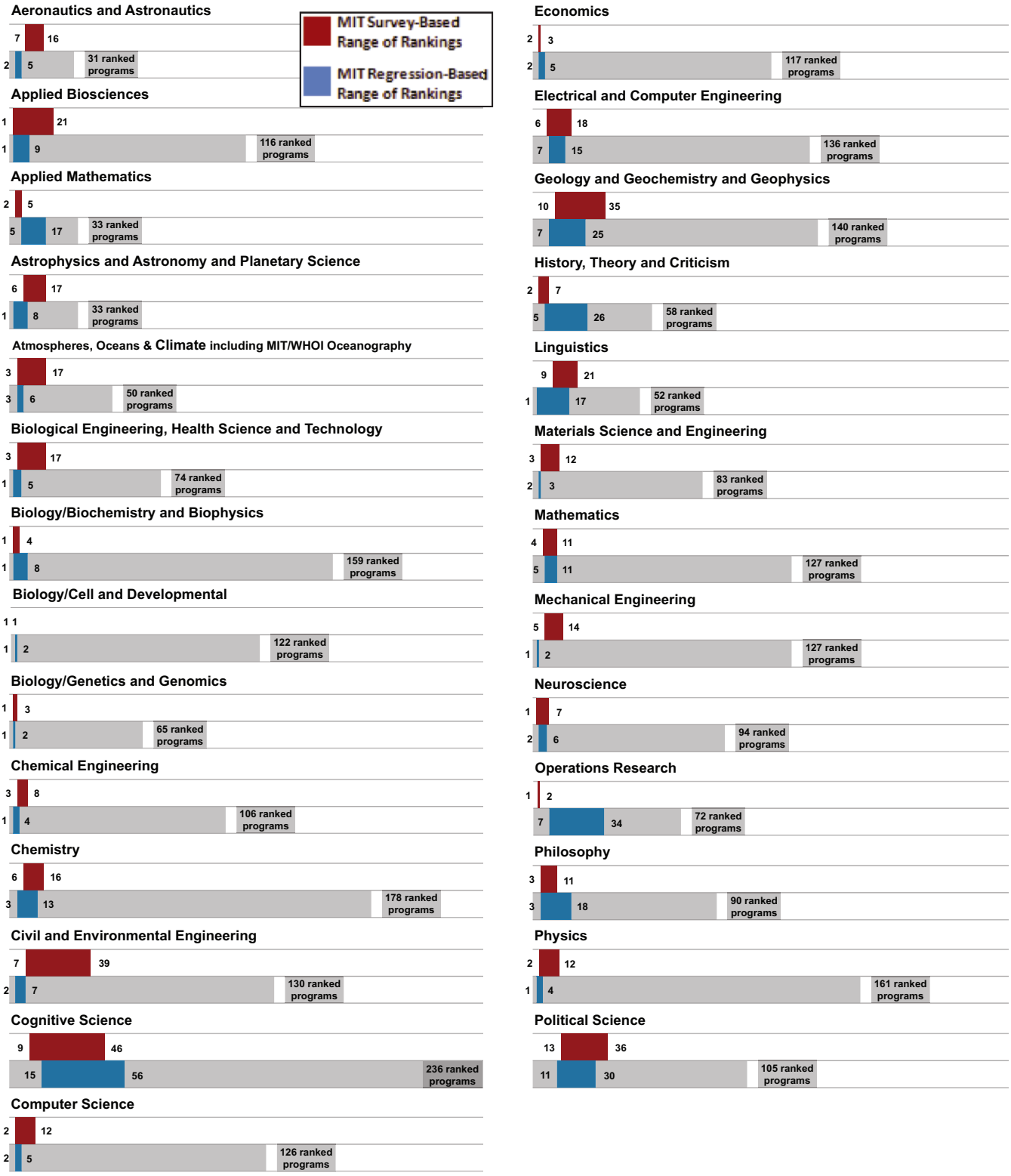
The second approach, for the regression-based (R) rankings, depended on the weights calculated from faculty ratings of a sample of programs in their field. These ratings were related, through multiple regression and principal components analysis, to the 20 characteristics that the committee determined to be factors of program quality.

In both approaches, the resulting weights were then applied to data corresponding to those characteristics for each of the programs in the field.

Taking the first MIT program from the chart on the next page as an example, Aeronautics and Astronautics was ranked between 7th and 16th out of 31 total participating programs using the survey-based (S) approach, and between 2nd and 5th using the regression-based (R) approach.

In total, 44% of MIT's participating programs were ranked as high as 1st in either the R or S rankings, and fully 81% of MIT's participating programs were ranked 3rd or higher in either the R or S rankings (see *M.I.T. Numbers*, back page).

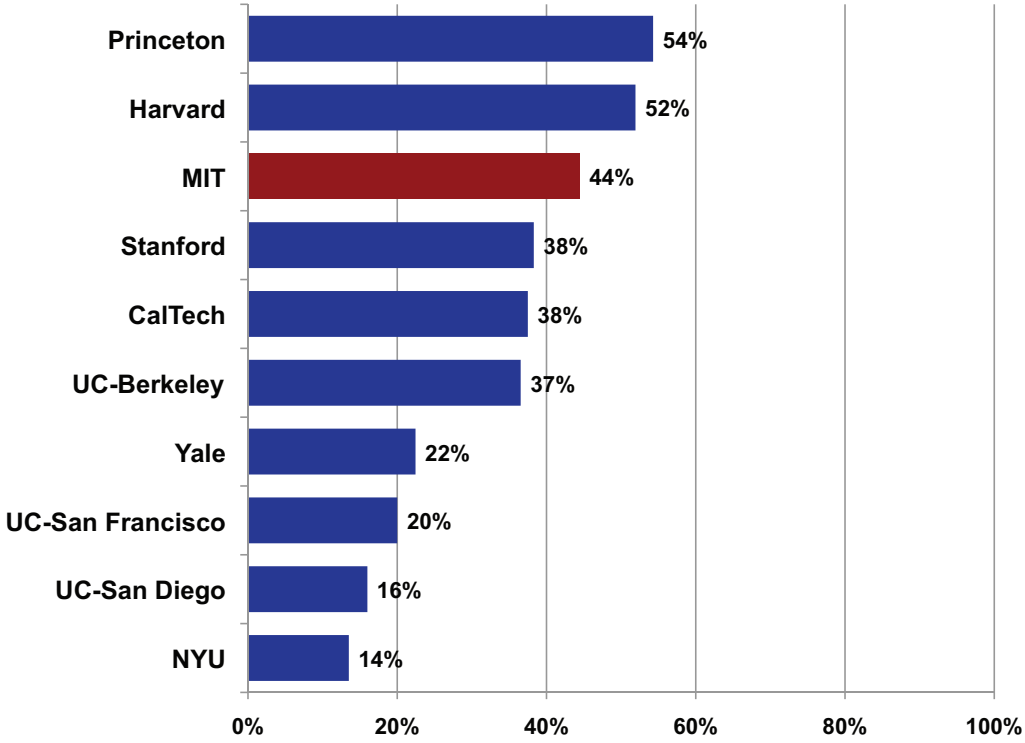
2010 NRC Rankings of MIT Doctoral Programs



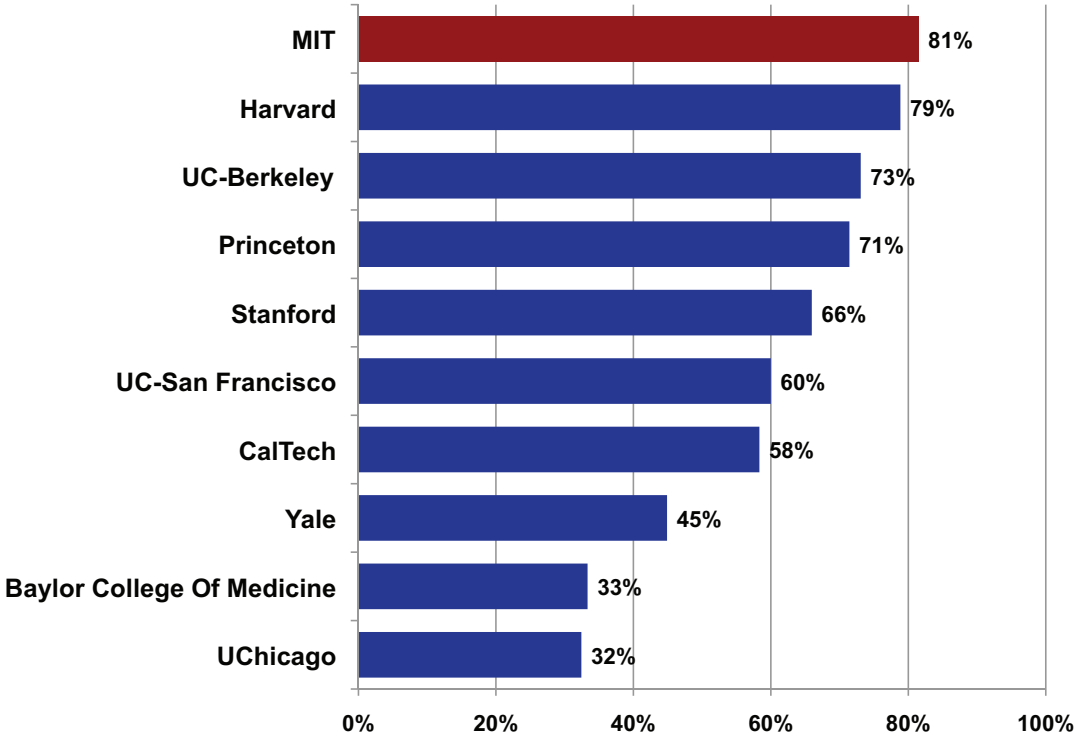
M.I.T. Numbers

National Research Council 2010 Doctoral Program Rankings

Percent of Participating Programs Ranked 1 in R or S Rankings*



Percent of Participating Programs Ranked in Top 3 in R or S Rankings*



*See page 26 for an explanantion of R and S rankings.