

MIT Faculty Newsletter

<http://web.mit.edu/fnl>

in this issue we focus on diversity at MIT and its significant relationship to the recent tragedy in Haiti. Pieces include excerpts from the Report on the Initiative for Faculty Race and Diversity and our editorial (below), and continue with From The Faculty Chair (page 5 and following); personal views from members of the Diversity Committee (pages 13 and 14); and "Counting Faculty and Students" (page 16).



Aftermath of the Earthquake in Haiti

Report on the Initiative for Faculty Race and Diversity: Excerpts and Commentary

Paula Hammond

WE WELCOME OUR FELLOW FACULTY COLLEAGUES' support in the release of the Report on the Initiative for Faculty Race and Diversity. For those who have not had the chance to read it yet, it can be found at: web.mit.edu/provost/raceinitiative/.

Due to the depth of coverage of the Report, rather than create a complete summary of it here, below are some highlights of the critical findings and a sampling of some of the key recommendations that were informed from those findings. These abridged excerpts do not include several important findings and key recommendations, and we encourage faculty to examine the major findings and the corresponding recommendations in their entirety in Sections D and E, respectively, in Part I of the Report. We also invite faculty to read the research report, Part II of the Report, which gives insightful details of the research and imparts a strong sense of the MIT experiences and perspectives of our minority faculty.

Although the focus of the recommendations is on underrepresented minority (URM) groups, it is believed they will benefit a much broader group of faculty – especially all junior faculty members and the faculty in general – including those who represent a broad range of differences: gender, nationality, culture, sexual preference and identity, and physical ability. We believe these recommendations will strengthen many of the core elements of the Institute's hiring, mentoring, and promotion processes by implementing a framework for greater oversight and self-evaluation at all levels, from department and lab to School and administration. Finally, along with the research find-

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Editorial Our "Inescapable Network:" Haiti, the Diversity Initiative, and MLK

IT HAS BEEN MORE THAN A MONTH since a magnitude 7 earthquake struck Haiti's capital, Port-au-Prince. News reports estimate that the earthquake has killed 230,000, injured 300,000, led to 2,000 amputations, and destroyed 250,000 homes and 30,000 businesses. We have a great affinity for numbers at MIT, but much of the damage cannot be expressed quantitatively. Institutions and resources have been devastated. Means of income and ways of life have been destroyed. And how does one measure unremitting grief?

Every day since January 12, images and stories of the earthquake in Haiti and the world's response fill the pages of newspapers and dominate television and online news coverage. Insensibility to this tragedy is inconceivable. And yet, until recently, except for in an *MITnews* article,

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Photo credit: Pages 1 and 6, Andreas Symietz; Page 7, Amy Smith

Our “Inescapable Network”
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the response by MIT’s administration has been simply inadequate. President Hockfield’s recent Institute-wide e-mail is encouraging. However, the situation demands more than a statement commending the initiatives of campus groups and individuals and calling generally for long-term action. What is urgently needed is for MIT’s administration to support its stated intentions with concrete and substantial institutional backing.

Many institutions and organizations have responded. Across town the Harvard administration spoke up immediately in recognition of the members of its community who were directly affected by the earthquake, thereby declaring its membership in the human community. On January 14, President Drew Gilpin Faust sent a letter expressing condolences and a recognition of suffering to the Harvard community that embodies the responsibility of leadership that her university’s privilege and resources entail. This letter stated that health care professionals from the Harvard teaching hospitals would be serving Haiti, thereby setting an example for others to contribute their expertise.

The letter also indicated that Harvard had established a dedicated Webpage facilitating direct contributions to Haitian relief and listing organizations responding to the crisis in Haiti and those supporting local Haitian communities. Two weeks later, on January 25, President Faust sent another letter sharing information on how the earthquake has affected members of Harvard’s “own community” and announcing a relief fund for colleagues, established with contributions from Harvard University and the Harvard University Employees Credit Union. And most recently, the Harvard administration helped students to plan the Haiti Benefit Concert, held on February 12, and covered all costs for this fundraiser.

Two days after the earthquake, also on January 14, President Hockfield announced the report from the Initiative

on Faculty Race and Diversity in an e-mail message to the MIT community. This letter proclaims the goals of “a true culture of inclusion” and “leadership in diversity and inclusion,” in service to MIT’s mission of continued excellence in teaching, research, and community service.

The failure to make the connection between the earthquake in Haiti, and issues of racial and ethnic diversity and inclusion needs to be corrected. MIT is

We cannot afford to be an institution that functions brilliantly from the neck up, or to demonstrate this example to our students. These efforts by some members of our community demonstrate that MIT need not be a place where ideas are explored and technology is invented and produced in an intellectual vacuum.

uniquely equipped to provide leadership in the areas of energy, engineering, media technology, telecommunications, architecture, urban planning, prosthetics, water resources, disease prevention, education, and more. Expertise in these fields is so desperately required in Haiti. Indeed, the silence of our leadership is perplexing on a merely pragmatic level, as Haiti offers many practical and clinical opportunities for the development and application of technologies through which MIT could distinguish itself.

Members of MIT’s student body have responded with compassion and ingenuity. In efforts to raise funding and awareness, they have established donation booths and organized activities such as the Strength Through Unity benefit Showcase, the Haiti Relief Show, a charity ice skating event, and a video game marathon. They have gathered to develop relief project ideas, hold prayer sessions, and strategize about ways to adapt technology such as a solar autoclave for sterilizing water. Donations to MIT’s Public Service Center will be used to fund student and faculty projects that benefit Haitian people who were affected by the earthquake. Faculty members, such as Dale Joachim, Phil Thompson, and Amy Smith, from whom you hear in this issue

of the *Newsletter* (beginning page 6), have stepped forward to devote their expertise to relief efforts.

We cannot afford to be an institution that functions brilliantly from the neck up, or to demonstrate this example to our students. These efforts by some members of our community demonstrate that MIT need not be a place where ideas are explored and technology is invented and produced in an intellectual vacuum.

What, then, does it mean for MIT, which is situated in the city with the third largest Haitian population in the United States, and whose circle includes many students, staff members, and faculty members of Haitian descent, to champion its commitment to inclusion, diversity, and service, while remaining publicly silent about the earthquake?

On February 4, MIT celebrated Martin Luther King, Jr. with an annual breakfast. The article written by the Chair of the Faculty and included in this issue (page 5) was inspired by the address given at that event. With King’s example so recently invoked, let us consider what he wrote, in “Letter from a Birmingham Jail,” about connectedness.

“Moreover, I am cognizant of the inter-relatedness of all communities and states. I cannot sit idly by in Atlanta and not be concerned about what happens in Birmingham... We are caught in an inescapable network of mutuality, tied in a single garment of destiny. Whatever affects one directly, affects all indirectly.”

Surely we must try to live King’s words beyond his annual day of celebration, by putting into practice, with our unique and tremendous engineering and scientific resources, the stated ethics of full inclu-

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Our “Inescapable Network”
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sion and service. Can we sit idly by in Cambridge and not be concerned about what happens in Port-au-Prince? Surely it is possible to speak out, in compassion and leadership, to say that we see the people of Haiti and that their fate affects us. That it is ours, as well.

If not, then King’s further words, also written from that Birmingham jail in 1963, are true: *“We will have to repent in this generation not merely for the hateful words and actions of the bad people but for the appalling silence of the good people.”*



Diversity Initiative Must Not be Undermined by Economic Belt Tightening

THE EXCELLENT REPORT ON the Initiative for Faculty Race and Diversity identifies not only the commitment to

fairness and justice, but also the necessity of broadening and diversifying the MIT faculty if we are going to continue to be able to contribute to social needs at the highest level.

An important aspect of the creativity and productivity of the US scientific and technological workforce has been its broad social and economic base. Though limited to white males, the establishment of the Land Grant Universities, the passage of the GI bill, the expansion of state public funds for higher education, and the availability of federal graduate training grants, opened up scientific careers to men from diverse social and economic backgrounds. During this period many other nations limited access to higher education to the children of their aristocracies.

However, until recently, even in the U.S., people of color and women have been systematically excluded from advancing in science and technology careers. We have to recognize both the

injustice of limiting their access to the Institute world, and the increasing damage to MIT that follows from excluding their talents and contributions.

We need to combat the persisting backward attitude that those from disadvantaged backgrounds have inferior talents; too many of our colleagues are slow to recognize that scientists and engineers from such backgrounds can be more hard working, more creative, and more productive than they are.

An additional danger is that the setbacks in the economy, and the concomitant belt tightening at MIT, will be used as an argument to delay or negate the recommendations of the report. We have to be clear that the fundamental health of MIT as a productive and leading institution of higher learning depends on the timely and steady implementation of the report in continuing to develop a faculty that fully taps the human resources of our nation. ■

Editorial Subcommittee

Teaching this spring? You should know ...

the faculty regulates examinations and assignments for all subjects.

Check the Web at web.mit.edu/faculty/termregs for the complete regulations.
Questions: Contact Faculty Chair Tom Kochan at x3-6689 or tkochan@mit.edu.

No required classes, examinations, exercises, or assignments of any kind may be scheduled after the last regularly scheduled class in a subject, except for final examinations scheduled through the Schedules Office.

First and Third Week of the Term

By the end of the **first week** of classes, you must provide a clear and complete description of:

- required work, including the number and kinds of assignments;
- an approximate schedule of tests and due dates for major projects;
- whether or not there will be a final examination; and
- grading criteria.

By the end of the **third week**, you must provide a precise schedule of tests and major assignments.

For all Undergraduate Subjects, Tests Outside Scheduled Class Times:

- may begin no earlier than 7:30 P.M., when held in the evening;
- may not be held on Monday evenings;
- may not exceed two hours in length; and
- must be scheduled through the Schedules Office.

No Testing During the Last Week of Classes

Tests after Friday, May 7, 2010 must be scheduled in the Finals Period.

From The Faculty Chair The Haiti Challenge: Are We Doing Enough?

Thomas A. Kochan

EVERY ONCE IN A WHILE I'm reminded of the profound wisdom of our students. The recent Martin Luther King Breakfast was such an opportunity, not just for me, but for all who participated in the breakfast.

The theme this year was: "Deploying our Gifts for the Betterment of Humankind: What would Dr. King say about us?" Dylon Rockwell, the undergraduate student chosen to speak, reminded us of what sets MIT apart. In quoting Dr. King, Dylon closed his speech with a set of profound questions:

"Dr. King said 'The ultimate measure of a man is not where he stands in moments of comfort and convenience, but where he stands at times of challenge and controversy.'

On January 12, 2010 a devastating earthquake hit the small country of Haiti, and my friends and I felt compelled to act to help the victims of this tragedy. We raised money at booths in the Student Center, but we wanted to do more. Last week, we hosted a relief benefit showcase to help those personally affected by the earthquake. The show was a success and we raised thousands in donations that went to Partners in Health.

But this morning I'm still wondering was that enough? What would Dr. King say about me? What would Dr. King say about MIT? Has MIT deployed its gifts for the betterment of humankind? . . .

. . . I sometimes wonder what makes MIT so special. What sets us apart?

I now know it is our ability to take risks. Risk taking is evident in our motto "Mens et Manus" which means Mind and Hand. To me this means that whatever we put our mind to – we can put our hands to and make it happen.

On Diversity and Standards

I AM PLEASED THAT much of this issue of the FNL focuses on MIT's Initiative on Faculty Race and Diversity. My hope is that all members of the faculty will treat attracting and retaining underrepresented minorities as a top strategic priority. Some colleagues have expressed concern that doing so might come at the expense of our high quality standards. We must not and will not let this happen. I wholeheartedly agree with President Hockfield's clear and powerful statement on this matter in her address at the Martin Luther King Jr. breakfast:

"Since the report came out, though, I have to be honest and direct with you – I have heard from a number of people that its findings and recommendations might somehow threaten to erode or compromise the excellence of MIT. I could not disagree more. As I have said many times, MIT is and must always be a place with unrelenting standards of excellence. This report is not about compromising those standards – it is about reaching them. For almost 150 years, MIT has built and maintained its standards of excellence by bringing in the very best people, and offering them an environment where they can do their very best work. Thanks to the Initiative on Faculty Race and Diversity, we have new information that will allow us to uphold those bedrock MIT standards. And strengthening MIT in this dimension is pivotal to helping us magnify and deploy our shared gifts, for humankind."

Let's all work together in this way to strengthen MIT and its contributions to humankind.

Thomas A. Kochan

This morning I would like to end by asking of myself, of you all here and of MIT in general, How can you serve? What can you give?"

We need to answer Dylon's challenging questions in a fashion true to MIT's motto, by putting our minds and hands to work in helping our neighbors in Haiti rebuild their lives and their country.

So I want to use this column to show we can and are making a difference in Haiti. I've asked three colleagues to tell how they are making things happen by

mobilizing the talent and energy of others in the MIT community. Their responses begin on the next page.

After hearing their stories, let's all ask again Dylon's question of ourselves and of MIT: *"Is this enough? What would Dr. King say about us? What would Dr. King say about MIT? Is MIT deploying its gifts for the betterment of humankind?"* ■

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

Responding to the Earthquake: A Workshop, Lecture Series, and More

Dale Joachim

NEWS OF THE 7.0 EARTHQUAKE of January 12 in Port-au-Prince, Haiti, rang as a call to action. As I began calling colleagues from across the Institute to organize discussion meetings, I learned that I too had suffered losses in my family. This realization only added resolve to my decision to act, drawing from a belief that knowledge carries responsibilities.

Following conversations with Prof. Michel DeGraff, whose many losses included relatives, friends, and colleagues (a tragic fact that is now common across Haitian communities everywhere), a series of meetings was promptly arranged to discuss the earthquake's aftermath, identify some of the most urgent problems that we at MIT could tackle, and strategize sensible contributions to both short- and long-term relief and rebuilding efforts. As one outcome of these meetings, Prof. Christopher Csikszentmihalyi and I developed an IAP workshop to discuss technological innovations relevant to the epic disaster.

The four-day IAP workshop took place on January 19-22 and centered around evolving contributions of media technologies to rescue efforts (e.g., Google PeopleFinder, an Internet service that played an important role in the rescue efforts, and the "4636" SMS short code that allowed the broadcast and translation of SMS alert messages through crowd sourcing). The IAP group identified communication and energy as key factors in the upcoming nation rebuilding efforts and discussed potential solutions to the environment-related energy problems.

Near the end of the workshop, it became clear that a well-designed selec-



Before the Earthquake (house of the author's uncle)



After the Earthquake (house in which the author's aunt was killed)

tion of communication, coordination, and energy challenges could be addressed within the MIT community with relatively immediate and noticeable impact.

As a result of the IAP session, two Media Lab students, Aaron Zinman and Greg Elliott, began designing what they termed SkillSetFinder, an Internet service

that would use cellular telephony to efficiently collect and disseminate information about personal skills. Such service is in the spirit of the culturally-rooted Haitian tradition called *konbit*, where people help one another by sharing their skills pro bono toward the completion of various tasks in a communal fashion. We

anticipate that the development of SkillSetFinder will contribute to rebuilding efforts.

A group of students outside of the IAP workshop, led by Nadya Peek, Keith Berkoben, and Amy Sun, began careful planning of a fabrication laboratory (“Fab Lab”) to be located in Haiti. These laboratories provide the tools needed to create custom precision parts, an important service when rebuilding partially destroyed objects and even for creating prosthetics, an urgent need after the earthquake. Such laboratories are meant to be operated by the local community and thus can serve both as educational tools and as agents for empowerment.

In setting the stage for longer-term discussion and projects, we launched a lecture series focused on Haiti that began with an evening with Prof. Noam Chomsky. In addition, Prof. Barry Vercoe and I crafted a class, “MAS963 Special Projects: New Media for Haiti,” which is being offered now, in spring term 2010. This class discusses the historical, socio-

political, economic, cultural, and linguistic backdrops in Haiti at the time of the earthquake, and then seeks to identify which post-earthquake problems can be tackled, even in preliminary fashion, in the course of the semester. The class is both a discussion and project class, with many guest lectures, including crucial contributions from Prof. DeGraff about the role of language and education in any solution to Haiti’s socio-economic and political problems. Other essential contributions to the new class will explore the roles of technology, economics, civic engagement, innovative teaching methods, and self-expression in the rebuilding of a better Haiti. Students are expected to select projects to be completed and tested in Haiti in the last week of April.

These activities, I hope, mark the beginning of a long-term MIT-wide engagement with the people of Haiti, a country that has lost much of its political, educational, economic, and public-health infrastructures, in addition to the

unprecedented loss of life. The forthcoming ground-up rebuilding efforts present unique opportunities for cutting-edge institutions such as MIT to make substantial contributions to relief efforts and reconstruction plans. In turn, such contributions will provide extraordinary learning opportunities to students and faculty. Coincidentally, the main factors needed to jump-start Haiti, rebuild its infrastructure, and improve the fabric of its society – namely energy, fabrication, communication and education – happen to also be MIT’s strengths. These formidable challenges will also give MIT an exceptional avenue to further its global leadership in these areas.

If you would like to be involved or need additional information on related classes or projects, please visit krikkrak.media.mit.edu, or e-mail me. We hope to garner enough enthusiasm to elicit, support, and coordinate long-term, sustainable projects from across the Institute. ■

Dale Joachim is a Visiting Scientist in the Media Laboratory (joachimd@mit.edu).

Building a Network of Organizations in the Haitian Diaspora

Phil Thompson

ON THE DAY OF THE EARTHQUAKE, at about 3 pm, Paul Altidorp, a former Summer Program in Undergraduate Research (SPUR) Fellow and Department of Urban Studies and Planning graduate from Haiti, Becky Buell, a fellow in the Community Innovator’s Lab (CoLab) in DUSB, and I completed a draft proposal for a pilot project building housing in Port au Prince. The idea was to take some recent innovations in affordable housing construction and development, along with low-cost energy and water technologies, and seek to deploy them in a small section of the city.

A few hours later the earthquake struck. Paul barely survived, running out of a hotel

as it collapsed behind him. The next day, the Service Employees International Union (SEIU), a union that has over 60,000 Haitian members, asked those of us at CoLab if there was anyone at MIT who could help their members communicate with their families and friends in Haiti. Chris Csikszentmihalyi and Dale Joachim at the Media Lab, along with a large group of students at the Center for Future Civic Media, were already working on communications with Haiti and assisted SEIU’s rapidly-organized Haitian family trauma center in Miami to connect family members.

Since then, we have been working on two tracks. We are working with SEIU and other organizations interested in building

a network of organizations in the Haitian diaspora. A first step along this line was SEIU’s opening, along with Mayor Menino’s office, a Haitian trauma center in Dorchester to supplement the center opened in Miami. A second avenue of work will be to support Paul Altidorp and his colleagues in Haiti’s government in planning the rebuilding of Haiti. We want to continue our focus on low-cost neighborhood development, but given the level of destruction in Haiti, there are likely to be many requests for advice, spanning the range of MIT’s competencies. ■

Phil Thompson is an Associate Professor in the Department of Urban Studies and Planning (jt71@mit.edu).

Short- and Long-Term Responses to the Tragedy in Haiti

Amy Smith

I TOO HAVE ASKED those questions. What can I do? What can I give? How can I serve? And the answers have been frustratingly slow in coming. D-Lab does development, and, traditionally, this is very different from relief. And so the answers have not been jumping out at me. But then, as the dust settled, quite literally, some things became clear. For several years, we've been working on developing a method for producing charcoal from agricultural waste materials as a means of addressing the severe deforestation in Haiti, and to create opportunities for income generation for people living in deep poverty.

We've been focusing in two areas: the southwest, in the area around Les Cayes, and the central plateau. Neither area sustained infrastructural damage from the earthquake, but the widespread reverse migration from Port-au-Prince to rural areas that has followed is having a major impact. We hope to work with our colleagues to ramp up charcoal production, so that the tragedy of the earthquake does not become an additional tragedy for the environment as fuel demand and food prices skyrocket. So we are looking at providing the resources to triple (at least) production in the southwest and central plateau, and for mechanisms for this fuel to get to Port-au-Prince.

Water is another basic need, and safe drinking water is in alarmingly short supply. We are working with a colleague at the Center for Disease Control (CDC) to provide low-cost water testing equipment to support this effort. We are also developing a low-cost, small-scale rainwater harvesting system. This will be the first

project in the D-Lab: Design class this semester, as we challenge our students to put their hands and minds to the task of developing the system. Conventional harvesting methods require large, expensive storage vessels or construction; with this system, water is stored in inexpensive plastic bags, each of which has a fitting

livelihoods in the coming months and years. The second focus is on identifying and developing technologies that can be used to generate income in the rural and semi-rural areas. It is unclear whether the tens of thousands of people who have fled Port-au-Prince for rural areas will stay, what type of work will be available, and



Making Charcoal in Haiti

afford, adding to their storage capacity as they save money by not having to purchase water, or earn money through dry season farming.

Finally, in the longer term, we will be focusing in two other areas. The first is Creative Capacity Building, a concept that we have been developing over the last few years, in which communities are trained and supported in the design process with the goal of empowering them to be creators of technology, not just users or recipients. We have been working in Uganda with communities that are moving back to their villages after decades of living in relief camps, and we believe that this can be an important tool for helping Haitians to rebuild their lives and

upon jobs, sustainable incomes will be essential to Haiti's recovery and growth.

One definition of "crisis" is, "a time when an important decision must be made." In this sense, the people of Haiti are not alone in this moment of crisis. Whether it be supporting the work of others, or doing the work ourselves, this is a time for us to think deeply about what we will do.

As Daniel Berrigan said, "One cannot level one's moral lance at every evil in the universe. There are just too many of them. But you can do something, and the difference between doing something and doing nothing is everything." ■

Amy Smith is a Senior Lecturer in Mechanical Engineering at the Edgerton Center (abs@mit.edu).

Report on the Race Initiative

Hammond, from page 1

ings, several recommendations were informed by successful examples of diversity efforts – from the building of the pipeline among graduate students and postdoctoral associates to the successful recruitment of new URM faculty – which were found within our own departments and schools. For this reason, the recommendations will provide the opportunity for MIT to learn from its best local successes by sharing information where appropriate and providing implementation across its units.

Recruiting – Some Key Findings

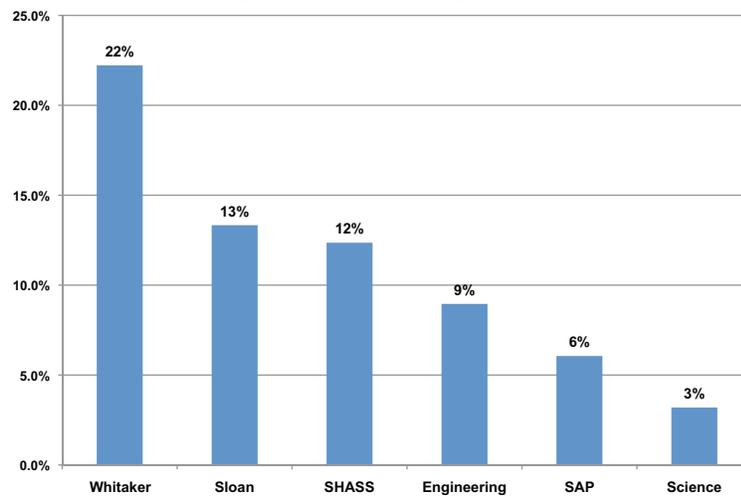
- MIT recruits heavily from its own and a few peer institutions: 55% of all URM faculty received their doctoral degrees from three key universities (MIT, Stanford, Harvard), with similar, though slightly lower numbers of White (50%) and Asian (43%) faculty from the same three key universities. The narrowness of the sources of URM faculty – essentially more than half with Ph.D. degrees from only three top-tier institutions – indicates a significant lost opportunity to gain faculty from other schools. The fact that these schools also do not necessarily have a large number of minority candidates in their collective graduate student pools can exacerbate a problem presented from narrow recruitment sources. An interesting extension of these findings, however, is that 36% of the minority faculty interviewed had a degree of some kind from MIT, showing that MIT has become adept at generating and recruiting its own faculty, which indicates potential opportunity to expand the pool among the MIT undergraduate and graduate student body.
- Hiring by School and department show patterns in which minorities are consistently not hired in certain departments. There are also positive hiring patterns that are apparent in certain other departments/disciplines. The cohort analysis included the examination of

incoming hiring of all faculty from 1991 to 2009, and determined the percentage of URM hires that took place during that period. There are definite and consistent trends among the different Schools and departments (see the figure below and “MIT Numbers,” back page). Over an extended time, there are some units within MIT that had consistently low or zero hiring patterns with respect to minority faculty, indicating areas where focus, added resources, support, and new strategies – for both pipeline and recruiting – could increase numbers. In these cases, a careful assessment of current search approaches may prove helpful. There are also units that have had relative success in URM hiring in past years, indicating the potential to examine and learn more about recruiting strategies within certain fields and disciplines.

be grouped, but not ranked, since ranking can often lead to exclusion of excellent candidates based on arguments of fit or need.

- MIT should build strong pipeline programs on campus, and network with peer institutions in a targeted and focused manner. Building strong two-way relationships with these peer institutions that involve directed recruiting will expand the pool of faculty candidates, bridged by specific one-to-one interactions with peer schools, including planned efforts for sharing information and shaping programs (on the School, department, or discipline level) between deans and department heads.
- The Institute must enforce the broadening of searches to a larger set of carefully selected institutions to increase the numbers of highly qualified URM appli-

% Underrepresented Minority (URM) Hires, 1991-2009
Ranked from Highest to Lowest Percentage URM Hires by School



Some Recruiting Recommendations

- Faculty search chairs must be trained and informed on issues that include hidden biases, broad search policies, and existing resources for identifying potential candidates.
- Where it is possible, faculty searches that involve hiring in small groups or clusters, as opposed to single hires, should be pursued. Final top candidates should

cants. Because these relationships are strongest on a discipline level, these interactions should be engaged by department heads and academic deans in a strategic fashion by determining top schools at which URM candidates reside. In many cases, there are excellent, highly ranked institutions, particularly in specific areas or fields, which also have larger numbers of URM PhD candi-

continued on next page

Report on the Race Initiative

Hammond, from preceding page

dates. MIT must form strong and substantive relationships with these institutions that will enable the sharing of information about potential URM candidates early in their graduate careers. Infrastructure should be provided to enable departments and units to build these relationships.

- Each department should track their top underrepresented minority undergraduate and graduate students, follow and support their academic careers and post-graduate successes, and keep information available that will enable or inform a search committee in future years.

Some Findings: Retention and Mentoring

- A significant number of minority vs. non-minority faculty leave before or at the AWOT case. *The first three to five years appear more critical* to the retention of URM faculty than the majority group. These numbers were statistically significant and provided a meaningful contrast in terms of expected outcomes for URM versus non-URM junior faculty at MIT. Once beyond the AWOT promotion, differences in URM versus non-URM tenure rates still indicate a difference (63% vs. 53%), though it is significantly lower and not statistically significant. The findings indicate that a disproportionately large number of minority faculty are lost within the early stages – generally the first three to five years that precede the first promotion. This phenomenon constitutes a significant loss in the number of URM faculty retained at MIT.

- **Mentoring across the Institute lacks consistency, including level of commitment and a defined role for mentors.** Interviews with non-minority and minority faculty indicated that poor or negative mentoring experiences are more frequent for URM than non-URM faculty, and they are particularly high among URM women. The interview

data indicated a broad range of mentoring experiences reported by URM faculty. Among the most positive experiences were those in which mentors were accountable at the departmental or higher levels for taking an active role in mentoring the junior faculty member. Formal programs with such accountability and personal investment from the faculty were most successful. In these

Mentoring across the Institute lacks consistency, including level of commitment and a defined role for mentors. Interviews with non-minority and minority faculty indicated that poor or negative mentoring experiences are more frequent for URM than non-URM faculty, and they are particularly high among URM women.

cases, mentors were reported to take on an advocacy role rather than a departmental evaluatory role, indicating a difference between the perceived roles of a formal mentor versus a tenure committee member. More negative experiences included those in which mentors were non-existent, or were not engaged or active, or in which the junior faculty received ill-conceived or overly-directive advice.

Some Mentoring Recommendations

- **Formal mentors should be assigned to all junior faculty hires as part of an Institute-wide policy on mentoring.** There is not a universal mentoring policy in place today for junior faculty at MIT, and there are large variations in mentoring efforts across Schools and departments.
 - a. It is recommended that junior faculty be assigned at least two mentors. Multiple mentors enable a balance/counterbalance in career guidance and provide the advantage of more than one perspective and greater opportunity for a good fit.
 - b. It is also recommended that one faculty member outside of the departmental unit (and in some cases outside of the School or the Institute) be assigned a

mentorship role; this external mentor can provide a broader range of advice, and may also have the ability to prod action outside of the department in difficult or strained internal situations.

- **The primary role of the mentor as an *informed advocate* independent of the evaluation process, rather than an evaluator, must be delineated and should be**

encouraged. Mentors should be independent advocates who can inform fellow senior faculty of the candidate's status and efforts, as well as act to help shape and develop the junior faculty member in a supportive fashion.

- **Mentors should be accountable to the department** in their role. Regular annual or biannual meetings with the mentee, followed by a presentation and update of the mentee's progress to the department or department head, should be minimal requirements of mentors. Mentors should be chosen so that they will be engaged/invested in both the process and the person.
- **Mentors should be trained/informed of their role and expectations** – formal training or informationals within departments or schools may be needed to disseminate the meaning of the mentor's role.
- **Mentees also should be trained or informed on what to expect from and how to use mentors.** Specific training and information on mentors and the promotion process in general can be included in the junior faculty introductory workshops now offered on teaching.
- **Annual departmental reviews should be implemented for each junior faculty,**

beginning in the first year. It is important for junior faculty to receive feedback and advice from their departments or units as early as possible. The review should be followed by verbal and/or written feedback from the department head and the assigned mentor(s). A follow-up meeting based on the feedback provided should be arranged with the mentee during the course of the following year.

- **All junior faculty should be introduced to the Faculty Personnel Record or other relevant device or form used to assemble the promotion package in the first year.** This is early enough to enable junior faculty to see benchmarks for tenure evaluations, to discuss and determine the relative importance of those benchmarks with mentors, and to enable mentors to impart rubrics for success.

Some Findings: Satisfaction and Climate

- Data from the survey indicate that **there is more dissatisfaction among tenured URM faculty compared to their White tenured counterparts** with Asian faculty in the middle. There also is more dissatisfaction among Asian and URM tenured faculty compared to their untenured counterparts. These trends are not statistically significant, but are supported by the interviews and by the discussions heard in the faculty forums. Ironically, this data is accompanied by the fact that **it is the URM non-tenured faculty, particularly the Black faculty, who are most likely to be highly satisfied with their lives at MIT (67% Black vs. 47% White).** It is difficult to separate cohort factors – such as changes over time in administrative practice or departmental climates at MIT – from differences in attitude that may occur over the course of a faculty career, as URM faculty may begin to face some of the challenges described by the senior URM faculty.
- MIT non-URM faculty view diversity as **less critical** to the Institute's core value of excellence. Based on responses from the Quality of Life survey to the question "I

feel a diversified faculty is important for MIT's academic excellence," URM faculty and women both indicate diversity to be a more critical component of MIT's core value of excellence than non-URM males. This difference in the level of valuation speaks to the climate to which minority faculty are recruited.

One of the greatest tensions associated with achieving a diverse faculty is the idea that by being more inclusive, one sacrifices excellence or dilutes quality. . . . The anticipation from some members of the community that the intentional inclusion or recruitment of a minority faculty member might, in some cases, represent a lowering of standards is one that can yield negative experiences for URM faculty even before their career has begun.

- **Discussion of race-related issues is avoided at MIT,** to the detriment of many URM faculty who may face but cannot confront such issues directly. Based on URM and non-URM faculty interviews, there is great awkwardness in openly addressing race and racial differences at MIT, leading to a sense of silence regarding race. URM faculty indicated this difficulty can lead to issues in communicating concerns from minority faculty regarding race, and can also impede the ability of faculty, in general, to move beyond unexpressed concerns or cultural misunderstandings. In other cases, for example, URM faculty may feel that speaking on diversity as a topic in any way can potentially "brand" them as someone who focuses only on this concern at the expense of other issues.
- Meritocracy is a concept that is key to the ideals at MIT. Although it is important to strive for this ideal, **there is tension created by the outward presumption that true meritocracy is already essentially achieved at MIT.** Such presumptions preempt the potential for hidden bias or preferential behavior, and do not acknowledge the use of relatively monolithic criteria of

excellence (which often works against those who are minorities by race, gender, or field).

- **There is tension at MIT around the concepts of inclusion vs. excellence.** One of the greatest tensions associated with achieving a diverse faculty is the idea that by being more inclusive, one sacrifices

excellence or dilutes quality. This concept and the tension generated by it was an underlying theme in both URM and non-URM interviews. The anticipation from some members of the community that the intentional inclusion or recruitment of a minority faculty member might, in some cases, represent a lowering of standards is one that can yield negative experiences for URM faculty even before their career has begun. On the other hand, this same tension is sometimes used as a reason for the lack of progress in increasing URM faculty numbers.

Some Recommendations: Climate

1. **MIT must present leadership from the top levels** to introduce, create, and maintain a climate of inclusion. Efforts should include:
 - a. The president and provost should initiate systematic efforts on the importance of diversity; motivation and the initiation of innovative processes to address diversity challenges should become a part of the primary message shared with the Institute faculty.

continued on next page

Report on the Race Initiative

Hammond, from preceding page

- b. Leadership training of new deans and department heads should be introduced, and should include a significant and relevant diversity component.
 - c. Implementation of a diverse faculty and student body as a part of the evaluation of success for Schools, departments, labs, and centers, and their leadership.
2. It is recommended that MIT harness its top and most highly respected scholars, scientists, and engineers to act as spokespeople on diversity issues. Key individuals respected for their academic achievements can be recruited as visible and influential allies in the effort to increase faculty diversity.
3. Active efforts are expected from department heads and deans to seek and recognize talent from faculty of color (at all ranks) within and beyond the university. Such efforts include speaking opportunities, named seminars, invitation of visiting faculty and scholars, selection of members to visiting committees, etc.

Structural Recommendations – Systematic Support, Recognition and Accountability

These over-arching recommendations are intended to increase the level of active engagement that the Institute invests in the increased diversity of the faculty, by addressing administrative organization of effort, from recruiting to reporting. Particular action is directed toward increasing the numbers of all underrepresented minority faculty, with special emphasis on the recruitment of U.S.-born and/or educated underrepresented minorities, though these measures should also lead to increased diversity of many different kinds within the faculty. As a launch point for a university that has accomplished much by setting strategic

goals for challenging endeavors, these measures include directed efforts to set meaningful goals and guidelines; to increase the level of short- and long-term strategic planning of our departments,

Minority hiring and retention should be critical issues in the selection of MIT administrative leadership. A clear plan to increase URM diversity, and, where possible, a track record and accountability in this area must be a necessary condition in consideration of others for appointment to department, lab, center, School, and administrative leadership roles.

labs, and centers around diversity efforts; to generate the needed ideas and infrastructure to support them; and to encourage sharing and discussion of practices among department heads and academic deans. Goals and efforts should reflect the academic pipeline for specific fields and should also include a comprehensive plan to address long-standing pipeline issues as well as short-term efforts in recruiting.

- Each departmental unit, lab, and center should work with its academic dean and the Associate Provost for Faculty Equity to set realistic but meaningful specific goals with timelines with respect to recruitment efforts of URM faculty. These goals should include URM faculty interview and recruitment; planning for future faculty recruitment through outreach on the graduate, undergraduate, and lower levels; and efforts to increase the graduate and postdoctoral pool, especially for fields that are highly challenged with regard to pipeline. Specific strategies and efforts should be reassessed, and new strategies put into place if long-term increase in diversity is not achieved.
- Resources and support should be provided to all units by the administration and School deans to assist in the recruit-

ment and/or retention of faculty from URM groups.

- Institutional measures of success and strategic plans for future diversity

efforts for each of the Schools, set by the president, the provost, and academic deans, should be specified and addressed on an annual or biannual basis in a written report to the president.

- Minority hiring and retention should be critical issues in the selection of MIT administrative leadership. A clear plan to increase URM diversity, and, where possible, a track record and accountability in this area must be a necessary condition in consideration of others for appointment to department, lab, center, School, and administrative leadership roles.
- Department heads and deans should catalog specific efforts and progress toward the recruiting and retention of diverse faculty in a formal and uniform manner, with such efforts shared annually at a Deans Council Meeting. A great deal of information can be gained by sharing and comparing strategies and goals. This meeting should specifically address the sharing of lessons learned in the recruitment of underrepresented minority candidates; emphasis should be placed on the progress made and efforts put forth by each department in achieving goals. ■

Paula Hammond is a Professor of Chemical Engineering; Chair of the Initiative on Faculty Race and Diversity (hammond@mit.edu).

The Initiative on Faculty Race and Diversity: A Personal View

Lotte Bailyn

THE FACULTY NEWSLETTER managing editor has asked me to write a brief retrospective on the experience of leading the research effort for the Race Initiative Report.

I am no longer sure what my expectations were when I joined the Initiative committee, but having long dealt with gender issues I thought I understood something about the experiences of a “minority” group in a predominantly majority environment. But this was different. In the gender studies I was part of the group that was the object of study; I was both seen as and felt knowledgeable and competent. Here, in contrast, I was in the “out” group, though I was working with people who belonged to the group being studied. This position led to some complex and uncomfortable situations for me, as well as to increased insight into the dynamics across racial lines.

I also learned, more than I had anticipated, in what ways the experiences of my minority colleagues differed from my own. If you look at p. 109 of the Report – Table D.1 – you discover that 42% of MIT’s Black male faculty, compared to almost no one else, report having been assumed to be a trespasser by someone at MIT during interactions on this campus. How is that possible, when we know that MIT people are basically well intentioned? One minority faculty member expressed well this disjuncture between good intentions and bad outcomes. “I’ve never experienced a place as good as MIT but there can still be a problem.”

Sections C and D of Part II of the Report detail this problem by providing the findings from all parts of the extensive

research effort: from an all-MIT quality of life survey (e.g., Table D.1); from interviews with the minority faculty and a comparison group of White and Asian faculty (e.g., the quote cited above); and from institutional data that allowed a comparative analysis of career trajectories. The analysis of these multiple data sources highlighted

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different aspects of the problem, but together they form a picture of the lives of minority, particularly Black faculty that differs significantly from the experience of White faculty in ways that I knew about but hadn’t properly appreciated. In dealing with issues of race and diversity, minority faculty are asked to do more than their non-minority peers. On issues unrelated to race and diversity, in contrast, they may be ignored and undervalued. Superstars do just fine – but not everyone, even at MIT, is a superstar. And expectations for minority faculty who are not in that small category are different from those of their non-minority counterparts. As reported by one department officer: “People have a lowered expectation of minority faculty when they walk in the door, something not spoken or even perceived.”

Here are some examples from the richness of detail provided by the interviews. One interviewee tells of keeping books on office shelves so as to be seen not as an “affirmative-action kid” but as “a real scholar.” Another recalls being told what to do in a faculty meeting – “as if I don’t know...that’s what it’s like being Black,

day-to-day.” On the whole, especially if male, White faculty are automatically assumed to belong and to know what to do and how to do it. And that’s what I mean by not appreciating White privilege. I discovered that I didn’t *really* know – though of course theoretically I knew – how much automatic privilege accrues to one just because one is White. For White men, who reside in multiple advantaged groups, that understanding must be even more difficult.

I also didn’t fully realize how much such understanding can be undermined by emphasis on objectivity and meritocracy, which is particularly strong in an institution centered on science. An emphasis only, or primarily, on the products of research, ignores the human transactions that underlie and support its

continued on next page

The Race Initiative: A Personal View

Bailyn, from preceding page

production. As one perceptive interviewee explained, “There are dynamics within labs. There’s funding. There’s all of these kinds of things that inform what happens. But somehow that all gets pushed to the side...I think in other places there’s just more cognizance of a more complex world.” The belief that all rewards are based strictly on merit – defined by explicit, objective, uncontested criteria – closes the mind to the relevance of the organizational, cognitive, and social interactions that together constitute scholarship, as well as to the biases

and stereotyped expectations that infect those interactions.

Section D, entitled “MIT: A Meritocratic Institution of Excellence and Inclusion?” is especially telling. It will not be surprising to our minority colleagues, but might be to faculty from majority groups. Race is a significant aspect of the lives of many of the minority faculty, even though most of us do not acknowledge this, but rather assume that because we are of good will, expectations for everyone are equally high and each lives in the same supportive environment. What we don’t realize is how privileged most of us are because we do not face such everyday difficulties as having someone ask what you

are doing here when you walk down the corridor and assuming you are not a faculty member. It is for this reason that throughout the Report we have capitalized “White” to indicate that it too is a racial/ethnic category, though one that can take much for granted.

The recommendations in Part I of this Report will go a long way, I hope, toward alleviating some of these disparities. But their implementation will be easier if we all understand the racial dynamics detailed in the research findings of Part II. ■

Lotte Bailyn is a Professor of Management; Member and head of the research effort of the Initiative on Faculty Race and Diversity (lbailyn@mit.edu).

The Initiative on Faculty Race and Diversity: A Personal View

Paula Hammond

WHEN ASKED TO PROVIDE my reflections on the work of the Race Initiative for the *Faculty Newsletter*, one of the first things that came to mind were my colleagues. The minority faculty at MIT encompass a very broad and diverse group of scholars, practicing in a multitude of fields: from music and dance to physics and electrical engineering. I have been impressed often by the phenomenal accomplishments of many of our minority faculty colleagues. They represent a wide range of experiences as faculty at MIT, and it is a significant task to convey

MIT initiated this effort because it, like many other colleges and institutions of higher learning in our nation, has faced very low numbers and only small growth in minority faculty, particularly in science and engineering.

both the specific challenges and sometime shared frustrations of the minority faculty, as well as their positive experiences, reflections, and hopes.

To begin to address diversity of race at MIT, it was essential that we got at the core of minority faculty experiences – to learn

what MIT has done right or wrong – to essentially learn from our own history, and I greatly appreciate the large number of faculty who contributed to this effort.

On setting about this task, I thought about my faculty colleagues of all race and ethnic backgrounds, both those in leader-

ship positions and the many who lead in more subtle and less visible ways by putting careful thought into the issues of how to increase diversity among our faculty, as well as in our graduate school and undergraduate program. Ultimately, it is the entire MIT community that benefits from thoughtful and open self-reflection on how the Institute is faring with regard to diversity, and how we can move forward from here.

MIT initiated this effort because it, like many other colleges and institutions of higher learning in our nation, has faced very low numbers and only small growth in minority faculty, particularly in science and engineering. We as a faculty body voted in 2004 to address these issues and increase the numbers. To accomplish this, MIT decided to approach the problem by understanding not only recruitment and retention issues, but aspects of the entire minority faculty experience at the Institute. In doing such an in-depth study, it was possible to find opportunities and to determine specific challenges and their potential solutions. As was the case in addressing issues around gender in the sciences and engineering, now MIT has the opportunity to take a leadership role in addressing faculty diversity issues, with the hope of meaningful and long-standing progress.

In addressing these issues, our committee is emphasizing strategic action rather than simply numbers. We are asking departments to examine their search practices, to look for and track promising talent (starting even from the undergraduate years) and, most importantly, to take an active role and invest in the academic pipeline, with focused programs or efforts that increase the numbers of highly competitive minority candidates in our fields. Retention is equally critical, and we are also asking for needed attention with regard to the career paths of current minority faculty, particularly, but not exclusively, in the early years. An interesting aspect of our recommendations is that many of them will strengthen the MIT environment for all faculty members, by providing: a stronger, more

defined mentoring policy and clarity around promotion processes that will benefit all junior faculty; broader and more extensive search processes that can expand on MIT's breadth and depth; and greater engagement in the academic pipeline and the opportunity to guide young scholars toward academia.

Although there are many findings outlined in the report that I believe are telling and significant, there is one that I wish to bring to the faculty that we must address and discuss in order to make progress. There is a notion that by actively seeking a more diverse faculty, we risk decreasing its quality. This misconception is one that has consistently hampered our ability to move ahead collectively; we need to embrace the idea that diversity and excellence can coexist, and that MIT is the place where this can be demonstrated.

It is clear from engaging in this work that there are some unique differences in the way MIT is experienced generally by minority faculty; a number of these differences presented in the findings include key areas such as mentoring. As a member of the minority faculty myself, I can attest to the fact that I have had many positive and rewarding experiences at MIT, and I feel very fortunate to be able to have the perspective of one who has had significant support. That said, I think we can look at the findings of the research report and get a greater understanding of some of the complexities involved in life at MIT when one is a member of an underrepresented group, regardless of their general experience or level of support. These complexities include a level of frustration regarding climate, a sense of silence and awkwardness on issues of race in general, and perceptions that issues around increased diversity with respect to minorities are either thought to be relatively less important, or considered impossible to address (and thus ignored).

Although there are many findings outlined in the report that I believe are telling and significant, there is one that I wish to

bring to the faculty that we must address and discuss in order to make progress. There is a notion that by actively seeking a more diverse faculty, we risk decreasing its quality. This misconception is one that has consistently hampered our ability to move ahead collectively; we need to embrace the idea that diversity and excel-

lence can coexist, and that MIT is the place where this can be demonstrated.

I remain convinced that MIT is a great place with regard to its general good will and its ability to implement change on some of the most difficult problems. We saw many signs of this ability and genuine spirit among our Schools, departments, and individual faculty members with regard to ongoing programs and efforts. By discussing the different approaches that some of our Schools and units have taken, we learned a great deal about opportunities to address some of the issues highlighted in the report. We also observed the development of new ideas and efforts generated even during the timeframe of our two-and-a-half-year study, and are greatly encouraged by the positive efforts of our community. For these reasons, I look forward to the next stage – implementation of the recommendations – and the challenge we all face as fellow faculty on this mission-critical issue for the Institute. ■

Paula Hammond is a Professor of Chemical Engineering; Chair of the Initiative on Faculty Race and Diversity (hammond@mit.edu).

Counting Faculty and Students

Lydia Snover

EVERY ACADEMIC YEAR, MIT counts the number of individuals holding appointments on October 31. This becomes the official MIT employee count. Likewise, the official count of students is based upon the number of individuals registered as of the Friday of the fifth week of the fall term. We use these census counts when evaluating the growth or decline of these populations from year to year.

MIT, like all universities, follows the federal guidelines for collecting and reporting students and employees by ethnicity and race. For purposes of reporting, underrepresented minorities (URM) includes individuals who self-identify as Black/African American, Hispanic/Chicano, American Indian/Alaskan Native and, beginning with the 2009-2010 Academic Year, Native Hawaiian/Other Pacific Islander. The federal government also considers Asian as a minority race, but MIT does not consider it to be underrepresented. In the case of students, to be considered a member of a minority group, individuals must also be citizens or permanent residents of the United States. Individuals who are members of minority groups, but who are at MIT studying on student or other temporary visas, are counted as international.

Charts 1-3 display the 10-year (Academic Years 2001-2010) trends for underrepresented minorities at MIT. The Undergraduate and Graduate Student charts display underrepresented minorities as a percent of the total student population and as a percent of the total

number of citizens and permanent residents. The faculty chart (next page) displays the number of underrepresented minorities as a percent of the total faculty.

Chart 4 provides the trends for the number of women as a percent of the undergraduate and graduate student bodies and as a percentage of the total faculty. As with underrepresented minorities, all counts are based upon the fall fifth week count for students and the October 31 census for faculty.

Charts 5 and 6 illustrate the net growth in the faculty by gender and URM since the 2004 faculty resolution requiring increased hiring of URM faculty. In AY2004 the faculty was comprised of 171 women and 804 men and in AY2010, there were 213 (+42) women and 812 (+8) men.

In terms of racial and ethnic diversity, in AY2004, there were 44 underrepresented minorities on the faculty and 931 Asians and whites. In AY2010, the faculty included 66 underrepresented minorities (+22) and 959 Asians and whites (+28).

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Chart 1
URM Undergraduate Students

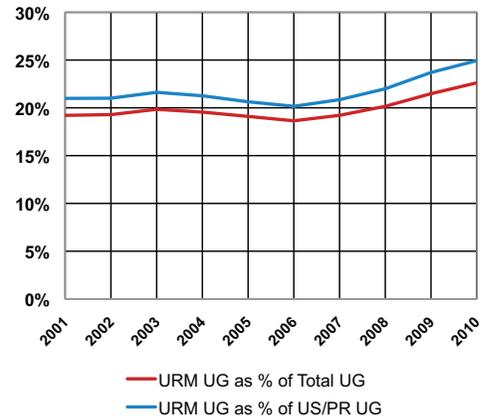


Chart 2
URM Graduate Students

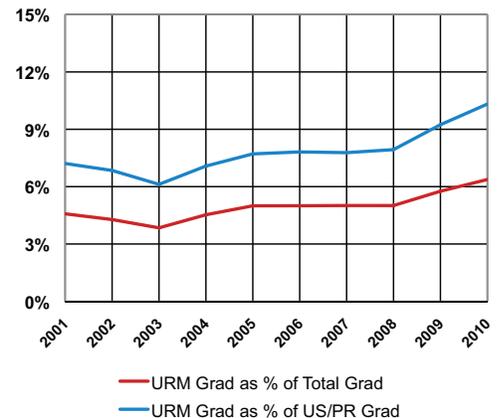


Chart 3
URM Faculty % of total

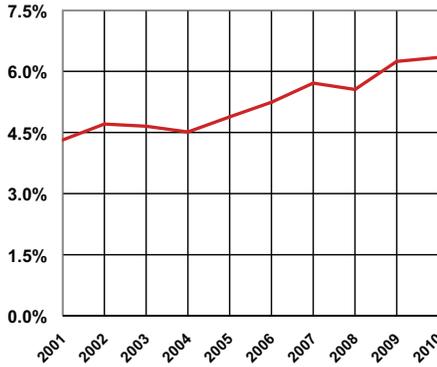


Chart 4
Women

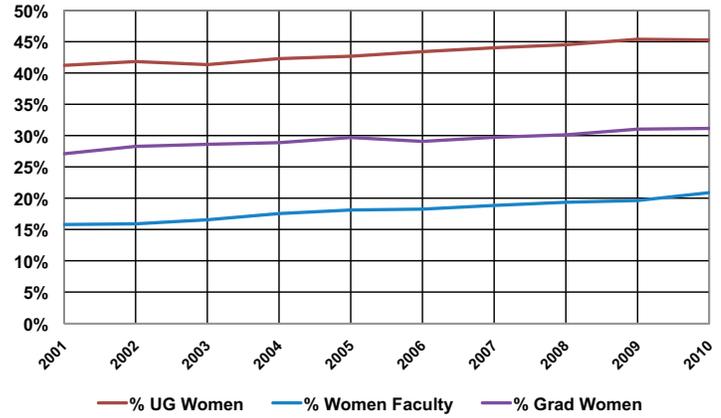


Chart 5

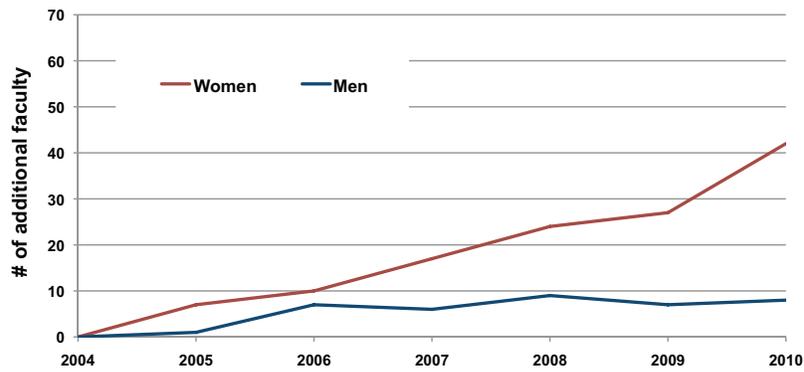
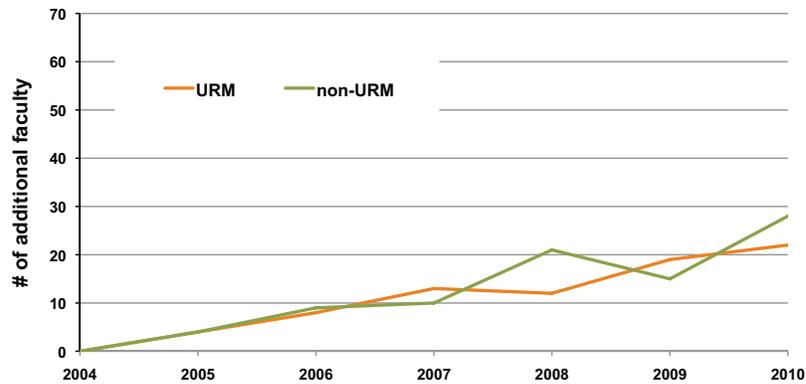


Chart 6



Source all charts: Office of the Provost/Institutional Research
URM: Underrepresented Minorities
US/PR: U.S. Citizens and Permanent Residents

Reflections on MIT's Layoff Process

Lotte Bailyn
Robert McKersie

IN AN AUGUST 12 LETTER, Tom Kochan, chair of the MIT faculty, asked Professors Lotte Bailyn and Robert McKersie to work with Vice President for Human Resources Alison Alden to review the processes followed in the full set of layoff and redeployment experiences this past year. The request was made because some of these layoffs have caused general concern for faculty involved with the employees that had been let go.

To fulfill this assignment, we interviewed five Human Resource Officers (HROs) about the process in general and specifically about the S³ layoff; met with senior administrators in one school to understand their interface with HR; met with faculty who have served on the Committee on Academic Performance (CAP); reviewed personnel policies and the task force report with respect to layoffs; and met frequently with Alison Alden.

What we found was that the framework in place is generally sound, though some fine-tuning is appropriate, as will be outlined in our recommendations. In general, consistent with the culture of the Institute, layoffs have been implemented in a very decentralized manner. With some specific exceptions, the layoff process has proceeded smoothly. During the first year of the budget reduction program slightly over 100 individuals have been given layoff notices. Approximately 30 individuals have found employment either at MIT or elsewhere.

We also heard of some innovative arrangements designed to prevent layoffs, such as furloughs and reduced time. These were all locally determined and we

believe could be more actively supported. Layoffs should be the very last resort to meet the current economic crisis.

Our sense of the specific layoff that created the most concern, as well as others we have heard of, is that the communications aspects of the process as laid out by the guidelines were not fully followed. For example, the guidelines provide the employee with some say over the communication of what has happened – this did not occur. Also, there are clearly issues about the decision of whether or not an employee returns to his or her office after receiving the news. Finally, there are some concerns about the particular people involved in giving the information to the employee.

Recommendations

These recommendations are based on our investigation of a few specific cases as well as the layoff process more generally. They can be summarized under several headings: the process before reaching a conclusion about the need for layoffs, the notification event when layoffs are necessary, and proactive steps to help those on layoff regain employment.

Before. In responding to budget realities, units across the Institute have adopted a variety of cost reduction measures that have kept the number of layoffs low. To the extent possible layoffs should be minimized and units should be urged to consider other steps for meeting cost targets. HR, in turn, if a layoff is recommended, should do some specific fact-finding before giving its approval. Specifically:

- To the extent possible all members of the organization should be engaged in fashioning solutions to achieve budget constraints without involving layoffs.
- Publicity could be given to examples where departments have shown creativity in developing options that reduce employment costs without layoffs.
- When it appears that layoffs will be necessary, careful monitoring by HR is required to assure that the plan is sound. In particular, HR needs to check that a layoff does not reflect possible retribution against an employee because of previous actions or tensions within the unit involved.
- It is also important that before a plan involving layoffs (and any associated reorganization) is finalized that faculty who are stakeholders are involved in discussing the plan.

During. Employees should be given as much control as possible about how to handle the communication about their layoff and the access they have to their offices. Specifically:

- Given the seriousness of a layoff event for the individual, careful thought should be given to who conducts the meeting and who else is present.
- During the meeting the individual should participate in shaping a plan for communicating news of the layoff to colleagues, and in most cases, the individual should be encouraged to share this information. "A layoff is not something to be embarrassed about."
- The decision as to whether the person returns to his or her office should ideally

be made by the employee, but, at a minimum, the employee should be consulted. This decision should not be pre-determined.

- Employees should be engaged in discussions of how to allocate the time involved in the period of working notice between continuing to perform duties at the Institute versus time spent on job search activities. In some cases, the arrangement might provide for payment of the whole or part of the salary involved in one lump sum (using the same formula as currently exists), while continuing the benefits for the notice period.
- Employees should be told that their resumes will be circulated among departments that are hiring, though they are given the opportunity to opt out of this if they so prefer.

After. Employees should be actively followed after the layoff notice has been given. The Institute should not depend only on their initiative to seek help and advice. Specifically:

- To the extent feasible it would be advisable to have a case manager assigned to each person on layoff. This would require recruiting HR staffs across MIT. In any event the point is to help the individual as much as possible.
- An ideal way to show MIT's commitment to help those on layoff is to facilitate their being hired into vacancies as they develop. This could involve retraining as well as an active referral program (by HR) and some type of signoff by administrators filling positions confirming that they have canvassed the layoff pool.

Finally, there needs to be transparency about the whole process. The Institute should be forthcoming about the numbers who are affected by layoffs as well as by terminations, and should also provide data concerning re-employment.

We also recommend that *MIT Policies & Procedures* be reviewed with an eye to emphasizing the importance of input by affected employees to decisions concerning communications to fellow employees and plans for the allocation of time during the working notice period. ■

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Robert McKersie is a Professor Emeritus, Sloan School of Management (rmckersi@mit.edu).

HR and MIT's Layoff Process

Alison Alden

I WORKED CLOSELY WITH Professors Bailyn and McKersie on their independent report and appreciated the opportunity to collaborate with them on this review of MIT's layoff process. Like any process, it is important to self reflect and evaluate what is working well, and just as importantly, determine to which areas we should pay particular attention.

Human Resources (HR) strongly support their suggestions, particularly related to redeploying employees who have been laid off. My office is being used as a central clearing-house to match these employees with positions both in and outside the Institute. Last year, we were able to place 30% of the employees who were laid off and hope to improve that

rate this spring, when we plan to redouble our efforts in this regard.

Last year, we were able to place 30% of the employees who were laid off and hope to improve that rate this spring

Professors Bailyn, McKersie, and I all agree that layoffs are never easy, regardless of the environment in which you work. But I believe our approach reflects the MIT way – characterized by professionalism and care – with the focus on the laid-off employee as well as their colleagues who feel the impact.

In the past several months, I have emphasized on campus how important it

is to consider alternatives to layoffs. Managers have been very creative, using

attrition and other means to achieve their savings targets for the next fiscal year, using layoffs as a last resort. HR stands ready to discuss a range of alternatives which may be useful to consider. With that said, my staff and I are ready to provide support on all fronts to make the process worthy of MIT. ■

Alison Alden is Vice President for Human Resources (aalden@mit.edu).

The Demand for MIT Graduates

Daniel Hastings
Steven Lerman
Melanie Parker

A Perspective on Student Post-Graduation Plans and How the MIT Experience Shapes Their Options and Choices

MIT'S CLASS OF 2009 graduated during one of the worst job markets in recent history. Recent college graduates across the nation struggled in this economic climate, as evidenced by the fact that only 20% of 2009 college graduates had full-time employment (compared to 51% for the same period in 2007), rising to 60% within six months of graduation (National Association of Colleges and Employers). Companies recruiting on-campus fell by 40% or more, even at MIT.

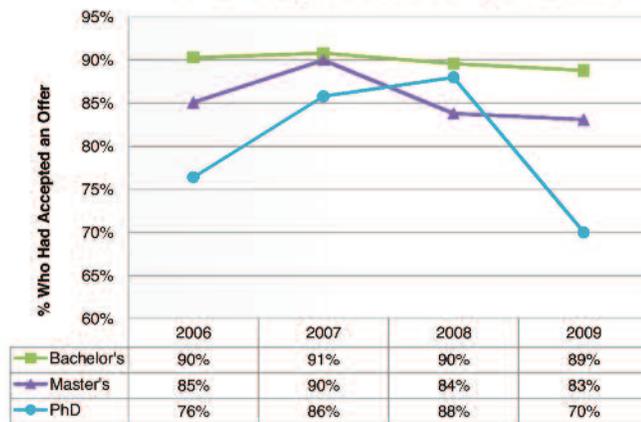
Despite this bleak backdrop, the MIT Class of 2009 bucked the trends by faring better than the national average in nearly all employment measures. Informal discussions among our peer institutions indicate that our graduates also fared far better than their peers at other Ivy+ schools. Although MIT's recent graduates may have done better in the job market than most of their peers, they definitely experienced the impact of the recession with a decline in the number who found jobs and lower salaries for some degree levels. The most significant declines were among Master's and Doctoral degree recipients, but the lack of comprehensive national data for Master's and Doctoral graduates makes it difficult to determine how their outcomes compare with their national peers.

How do we account for this performance and how has it changed over time? Employers of our new graduates report that they highly value the unique combination of strengths that MIT graduates possess, in particular, an unusual level of creativity combined with analytical and problem-solving skills. We also know that the technology sectors did not experience as much of a hiring downturn as other

areas, which certainly plays to our strengths. We will explore this further by

pared down the number of the schools at which they recruit.

Figure 1
% of Graduating MIT Students Who Had Accepted a Job Offer by Graduation



reviewing responses from the 2009 MIT Graduating Student Survey as well as the new Doctoral Student Exit Survey and looking at trend data for the last three to five years.

In looking ahead, national data indicate that hiring will continue to slide, with 39.7% of employers reporting that they expect to decrease their college hiring in 2010. However, the national data does provide some bright spots for MIT, with demand for engineering and information sciences/systems majors topping the lists for all degree levels. Additionally, the Global Education and Career Development Center (GECDC) has seen an increase in on-campus recruiting over last year, with 6.5% more interviews conducted over fall 2008. Finally, numerous employers have indicated that they have continued to view MIT as a top-recruiting target, even as they've

Student experiences while at MIT play a significant role in their success. Nationally, employers report that in deciding between two equally qualified candidates, they will select the one who has held a leadership position. The same report indicates that internship, extracurricular, and volunteer activities can be a factor and, for the first time, GECDC had companies specifically targeting and hiring students because of participation in a study abroad experience.

SB Graduates Fared Well in the Shrinking Job Market

Despite the challenging job market in 2009, 89% of MIT SB graduates who were pursuing work had accepted a job offer by the time of graduation. This was enormously higher than the national placement rate of 20% for all 2009 graduates

Figure 2
Average Starting Salary of Graduating MIT Student

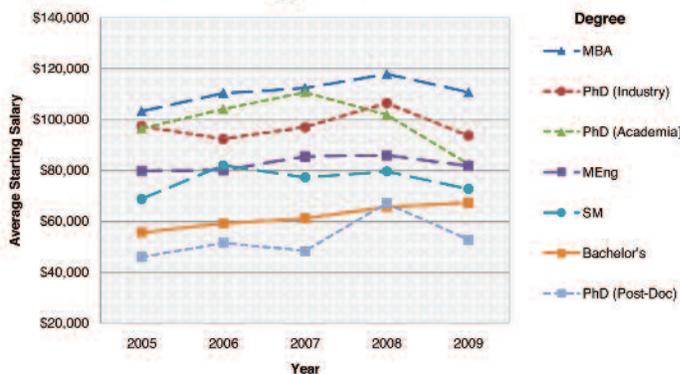
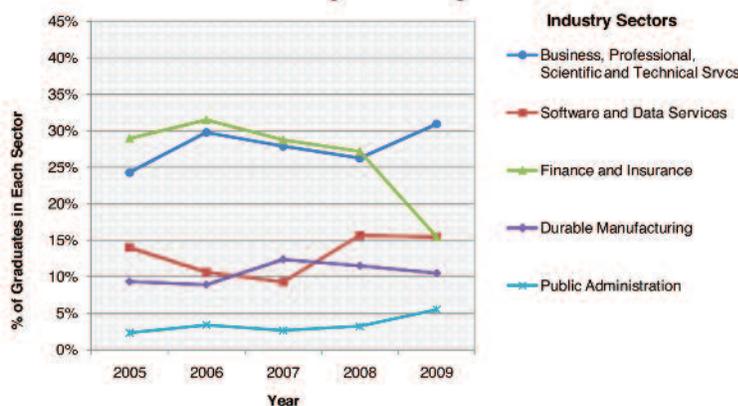


Figure 3
Top 5 Industry Sectors that Hired MIT Graduates Receiving an SB Degree



and was only 1% lower than the previous year [see Figure 1]. At the same time, while MIT Master's and PhD graduates saw a decrease in starting salaries, our SB graduates saw a 2.5% increase to \$67,270 which continues a five-year upward trend [see Figure 2]. This was significantly higher than the national average for all disciplines, \$48,633, as well as for engineering graduates, \$59,670.

Finance was replaced by management consulting and technology as the top hiring industry sectors of SB graduates [see Figure 3]. In 2007, Morgan Stanley, Lehman Brothers, JP Morgan, and Goldman Sachs were among the top 10 employers of MIT graduates. Only Morgan Stanley remained in the top 10 by 2009, and was part of a diverse mix of top employers of MIT graduates, including MIT, McKinsey & Co., Microsoft,

Exxon Mobil, Booz Allen Hamilton, Merck, Oracle, and Intel. Lincoln Labs and various other campus laboratories accounted for most of the hires within MIT.

The decrease in on-campus recruiting by employers resulted in fewer job applications and fewer interviews for SB graduates than in previous years. However, on-campus recruiting continued as the primary source of employment. At the same time, it is clear that MIT students were resourceful in this challenging job market. They continued to use networking as a key source of employment and relied more heavily on developing opportunities through internships, career fairs, and contacts acquired through the GECDC. The ultimate outcome was an increase in the average number of offers.

Learning Outside the Classroom Key to Career Preparation

In the 2008 Senior Survey, 83% of students indicated that MIT prepared them generally well or very well for the job market. While academic experiences provide the cornerstone in developing the quantitative and analytical skills of MIT graduates that are highly sought by employers, learning outside the classroom helps students experience diverse environments and perspectives, broaden their communications skills, and develop a better sense of themselves and possible career trajectories. Communication skills are perennially ranked as the most important candidate skill for new graduate hires.

An internship can be a very impactful learning experience for students, as they are working to solve real-world challenges in industry and academia. Undergraduate participation in internships has steadily grown in recent years. In 2009, 78% of SB graduates had participated in an internship, up from 72% in 2006, 75% in 2007, and 77% in 2008. The primary sources of internships include UPOP, externships, career fairs, departmental internships, and MISTI. These hands-on experiences expose students to different ways of thinking and solving problems. Students broaden their technical skills and develop business skills while developing a network of valuable contacts.

Students who choose to participate in an internship abroad not only learn through work experience, but also gain critical global competencies that are valued by employers. Through internships, research, public service, and study abroad, more and more students are participating in an educational experience abroad. In 2009, 30% of SB graduates indicated they had a global educational experience, which is up sharply from 24% in 2008.

MIT is working to make a global experience an essential part of an MIT education. One key aspect of this sustained effort has been to provide more global educational opportunities for students through the creation of the Global

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Demand for MIT Graduates

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Education Office and the expansion of key programs such as International Research Opportunities Program (IROP), D-Lab, MISTI, and public service abroad. While increasing the number of opportunities, MIT is also working to eliminate the barriers which have limited student participation. For example, the financial aid budget is now adjusted upwards for students studying abroad in locations where the cost of living is higher than at MIT. Also, students who lived on campus prior to an Institute-approved program abroad are now guaranteed on-campus housing upon their return. Finally, some initial discussions with departments are underway relative to transfer credit from

where 7% are attending. Of the students pursuing graduate school, 69 SB graduates applied to medical school, representing an increase of 15% over 2008. This cohort had the highest acceptance rate in recent history, with 94% accepted into medical school, a jump of 8% over 2008. The national acceptance rate was 46% for all medical school applicants, regardless of degree of level.

serving our students well. The demand clearly indicates that the complementary experiences outside the classroom are critical to this global market acceptance.

In their roles as UROP supervisors and academic advisors, faculty can have a major impact on a student's decision to attend graduate school as well as the graduate school selection process. 68% of SB graduates going to graduate school indicated that faculty had provided assistance in their search for a graduate program; 53% had received assistance specifically from their faculty advisor. At the same time, there is also a direct correlation between UROP participation and graduate school. Historically, 51% of students with UROP experience pursue graduate school while only 40% without UROP experience do so. An impressive 86% of 2009 SB graduates completed a UROP.

MIT can be proud of this and we will continue to offer and improve this excellent education.

More SB Graduates Go to Graduate School

While job placement remained strong in 2009, there was an increase in the number of SB graduates pursuing graduate school, specifically Master's programs. This may be a temporary reflection of the state of the economy in which students are putting off entering the job market [see Figure 4]. Of the SB graduates who went on to graduate school, 36% are pursuing a PhD, 22% MEng, 20% MS, and 14% MD. Top graduate schools attended by SB graduates included MIT, Stanford, Harvard, UC Berkeley, Cal Tech, and UC San Diego. MIT continues to dominate as the top choice for graduate school. 66% of SB graduates pursuing graduate school applied to MIT and 43% are now attending MIT. Stanford is the second choice,

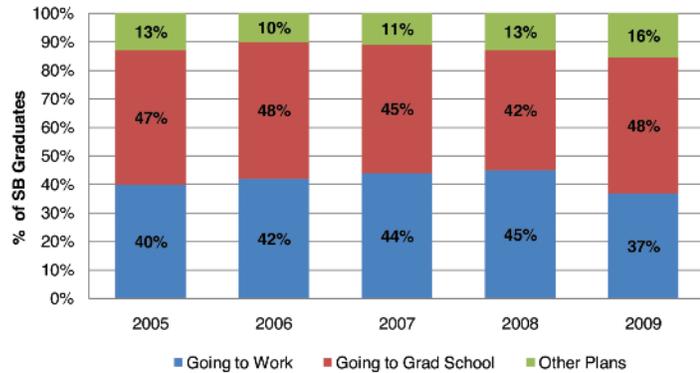
Top graduate schools attended by SB graduates included MIT, Stanford, Harvard, UC Berkeley, Cal Tech, and UC San Diego. MIT continues to dominate as the top choice for graduate school. 67% of SB graduates pursuing graduate school applied to MIT and 43% are now attending MIT. Stanford is the second choice, where 7% are attending.

foreign universities and course pathways that could guide students in preparation for study abroad.

Through learning opportunities outside the classroom, students develop relational and collaborative abilities which are key to leadership development. Employers are interested in students who have demonstrated the ability to lead and collaborate. In 2009, 71% of SB graduates indicated that they participated in leadership activities, up significantly from 64% the previous year. MIT continues to broaden the portfolio of opportunities for formal leadership training. For example, the recently initiated Gordon-MIT Engineering Leadership Program focuses on developing next-generation technical leaders who are able to understand and address significant engineering problems in real-world situations.

These trends suggest that the rigorous, technically grounded education at MIT is

Figure 4
Post-Graduation Plans of MIT Graduates Receiving an SB Degree



Master's Graduates Accepted Lower Salary Offers

For 2009 Master's graduates who were pursuing work, the 83% job placement rate was down by only 1% from the previous year [see Figure 1]. While they were successful in finding jobs, MBA, MEng, and SM graduates experienced the first

decrease in starting salaries in five years. The average for MBAs was \$110,713, down 6.5% from the previous year, the average for MEng graduates was \$81,900, down 4.8%, and the average for SM graduates was \$73,966, down 7.6% [see Figure 2].

While management consulting, scientific services, and technology remained as the top hiring industry sectors of SM and MEng graduates, fewer graduates were hired than in past years [see Figure 5]. Similarly for MBAs, management consulting, scientific services, and finance continued to hire the most graduates, but at a decreased level [see Figure 6]. Alternately, more Master's graduates went into public administration, manufacturing, transportation, and a multitude of diverse sectors that did not traditionally hire at MIT. The shift into these industries, which do not typically have high entry-level salaries, could explain the decrease in starting salaries. Top employers included Apple, Bain, Cisco, McKinsey & Co., Microsoft, U.S. Air Force, Intel, Google, and Fidelity Investments.

As sources of prospective employment became scarcer, Master's graduates faced a more competitive job search than in previous years, resulting in students applying to more jobs than ever before. The average number of applications went from nine in 2008 to 13 in 2009. Career fairs, applying directly to employers, and departmental contacts were less fruitful as job sources. Instead, more applied to and found jobs through on-campus recruiting. There may have been fewer employers on campus, but 42% of SM graduates were able to find jobs in this way, up from 38% the previous year.

Internships also became a more significant source of jobs; 20% accepted offers from their internship employers which was a dramatic jump from 15% in 2008. Part of this could be attributed to the significant increase in the number of Master's graduates who participated in an internship, 63% in 2009, up from 51% in 2008. Similar to undergraduates, Master's students are recognizing that internships provide a valuable vehicle for personal, intellectual, and career development.

Most relied on their department, GECDC's on-campus recruiting, and the Leaders for Global Operations programs as their internship source.

As future global leaders, more Master's graduates included a global educational experience during their tenure at MIT.

Participation has steadily increased from 30% in 2006 to 41% in 2009. Sloan's Global Entrepreneurship Lab (G-Lab) provided the greatest number of opportunities by giving over 100 students a consulting and internship experience

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Figure 5
Top 5 Industry Sectors that Hired MIT Graduates Receiving a Master's Degree (non-MBA)

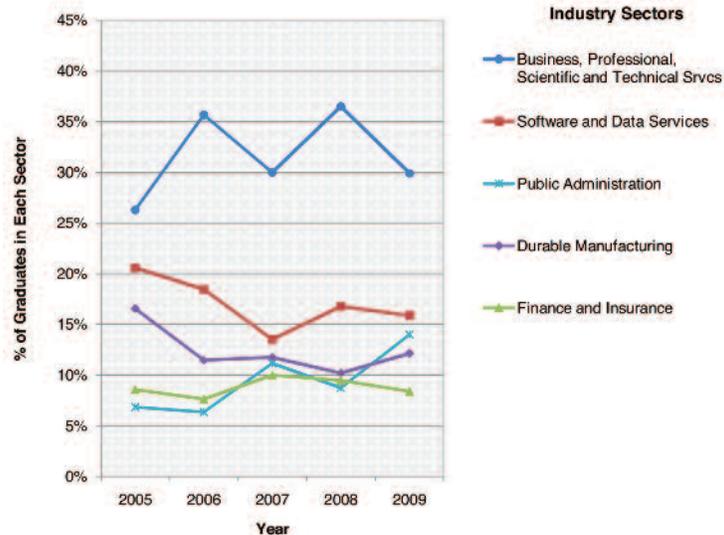
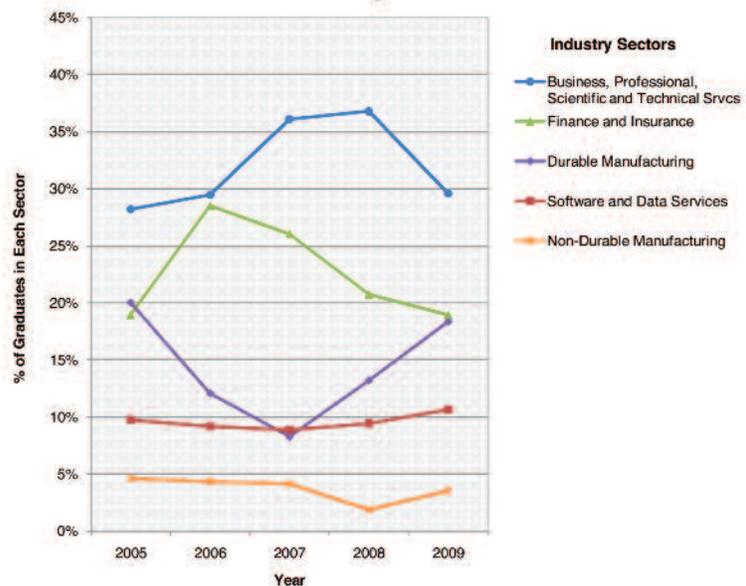


Figure 6
Top 5 Industry Sectors that Hired MIT Graduates Receiving an MBA



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abroad. Beyond G-Lab, Master's graduates primarily sought out international internships and international development projects.

Fewer Master's Graduates Immediately Pursue Graduate School

Unlike undergraduates, the number of Master's graduates pursuing additional graduate studies has steadily declined over the past five years, from 27% in 2005 to 13% in 2009 [see Figure 7]. Top graduate school destinations for Master's graduates included MIT, Harvard, Princeton, and Stanford, with MIT by far the top choice. 82% of Master's graduates pursuing graduate school applied to MIT and 64% are now attending.

The trends outlined here show that a Master's degree is still valuable even if the market value, measured by starting salaries, has dropped in the last year. The data also show the growing value of internships as part of the Master's experience. We will continue to evolve our programs in light of these needs.

PhD Graduates Felt the Pain of the Economic Downturn

A soft academic job market and the overall decline of the job market had a major impact on the ability of PhD graduates to find employment. On average, PhD graduates had fewer interviews than last year, four versus six, and the average number of offers declined from three to two. Only 70% had accepted a job by graduation, a dramatic decrease from 88% in 2008 [see Figure 1]. The effect on salaries was no less dramatic. Average starting salaries for PhDs entering a post-doctoral position were down 21% from the previous year to \$52,737; for PhDs entering academia, salaries were down 19% to \$82,422; and for PhDs entering industry, salaries were down 12% to \$93,595 [see Figure 2].

While overall hiring was down, academia regained the position of top hiring

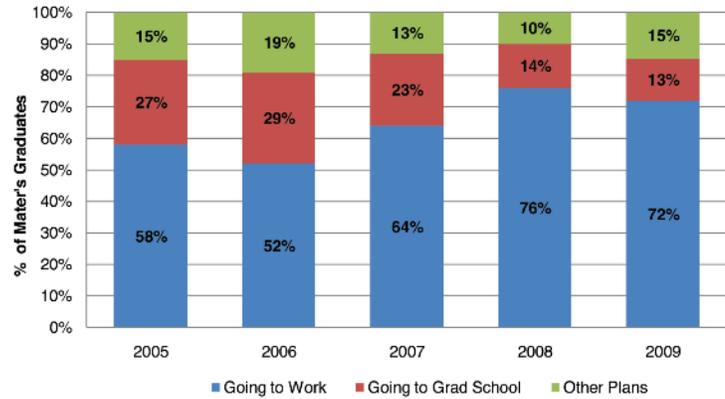
industry sector for PhDs after a sharp drop in 2008. Beyond academia, more than a quarter of PhDs took positions in management consulting and scientific services [see Figure 8]. These sectors dominate hiring of PhDs. When combined, they hired 66% of all graduating PhDs. The top employers included MIT,

Stanford, Harvard, McKinsey & Co., Cornell, and MGH.

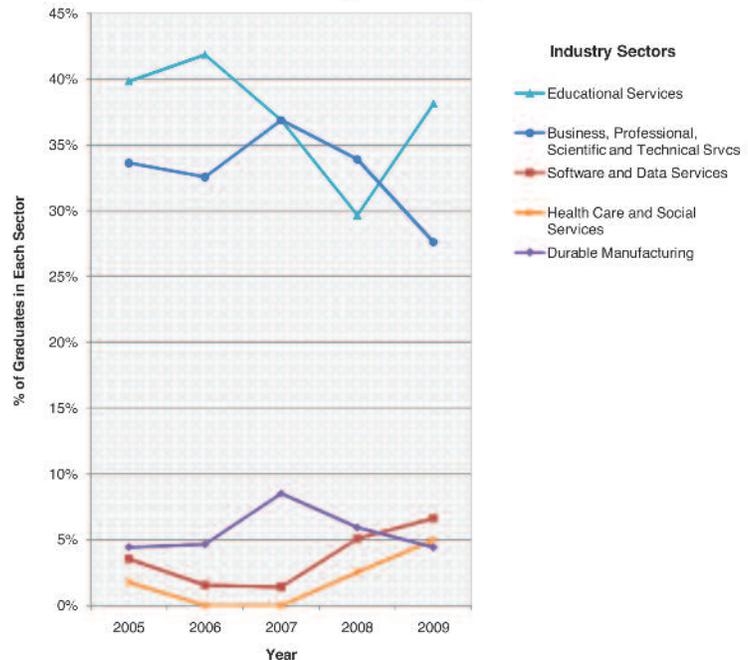
More PhDs Pursue Post-Doc Positions

While 47% of PhD graduates intended to pursue a career in academia, only 10% planned to do so upon graduation.

**Figure 7
Post-Graduation Plans of MIT Graduates Receiving a Master's Degree**



**Figure 8
Top 5 Industry Sectors that Hired MIT Graduates Receiving a PhD Degree**



Alternately, 49% of PhDs planned to pursue a post-doctoral position as their first job. This represented a 24% increase over 2008 [see Figure 9]. This considerable rise was another reflection of the problematic PhD job market. More PhDs saw a post-doc as an intermediate position until the job market improves. The shortage of job opportunities also affected how PhDs perceived their career choices. 71% said they expect to take a job directly related to their graduate training, down dramatically from the prior three years: 93% in 2006, 90% in 2007, and 89% in 2008.

Faculty Play a Strong Role in Shaping PhD Career Choices

Faculty occupy a central role in shaping and influencing a PhD student's professional development, career path, and job search. 57% of PhD graduates strongly agreed that their dissertation/thesis advisors promoted their professional develop-

However, PhDs indicated that they are not consistently supported in making career choices outside of academia. 27% of PhD graduates reported being given little or no guidance about multiple career paths.

ment. However, PhDs indicated that they are not consistently supported in making career choices outside of academia. 27% of PhD graduates reported being given little or no guidance about multiple career paths. Anecdotally, the GECDC reports students expressing concern about sharing plans to seek jobs in industry or in other non-academic areas with faculty and advisors. Despite what seems to be a bias towards academic careers, 55% felt their advisors would strongly support them in any career path. At the same time, 65% had received some direct assistance from their advisors in their employment search. In fact, in 2009, 26% of PhDs found jobs through a faculty contact. This was higher than in previous years and represents one of the top three vehicles through which PhD graduates found a job.

Consistent with SB and Master's graduates, the learning experiences of PhDs in the classroom, lab, and outside the classroom are key elements in their

career preparation. 80% of PhD graduates had been a teaching assistant (TA) at MIT and 85% felt the experience was helpful to their professional development. 91% of PhD graduates had been a research assistant (RA) at MIT and 91% felt the experience was helpful to their professional development. At the same time, internships have become important to a larger number of PhD students as they recognize the value of balancing their research with applied experience in industry and at other research facilities. In 2009, participation in internships rose to 27% from 24% the previous year and represents a steady increase. More PhDs are also participating in leadership activities during their graduate program. Participation increased to 48% from 40% the previous year.

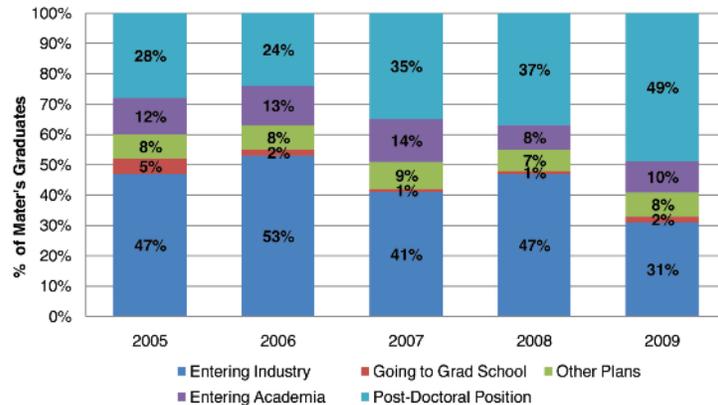
Overall, the analysis and data in this article shows that MIT degrees are highly valued and that we can be proud of what we produce in our students. MIT must continue to examine all its degrees and modify them in response to fundamental pedagogical advances, new knowledge, and market demand.

Sources

Each year the Office of Institutional Research, in conjunction with the Global Education and Career Development Center (GECDC), surveys graduates to determine employment or continuing education status, salary information, satisfaction with career and global education services, and perspectives on various aspects of their MIT experience. This year, questions regarding PhD post-graduation employment and salary were incorporated into the Doctoral Student Exit Survey. The results of each survey can be found at web.mit.edu/career/www/infostats/graduation.html and web.mit.edu/ir/surveys/grad.html.

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Figure 9
Post-Graduation Plans of MIT Graduates Receiving a PhD Degree



Teach Talk

Christine Ortiz

Toward a Personalized Graduate Curriculum

DRAMATIC CHANGES IN GRADUATE education are taking place due to the emergence of knowledge-based societies, where new knowledge has become a valuable commodity, strategic national resource, and political agenda item (Kehm, 2006). Key trends have been articulated as (Uronen, 2005): from national to international, from basic, curiosity-driven research to results-oriented research, from individual to team research (Hand, 2010); from disciplinary to multi- and interdisciplinary, from smaller laboratories to larger research institutes, programs, and centers (Hand, 2010); from fragmented projects to “Big Science” (e.g., sustainability, energy, health, security, infrastructure, etc. → complex systems) (NAS, 2008; Hand, 2010; Cambridge, 2006); from public or university funded to multiple funding sources, from unbounded research to research within pre-defined programs and projects, from purely academic to the professional, from national security to competitiveness and job creation, and from utilization of resources to sustainable development. Additionally, an increasingly diverse graduate student population is expected due to demographic shifts, i.e., larger numbers of competitive international student applications, and larger numbers of female and U.S. underrepresented minorities.

In parallel, significant modifications to the graduate student experience have taken place. For the latter years of the graduate program during the research thesis, there is an enhanced concept of apprenticeship, i.e., that it is more than technical training which requires mentoring as well (U. Michigan, 2006). Graduate

programs are becoming more and more reliant on technology for formalized coursework and research (e.g., the Internet, videoconferencing, Wikis, video and audio podcasts, blogs/vlogs, message

boards, etc.) (Murphy, 2001; Salmon, 2000; Housego, 2000).

Increased productivity is expected of our graduate students by doctoral advisors and research sponsors, as well as rising expectations for accomplishments prior to graduation. Students obtain much larger amounts of data and analyze, assess, and write up their results for publication much more rapidly than their predecessors. Graduate students are increasingly in need of transferable personal and professional skills, e.g., leadership, global cognizance, entrepreneurship/intellectual property, human sciences, ability to work as members of a diverse team, creativity, innovation, open-ended problem solving, communication, ethics/social responsibility, etc. (NAE, 2004; Fallows, 2000). This concept has been referred to as the creation of a “T-shaped” graduate (Plummer, 2009), mostly in the context of undergraduate education. The base of the “T” involves a breadth of knowledge in the

forementioned topics, while simultaneously having a depth of knowledge in a specific discipline (Plummer, 2009). At the undergraduate level, where many curricula are already packed, the reduc-

It is intended that by allowing students to take increased ownership, leadership, and direction of their educational path, this will stimulate creativity, inspiration, excitement, new interdisciplinary ideas, and provide support for research endeavors.

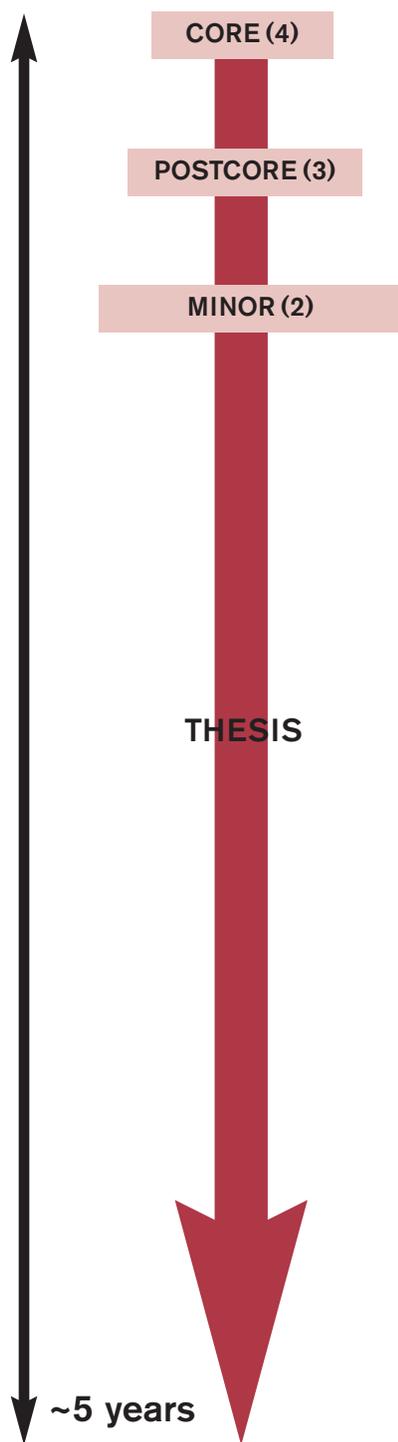
tion/loss of academic and technical rigor is a major concern and the “aspect ratio” of the “T” is of importance (Thomas, 2009). Lastly, there is a demand for personalized and flexible curricula (Sunstein, 2002), which is discussed further below.

Hence, as articulated by Prendergast (Prendergast, 2006), a new benchmark for doctoral graduates has evolved which includes not only the creation of new, original knowledge at the frontiers of the discipline, but also the ability to appreciate this new knowledge in a broader context (e.g., socioeconomic, global) and to have a more extensive skill set to be able to act on this new knowledge (Prendergast, 2006; NAE, 2004, 2005). In essence, we are continually “raising the bar” on what we expect our graduate students to achieve upon graduation. For financial and competitiveness reasons, there is significant pushback on extension of the time-to-graduation and, hence, the rate of skills acquisition in graduate programs is expected to increase.

Starting in the fall of 2008, the MIT Department of Materials Science and Engineering (DMSE) began an extensive evaluation and revision of its graduate doctoral curriculum, which included in-depth discussions of the above trends and their implications for our graduate program. The MIT-DMSE doctoral program has had a long history of leadership through interdisciplinary collaboration, a culture of innovation, and spanning fundamentals to real world applications (Flemings, 1985), and has been ranked #1 consistently by *U.S. News & World Report* since the rankings were first established in 1996. DMSE research, via the graduate program, continues to play a critical role in the “Big Science” research initiatives throughout the Institute, the nation, and the world. Our graduate students form the backbone of these efforts and compose a core intellectual hub of a dynamic, rich, and broad materials network/community. We have an important responsibility to provide our 225+ graduate students with the highest quality and most current educational, research, and personal development experience while at MIT by continually adapting it to the changing nature of engineering education and the MS&E discipline.

The structure of the DMSE doctoral program has undergone significant changes in recent decades, including: the establishment of a required set of four core classes (a prescribed materials-generic foundation for all graduate students), structural variations of required post-core classes (first established in 1995), and the requirement of a two-course minor. The current DMSE graduate program structure is shown in the figure.

In the spring of 2009, the DMSE faculty voted to convert a mandatory sub-disciplinary based post-core into a more flexible consolidated system. In the prior system, students chose one of four academic panels/tracks (i.e., Electronic, Photonic, Magnetic and Materials, Bio- and Polymeric Materials, Structural and Environmental Materials, Emerging and Fundamental Computational Studies)



Schematic of current doctoral program structure for the MIT Department of Materials Science and Engineering. The numbers in parenthesis are the number of courses required for each component of the graduate program. A total of nine courses are required for completion of the doctoral degree.

after completion of the core and had to take electives specified within each panel that were directly linked to the oral qualifying exam. In the current system, students may choose three electives from an extensive consolidated list of all DMSE graduate electives, as well as from advanced graduate-level technical classes outside of the Department.

Overall, the aim of the new post-core is to provide a “personalized” or “individualized” educational supplement where students design their own post-core curriculum, in consultation and with faculty approval, in order to tailor their own learning experiences and academic path to their interests, strengths, and career goals. It is intended that by allowing students to take increased ownership, leadership, and direction of their educational path, this will stimulate creativity, inspiration, excitement, new interdisciplinary ideas, and provide support for research endeavors. There is some evidence that such flexibility will be particularly beneficial and attractive for female and under-represented minority students (Vincent, 2001). “Creative studies programs” have long made use of these concepts (e.g., see University of California, Santa Barbara (UCSB) undergraduate College of Creative Studies). However, such programs rigorously pre-select relatively small cohorts of students with exceptional abilities to carry out advanced and independent studies that take place in small group settings such as tutorials.

While personalized education, in general, may provide the numerous advantages described above, a completely unrestricted non-prescribed curriculum may have numerous risks, such as group polarization and fragmentation and students lacking experience to make fully-informed choices (Sunstein, 2002). It has been suggested that an appropriate level of personalization is necessary, in particular, a curriculum that includes a set of common experiences and exposure to unanticipated topics and points of view (Sunstein, 2002). In our case, the core serves this purpose.

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A Personalized Graduate Curriculum
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Hence, in the new DMSE post-core curriculum, doctoral students may choose to create a specialization/concentration by creating a post-core sub-program of three courses in a particular sub-discipline (emphasizing depth). Conversely, graduate students also have the option to formulate a broader educational experience, for example, by choosing courses in three different sub-disciplines or disciplines. Options include a focus on the previous academic panel areas, a number of DMSE emerging research areas, and materials-generic options such as a focus on materials design, materials economics, materials processing, and materials for energy and environment. Another optional sub-program available is a “skill-based” post-core with selected classes in experiments/characterization/laboratory, computa-

tion, and application/design. It should be noted that if a broader post-core is chosen by the student, this does not in any way imply a lack of rigor or superficiality, since each class taken will be required to adhere to the standards of technical rigor set by the Department for advanced-level graduate study. The optional post-core sub-programs suggested by the Department will be helpful for recruitment to demonstrate current Departmental research areas to prospective graduate students.

The structure can also easily evolve with the discipline (i.e., adding new sub-programs, eliminating outdated ones) since it is no longer explicitly coupled to the oral qualifying examination. Within the new consolidated post-core infrastructure, there is now a place for new classes that may arise which are not easily categorized into existing smaller sub-programs. Lastly, the new post-core (in addi-

tion to the two-course minor) will readily enable the inclusion of transferable skills into the curriculum.

A 65-page report on the DMSE graduate curriculum revision with complete reference citations is available via e-mail: cortiz@mit.edu.

Acknowledgements

Current and past members of the DMSE Departmental Committee on Graduate Students (DCGS), Samuel Allen, POSCO Professor of Physical Metallurgy and Professor of Materials Science and Engineering, and Edwin L. Thomas, Head, MIT Department of Materials Science and Engineering and Morris Cohen Professor of Materials Science and Engineering. ■

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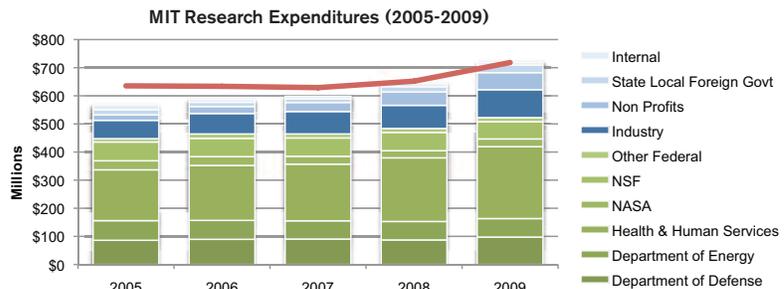
2010 MIT Briefing Book Available Online

THE MIT BRIEFING BOOK has been updated and is available online at web.mit.edu/vpr/www/briefingbook/. The publication is sponsored by the Office of the Vice President for Research and the MIT Washington Office.

The *Briefing Book* is a compilation of information about MIT with a focus on MIT’s research activities. The book includes chapters on MIT’s Global Engagement, Service to Local, National, and World Communities, and Undergraduate Financial Aid. The publication includes highlights of MIT’s educational

and research activities as well as summaries of projects funded by federal agencies, industry, and nonprofit institutions. Faculty and staff provided many of the

project summaries. Questions or suggestions should be directed to Lydia Snover, Director of Institutional Research, lsnover@mit.edu. ■



NRC Doctoral Rankings: The Weighting Game

RANKINGS OF U.S. DOCTORAL programs by the National Research Council (NRC) are widely anticipated. The new ranking approach, producing ranges of rankings rather than a single ranked list for each discipline, has added an additional layer of complexity to an already widely discussed project. The long

ing faculty's direct statements about the relative importance of various attributes, as well as weights inferred from faculty's rankings of a sample of actual programs.

To gather data on the importance of the 20 indicators, faculty members in each field were asked to directly rate which *characteristics* were the most important

The methodology used by the NRC is considerably more complicated than the approach used by other ranking bodies, such as *U.S. News & World Report*.

awaited results are based on data collected for the 2006 academic year. While the timing of the release of the rankings is as of this writing unknown, the NRC recently shared the methodology it is using.

The methodology of the current study was refined to rely more heavily on quantitative, objective data and to better reflect the uncertainty associated with measuring program quality, in response to criticisms of previous NRC assessments of PhD programs. Instead of calculating a single rank per program, the NRC is using a resampling statistical technique (similar to a Monte Carlo method) to produce a range of rankings that account for statistical error, year-to-year variations in metrics, and the variability of faculty ratings.

The methodology used by the NRC is considerably more complicated than the approach used by other ranking bodies, such as *U.S. News & World Report*. Though the actual rankings are derived from objective data on 20 program characteristics, the weights applied to these data were developed through faculty surveys gather-

ing aspects of a quality PhD program. A second set of weights were created as well, using a sample of faculty in each discipline who were asked to rate a sample of specific *programs*. Statistical techniques were used to infer the weights that best predicted the stated estimates of program quality.

These two sets of weights were then combined and applied to the program data to prepare the rankings. Finally, statistical resampling techniques were used to generate the range of rankings to be published in the final report.

As soon as the NRC rankings are released, MIT's Office of Institutional Research will disseminate the results to departments.

A more detailed presentation on the NRC rankings, including sample tables, can be found here: web.mit.edu/ir/rankings/nrc.html.

A Guide to the Methodology of the National Research Council Assessment of Doctorate Programs can be found at: www.nap.edu/catalog.php?record_id=12676. ■

The NRC Methodology: Step-by-Step

- **Step 1:** Gather raw data on measures of faculty productivity, student support and outcomes, and diversity from institutions, faculty, and external sources.
- **Step 2:** Ask faculty to rate how important 20 characteristics are to program quality in their field.
- **Step 3:** Randomly draw half of faculty importance ratings 500 times to produce 500 "direct" weights.
- **Step 4:** Ask faculty to rate the quality of a sample of specific programs in their field.
- **Step 5:** Randomly draw half of faculty program ratings 500 times to produce 500 "regression-based" weights.
- **Step 6:** Combine the direct and regression-based weights into 500 sets of indicator weights.
- **Step 7:** Match the combined weights to 500 randomly adjusted sets of normalized program data (from data in Step 1) to rank each program 500 times.
- **Step 8:** Sort each program's 500 rankings from lowest to highest and present the program's rank at the 25th and 75th percentiles as the range of possible rankings.

Planning for the Future of the MIT Libraries

Ann Wolpert

IN THE SUMMER OF 2008, the MIT Libraries initiated a strategic planning process to consider how best to provide library services for the future at MIT. It was clear that forces of change, internal and external to MIT, needed to be addressed. We had observed that growth in the use of networked resources was outpacing growth in door counts and physical circulation at the same time as research and learning at MIT were becoming increasingly mobile and less location dependent. The MIT Libraries had to be prepared to respond to MIT's rising emphasis on interdisciplinary, inter-institutional, and international collaborations in both education and research, and we needed to strike the right balance between the resources we were dedicating to our important physical collections, and the resources we deployed to support the digital library environment.

The document "MIT Libraries: Achieving a Desired Future State for 2015" [libstaff.mit.edu/futurestate/DesiredFutureState2.0.pdf] summarizes the findings of that effort, and points to progress as well as gaps. It is gratifying that students and faculty have become such avid users of our network-based resources and services, and we are committed to making sure the MIT Libraries can support this growing demand. But it was also obvious that the dominant organizing principle for the MIT Libraries, once defined by physical libraries with disciplinary-focused print collections, was increasingly misaligned with usage data trends. These trends were pointing us in the direction of an organizing principle that

would be defined more by Libraries-wide services and online systems than by traditionally structured, stand-alone libraries.

As our planning process progressed during calendar year 2009, our thinking was also informed by the extensive surveys of faculty, students, and research staff, which we had conducted in 2005 and 2008. Feedback from these surveys, when combined with actual usage data collected by the Libraries, serves to guide decisions concerning the organization and operations of the Libraries going forward. The granularity of the survey data is sufficient to provide a vivid appreciation for the disciplinary differences in patterns of library use, and these differences will be taken into account as planning advances.

Also central to the Libraries deliberations are the needs to 1) attract and retain the highest quality Libraries staff, 2) continue support for the most heavily used physical facilities and collections, and 3) sustain the digital information resources and systems on which so many faculty and students depend. Both digital and physical library services have their passionate advocates among the faculty – sometimes within the same department – and the Libraries are well aware of the importance faculty in all disciplines place on a robust, easy to use, and reliable set of networked library resources and services. Members of the Faculty Committee on the Library System have generously contributed their thoughts and insights to the process as well.

The need to accommodate FY2011 budget reductions has now accelerated our planning. Many university

research libraries in the United States are also coming to grips with reduced funding levels. The MIT Libraries will face special challenges, however, given their relatively modest size, the exceptionally high prices of many science and engineering journals and databases, and the physical constraints of our library facilities.

We are very fortunate that the strategic planning work begun back in calendar year 2008 is now available to inform our approach to budget reductions, and that there is a standing committee of the faculty dedicated to Libraries issues. In the coming months we anticipate taking multiple steps to respond to our reduced budget in the context of our future directions. Actions will most likely include some combination of 1) a reorganization of staff operations, 2) a new approach to collections acquisition and management, and 3) reconsidered hours of operation. As planning progresses the Faculty Committee on the Library System will remain actively involved, as is their mission and role.

A chief goal in planning for FY2011 will be to implement the necessary organizational changes in a manner that respects the relationship between faculty and the librarians who understand and support their disciplines. Conceptually, the Libraries will be working toward a library system that is based on the following principles:

- Delivering services and information resources most needed by faculty and students

- Continued emphasis on strong subject expertise within the Libraries' staff
 - Maintenance of formal liaison relationships between the Libraries and faculty in departments, labs, and centers
 - A unified staff, providing service through a distributed network of contemporary facilities
 - A focus on shared online systems and facilities, emphasizing function rather than traditional geography
 - A balanced approach to collections and collecting that includes access as well as ownership.
- The Faculty Committee on the Library System will monitor the process by which

the Libraries make these challenging decisions in the year ahead, and the Libraries will, as always, communicate with faculty and the MIT community as decisions are made. Meanwhile, I urge faculty to send comments and questions to me. ■

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Stellar LMS Evaluation FAQ



What is Stellar?

STELLAR IS MIT'S ONLINE platform for learning and course management [stellar.mit.edu]. Faculty use Stellar to centrally organize course materials, assignments, and class activities, while students use it to access their course work. From a Stellar course site, instructors have the ability to post class announcements, e-mail their class, upload lecture notes, and release solutions to PSETs – all electronically and all online. Course administrators also have access to a host of tools that allow them to manage everything from course membership to recitation selection to student grades (via the Stellar Gradebook pilot).

Currently, Stellar hosts over 1000 sites for nearly 800 courses across all of MIT's Schools, departments, and programs.

Why a Learning Management System (LMS) Evaluation?

The Stellar platform, launched in 2001, is showing signs of age. Its architecture cannot be effectively extended to support the breadth of use cases and teaching models at MIT.

What has been done to evaluate a LMS?

IS&T began the Learning Management Systems (LMS) evaluation project in

2008. The goal: to find the best combination of features and functionality that can be effectively supported with a reasonable commitment of resources.

After verifying and documenting key Stellar use cases and features, IS&T worked with customers and stakeholders to validate requirements for a next-generation LMS for MIT. In spring 2009, IS&T evaluated several products and services – Moodle 1.9, MoodleRooms, Drupal 6, Sakai versions 2x and 3, and BlackBoard versions 8 and 9 – against functional requirements, data dependencies, and other key criteria for an LMS. In summer 2009, IS&T presented recommendations to stakeholder groups, with Drupal 6, Sakai 3, and BlackBoard 9 suggested as the most viable platforms.

How will the decision be made?

The LMS Evaluation project is sponsored by the Faculty Advisory Committee on Learning Management Systems. The Committee is a group comprised of faculty, staff, and students committed to providing IS&T with views of the faculty (and other interested stakeholders) on the features and strategic directions for a supported learning management system. The

Faculty Advisory Committee works closely with IS&T. Since it is newly formed, the Committee is currently working with IS&T to determine the relevant criteria, collect data from inside and outside of MIT, re-examine platforms, and provide direction on the future of LMS at MIT.

Will Stellar go away?

No. Similar to how operating systems or cell phone technologies upgrade regularly, Stellar NG will be a better, more efficient, and feature-rich version of the existing Stellar. When Stellar NG is released to the community, IS&T will continue to support (the existing) Stellar for a period of time to allow departments to successfully migrate over to Stellar NG.

How do I provide input?

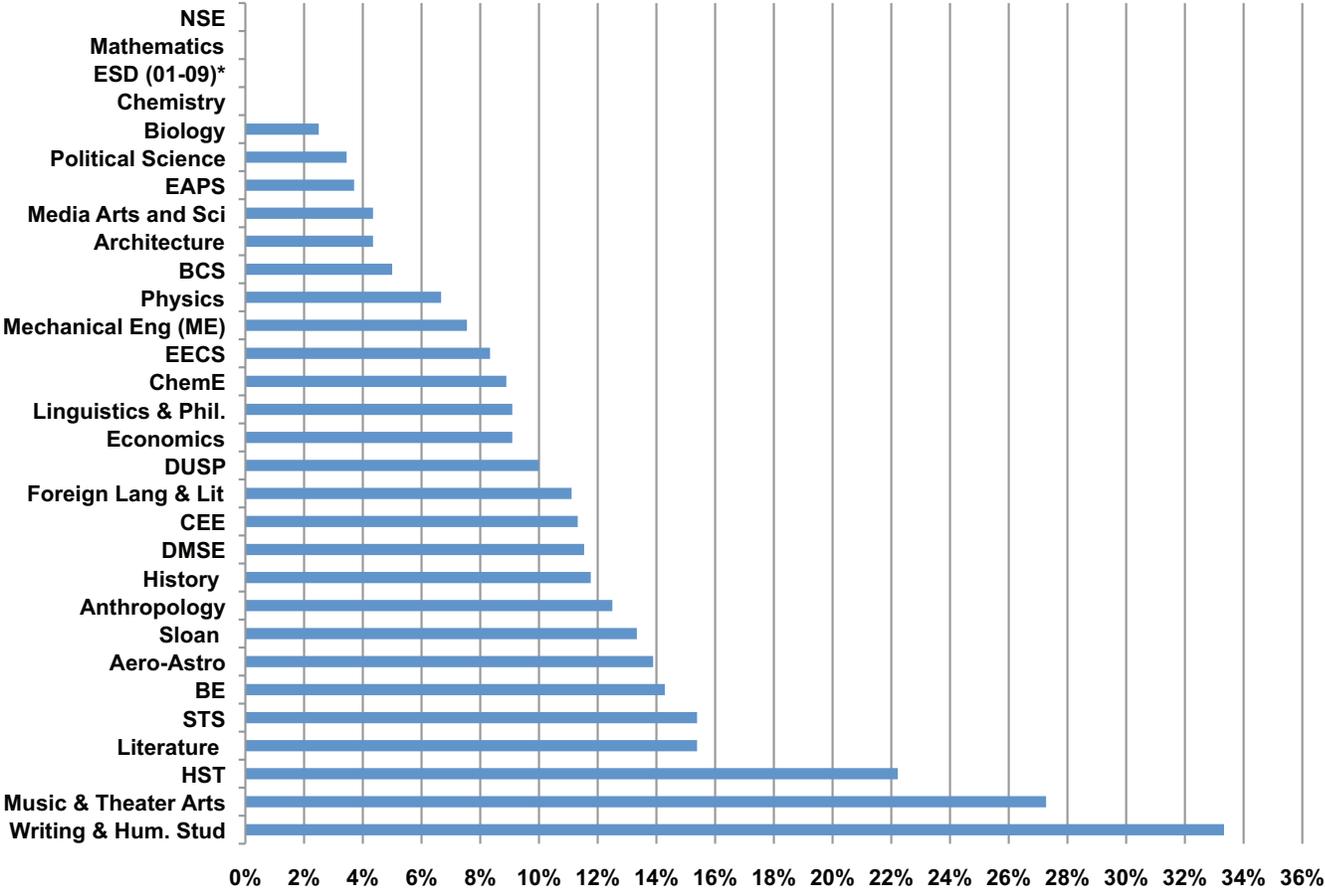
IS&T and the Faculty Advisory Committee encourage input from community members on MIT's next LMS. Please send your comments to: stellar-support@mit.edu.

Reference

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

M.I.T. Numbers

Percent Underrepresented Minority (URM) Hires, 1991-2009



Source: Report on the Initiative for Faculty Race and Diversity