MIT Faculty Newsletter

in this issue we offer commentary on the recent Task Force Report on Community Engagement in MIT 2030 (see below and page 4); articles concerning significant issues for our graduate student population (pages 6 and 9); a piece on the Office of Faculty Support (page 12); and an article analyzing those college rankings (page 16).

Kendall Square T Stop

Beyond the Classroom
What Students Want From Faculty

Edmund Bertschinger

This is the first in a series of occasional articles relating rewarding faculty/student interactions outside the classroom.

I KNOW AN MIT faculty member who grew up in a poor Latino neighborhood, whose immigrant mother had only an eighth-grade education and whose father never graduated from college, and who was rejected by MIT freshman admissions. Worse, a mediocre performance in freshman physics led to his TA's written advice to pursue something other than his ambition of theoretical physics. That faculty member is me.

Despite the odds and my TA's assessment, I succeeded; as can current MIT students who may, unknown to their professors, have experienced difficulties similar or even worse than mine.

Report of the Task Force on Community Engagement in 2030 Planning on Development of MIT-Owned Property in Kendall Square

October 12, 2012

Background

THE TASK FORCE ON Community Engagement in 2030 Planning, consisting of eight faculty members* was appointed in August, 2012 by Provost Chris Kaiser and asked to provide guidance on upcoming decisions related to campus development within the context of the capital planning process known as MIT 2030. Specifically, the Task Force was charged with:

1. Providing advice regarding the development of MIT-owned property in Kendall Square.

2. Determining the most effective ways to engage the MIT community in the overall campus planning process going forward.

Editorial
Faculty MIT 2030 Task Force Report Clearly Identifies Key Issues

THE THOUGHTFUL AND PENETRATING report from the Faculty Task Force on Community Engagement in MIT 2030 Planning is published in full in this issue (page 1). We share the Task Force view (Finding #3) that:

"…financial return should not be the principal criterion of value creation and success for this area of campus. Equally important are criteria related to the 21st century image of MIT, creation of a significant eastern gateway to the campus, the enhancement of student life, and providing opportunities for future academic buildings and activities that we have yet to invent. We also believe these latter considerations, which go the heart of MIT's mission, will be more important to sustaining financial returns to the Institute in the long run."

contents

Photo credit: *Page 1:* Patrick Gillooly

Task Force Report Identifies Key Issues

We note too the call for increased attention to housing needs, which has been addressed in these pages in recent issues (see: *MIT Faculty Newsletter*, Vol. XXV No. 1, "Concerns Over Affordability of On-Campus Housing," and Vol. XXIV No. 5, "Concerns Over the Lack of Graduate Student Housing in the MIT 2030 Plan."). The current issue includes a further article, page 6, that develops the case for the importance of on-campus graduate student housing. Other aspects of graduate student life are described in the article on page 9.

In response to Faculty Chair Sam Allen's summary of the Task Force report at the most recent MIT faculty meeting, Prof. de Neufville noted that, given the report's call to re-examine and redesign the campus development plan in the MITIMCo proposal, it might not be wise to present the existing petition to the City's Planning Board and Ordinance Committee at this time. He suggested that, in view of the further planning and analysis needed to develop a proposal reflecting the priorities of the Task Force report with respect to campus needs, it would be wiser to wait until a petition was prepared that represented MIT's actual plans. Similar views had been expressed by faculty members speaking at the July 12 Faculty Forum on MIT 2030.

MIT Governance, Committee Function, and Transparency

Most U.S. research universities have a faculty senate that provides a forum for exchange of ideas and information among faculty, and for responses to changing education and research policies. MIT does not have such a forum, but relies on a system of committees, which periodically report to the faculty on their activities and deliberations. When issues arise that these standing committees are not suited to dealing with fully, *ad hoc* committees or task forces have generally been established, such as those on gender equity set up in each School under President Charles Vest's administration. Because of our concerns about the commercial use of campus land in the MIT 2030 Plan, we were gratified when the Provost established the Task Force on Community Engagement in MIT 2030 Planning.

This more consultative process for MIT 2030 planning is described clearly in Faculty Chair Sam Allen's report on page 4. Prof. Allen correctly refers back to the important 1988 *ad hoc* faculty committee report that responded to the controversy over the abrupt closing of the Department of Applied Biological Sciences. It was the need for a forum for faculty input into administration decisions that led to the founding of the *Faculty Newsletter*.

Faculty members serving on Institute committees and task forces are not staff to the executive branch, but representatives of the faculty as a whole. In MIT's model of shared governance, such committees have to be able to share their views, concerns, and information with their faculty colleagues. At a minimum, we need to be fully briefed about matters of importance to the MIT community. We can then offer informed consideration and useful guidance before any final decision is made.

The ultimate decision with respect to the MITIMCo up-zoning petition and MIT 2030 rests with the administration. But MIT operates best when there is a high level of trust and engagement between faculty and administration. To maintain the critical degree of trust, the administration must adequately consider

> The ultimate decision with respect to the MITIMCo up-zoning petition and MIT 2030 rests with the administration. But MIT operates best when there is a high level of trust and engagement between faculty and administration. To maintain the critical degree of trust, the administration must adequately consider faculty views and guidance, and then make decisions in as transparent a manner as possible.

faculty views and guidance, and then make decisions in as transparent a manner as possible. The advantages of open processes strongly outweigh the potential costs. Drawing on a diversity of perspectives, viewpoints, and expertise helps to make MIT a great university. With its thoughtfulness, insight, and broad scope, the report from the Faculty Task Force on MIT 2030 is testimony to this view.

We will be living with the consequences of the MIT 2030 decisions long beyond the current administration. We look forward to substantial and robust faculty discussion of the serious issues raised by the Task Force's assessment of the MIT 2030 and MITIMCo proposals. The implementation of the report's suggestion to establish a broad-based standing committee on Campus Design Planning would go a long way towards avoiding the errors that can arise from a narrowly constituted planning process. ■

Editorial Subcommittee

From The Faculty Chair
Task Force on Community Engagement with 2030 Planning

Samuel M. Allen

MY BIGGEST ASPIRATION IN taking on the role of Chair of the Faculty has been to improve faculty/administration communication, collaboration, and trust. Whether justified or not, many faculty had told me they felt that important decisions were made by "the administration" before faculty had the opportunity to provide their perspective on the issues. Examples included initiating major international initiatives, launching *MITx*, and participation in the MIT 2030 planning process. A major faculty concern was the belief that faculty should have a say in decisions that would have a significant impact on how faculty members spend their working hours.

Over the past summer the new administration took a major step toward encouraging faculty engagement by announcing the formation of the Task Force on Community Engagement in 2030 Planning, a group of eight senior faculty with diverse perspectives, to consider and make recommendations on two topics. First, should MIT re-file its "up-zoning" petition with the City of Cambridge, seeking to increase the density of development around Kendall Square? Second, how should the MIT community provide input to long-range planning encompassing the entire campus?

What factors led to formation of the Task Force? From my direct experience, I can identify a few:

1. Several lively discussions at meetings of the Faculty Policy Committee during the 2011–12 academic year focused attention on the fact that among our faculty there are numerous experts in urban design, city planning, and real estate, yet only Adele Santos, Dean of Architecture and Planning, had been included in the 2030 planning activities.

2. Significant attention over several years was given in the *Faculty Newsletter* to faculty concerns about the development of Kendall Square.

3. A plea was made at the May 2012 faculty meeting to broaden the discussion of Kendall Square development to include more faculty input.

4. A Faculty Forum held in July 2012 was devoted to Kendall Square planning and a number of colleagues expressed concerns about the very limited engagement with the planning process.

Would the Task Force have been formed without the faculty having spoken out? It seems unlikely. Would it have been formed without an attitude of respect toward the faculty on the part of the administration? Again, I doubt it.

The Task Force's creation is a tangible sign that the administration values faculty engagement in decision-making. This is something that the faculty have long expected. Not too long ago, as part of my Conflict Resolution studies at UMass Boston, I had the occasion to review the 1988 report, "Report of the Committee on Reorganization and Closing of Academic Units: Learning from the ABS Experience." [This report makes for very interesting reading, as it chronicles an especially low point in MIT administration/faculty relations. It is available at: *orgchart.mit.edu/node/6/pnr*.] This report was prepared by an *ad hoc* faculty committee in response to the way in which the decision to close the Department of Applied Biological Sciences was implemented. I was struck with the current relevance of a portion of the report's conclusion:

"It is the view of this committee, and we believe of the faculty at large, that a key to the success of the Institute has been the maintenance of a system of shared governance. Few of the MIT faculty see themselves in an employee/employer relationship to the Administration. Rather, most feel that the Administration and faculty share a joint responsibility for sustaining the excellence of the Institute. They expect that, when important choices arise about mission or internal organization, they will naturally be involved in the process leading up to decisions and in the planning of implementation."

The administration's recent decision to form the Task Force on Community Engagement with 2030 Planning is an affirmation of this principle of shared governance.

The Task Force completed its report [available at: *orgchart.mit.edu/node/6/pnr*] on the up-zoning petition in mid-October, and I had the privilege to present the main findings of the report at the October faculty meeting. [The Task Force Chair, Tom Kochan, was out of town that day.] Faculty received copies of the report by e-mail shortly after the faculty meeting concluded. Quoting from the report:

"The Task Force's key finding was that the Kendall Square design proposed by MITIMCo [the MIT Investment

Management Company] falls short of MIT level expectations, standards, and aspirations we have for the future of the campus. We can and must do better and we suggest options for improving the design. We believe these options can be considered and implemented in the design phase after the up-zoning petition is approved. For this reason, and because a number of City officials are anxious to receive MIT's petition, we support filing the petition now, provided that:

1. A comprehensive urban design plan for East Campus is developed in the post up-zoning stage but before any building starts. This has not been done yet and needs to be done as part of the planning for Kendall Square development.

2. Our faculty Task Force or a similar group participates directly in the development of the East Campus plan and Kendall Square project design.

3. The plan and design of Kendall Square is evaluated against a broader set of principles than just return on investment principles that reflect the things we value when designing academic space and spaces for student use."

All of the feedback I've received on the contents of the report has been very positive. This includes faculty who had been most vocal in expressing concerns with the Kendall Square development process and several members of the *Faculty Newsletter's* Editorial Board.

The Task Force is now engaged in weekly meetings, working with MITIMCo planners and members of the MIT administration, to discuss and evaluate revisions to the plan presented with the prior up-zoning petition, filed with the city in April 2011. Our aim is to develop a framework for a design that addresses the concerns of the Task Force, which when complete will accompany a new up-zoning request. I am hopeful that this three-way collaborative process will result in a much-improved design for MIT's real estate east of Ames Street, which includes a dramatic and functional eastern gateway to the campus.

The Task Force will continue its efforts this fall, including making a recommendation about community engagement with planning for the entire MIT campus.

The Task Force's formation, breadth of faculty expertise and viewpoints, and progress to date bode well for serving as a model for future engagement of the community in MIT's decision-making processes. Much remains to be accomplished before I am willing to call this an unqualified success, but I am very hopeful. ∎

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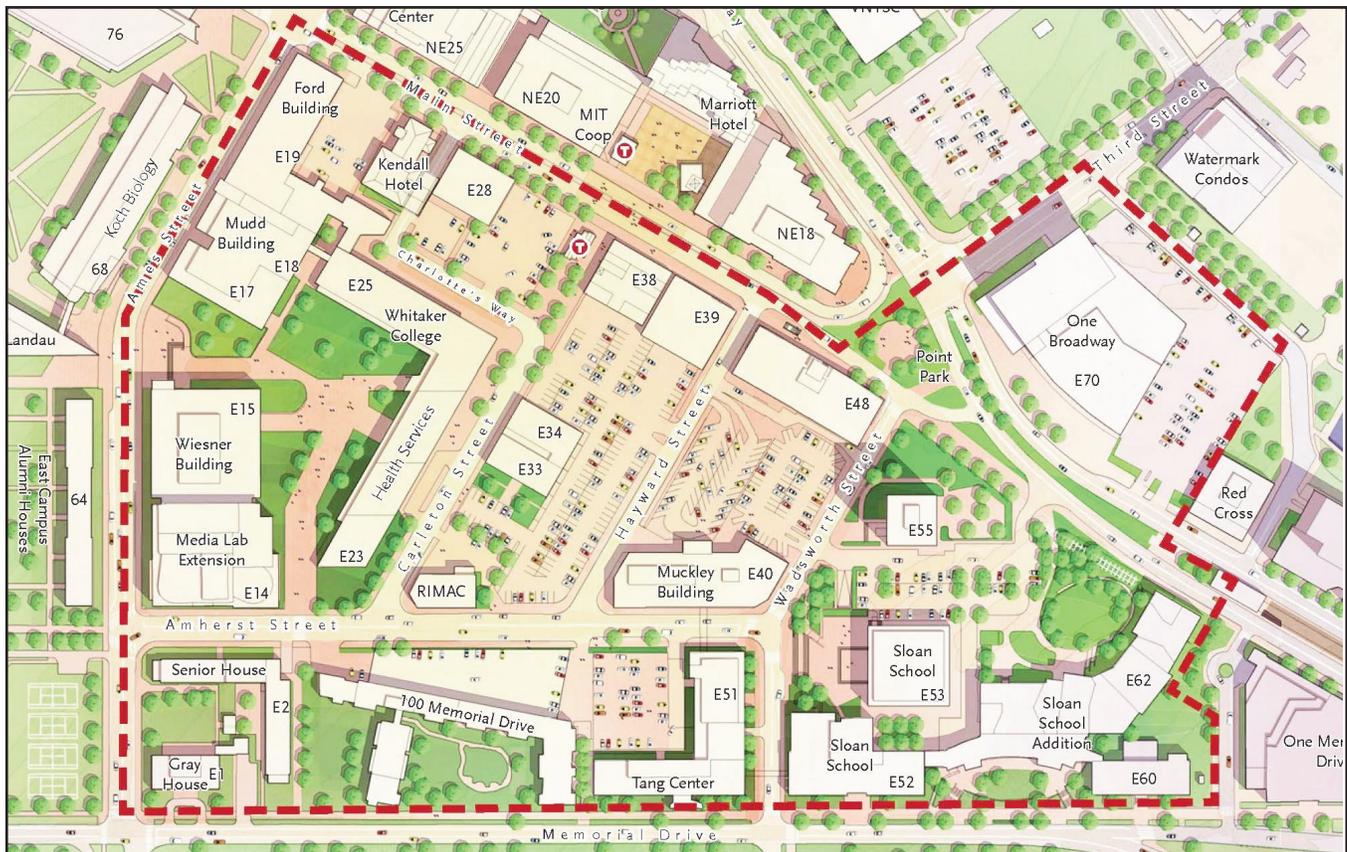
The area within the dashed lines comprises the portion of campus considered in the Institute's up-zoning petition that was submitted to the City of Cambridge in April 2011.

Source: MITIMCo

5

Graduate Student Life, Research Productivity, and the MITIMCo Proposal

Jonathan King

The value of a residential campus

FEW FACULTY, STUDENTS, OR administrators doubt the advantage of a residential campus over a commuter campus for undergraduate education. The ability of students-in-residence to continuously interact with each other, with their TAs, with grad students and faculty in UROP projects, provides a deeply enriched educational environment, compared to a dispersed commuting campus. This is even truer for graduate students. Particularly for those graduate students whose theses require hands-on work (e.g., in biology, chemistry, chemical engineering, and many other experimental disciplines), the interaction of students with each other, with postdoctoral fellows and research technicians, is absolutely critical for optimal research productivity. In addition, many graduate students have to be able to spend extended and irregular time with their experiments, unrelated to the rhythms of the conventional workday.

The MIT 2030 Task Force report (see page 1) notes the absence of housing needs or goals in the MIT 2030 plan, and calls for a study of housing needs of MIT graduate students, faculty and staff.

The table (next column) shows that many leading research universities house a significant fraction of their graduate students on campus. For some strong research universities, low graduate student residence numbers are misleading, as the campuses are surrounded by residential neighborhoods providing graduate student housing adjacent to campus. Though there are few studies on the relationship between graduate student resi-

Percentage of Graduate Students Housed on Campus for Some Peer Institutions	
Stanford	56%
UCSD	52%
MIT	**41%**
Harvard	34%
Rice	20%
UCLA	20%
Chicago	15%
Georgia Tech	10%
Penn	6%
UT Austin	6%
UNC	3%
Vanderbilt	1%

Source: Office of the Provost/Institutional Research

dences and research productivity, there are very few full commuter campuses in the top tier of research universities.

The graduate student housing dilemma

With limited on-campus graduate housing, more than half of MIT graduate students have to secure housing off campus. Unfortunately, the increased cost of housing in Cambridge is causing considerable distress for our graduate students. As described in the May/June issue of this *Newsletter* ["Concerns Over the Lack of Graduate Student Housing in the MIT 2030 Plan"], vacancy rates in Cambridge are around 1%, among the lowest in the nation. Given the commercial development in Cambridge, housing costs are very high and increasing significantly faster than graduate student

stipends. Graduate students cannot compete financially with employees of Novartis, Shire, Pfizer, Microsoft, or Google.

One consequence of this is that our students are being pushed further away from the campus, resulting in an ever increasing time spent commuting, and significantly decreasing their productive time on campus. In practice, many students are limited to housing that is near the Red Line or other public transit, with attendant higher rents. Furthermore, as many faculty know, commuting by car into and out of Cambridge, across the BU Bridge, through the Alewife Brook interchange, on McGrath Highway, or through Union Square, meets with increasing congestion. If the proposed developments in Kendall Square, Central Square, Alewife Brook, and North Point – on the order of 18,000,000 square feet – are built, the number of auto trips/day into and out of Cambridge will increase by more than 50,000, with a similar increase in Red Line and bus trips. Given that the Red Line is already close to saturation point, and the critical road interchanges are already heavily congested, commuting to and from MIT is going to be more and more time consuming. Thus it is not practical for graduate students who have to spend considerable time with their experiments to try to lower their rents by living outside of Cambridge.

The solution is campus graduate student housing

The solution – just as for undergraduates – is to build sufficient housing on the campus. Many of our nation's leading

research universities have followed this path.

President Vest's administration listened to the housing concerns of graduate students [see: *MIT Faculty Newsletter*, Vol. 13 No. 2, "Pressing Issues for Graduate Students"] and launched an effort to increase on-campus graduate student housing to 50% of the need. This resulted in the renovation of 224 Albany Street into graduate housing and the construction of the Pacific Street housing. That was an important step in the right direction, but the initiative was not sustained under President Hockfield. That path should be pursued by building additional graduate student housing. Campus space to the northwest between Massachusetts Avenue and Main Street has already been leased for 40- and 60-year periods to Pfizer and Novartis. That leaves the MIT land between Main Street and Memorial Drive on the East Campus as the most natural area for new construction of graduate residences.

The MITIMCo proposal ignores graduate student housing needs and its relation to research productivity

Unfortunately, MIT 2030 and the MITIMCo up-zoning proposal ignore this need. In particular, the MITIMCo proposal focuses on building commercial offices on campus land, which will be leased for long terms as a source of income. No student housing has been included in any of the MITIMCo presen-

tations to the Cambridge Planning Board. This lack of housing was sharply criticized at the Planning Board hearing by both representatives of the East Cambridge and Kendall Square communities, and by

In particular, the MITIMCo proposal focuses on building commercial offices on campus land, which will be leased for long terms as a source of income. No student housing has been included in any of the MITIMCo presentations to the Cambridge Planning Board. This lack of housing was sharply criticized at the Planning Board hearing by both representatives of the East Cambridge and Kendall Square communities, and by MIT's Graduate Student Council.

MIT's Graduate Student Council. It is perhaps not surprising that real estate executives who have driven the MITIMCo proposal would be insensitive to issues like graduate student housing. In addition, there is an intrinsic conflict of interest with MITIMCo's real estate managers receiving much larger bonuses from long-term commercial leases than from building affordable graduate student housing. These are among the many reasons MIT needs a standing Campus Planning Committee of faculty, administrators, staff, and students, as suggested by the faculty MIT 2030 Task Force in their closing section.

The MIT 2030 plan focuses on the income generated from the commercial

leases. But real estate profits can be realized in many venues in the Boston area, elsewhere in the U.S., and abroad. Graduate student housing is only of use to MIT if it is on the campus or in close proximity. In addition, a significant fraction of MIT income – overhead on research grants – depends on graduate student productivity. Reducing the quality of life and productivity of a significant fraction of MIT's graduate students has real costs, even though they may not be easy to assess. At a minimum, the MITIMCo up-zoning proposal should be put on hold until the Provost's Task Force on Community Engagement in 2030 Planning has been digested by the faculty and graduate students, and the redesign called for has been assessed and adopted. ■

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What Students Want From Faculty

The challenges I overcame in college exist even now at MIT. I hear about it from some of the students I mentor after meeting them in MIT's Interphase EDGE (a pre-freshman summer program) or

> My greatest satisfaction as a faculty member has come from mentoring students – not just research students, but also undergraduates who want and need the encouragement of a role model. The Office of Minority Education creates an excellent framework in its Mentor Advocate Partnership program . . . . Freshman advising plays a similarly important role . . . . Unfortunately, these programs have a severe shortage of faculty mentors.

through the American Physical Society's Minority Scholarship program. Some of these students receive the kind of discouragement I got 33 years ago at Caltech, and even though the faculty may think they are being helpful, they are not. Nationwide, only about 30 physics PhD degrees are awarded annually to underrepresented minorities. Many more are needed. Millie Dresselhaus and the late Michael Feld showed me by example how easy and rewarding it is to improve these numbers. Each of them supervised the

PhDs of five African American students at MIT.

Fifteen years ago, the MIT Admissions Office asked me if I would supervise a promising young summer student in a program called Research Science Institute. It was the first time since graduate school that I had worked with a high school student in research. I was most fortunate and hit the jackpot as a research mentor – the 13-year-old Hispanic girl I supervised won first place in the Intel Science Talent Search the next year and soon graduated from MIT with an SB in physics, followed by a PhD at Harvard. She is now a tenured professor and a leading theoretical particle physicist. I have supervised or helped find supervisors for RSI students ever since.

The MIT Summer Research Program (MSRP) also presents a golden opportu-

nity for faculty. MSRP seeks to boost the academic careers of undergraduates from outside MIT who show strong promise for graduate education. It also seeks to improve the research enterprise through increased diversity. It has been inspiring to see our MSRP physics students admitted into PhD programs at MIT, UC Berkeley, and other top universities. As a result of these and other efforts, the MIT Physics Department trains (through MSRP and our own degree programs) more than 10% of the underrepresented minority PhDs in physics.

My greatest satisfaction as a faculty member has come from mentoring students – not just research students, but also undergraduates who want and need the encouragement of a role model. The Office of Minority Education creates an excellent framework in its Mentor Advocate Partnership program, making it easy for any faculty or staff member to help our students thrive. Freshman advising plays a similarly important role, and has provided my greatest satisfaction this semester. Unfortunately, these programs have a severe shortage of faculty mentors.

These are just a few of the ways we can make a huge difference in the lives of our students. I invite you to add your own examples to the list. Please consider what you can do – our students want and need your advice and encouragement. ■

Edmund Bertschinger is Department Head and Professor, Department of Physics *(edbert@mit.edu).*

The Millenials@MIT: Discussions on the Generational Changes in the Graduate Student Population

Christine Ortiz
Ellan Spero

OVER THE PAST TWO YEARS, we have had extensive discussions with graduate students at monthly "Dinners and Dialogue," a number of focus groups, panels and many one-on-one meetings. Recently, we held a round table discussion with a cross section of seven MIT graduate students representing all five Schools, a variety of backgrounds, ethnicities, genders, nationalities, departments, research and extracurricular interests, family status, and lengths of study at MIT (see Acknowledgements). The aim was to focus on a single topic in depth: the generational changes of the MIT graduate population – the majority of which (85%) include "The Millenials" (birth years 1980 to present, see figure below) – and how these changes were reflected in and impacting their educational experience.

We also discussed how MIT could evolve to better support this generation of graduate students in order that they may more efficiently and easily find their path and passion, engage strategically in the innumerable educational opportunities MIT has to offer, unlock their imagination and creativity, realize their unique strengths and potential and achieve all of their academic, personal, and professional goals. A number of themes emerged from this fascinating discussion (see box, next page) which were often heard in our previous outreach and are supplemented by supporting data when available, following. The goal of this article is to provide faculty with a snapshot into the educational experience of this generation of graduate students, to serve as impetus for continued dialogue and exploration of new areas for improving the quality of graduate education at MIT.

Taking Action to Have a Positive Impact in the World

This generation of MIT graduate students are community and global minded and, hence, interest in "grand challenge" research areas is flourishing (e.g., energy, environment, health, poverty, water, etc.), as well as non-traditional learning, public service, entrepreneurship, leadership, international projects, and educational outreach. Approximately 440 graduate students were involved in the MIT Global Ideas Challenge and 12 of the 14 winning teams in 2012 were led by graduate students. Approximately 2000 graduate student "seats" were taken in 36 Entrepreneurship subjects and about 1000 graduate student "seats" were taken in 18 "Innovation" subjects (Committee for Innovation and Entrepreneurship
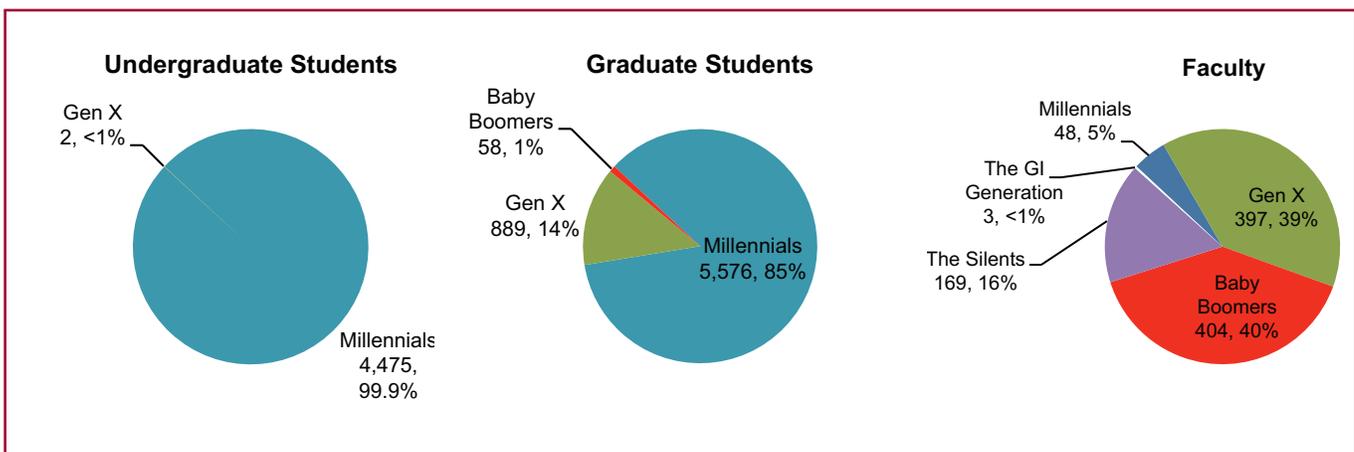
Generational demographics of MIT undergraduates (AY2013 degree-seeking candidates), graduate students (AY2013 degree-seeking candidates) and faculty (AY2013 as of 10/14/2012); Millenials or Generation Y (Birth Years 1980-present), Generation X (Birth Years 1965-1979), Baby Boomers (Birth Years 1946-1964), Silents (Birth Years 1928-1945), and GI Generation (Birth Years Prior to 1928).

Source: Office of the Provost/Institutional Research

Education, Sub Committee Report, 2012). Many graduate students also engage in the $100K Entrepreneurship Competition and the MIT Entrepreneurs Club. Participation in graduate student governance continues to thrive with close to 600 students volunteering and graduate student representatives serving on more than 30 Institute-level committees. Graduate students also engage in international engagements through individual faculty-driven research collaborations and Institute-supported global research teams (e.g., The Singapore-MIT Alliance for Research and Technology or SMART), internships (The MIT International Science and Technology Initiatives or MISTI) and globally-oriented curricula (e.g., MIT Sloan Action Learning Labs).

On a Journey of Self-Discovery and Willing to Take Risks

Today's MIT graduate students are not only immersed in a diverse array of academic, co-curricular, and extra-curricular opportunities ("drinking from the fire-hose") but in addition must manage 24/7 access to information, hyper-communication, national and global uncertainty and increasing expectations for productivity. Within this turbulent maelstrom of choice and interactivity, they are searching for purpose and meaning in life and seeking to explore and define their own educational and life path. The graduate student participants expressed a desire for a guided, supported, more flexible and personalized education, e.g., greater ease to study boundary-crossing and non-traditional research areas, increased access to interdisciplinary and extra-departmental interactions and holistic mentoring beyond the primary thesis advisor, including peer advising, for educational mapping and navigation. An evolution for graduate evolution was proposed; a core of academically rigorous foundational, discipline-specific training integrated with long-term transferable professional

Generational Characteristics of the MIT Graduate Student Population

- Taking Action to Have a Positive Impact in the World
- On a Journey of Self-Discovery and Willing to Take Risks
- Increasingly Diverse and Inclusive
- Exhibiting the Paradox of Simultaneous Optimism and Pessimism
- Natives of the Digital World
- Striving for Work-Life Integration

skills development and personal growth, in particular, critical thinking and the ability to produce creative solutions to broad complex problems, manage failure, self-reflect, and develop self-confidence. All of the student participants in the round table felt that they had in some way taken educational "risks" during their time at MIT, for example: switching fields to pursue a deeper passion, choosing a non-conventional interdisciplinary research topic, creating a start-up company with scholars outside of the current field of study, going abroad with programs like the MIT Sloan Action Labs, and engaging in leadership and student government; they felt it would be highly beneficial to reduce the "invisible" barriers to such activities.

Increasingly Diverse and Inclusive

Compared to previous generations, our graduate population is increasingly diverse (approximately 38% international, 12% domestic underrepresented minority, 32% women), which is reflective of recruitment efforts at all levels of the Institute, national demographic shifts, and the increasing globalization of higher education. Diversity is a core value of MIT and deep-rooted inclusivity is an aspiration for MIT. The Office of the Dean for Graduate Education (ODGE) has adopted a vision to foster an environment which embraces the potential of all its members, where all feel intellectually and socially engaged, valued, interacting, and connected to the MIT community. This philosophy is a component of the recently

launched "MITogether" campaign. The participating students in the round table cited the benefit and prevalence of over 450 interest groups along many dimensions – from faith and cultural groups to arts and athletic communities – as core support structures that often enable students to go out and engage more confidently in the broader MIT community. Cross-disciplinary and cross-cultural interactions are also facilitated by the large residential graduate community that houses approximately 38% of graduate students on campus and related programming such as Sidney Pacific Cultural InterExchange or SPICE.

However, challenges do exist, in particular for underrepresented minority students with regards to the perceived tension between diversity and excellence which creates a need to justify qualifications and belonging (see *The Tech*, Volume 132, Issue 5, 2012), the small number of faculty role models of similar backgrounds, disconnection with faculty, self-doubt, isolation, and self-confidence. International students may also face issues related to cultural acclimation. While there is still work to be done, the students who participated in the round table viewed MIT as a place where dialoguing has begun, the barriers to having difficult conversations are decreasing, and cross-cultural interactions are growing.

Exhibiting the Paradox of Simultaneous Optimism and Pessimism

The participating students in the round table expressed a paradox of outwardly facing optimism and confidence simultaneously with inward pessimism and self-doubt (the "imposter syndrome"). When they look from MIT out into the world, they were optimistic about tackling the world's challenges, but when they look within the bubble of MIT at their educational journey, they are sometimes pessimistic about being able to make it through. The students commented that this may be due in part to the high quality and accomplishments of their peers, the lack of experience with failure and learned coping mechanisms, the large

number of choices and decisions, the increasing expectations of productivity, and the drive to achieve an artificial vision of perfectionism. In the worse-case scenario, these contributing factors can lead to isolation and factor into depression and mental health issues; in fact, the volume and complexity of personal support needed and requested by graduate students has increased dramatically in recent years and 42% of graduate students cite academic and/or social isolation as a barrier to their academic progress (2011 Enrolled Graduate Student Survey). Graduate education and its supporting infrastructure at MIT can serve to proactively prevent and mitigate such issues, to build self-confidence so that an equilibrium can be achieved between these two diverging facets of their character. A Quality of Life Survey for the entire MIT student population spearheaded by the Chancellor's office is planned for the spring of 2013 to better understand such issues and guide future programming.

Natives of the Digital World

This generation of graduate students uses technology and diverse and personal media ubiquitously and simultaneously for communication, classwork, and research. They are infiltrated by technological tools that affect their educational experience in a myriad of ways: social interactions, communication with their thesis advisor, remote online instrumentation training and experimentation, scholarly conferences, online disciplinary discussion groups, virtual international collaboration, nearly instantaneous literature alerts, etc. The research of Professor Sherry Turkle (MIT Program in Science, Technology, and Society) reveals how the use of technological devices causes the periodic mental and emotional removal from face-to-face interactions, the sacrifice of deep and meaningful conversations and a reduced capacity for self-reflection and solitude, ultimately increasing vulnerability to loneliness and isolation. As deep intellectual discourse is the currency of collaboration, research innovation, and

knowledge generation central to graduate education, Professor Turkle's comments on the creation of sacred times and spaces for deep thought, active listening, and face-to-face interactions warrant consideration as we consider the evolution of the twenty-first century residential research university: for example, curriculum, *MITx*, the physical plant and teaching, learning, collaboration and community spaces, co-curricular activities and transferable skills development, and in mentoring and advising.

Striving for Work-Life Integration

The Millenial generation is evolving the concept of work-life balance to a more flexible work-life *integration*. Many aspects of graduate education enable the capability to work whenever and wherever is most productive. Faculty, who serve as role models for our graduate students, report increased satisfaction with the ability to integrate work and personal/family life from 40% in 2008 to 64% in 2012 (Faculty Quality of Life Survey). Many of our graduate students have families; 49% report having a spouse or partner and 9% report having one or more children (2011 Enrolled Graduate Student Survey). For graduate student families, the dual role of parenting and being a graduate student is challenging, with regards to finances, childcare, and scheduling. It requires prioritizing, time management, and coming up with creative solutions. Simultaneously, there is great opportunity for families of graduate students sharing the MIT culture and lifestyle to build a continuous integrated experience. MIT increasingly plays a role as a resource for education, creativity, and inspiration for graduate student families.

The Future

The ODGE Strategic Plan (*odge.mit.edu/about/strategy/*) sets forth a future vision for graduate education which considers the generational changes of our graduate students – expanding upon its foundation of the creation and dissemination of original knowledge at

the frontiers of a field, to include also the recognition of what the new knowledge generated means in a broad context, and the development of a metacurricular skillset and the character to act on this new knowledge for the benefit of humanity. ODGE strategic initiatives on facilitating cross-cutting interdisciplinary intellectual networks, diversity and inclusion, personal support and professional development were all areas raised in the round table and in many other discussion forums. New ideas were raised as well within these general themes and provide opportunities, as we continue to dialogue on how we may best advance the quality of graduate education at MIT. It is clear that as higher education is undergoing disruptive change, it is taking our students along with it; our creativity and collaboration will allow us to direct this wave of change.

Acknowledgements

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Ellan Spero is a Doctoral Student in the Program in History, Anthropology, Science, Technology and Society (*efs8@mit.edu*).

The Office of Faculty Support: What Can We Do To Help You?

Diana Henderson

OUR NAME SAYS IT ALL – the Office of Faculty Support (OFS) is here to help faculty in your educational endeavors. OFS staff members assist in developing and coordinating the undergraduate curriculum and educational programming, support our remarkably strong faculty governance system, and provide information and infrastructure related to undergraduate education. We also advocate on behalf of the faculty for improvements to the educational infrastructure and resources.

Specifically, OFS:

• Supports the Committee on the Undergraduate Program, the Subcommittee on the Communication Requirement, the Subcommittee on the Humanities, Arts, and Social Sciences (HASS) Requirement, and other committees related to the undergraduate curriculum

• Oversees the Communication Requirement and the HASS Requirement, and advises undergraduates about both requirements

• Manages the Margaret MacVicar Faculty Fellows Program

• Convenes monthly meetings of departmental Undergraduate Officers

• Distributes grants from the d'Arbeloff Fund for Excellence in Education and the Alumni Class Funds, and analyzes their outcomes to help disseminate successful innovations

• Administers student subject evaluations

• Gathers and represents faculty, student, and staff perspectives in projects to improve online academic services

• Provides outreach and communications regarding the undergraduate program generally and the General Institute Requirements (GIRs) in particular, both online and person-to-person

Frequently partnering with staff from other offices, OFS staff members are currently involved in a number of projects including:

• Fostering curriculum innovation, particularly in the GIRs, in cross-disciplinary areas, and in online education that contributes to MIT students' learning

• Coordinating the transition to a new Distribution Component of the HASS Requirement

• Supporting the experimental HASS Exploration (HEX) Program

• Moving the HASS Concentration Forms online

• Designing better tools to help instructors manage enrollments in MIT subjects

• Streamlining the Institute subject evaluation questions

Support for Faculty Committees

MIT is, in my experience, unique in the persisting strength of its commitment to faculty governance: the "hands on" attitude that we value in our educational programs extends to our role in overseeing the curriculum and helping to run the Institute. With such involvement comes much responsibility, as well as the need to understand how the varied parts of our curriculum combine to provide our students with an excellent education. To help in this process, OFS keeps track of faculty educational policies and principles over time and supports the work of many committees.

Dean for Undergraduate Education Daniel Hastings created OFS and appointed me director and Dean for Curriculum and Faculty Support in 2006, just as the Task Force on the Undergraduate Educational Commons was publishing its recommendations to improve the quality and clarity of the undergraduate educational experience. Dan and I served on that Task Force, and several of the members of the new OFS had provided support. OFS worked with the Educational Commons Subcommittee and the Committee on the Undergraduate Program (CUP) as the Task Force recommendations were refined, discussed, and voted on by the faculty.

Among the curricular changes OFS helped implement were MIT's offering of double majors instead of double degrees and the revised Distribution Component of the HASS Requirement, which is replacing the limited list of HASS-D subjects. As oversight of the HASS Requirement shifted to a new CUP subcommittee, support for that Subcommittee on the HASS Requirement (SHR) moved to OFS, joining our ongoing support for CUP and

the Subcommittee on the Communication Requirement (SOCR).

At the behest of faculty on these committees, OFS staff often track emerging issues related to undergraduate education, and assist in coordinating work across the various groups. They collaborate closely with faculty members chairing the committees, preparing background materials for meetings and disseminating policy documents and recommendations that result from committee consideration. An important part of the staff work is maintaining committee records, which those involved in faculty governance often find of use subsequently – as when perennial concerns (such as student advising, or pace and pressure) appear on our agenda.

OFS staff also try to assist faculty members in departments as they present curricular changes such as the introduction of new majors or minors. The iterative process that requires presentations to various faculty committees and the faculty as a whole can appear daunting, so recently staff from OFS, the Registrar's Office, and the President's Office developed guidelines and a proposal template for a New Undergraduate Degree Program, which are available on the faculty Website at *web.mit.edu/faculty/ governance/degree.html*. Work is underway to develop parallel materials for faculty seeking to propose new undergraduate minor programs.

For faculty wishing to have their subjects designated as fulfilling components of the Communication and/or HASS Requirements, OFS staff (Kathleen MacArthur for the Communication Requirement and Genevre Filiault for the HASS Requirement) can provide information on both the criteria for and licensing of subjects. Typically they will serve as liaisons to the subcommittees and assist faculty and departments throughout the proposal process. The subject proposal deadline for both requirements is December 7, 2012.

Advising for the Communication and HASS Requirements

Because of the overlap between the Communication and HASS Requirements, OFS created a position that provides a single point of advising to ensure that students stay on track in both requirements. Patricia Fernandes, the advisor for the Communication and HASS Requirements, is available to students, advisors, and administrators who have questions about either requirement (as am I).

Staff from OFS and from Information Services and Technology (IS&T) are currently working to move the HASS Concentration process online so that students will be able to submit proposal and completion forms electronically for review and approval by concentration advisors. The forms will also be available for viewing by students' major advisors.

Curriculum Innovation

Each year faculty can apply for financial support from two funds administered by OFS: the d'Arbeloff Fund for Excellence in Education, and the Alumni Class Funds (supported by the Classes of 1951, 1955, 1972, and 1999). The application periods for the funds are staggered to provide more options to faculty, with applications due in the fall for the d'Arbeloff Fund and at the beginning of spring term for the Alumni Class Funds – all for projects offered during the subsequent academic year. Proposals for Alumni Class Funds are due February 1, 2013.

These grants foster experimentation in residential-based undergraduate education with particular emphasis on the GIRs, the experience of first-year students, interdisciplinary and cross-disciplinary offerings, and development of online learning modules for use at MIT.

Selections are decided by a committee of faculty from across the five Schools, as well as the donors. Last year 17 faculty groups received almost $373,000. Five projects received d'Arbeloff awards, while

Each year faculty can apply for financial support from two funds administered by OFS: the d'Arbeloff Fund for Excellence in Education, and the Alumni Class Funds . . . .

12 grants were made from the Alumni Class Funds. Even when a grant is not awarded, we try (within the bounds of confidentiality) to share any helpful feedback or to redirect applicants to other, potentially more appropriate sources of funding or assistance. Please feel free to contact Mary Enterline or myself with your proposal ideas or questions about the funds.

Beyond the funds, OFS supports the efforts of the CUP in licensing educational experiments, and is currently involved in discussions at faculty committees on the impact of *MITx* and online learning on residential-based undergraduate education. I sit on the MIT Council on Educational Technology (MITCET) as well. We also collaborate with our DUE colleagues in the Teaching and Learning Laboratory (TLL) and the Office of Educational Innovation and Technology (OEIT) to promote educational innovation at MIT.

Margaret MacVicar Faculty Fellows Program

The Margaret MacVicar Faculty Fellows Program is the newest addition to the OFS portfolio, having become part of OFS last academic year. The program, which honors MIT's first Dean for Undergraduate Education, is MIT's highest undergraduate teaching award. OFS staff oversee the nomination and selection process for fellows, who are recommended by a committee of faculty and students for the Provost's approval.

New MacVicar Faculty Fellows are honored at MacVicar Day events each March. MacVicar Day also features a program focused on undergraduate education, which is open to the entire MIT community. Last year we had a wonderful panel of speakers, in a tribute honoring the late Professor and Dean of Science

Robert Silbey; the event highlighted the ongoing excellence and commitment of some star teachers. The next MacVicar Day will be March 13, 2013. As well as MacVicar Day, we organize other events for the fellows and for the public.

The MacVicar program provides an opportunity for these dedicated faculty across MIT to learn from one another, share their innovations, and advocate for excellence in our undergraduate educational mission. We meet several times each year, and I have tried to institute new opportunities for sharing perspectives among and by the MacVicar Fellows, for the benefit of the wider community.

Undergraduate Officers Group and Faculty Outreach

In OFS we see ourselves as a bridge between teaching faculty and members of the administration. During the academic year, I convene monthly meetings of the Undergraduate Officers from all departments, sections, and programs. This is an opportunity both to provide information for the officers to take back to their colleagues and also to get feedback on educational issues and on administrative and infrastructure changes. For example, at a recent meeting, we had presentations and discussions on streamlining subject evaluation questions, changes to the gradebook module in Stellar, and actions to take if you perceive students are highly stressed. We welcome hearing more from departments about their instructional staff's concerns and interests, especially as they might help us maintain and improve the education of our MIT undergraduates. We are happy to put you in touch with people and offices whom you might wish to have visit your faculty meeting.

Subject Evaluation

MIT's subject evaluation system moved entirely online in fall 2010 after a two-year pilot which benefited from the experience and perspectives of many departments (including Courses 2, 6, and 16, who had previously set the way forward by establishing local online systems, and have since joined our common system: many thanks!). OFS now manages the Institute-wide system.

This past spring, after consultation with the Officers of the Faculty, I convened a Subject Evaluation Advisory Committee (SEAC) comprised of faculty with expertise in education, surveys, and evaluations from all five Schools, as well as undergraduate and graduate student representatives.

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SEAC's first task was to examine the Institute-wide questions asked on the evaluations. We had continued to use the two sets of 30-plus questions from the paper forms (with slight variations between those for Science/Engineering subjects and those for SHASS/SAP) as the online system was established, so that we could compare responses between the two systems without introducing extra variables. However, following the recommendations of an earlier advisory group, OFS has since worked with the Teaching and Learning Laboratory and SEAC to create a shorter, more universally relevant set of questions. Fewer common questions will make the basic forms less onerous for our busy students while allowing greater customization by Schools, departments, and instructors who are now able to add a limited set of their own specific questions. We hope that reducing the standard set of questions may also help response rates by keeping surveys to a reasonable length.

The streamlined set of questions has been shared with the CUP, the Committee on the Graduate Program, the Faculty Policy Committee, and the Undergraduate Officers. We hope to introduce and test the new set of questions during this academic year with the cooperation of the Sloan School, who could help us become the rare university to have a single set of evaluations.

Summary subject evaluation data continues to be available to everyone in the community while instructors, department heads, and academic administrators can also access student comments. OFS staff help departments, Schools, faculty committees, and administrative offices analyze the data as they consider curricular questions and policies. We also stand ready to suggest good practices for encouraging student participation: At the top of the list, perhaps hearteningly, is faculty making a point of valuing the responses, and letting students know that directly. Many faculty encourage students to bring laptops to class (the MIT Library has loaners if needed) and reserve time for their responses.

Enrollment Management

As part of the Online Registration Phase Two initiative, I am the business lead on a project team that was formed this past spring to deliver tools that support instructors' ability to manage enrollment within individual subjects. Through these tools, we hope that students will more easily find appropriate subjects in a timely fashion, instructors will be able to accommodate those students with the greatest need in limited enrollment subjects, and departments will be able to improve their advance planning. OFS is providing sponsorship and staffing for this project jointly with the Registrar's Office and IS&T.

The project team received preliminary input through discussions with faculty groups including CUP, SOCR, and the Undergraduate Officers Group. This past spring, a subset of the team interviewed faculty and staff from eight departments (2, 5, 6, 9, 14, 18, 21L, 21W) in an attempt to better understand the issues depart-

ments face with enrollment management. In May, the team administered an online survey to all active faculty and non-faculty instructors, to which 505 people (including 326 faculty members) responded. Some who were on leave may not have received the survey, and if you have additional input do please feel encouraged to contact me directly.

The project team has identified the following items as potentially in scope for the project:

• Tools for adding, removing, approving, and denying student enrollment throughout the term

• Capacity to enforce limited enrollment caps

• Tools to set priorities for enrollment

• Support for waitlists

• Capacity to track and enforce pre/co-requisites

• Tools for managing and enforcing permission of instructor

• Tools for section management

• Tracking and managing conflicts within an individual student's schedule

The team has just begun prioritizing these items. It is possible that some may be addressed in other IS&T projects – and, of course, getting these projects right takes time. We'll keep in touch as the work evolves.

As you can see, we have many ongoing projects in OFS. At all times, however, our first priority is to support faculty members in their educational endeavors. When you have an idea or a question and don't know where to go, don't hesitate to contact us. We're located in Building 12, just off the main corridor, down the hallway by Café 4. Or call (x36776) or e-mail us (*ofs@mit.edu*). Our Website is *web.mit.edu/facultysupport*. It includes links to the program Websites and contact information for the staff. We'll help you, or try to direct you to someone who can. ■

Diana Henderson is Dean for Curriculum and Faculty Support and a Professor in the Literature Section *(dianah@mit.edu)*.

Preparing for a New Industrial Revolution

Ernst G. Frankel

MANUFACTURING AND SCIENCE have converged and the new manufacturing environment has little in common with traditional ways of making things. Similarly, it is no longer labor intensive and therefore labor cost differentials play a declining role and no longer serve as an excuse for outsourcing to low labor cost countries or regions. There is an urgent need to teach manufacturing not only based on simple mechanical and physical processes, but on smart processes and assembly decisions.

Supply channels as well as idea chains are now global and virtually real-time, as electronic communication permits both information and command transfer almost instantaneously. We must teach a new generation of technical design and manufacturing engineers capable of integrating new material, information, and technology not just into new products and uses, but also into effective manufacturing, assembly, and delivery. This will require a new kind of engineer, one with multi-disciplinary skills, a broad view and unfettered imagination, who questions everything and is willing to ignore tradition. Such a person must learn not only the basics but, more importantly, how, what, and when to question.

We must teach our students not just that the sky is the limit, but that human imagination can solve and resolve any problem, as well as develop new solutions. We have developed unique new technologies; let us now do the same for their manufacturing, assembly, and use. Such a challenge may require a new approach to engineering education, and MIT is well positioned to lead this revolution.

In addition to new types of degree pro-grams, we should also consider offering trade or apprenticeship programs, using MIT's workshops and laboratories not just for research, but also for the training of a new generation. The objective would be to develop a cadre of new, well-trained, motivated, and equipped manufacturing leaders who not only have the required skills, but also the knowledge and incentive to always question how things are done, and the ability to get them done better, cheaper, and faster.

Concomitantly, there is an urgent need for expanding the re-education and training programs offered by MIT, with engineers and scientists, as well as skilled workers, returning every 7-10 years to renew their knowledge and maintain their credentials. ■

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MIT: First in the World, Sixth in the U.S.?

MANY ORGANIZATIONS CREATE and publish rankings of institutions of higher education. They range from the trivial – *Princeton Review*'s top party schools – to the much-hyped *U.S. News & World Report* rankings. One goal most of these rankings have in common is putting the top institutions into a simple rank-order list that somehow captures the quality of the entire educational experience. Colleges and universities are sufficiently complex that any comparison will by nature be reductive, but the publishers of these rankings each claim that they are reducing to the most important factors.

Here at MIT, Institutional Research (in the Office of the Provost) routinely collects and distributes to our Schools and departments four popular ranking systems: the aforementioned *U.S. News & World Report* (which has overall university rankings as well as undergraduate and graduate subject rankings), *Times Higher Education* (from the U.K. magazine of the same name, also divided into institutional and subject rankings), the *QS World University Rankings*, and the *National Research Council* ranking of graduate programs. These rankings incorporate a variety of measures to arrive at an overall score. For each category, say teaching for example, the rankings usually incorporate quantitative measures, such as the faculty-student ratio, and qualitative measures, such as teaching ratings from reputation surveys. In addition to measures of teaching, other drivers of these rankings methodologies include indices of research productivity (such as numbers of publications and citations), financial resources, and the ill-defined construct of reputation.

Generally speaking, the different rankings adopt different orientations which can be broadly categorized into input-centric and output-centric. Nearly half of the *U.S. News & World Report* ranking is composed of input measures such as incoming undergraduate class rank, incoming undergraduate SAT scores, undergraduate selectivity, financial resources per student, and student-to-faculty ratio. A

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third of the *U.S. News* ranking is based on outputs (graduation and retention rates and alumni giving).

Two other rankings are more output-based than *U.S. News*. 60% of *The Times Higher Education* (*THE*) World University Rankings is based on faculty research outputs (publications and citations), and 20% of the *QS* World University Rankings is related to citations. Both of these rankings, as their names would suggest, include institutions from around the globe, not just in the United States. MIT tends to do much better in these rankings than in the *U.S. News* rankings, due to their focus on research. The most recent

THE rankings have MIT third worldwide, and the *QS* rankings have MIT as the number one institution in the world. While this may sound perfectly reasonable to those of us who work here, *U.S. News* disagrees and most recently had us tied for sixth place nationally with Stanford.

While these systems of rankings assign different weights to different categories, all three of them include some arguably objective, verifiable measures, such as publications and citations, student characteristics, or student-to-faculty ratios. The survey-based measures of reputation are more opaque, and influence the rankings to a considerable extent. Each of the rankings includes the results of surveys sent to faculty, department chairs, employers of graduates, and/or college and university presidents. As a part of these surveys, academics from the participating institutions are asked to score the other institutions, and an average of these scores is a part of the final tally. The most reputation-based ranking is *QS*, with 50% of an institution's rank derived thereof. *U.S. News* is 22.5% reputation, and *THE* is 15%.

2012-2013 World Rankings of Colleges/Universities

Rank	*Times Higher Education*	Rank	*QS*	Rank	*U.S. News & World Report*
1	CalTech	1	**MIT**	1	Harvard
2	Oxford	2	Cambridge	1	Princeton
3	Stanford	3	Harvard	3	Yale
4	Harvard	4	Oxford	4	Columbia
			University College		
5	**MIT**	5	London	4	U of Chicago
6	Princeton	6	Imperial College London	**6**	**MIT**
7	Cambridge	7	Yale	6	Stanford
	Imperial College				
8	London	8	U of Chicago	8	Duke
9	Berkeley	9	Princeton	9	U of Pennsylvania
10	U of Chicago	10	CalTech	10	CalTech

All three of these publishers also produce rankings at the subject/course level. *THE* uses the same methodology for their subject rankings as they do for their institution rankings. *QS*'s subject rankings are more simplified than their institutional ones and rely only upon a survey of academics, of employers of graduates, and counts of citations. The relative weight of each category is tailored to each field as deemed appropriate to that field. *U.S. News*, however, includes no objective measures in their undergraduate and graduate subject rankings. These are determined entirely by surveys sent to deans (for their rankings of undergraduate engineering and business) and department heads (for their rankings of graduate programs).

The last ranking system mentioned in the introduction, but purposefully left separate, is the *NRC*'s 2010 ranking of doctoral programs. The methodology for the *NRC* rankings was designed to use measurable data on doctoral programs and apply both the stated preferences of academics in the field and their revealed pref-

erences. This was done using a survey that asked not only how respondents would rate each program, but the importance of certain factors – such as graduate student support or number of publications by faculty – to compute a range of rankings for each program. One range was calculated using weights derived from the stated importance of the factors, while the other was calculated using the *revealed* importance of these factors based upon ratings of programs. So, for example, if respondents to the *NRC* survey (i.e., faculty in the field) said that diversity was very important, but then the top-rated programs were not diverse, measures of diversity would be a large part of one ranking but not the other. The end result was a ranking that, despite its noble goal of capturing the "multidimensionality" of doctoral program quality, gave programs two ranges of rankings (e.g., from fourth to fourteenth for stated importance and fifth to eighth for revealed importance) that are difficult to understand or interpret because the typical consumer of rankings wants a single number.

All of these rankings attempt to do something very difficult by quantifying – at a single point in time – the relative quality of one school or program that is constantly evolving. For those of us at MIT, the difference in our rank from one year to the next, say from fifth to sixth, seems arbitrary. But for institutions and programs on the margin of the top 10 or the top 50 or top 100, being bumped out of one of these groups could mean a difference in which students apply for admission. Perhaps the greatest source of anxiety is being ranked first, as there is nowhere to go but down. In summary, while it is important to watch the rankings in order to know how your institution or program will be perceived by consumers of these rankings, it is also important to know that the methods behind these rankings determine the results just as much as the quality of the school or department. ■

An Opportunity for Faculty to Help Shape MIT's Remarkable Graduate Student Community

Costantino J. Colombo
Christine Ortiz

HOUSEMASTERS HAVE BEEN AT the heart of the MIT graduate student experience since the 1930s, when Dr. Avery Ashdown (PhD '24) was selected as the first live-in faculty resident of any of the dormitories at MIT. Today, faculty still hold a vital place as the intellectual and community leaders of the residential system for graduate students. [*studentlife.mit.edu/housemasters*]

This year, MIT is seeking to appoint faculty housemasters to two graduate dormitories for a term beginning in the 2013-2014 academic year. At Ashdown House, MIT's oldest graduate community, EECS Professor Terry Orlando and Dr. Ann Orlando will be stepping down after more than a decade of living alongside graduate students, including overseeing Ashdown's 2008 move from its former location to a brand new building at Pacific & Albany Streets. [Ashdown: *whereis.mit.edu/?go=NW35*]

Next door at Sidney Pacific, HST Professor Roger Mark and Dorothy Mark are also ending their terms after leading their building through its first 10 years. They have overseen the development of a remarkable community at MIT's largest residence hall, including a wonderful 10th anniversary celebration this past July. [Sidney Pacific: *whereis.mit.edu/?go=NW86*]

"We have had the pleasure of supporting incredibly talented, creative, and committed student leaders as they have worked hard to develop our residential community into a welcoming, supportive, and very socially active home," Roger Mark says of the experience. "The dorm is highly diverse: close to half of the 700 residents are international students from more than 50 different countries. We have made many close friends from all over the world, and for me a pinnacle experience was officiating at the marriage of two of

structure of Ashdown House. And there is deep satisfaction during graduation to see a student whom we have assisted over a 'rough patch' graduate as an accomplished and confident professional," says Ann Orlando. "Living with a vibrant group of international scholars has enriched our lives more than we could have imagined –

Graduate Housemasters have a rich, engaging, and influential position. As the senior residents in the community, they serve in a role that is part advisor and advocate, mentor and neighbor.

our officers! Serving as a Housemaster has definitely been the highlight of my MIT years."

Graduate Housemasters have a rich, engaging, and influential position. As the senior residents in the community, they serve in a role that is part advisor and advocate, mentor, and neighbor. They also are central to fostering community and sustaining the special traditions of each location in partnership with very active and mature student executive committees. Besides the personal and social experience of working directly with graduate students, there are several other more tangible benefits. Housemasters receive free housing, in beautiful apartments located right on the MIT campus, as well as a salary supplement.

"One of the joys of 'Housemastering' is watching a student grow in leadership skills as they participate in the governing

from music to art to photography to cooking to athletic skills. And mostly we will cherish the friendships made over the years."

If this sounds exciting to you, please consider applying to serve as a graduate Housemaster. To learn more about the rewards and responsibilities, contact Henry Humphreys, the Senior Associate Dean for Residential Life, at *humphrhe@mit.edu* or (617) 252-1505. Dean Humphreys will be happy to answer your questions about the logistics of moving to campus or to put you in touch with other graduate Housemasters so you can learn more about this special position in the MIT community. ■

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Faculty Committee Activity: Fall 2012 Update

Aaron Weinberger

IN A PRACTICE BEGUN last spring, the Office of the Faculty Chair publishes a biannual article in this *Newsletter* summarizing the work of the Standing Committees of the Faculty. In a meeting of the Committee Chairs in September, a number of common themes emerged.

Across the board, the committees are thinking about the potential impact of *MITx* on education and student life. Online learning could affect nearly every aspect of MIT, including curriculum development, course credit, the Library's Open Access Policy, space planning, and technology. Committee Chairs are eager to hear more about the Institute's plans for the governance of *MITx* in order to start planning for the appropriate oversight and support infrastructure.

The Committee on Nominations is facing a challenge as it tries to recruit new members to serve on the Standing Faculty Committees. The annual committee preference questionnaire generates only a 37% response rate. As a result, the same faculty members are consistently called upon to serve while many others remain unengaged in faculty governance. In recent years, there also seems to be an increase in the number of faculty who choose to leave their three-year service commitment early. The Committee is considering ways to increase faculty participation, including asking department heads to place a higher premium on committee service.

The Library continues to face obstacles to its Open Access Policy, most notably from Elsevier. As Professor Richard Holton described in an article in the FNL last spring ["New Open Access Working Group Formed: Formulating Response to Elsevier's Policy Change," Vol. XXIV, No. 4] the Committee on the Library System has charged a working group to reassess the policy in light of Elsevier's revised author contract requiring authors to obtain an express waiver from MIT's policy in order to publish. The Library is committed to building on the success of the Open Access Policy and maintaining a free flow of faculty scholarship online.

In consultation with the Faculty Officers, the Committee on the Undergraduate Program (CUP) and the Committee on Curricula are considering models for the governance of interdisciplinary minors. Last spring, an experiment initiated by the CUP to govern the Energy Studies minor came to an end. The committees have worked with administrators in the Energy Initiative to formulate a long-term plan for governing the minor, and are working to implement oversight for interdisciplinary minors that are comparable to those provided for departmental minors.

The Committee on Undergraduate Admissions and Financial Aid is closely monitoring the case of Fisher v. University of Texas now in front of the Supreme Court. The case focuses on a white student who was denied admission to the University of Texas, allegedly because of discriminatory admissions practices. If successful, the suit could impact the way universities assess and admit underrepresented minority applicants. MIT has made great strides in cultivating a diverse student body; there are concerns that the Court's ruling could negatively impact MIT's commitment to diversity.

The Faculty Policy Committee's (FPC) IAP Subcommittee continues its work to examine the evolution of IAP since its introduction in 1971. IAP has clearly changed over the last 40 years, most notably with the inclusion of for-credit subject offerings. Many would argue that the evolution of IAP has been positive and that the current state of IAP is now integral to the MIT experience, while others are concerned that the term-like qualities of IAP are at odds with its original intention. The Subcommittee plans to submit a report to the FPC later this fall.

The FPC is also preparing to charge a working group to examine the September student holiday experiment that was launched in 2009. The experiment shifted the date of the September student holiday, which according to the *Rules and Regulations of the Faculty* must fall on a Monday, to a Wednesday in 2011 and to a Friday in 2012. The impetus for the experiment was to align the holiday with Career Day; the students in 2009 felt that it was not ideal to hold Career Day on a Monday. With the experiment now complete, the FPC must assess its success to determine the appropriate long-term placement of the September holiday. ◼

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Progress Report on the Bernard M. Gordon – MIT Engineering Leadership Program

Joel Schindall

Introduction

IN MAY 2009, MY fellow co-director Ed Crawley (Ford Professor of Aeronautical and Astronautical Engineering), and I, wrote an article in the *Faculty Newsletter* [Vol. XXI, No. 4] describing a new program housed in the School of Engineering: The Bernard M. Gordon - MIT Engineering Leadership Program (Gordon ELP). At the time, we had been in existence for almost two years and had 14 students. After spending a solid year planning program pedagogy, we had enthusiasm and high hopes – but few results to report.

The purpose of this article is to describe the background and philosophy of the program, to provide a status update, and to report some encouraging assessment results concerning how the Gordon ELP is advancing the confidence (self-efficacy) of MIT engineering undergraduates.

Program Background and Philosophy

In early 2008, with initial funding from a $20M pledge (with a matching requirement) to the School of Engineering by the Gordon Foundation (headed by MIT alumnus Bernard M. Gordon, '48, MS '49), we worked with prominent educators, MIT alumni, industry leaders, military leaders, community leaders, and those from other leadership programs at MIT to design, develop, and implement an integrated undergraduate program in engineering leadership.

This group started with the premise – strongly validated by the industry leaders – that engineers design and build things that meet the needs of customers, benefi-

ciaries, and ultimately society. As a consensus of this group, we generated our guiding pedagogical document, *The Capabilities of Effective Engineering Leaders*. (For an explanation of *The Capabilities of Effective Engineering Leaders*, see the Program Website *web.mit.edu/gordonelp*.)

Guided by *The Capabilities of Effective Engineering Leaders*, the Gordon ELP seeks to educate and develop the character of outstanding MIT students as the potential future leaders (not necessarily entrepreneurs) of engineering practice and development. In this program, we define *engineering leadership* as the technical leadership of change: the *innovative* conception, design, and *implementation* of new products/processes/projects/materials/molecules/software/systems, supported by the *invention* of enabling technologies, to meet the needs of customers and society.

The capabilities of engineering leadership upon which our curriculum is built are based on the Four Capabilities model, developed at the MIT Sloan School of Management (Ancona 2007), and anchored in the scholarship of leadership. The educational task of our program is to provide opportunities for all engineering undergraduate students to further develop, deepen, and broaden their engineering leadership capabilities.

Program Specifics: The GEL Program Today

The Gordon ELP is designed to augment MIT's educational commons by providing engineering undergraduates with the design thinking, system

thinking, teamwork skills, and engineering leadership skills that are vital to an effective engineering career (in either industry or academia).

The Gordon Engineering Leader (GEL) component combines:

- immersive experiences on and off campus in which students practice, observe, and discuss engineering leadership, with

- courses that provide conceptual and analytical models and frameworks that support engineering leadership, and

- reflection, evaluation, and feedback from faculty, peers, and experienced engineering industry mentors on lessons learned from leadership activities.

The GEL program can begin as early as the sophomore year, with students participating in UPOP (the Undergraduate Practice Opportunities Program). Over 500 sophomores have applied for this year's program. UPOP students are introduced to engineering practice, receive personalized coaching, a summer internship, post-internship reflective activities, and hone basic interpersonal proficiencies such as effective networking. Participating in UPOP is not required for application to the GEL program, but it is recommended and many students have found it useful.

Although we hope to expand to serve all MIT students, both undergraduate and graduate, the existing GEL funding is des-

ignated for engineering undergraduates. In February preceding their junior and senior year, engineering students can apply for the GEL Year One (GEL1) program consisting of short subjects in engineering leadership and engineering innovation and design, weekly hands-on Engineering Leadership Labs (ELLs), and projects, mentorships, and a personal leadership development plan. GELs participate in guided reflection on their successes and discover opportunities for improvement. Mentors, faculty, staff, peers, and program alumni provide guidance in reflecting on and learning from leadership experiences. The time commitment of GEL1 is equivalent to an MIT concentration.

Students who successfully complete the GEL1 requirements may apply for the more intensive GEL Year Two (GEL2) program of two additional short subjects in project engineering and planning, and human and organizational contexts, more weekly ELLs, and projects, an Internship Plus, additional mentoring and coaching, more leadership roles, and a compelling final presentation of their personal leadership development plan. The time commitment of the two-year program (GEL2) is equivalent to an MIT minor.

In our short subjects, weekly ELLs, and other activities, it is important to note that we are not *lecturing* students about leadership; rather, we are developing their ability to "*be*" effective engineering leaders by immersing them in an environment of intensive practice in engineering leadership or team member roles and giving them active, candid feedback, coaching, and mentoring on their effectiveness.

The Engineering Leadership Labs (ELLs)
A distinguishing element of the GEL program is the inclusion of experiential learning opportunities for the development of leadership capabilities in the weekly two-hour Engineering Leadership Laboratories. GEL1s (two semesters) and GEL2s (four semesters) fully participate in ELLs that are each designed to provide

The Capabilities of Effective Engineering Leaders.

Small teams of GEL1s are placed in engineering situations and challenges. The assignment of team leader rotates among the GEL1s and the GEL2 assigned to the team giving all team members several opportunities each semester to be the team leader. The situations – often designed in collaboration with practicing engineers – are set in a context that provides a feeling of authentic industry practice (e.g., setting up an assembly process for simple testing devices), and each lab is designed to practice a different leadership capability.

The team leaders are observed by faculty, staff, GEL alums, or guest engineers, a leadership capability assessment card is completed, and team leaders and evaluators give private feedback on the leader's performance, including what went well, what did not go well, and what needs to go differently at the next leadership opportunity. In keeping with learning pedagogy, students also reflect on their performance and complete a reflection document.

GEL2s also act as a cadre, helping run most of the ELLs, providing support for the GEL program outreach and team-building events, and designing and running one ELL each semester entirely on their own.

Other Program Components
To serve non-GEL engineering undergraduates, the program partners with departments to promote capability development by providing activities, class sessions, materials, and workshops on leadership, teamwork, and project engineering. We can also collaborate with departments by funding and training teaching assistants to facilitate student teams in project-based courses.

Status Update
After four years, the Gordon ELP is thriving: Although a voluntary, co-curricular program, we currently have 102 students in GEL1 and 24 students who advanced last year from GEL1 to GEL2 this year.

Last year we touched a total of 1100 students through GEL1, GEL2, UPOP, and the teamwork and team leadership workshops that we conduct in a significant number of MIT's project-oriented courses. We have received many accolades from students in the program, from the employers for their internships, and from faculty who have observed GELs in their classrooms.

Significant Increase in Leadership "Self-Efficacy"
From the inception of the Gordon ELP, we have been focused on measuring program effectiveness through a variety of direct and indirect assessment measures. All subjects in the GEL component have defined and measurable learning outcomes, as does each ELL, that continue to be based on *The Capabilities of Effective Engineering Leaders.*

We assess progress against these outcomes annually for the subjects and weekly for the ELLs, making programmatic changes based on the findings. In addition, each student completes an Engineering Practice requirement, which program faculty review, along with staff and outside mentors and reviewers where appropriate. GEL2s undertake an InternshipPlus under the guidance of an industry supervisor. Program staff and the industry supervisor evaluate the student's experiences and competence. We also collect anecdotal experiences from both students and from either their industry supervisor or mentors. The Industry section of the Program Website (*web.mit.edu/gordonelp/industry.html*) features industry supervisor and student comments.

The GEL component also has a rigorous program of indirect assessment focused on the change in student confidence in their ability to do specific leadership tasks before and at the end of the program. The gains in student confidence cover a range of tasks that students practice in GEL, including their ability to organize teams.

Gordon-MIT Engineering Program
Schindall, from preceding page

• Their confidence that they can insist that a team agree on objectives and a schedule of work rose from 66.5% to 87.2%, and confidence that they can persuade a team to set up a consistent decision-making process rose last year from 64.3% to 85.3%.

• Confidence that they can create a shared vision for a project went from 71.1% to 86.4%.

• Other domains showing substantial increase are interpersonal communication skills, assessed by asking their confidence that they can listen carefully to those who disagree with them (from 69.5% to 93.1%) and whether they know how to ask questions to help others clarify their ideas (74.0% to 89.4%).

Comparative data supports the view that the program has an independent and consequential effect on leadership capabilities. Questions placed on the MIT graduating senior survey included the student's confidence they could "Make firm decisions and take action even if some of the facts about the best choice are not clear," and "Recognize when you should stop talking about improvements and focus on what can be fully implemented." For these and a few other capabilities that have been emphasized in the GEL program, GELs had higher confidence of accomplishing key leadership tasks than non-GELs in engineering departments, and slightly higher confidence than graduating seniors in Management.

Summary
The Gordon ELP has come a long way since 2008. MIT students appear to value the education the program provides, with program admissions increasing as follows: 14 in year 1, 35 in year 2, 70 in year 3, 115 in year 4, and 135 in year 5. We continue to review and rework our program, gathering and assessing internal and external feedback to improve the educational experience we offer students. We welcome any feedback you may have about our program or our students. We also urge you to encourage your students to apply for this program. We are confident that it will make a significant difference in their career effectiveness, both in industry and in academia. ∎

Joel Schindall is a Professor in the Department of Electrical Engineering and Computer Science; Co-Director, Bernard M. Gordon – MIT Engineering Leadership Program *(joels@mit.edu)*.

MITAC: Your Ticket to Cultural and Recreational Activities

LEISURE TIME WITH FRIENDS and family is precious, which is why the MIT Activities Committee (MITAC) is pleased to offer discounted tickets to cultural and recreational activities to Institute faculty and staff.

Whether you are interested in movies, sports, seasonal activities, family activities, theater, or music, you can save time and money – and enjoy friendly customer service – thanks to MITAC, an employee benefit program. In addition to purchasing tickets for your own use, you also may buy them as gifts for family, friends, and colleagues.

MITAC offers a wide spectrum of more than 250 cultural and recreational events annually to our community. Regularly discounted tickets include those for:

• Boston Celtics
• Broadway Shows
• Holiday Pops
• Boston Symphony Orchestra
• World Music
• Local Attractions (Boston Children's Museum, Museum of Science, New England Aquarium, and Peabody Essex Museum)
• Blue Man Group
• Special Family Events

Current event offerings include:
• Boston Celtics – 13 games (including the LA Lakers), balcony and promenade seating, $47 – $125/ticket
• Holiday Pops, 3 performance options, December 8, 9, or 15, $38 – $64/ticket
• Jersey Boys, Sunday, February 24, 6:30 pm, $96/ticket

Launched as a pilot program in 1983 in Building 20, MITAC now serves more than 4,800 customers, saving MIT community members $170,000 annually. MITAC is guided by both a program committee and presidentially appointed Advisory Council, which provides guidance on long-term goals and planning, business practices, and policies.

For more about MITAC, subscribe to our weekly and monthly electronic newsletter, and send us your questions and activity suggestions via *mitac-office@mit.edu*.

Visit MITAC
Online: *web.mit.edu/mitac*
On campus: Stata Lobby, Tuesday–Friday, 11 am – 4 pm
At Lincoln Laboratory: A-109, Thursday and Friday, 11 am – 4 pm

Thanks – we look forward to seeing you soon.

–The MIT Activities Committee

letters

To The Faculty Newsletter:

I HOPE THAT HUMANITIES will be included in any edX course offerings. I was one of the first students to enroll in the UK's Open University (OU) when it first began in the 1970s. There was no online presence only specially prepared units, BBC TV and radio programs, textbooks, and a week's summer school. We were graded by mailing in our essays, computer marked assignments, and a final exam. I had practically no contact with other students and only met a tutor once when I could not understand how to write about "the lords and peasants during the 1848 revolutions."

But the required foundation course in the humanities has had an enduring effect on my life. It gave me a love of learning, taught me about music, art, philosophy, and literature I could never have imagined, and far from being passive made me think and create work of my own. Even though the end degree made a huge dif-

ference to my career, learning does not always need to be career-focused or geared towards a credential.

As Professor Perry points out [*MIT Faculty Newsletter*, Vol. XXV No. 1], MIT faculty do not have the time to grade essays from thousands of online students, but I am sure this a problem that MIT can solve (possibly by forming online student groups similar to writing or reading groups). It is possible to prepare a test that can be graded by computer as this was done as early as the 1970s.

The point for the humanities is not really the credential. No employer is going to hire you for your essay or grade on Jane Austen. But an employer might well be glad to see that an individual is well-rounded and brings a humanities' perspective to their job.

Professor Perry asks: "For whose benefit are we developing online modules in the Humanities and why?" I would

answer that an MIT quality humanities course could change the lives of students globally as much as Circuits and Electronics. Creating a course that is culturally diverse, that would have meaning for MIT residential students as well as students around the world, is challenging. The OU course materials were expensive to create, but given the materials now available through the Internet, the cost might not be prohibitive. I hope that a humanities course can be considered and made a priority. I believe it would as Professor Perry states, educate "people to be informed citizens in a genuine democracy and for enriching their lives." Democracy is slowly trying to build across the globe and an MIT humanities course would, I believe, make a difference.

Janet Wasserstein
Senior Associate Director
MIT's Office of Foundation Relations

The Alumni Class Funds Seek Proposals for Teaching and Education Enhancement

THE OFFICE OF FACULTY SUPPORT is requesting proposals for projects for the 2013-2014 academic year that improve the quality of teaching, enrich students' learning experiences, and uphold the tradition of innovation at the Institute. The Alumni Class Funds are comprised of gifts from the classes of 1951, 1955, 1972, and 1999.

Over the past 15 years more than 150

projects were made possible through the generous assistance of the Alumni Class Funds. These projects have had substantial impact on education both inside and outside MIT. Grants typically range from $10,000 to $50,000 and cover a wide variety of creative curricular and pedagogical projects. Larger scale projects will also be considered, as well as project renewals and multiple year projects, but

funding commitments will be made on a year-by-year basis.

Proposals are due on Friday, February 1, 2013. Guidelines, forms, instructions, and descriptions of previously funded projects can be found at: *web.mit.edu/alumnifunds*. Please contact the Office of Faculty Support at 617-253-6776 or alumni*funds@mit.edu* for more information. ∎

[The full charge to the Task Force is provided in Appendix 1.]

At present, MIT faces a decision whether to move forward with submitting a rezoning petition to the City of Cambridge for formal approval, which would enable the Institute to proceed with further planning, design, and construction of a series of capital projects in Kendall Square expected to span roughly the next ten years. Specifically, the petition requests an "up-zoning" to increase the permitted density of development in the target area to allow taller buildings.

Because of timing considerations related to this decision, this report addresses the first part of our charge. Specifically, we offer our recommendations on the question of whether or not, or under what conditions, MIT should file the up-zoning petition with the City of Cambridge to allow development of Kendall Square to proceed.

Later this fall term, we intend to submit a follow-up report that addresses the second part of our charge.

Process

The Task Force met weekly from early August through early October 2012. Meetings primarily involved interviews with stakeholders in the MIT 2030 process in general and in the Kendall Square development issues in particular. These stakeholders included individuals both within and outside of the MIT community. [A list of individuals interviewed is provided in Appendix 2.]

In addition, the Task Force reviewed MIT internal documents related to the development of MIT-owned property in Kendall Square and elsewhere on campus, as well as public documents related to development in relevant areas of Cambridge, in order to better understand the Institute's campus planning process as

well as its interaction with the City of Cambridge on these issues.

The Task Force focused primarily on an assessment of the current rezoning petition, involving the 26-acre MIT East Campus property in Kendall Square proposed for development by the MIT Investment Management Company (MITIMCo), a division of MIT that manages the Institute's endowment and real estate investments. The petition seeks the City of Cambridge's permission to allow MIT to add more total gross square footage, including taller building heights, than allowed under current zoning in this area of the campus. The design concept that accompanies the petition includes a set of illustrative building sites for commercial office/laboratory use, plus potential academic, retail and residential uses and other improvements.

Findings

The following key findings about the up-zoning petition reflect our discussions with stakeholders and review of the data:

1. The MIT property that will be affected by the proposed up-zoning petition is first and foremost part of the MIT campus, as it lies within the area of Kendall Square south of Main Street that has traditionally defined one of the Institute's East Campus boundaries. It is intimately tied to the Institute's campus structure and patterns of movement extending from 77 Massachusetts Avenue to the Sloan School. This area of land is also the last piece of undeveloped, contiguous campus space lying between the Charles River, Main Street and Ames Street, with ready access to the MBTA Red Line, representing an extremely precious resource.

2. The planning and development process affecting this part of campus has become intertwined with MIT's commercial real estate investment goals. MIT land development for investment purposes traditionally has taken place beyond the edge of what normally is considered to comprise the MIT campus, often a significant

distance away from the center of campus activity. Such development seeks to maximize financial returns.

3. Setting aside the question of whether commercial development is appropriate at this location, financial return should not be the principal criterion of value creation and success for this area of campus. Equally important are criteria related to the 21st century image of MIT, creation of a significant eastern gateway to the campus, the enhancement of student life, and providing opportunities for future academic buildings and activities that we have yet to invent. We also believe these latter considerations, which go to the heart of MIT's mission, will be more important to sustaining financial returns to the Institute in the long run.

4. The current rezoning plan (as outlined by MITIMCo) for development of the Kendall Square area falls short of the aspirations described above. The Task Force has concerns with the single diagram that MITIMCo has presented as its design proposal. We have been reassured by MITIMCo that its proposal is flexible and that, if the up-zoning is approved, MIT retains options to work with the city and surrounding neighborhoods to alter building heights, densities, and footprints (within the constraints of the zoning) to improve the project.

5. MIT needs to carefully consider the need for additional campus-serving housing, especially for graduate students. Concerns were raised with our Task Force that there is a need to expand graduate student housing either on campus or off campus in some affordable way. Certain Cambridge resident groups also have expressed concern for more housing in this area of the city. MITIMCo's current proposal includes provision for 120,000 square feet of new housing, tentatively targeted for a new building adjacent to One Broadway in Kendall Square. These will be primarily market priced units and not likely within the reach of graduate students (although Cambridge will require

that 15% of the units be reserved for low and moderate income families). At this point our Task Force does not have sufficient information to judge whether more graduate student housing is needed on or off campus and, if so, how much. Nor have potential housing needs or goals been incorporated into the MIT 2030 planning process to date. Therefore, a study of housing needs of graduate students, faculty, and staff should be undertaken with involvement from these constituent groups as part of the MIT 2030 process. The study should consider the benefits and costs of Kendall Square and other on- or off-campus potential housing sites.

6. The likely traffic impacts of Kendall Square development need further analysis and discussion as well. We heard very different views on whether the Kendall Square development would affect future traffic flows in the surrounding areas. Again we do not have sufficient information to decide what the impacts on traffic, parking, use of public transportation, etc. will be and we worry that these issues have not yet been studied adequately – particularly from the student point of view – or integrated in the Kendall Square design/development process. MIT has ample faculty, student, and staff expertise to draw on to address these questions, and this analysis should be incorporated into a comprehensive planning process for East Campus.

7. The City of Cambridge Historical Commission has designated three buildings on the south side of Main Street as historical landmarks that must be preserved. This significantly constrains the design and development options for use of this space for ground floor retail, academic or commercial purposes and limits the opportunity to create a landmark gateway connecting Kendall Square to MIT. Creative options for preserving the historical importance and awareness of these sites in particular, and of Kendall Square more generally, need to be explored jointly by MIT and the City.

8. The City Manager and the Cambridge Planning Commission have expressed interest in receiving MIT's up-zoning petition soon and look forward to working closely with MIT in developing this area in ways that meet the mutual needs and interests of the City, the MIT community, area residents, and current and future commercial businesses that will enhance the area's reputation as a world-class hub of innovation.

Conclusions and Recommendations
Given these findings, we support moving forward with MIT's submission of the rezoning petition provided that:

1. A comprehensive urban design plan for East Campus is conducted and completed after the petition is approved but before anything is built in the area covered by the petition. The plan needs to consider alternatives to the current MITIMCo diagram for commercial building sites, floor plates, program, heights, and scale of development, keeping in mind the findings described above.

2. This Task Force or a similarly constituted faculty group participates directly in the East Campus planning process and design of the Kendall Square project. and

3. The work of preparing and deliberating a plan for East Campus, and subsequent development of the area, including Kendall Square, is guided by a set of design principles, described in the next section.

Design Principles/Criteria. Any development of the parcels under consideration in Kendall Square must honor the following principles/criteria for evaluating design options and decisions that involve MIT-owned property developed either for academic purposes or for commercial purposes (with the possibility that commercial may house some academic uses at some point in the future). Our sense is that MITIMCo currently evaluates development opportunities primarily against a

return on investment (ROI) criterion. This is appropriate when property is solely for investment purposes, away from the core of the MIT campus. But Kendall Square, with its Red Line MBTA station, clearly has the potential to serve as a new gateway to MIT, similar to the function now served by 77 Mass. Ave. to the west. Equally important, much of the property that would be developed for commercial tenants could house MIT uses at some point in the future. Therefore, it is critical that these buildings and the space they create on the ground be considered first as a part of the campus designed to support our students, faculty and staff. To ensure this, we recommend the following principles to guide decisions about development and design of this area:

• **There must be a gateway to MIT worthy of MIT and its aspirations, mission and standards of design excellence.** The gateway should not just be an entrance, but a physically prominent node of activity, equivalent to the function of MIT's Lobby 7, containing destinations relevant to the MIT community and helpful to visitors (e.g. an information office) linked to clearly recognizable spaces that support learning and research (e.g. laboratories, studios, classrooms, study and meeting spaces accessible to the public). It should connect MIT directly to Kendall Square with minimal physical barriers or gaps. The gateway should be welcoming to residents and visitors.

• **East Campus buildings and spaces must create and convey a campus feeling that serves the needs of the MIT community in ways that attract people to the area across the broad band of hours that typifies the rhythm of student, faculty, and staff life.** This means, for example, providing amenities and services for students, faculty, staff and residents, with a minimal corporate presence (on the campus side), and well-defined public space for people to gather, affordable places to eat, bicycle parking, and access, etc. To ensure this, the ground floor space on all buildings should

Task Force Report
from preceding page

be primarily reserved for inviting academic, student life, or retail uses, and not have a "gated," privatized character.

- **Any commercial space in Kendall Square should serve as an extension of the campus and not the other way around.** The businesses invited to locate there should complement and support the mission of MIT to promote innovation and start-ups and allow maximum access to students and faculty for research, class projects, and other mutual learning opportunities. Kendall Square should not just be a commercial or corporate office location that happens to be adjacent to a university.

- **The portion of the development intended for commercial use should generate an appropriate financial return to warrant investment of MIT endowment funds.** However, given the location of this development on campus and the need to support academic and student life, it may not be reasonable to expect the same level of return as that from commercial property developed in sites removed from the campus. Alternatively, it would be appropriate for the Institute to consider investing a portion of the income from the Kendall commercial development into developing the campus spaces, facilities and academic environment planned for the area.

- **Design of commercial development should proceed only in the context of a comprehensive plan for the future of the East Campus, including its public realm, academic, student life, transport, and recreational functions, taking into account potential disposition of all property between Main Street and the Charles River.** It is not sufficient or prudent to design commercial buildings in the absence of a systematic analysis and clear under-

standing of how the remainder of the East Campus is intended to evolve. It is important that ample space for future academic expansion be reserved in the up-zoning petition. We have not studied this issue in sufficient depth to reach a conclusion about how much space at this point, and, therefore, it is another issue for further review and discussion in the post-up-zoning design phase and plan for East Campus.

Flexibility: Envelope versus Constraints. We have heard from the Cambridge City Manager, MITIMCo, and others that the up-zoning petition would create an "envelope" that would allow for considerable flexibility in design and development options going forward. The key constraints from the City of Cambridge's perspective would be limitations on building height, total square footage of new development, the need to retain three historical buildings, and provision of an appropriate amount of housing. Given these minimal constraints, we need assurance from MIT leadership that the principles listed above are acceptable and the path clear to consider design alternatives. Among the options that should be considered are:

- Less commercial development in the area shown as Site 3 on the MITIMCo plan, providing the potential to develop a significant gateway to the campus.

- A better defined campus space connecting to Eastgate and Sloan that is more closely associated with Main Street, so there can be sufficient interaction and permeability to support campus activity. This space should also facilitate interaction with the rest of the Institute, which is vital to achieving the goal of a "One MIT" campus culture.

- More space for academic development and student life.

- Reallocation of height and massing to the edges rather than heart of the campus area, or a smaller commercial project overall.

- Alternate sites for commercial office and housing development that reduce impact on the campus.

Historic Preservation Options. We commend the City and MIT for honoring the principle that the history and co-evolution of Kendall Square and the MIT campus be preserved, honored, and featured in the design of this site. At the same time, we are deeply concerned that simply preserving the three buildings on Main Street proposed as historic landmarks will substantially increase development costs and limit design options for the spaces these buildings now occupy. We believe that by working together and in consultation with residents and the business community in the area, the historic preservation objectives can be met in creative ways while also opening up the space needed to create a world class gateway to the Institute. One way to do so would be to design and build a multi-media supported entrance and information center that provides a visual, interactive timeline of the past, current, and future contributions of this region to the advancement of knowledge, industry, and city life. We urge a joint Cambridge/MIT study be undertaken of creative options for meeting these objectives.

Process moving forward
We commend the Provost and President for creating this Task Force and providing the faculty an opportunity to weigh in on the Kendall Square proposal. As stated earlier, we believe that this Faculty Task Force, or a similarly constituted group that is broadly representative of the faculty and includes individuals with special expertise in design, planning and real estate economics, should continue into the post-up-zoning design stage of the Kendall Square development process to advise the Provost and President on the academic issues associated with campus design and planning.

We thank the MIT staff, faculty and students and Cambridge leaders who provided inputs to our work. We look forward to continuing to work together on future phases of this important opportunity.

We welcome comments from the MIT Community and Cambridge neighbors on this report and/or on our future work as we take up the second item in our charge from the Provost – considering the best way to engage the MIT Community in the ongoing development of the MIT 2030 vision and plan.

Appendix 1
Provost's Charge to the Task Force

Dear Faculty Colleagues,

The capital planning framework known as MIT 2030 was launched two years ago to guide the Institute in making decisions about campus renewal and development in the decades ahead, relying on the broad engagement of the campus community to help inform these decisions. In recent months the effort has begun to transition from planning to implementation, particularly for development of MIT-owned land in Kendall Square in ways that continue to revitalize this important area of Cambridge while best serving the long-range interests of the Institute. To ensure that we maintain constructive community engagement through the implementation process, I have appointed an ad hoc faculty committee, the Task Force on Community Engagement in 2030 Planning, which is charged with advising me about decisions related specifically to the development of MIT property in Kendall Square and about the most effective ways to engage the MIT community in the 2030 decision process generally, going forward. Members of the Task Force include Thomas Kochan (chair), Samuel Allen, Xavier de Souza Briggs, Peter Fisher, Dennis Frenchman, Lorna Gibson, William Wheaton, and Patrick Winston.

The Task Force will begin engaging with members of the faculty and other Institute stakeholders on these issues in the weeks and months ahead. I want to thank Professor Kochan and other members of the Task Force for their willingness to devote their time and effort to this process, and I look forward to our continuing discussions regarding MIT 2030.

Sincerely,

Chris A. Kaiser

Appendix 2
Individuals interviewed by the Task Force

Chris Kaiser, Provost

Martin Schmidt, Associate Provost

Israel Ruiz, Executive Vice President and Treasurer

John Reed, Chairman of the MIT Corporation

Lawrence Fish, Member of the MIT Corporation

Steven Marsh, Managing Director, Real Estate, MITIMCo

Michael Owu, Director, Real Estate, MITIMCo

Patrick Rowe, Associate Director, Real Estate, MITIMCo

Sarah Gallop, Co-Director, Office of Government and Community Relations

Jonathan King, Professor, Biology

Edward Roberts, David Sarnoff Professor of Management of Technology

Nigel Wilson, Professor, Civil and Environmental Engineering

Frederick Salvucci, Senior Lecturer, Center for Transportation and Logistics

John Attanucci, Research Associate, Civil and Environmental Engineering

Pamela Delphenich, Director of Campus Planning and Design

Peter Roth, Lecturer, Center for Real Estate

O. Robert Simha, Research Affiliate, Urban Studies and Planning

Representatives of the Graduate Student Council

Representatives of the Undergraduate Association

Robert Healy, Cambridge City Manager

Timothy Rowe, CEO, Cambridge Innovation Center

Charles Sullivan, Executive Director, Cambridge Historical Commission

* * * * * * * * * *

*Task Force Members:
Samuel Allen, Materials Science and Engineering;

Xavier de Souza Briggs, Urban Studies and Planning;

Peter Fisher, Physics;

Dennis Frenchman, Urban Studies and Planning, Center for Real Estate;

Lorna Gibson, Materials Science and Engineering;

Thomas Kochan (chair), Management;

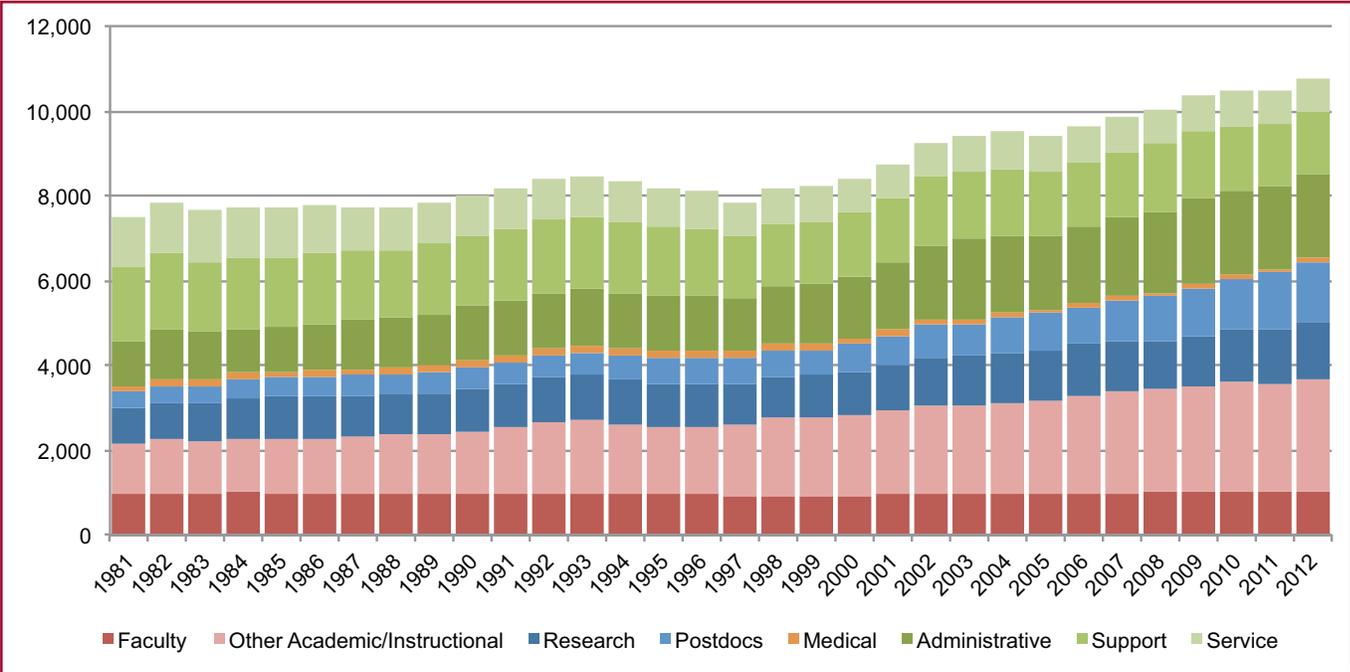**William Wheaton**, Urban Studies and Planning, Economics, Center for Real Estate;

Patrick Winston, Electrical Engineering and Computer Science;

Staff to the Task Force: **Douglas Pfeiffer**

M.I.T. Numbers
Campus Population* FY 1981 – 2012

Faculty and Staff

Legend: ■ Faculty ■ Other Academic/Instructional ■ Research ■ Postdocs ■ Medical ■ Administrative ■ Support ■ Service

Note: *Other Academic/Instructional* includes: Adjunct/Visiting/Emeritus Professors, Affiliates, Instructors, Lecturers, Sr. Research Scientists
Research includes: Principal Research Scientists, Research Scientists, Technical Assistants

Students

Legend: ■ Undergraduates ■ Graduate Students
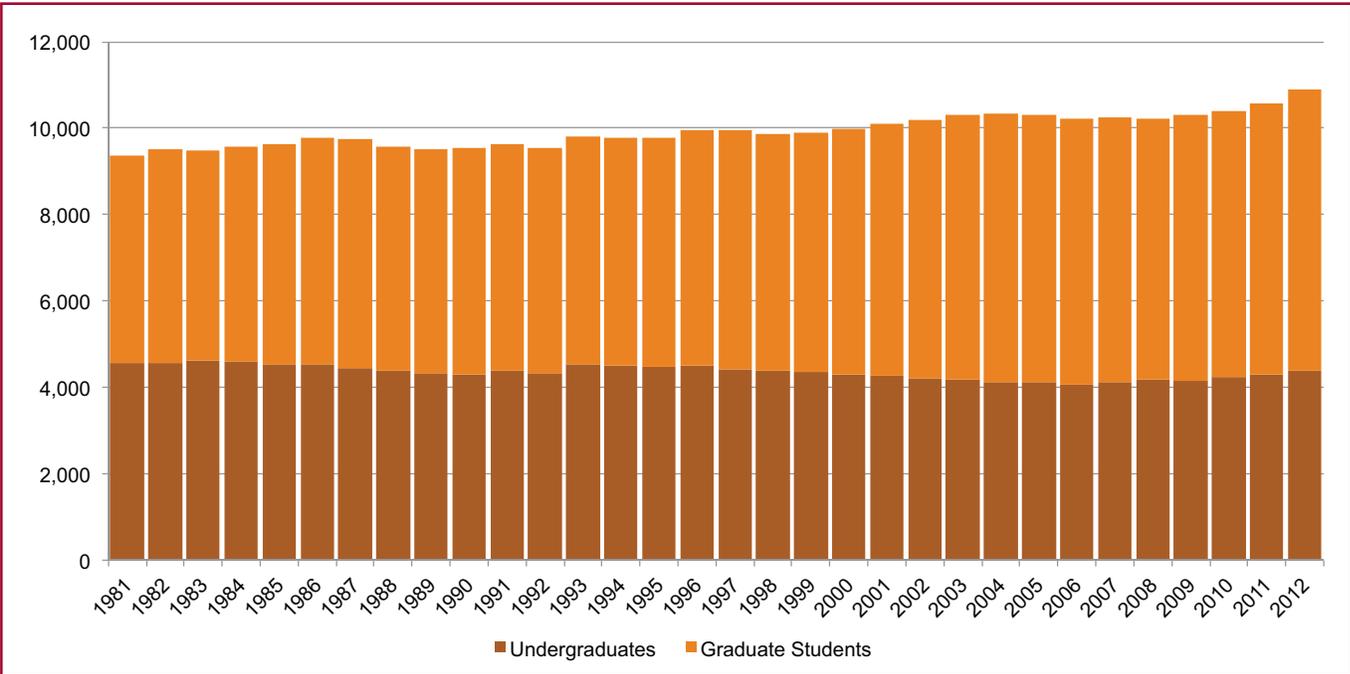
*Excludes the Broad Institute and Lincoln Laboratory

Source: Office of the Provost/Institutional Research