MIT Faculty Newsletter

in this issue we offer continuing discussion of online education, beginning with "The Magic Beyond the MOOCs" (below) and inside with pieces on MIT's new Modular Learning Management System (page 6) and a perspective on the potential impact on the teaching of mathematics (page 12). We also highlight our new Chair of the Faculty (page 13) and offer reflections from the outgoing Chair (page 4).

Officer Sean Collier

Memorial Resolution for Officer Sean Collier

The following resolution was presented by Faculty Chair Sam Allen at the May 16 Institute faculty meeting.

ON THE EVENING OF Thursday, April 18, MIT suffered a tragedy, as Officer Sean Collier of the MIT Police Department was shot and killed in his vehicle outside the Stata Center. He was only 27 years old.

In the weeks since the shooting, members of our community who knew and worked with Officer Collier have spoken eloquently about his integrity, kindness, and commitment to law enforcement. We came together during a beautiful and heartfelt ceremony on April 24 to remember Officer Collier and to begin to heal as a community.

I have been struck by the outpouring of love and support the MIT community and the entire nation has shown for the

The Magic Beyond the MOOCs

Sanjay Sarma and Isaac Chuang

OF THE GREAT DEAL WRITTEN about MOOCs (Massive Open Online Courses) in recent months, much has been positive, some frothy, some skeptical, and some outright negative. Online education is likely a game changer for those who don't have access to residential education but will it – the question goes – replace residential education? That is the fear in some quarters (and the hope in others). Our personal view is: not in the foreseeable future.

The edX platform, which has simulations, advanced assessment, and discussion forums, is becoming more capable every month, but there is essential magic in residential in-person education that is difficult to articulate, let alone replicate online. Meanwhile, independent concerns over the high costs of higher education are triggering a re-examination of

Editorial
A Letter to the Class of 2013

GREETINGS TO YOU, THE GRADUATES! – and to your families.

Together with the thousands of families and friends gathered for Commencement, we share excitement, pride, and confidence in our new MIT 2013 graduates. In teaching and mentoring you, we on the faculty have also learned and grown and found new beginnings. As you launch your own careers, your contributions to society will be among the most gratifying products of our academic labors.

The past few weeks have been particularly difficult, and in a very personal way for many. However, the sense of community and mutual support during this time has been unparalleled. To echo a motto for the Institute proposed nine years ago in the pages of this *Newsletter*, the MIT we've seen in these weeks has been the MIT of *Mens, Manus et Cor*.

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Photo credit: *Page 1:* MIT Campus Police, *Page 13:* William Litant.

A Letter to the Class of 2013

Looking back on your years at the Institute, and at the legacy you leave here, there is much to celebrate. As you transition to other opportunities and challenges, MIT is in the midst of a vigorous and healthy reexamination of how and what and when we teach, how and where we grow, how and why we engage with the world. Our students remain terrifically talented, committed, and optimistic – worthy successors to you whom we celebrate this month. And our faculty is continually refreshed and energized by new additions, new collaborations, new questions. These are reasons enough for you to stay connected to the Institute even as you move on.

We know that you have the talent, education, skills, and resilience to accomplish great things, as your various individual paths unfold. On behalf of the entire faculty, we wish you vision, strength, commitment, and success in the challenges you take on.

The Editorial Board
of the *MIT Faculty Newsletter*

Editorial
City Council Approval of MITIMCo Petition Only Beginning of MIT 2030 Review

THE CAMBRIDGE CITY COUNCIL'S approval of MIT's controversial up-zoning petition at its meeting of April 8, satisfied some, but disappointed others. The approval allows MITIMCo (the MIT Investment Management Corporation) to build two 250-foot commercial office towers in the heart of East Campus. No housing for graduate students or postdoctoral fellows was included, though there will be a 300-foot tower with market-rate units on the corner of Broadway and 3rd Street. Even the pro-development *Boston Globe* ran an editorial (May 8) calling for MIT to build additional housing for graduate students.

Just about the only point of agreement on campus was that the faculty Task Force on Community Engagement with 2030 Planning did good work, and wrote a sound report last fall. We note, though, that an *ad hoc* committee appointed by and reporting to the Provost does not substitute for the establishment of a full-scale Campus Planning Committee with elected faculty representation and reporting to the faculty.

Going forward, it would be easy to glide over important points in the Task Force report. The Task Force recommended taking several key steps before moving ahead [emphasis added]:

"*1. A comprehensive urban design plan for East Campus be 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, priority uses heights, and scale of development, keeping in mind the findings described above.*

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

3. The work of preparing and deliberating a plan for East Campus, and subsequent development of the area, including Kendall Square, is to be guided by a set of design principles reflecting MIT's educational and research missions, and institutional traditions."

The Task Force report [*orgchart.mit.edu/sites/default/files/reports/20121012_Provost_2030CommEngageTFReport.pdf*] should be thoughtfully read in its entirety by anyone interested in the future of our East Campus. Without careful adherence to these provisions, our campus in the future could be dominated by a substantial fraction of heavy office buildings that will lose us flexibility and campus character.

A positive step forward is the appointment of a Graduate Student Housing Working Group chaired by former Chancellor Phillip Clay, to assess the need for graduate student housing. Prof. Clay's plan for the committee is described on page 9 of this issue. We look forward to an authentic and transparent effort to assess pressing housing needs of the more than 4000 graduate students who have to secure housing off campus.

We emphasize the need to implement the provision in the Task Force's report that asks for a serious exploration of alternatives to the MITIMCo plan. The proposed plan presented to the City Council was not much changed from what was offered by MITIMCo before the Task Force was constituted: a design produced by financially-oriented real-estate executives, with limited input from our world-class Department of Urban Studies and Planning. The MIT community and campus deserve better.

Editorial Subcommittee

From The Faculty Chair

Why I Decided to Transition to Professor Without Tenure, Retired

Samuel M. Allen

"I'M RETIRING AT THE END OF JUNE, on the eve of my 65th birthday." I've said this countless times over the past five months and the reaction of my colleagues nearly always ranges somewhere on the spectrum from puzzlement to astonishment. (A few "Good for you" comments were received.) This certainly reveals some things about the MIT culture, and hence bears some examination.

My attitude toward my work has had its ups and downs. The up times have involved promotions, having highly capable support staff and graduate students, and strong support from my family. The down times have been periods during which I've felt a degree of professional stagnation or suffered some personal loss. After stepping down from a six-year term as DMSE (Department of Materials Science and Engineering) Executive Officer in 2006, I had the feeling that my MIT career had reached its peak and I began to think seriously about retirement.

In 2007 I suffered a "very minor" heart attack. Four months prior I had run a half-marathon in just under two hours, and I had been an active distance runner since 1986. It came as a real shock to me (and those who knew me), and caused me to think more deeply about all the things I was hoping to accomplish while I had the opportunity. This reinforced my thoughts about retiring early.

A year or so later, my wife, Annie, began to question my loosely formed retirement plan, saying in effect: "You will need something to do." I had convinced myself that I could easily fill my time with my hobbies that include wooden boat building, sailing, birding, and blacksmithing. Annie persisted in pressing me to broaden my thinking about how I could use my time, and it caused me to begin reflecting on the aspects of my MIT career that had been most satis-

fying. I began to appreciate that interpersonal relationships were central to my work satisfaction, particularly mentoring, advising, and helping people in conflict.

Early in 2009 I was interviewed by Jessica Landry (now Assistant to the Dean in the Office of the Dean for Graduate Education) who was working on a project that studied the "REFS" program of peer-to-peer graduate student advising that started in MIT's Department of Chemistry. Jessica's project arose from her taking classes in UMass Boston's graduate program in Dispute Resolution, and on learning about that program I was immediately struck by the thought, "I could do that!" I began with an introductory-level class later that year, and continued in the program for five semesters. This work provided me with useful skills for my remaining years at MIT, as well as the basis for a somewhat different career trajectory after retirement.

Midway through my studies at UMass Boston, I began to talk to my department head about retiring, thinking that I might make the move in the summer of 2010. Then something very unexpected happened: Jesus del Alamo, then Chair of the Committee on Nominations, contacted me to ask if I'd consider becoming Chair-Elect of the Faculty. My initial thought was "no, I'm retiring," but Annie immediately saw it as an opportunity to further serve MIT in a capacity that would potentially be very fulfilling for me, while giving me additional practical experience using my conflict resolution skills. The fact that I was actively studying conflict resolution boosted my confidence that I could handle the responsibilities associated with being Chair of the Faculty. So I decided to postpone retirement until I concluded my term as Chair in 2013.

I have told many, many colleagues that being Chair of the Faculty has "been the best

thing I've done at MIT," and I truly believe that. I feel extraordinarily fortunate to have worked with so many fine people while navigating some serious challenges that arose during my two-year term as Chair. I am especially grateful to Associate Chair of the Faculty Mary Fuller, Secretary of the Faculty Chap Lawson, and my extraordinary Staff to the Chair of the Faculty, Aaron Weinberger. I wish the new faculty officers – Steve Hall, John Belcher, and Susan Silbey – all the best as their two-year terms commence on July 1.

My resolve to retire did not dissipate while serving as Chair of the Faculty. In many ways, I viewed my service as Chair both as a way to serve and "give back" to MIT and as a way to eventually begin a different career trajectory working on a part-time basis. The Chair position is very nearly a full-time job, and I do feel I have withdrawn somewhat from life in my department. But when I have been able to attend department faculty meetings and events, I have seen that there are many younger colleagues who are helping the department evolve and grow. I can "make way for younger talent" and retire with a sense of satisfaction that the department and the Institute will continue to flourish without me.

I have a close friend, Bob Weiss, who is a sociologist and wrote a book with the title *The Experience of Retirement*. A major takeaway for me was that people who have significant friendships and activities that are outside of their workplace have a far easier time adjusting to retirement. I've been very active in my church community – for 10 years I've belonged to a men's group that meets every week; I pursue various creative hobbies, and value deeply time spent at our vacation home on Maine's midcoast. And I have been proactive about developing skills in conflict resolution that will allow me to

work in a different milieu during retirement, if and when I choose. In short, I feel well prepared to step down from full-time service to MIT.

My initial transition to retirement will be to become Professor without Tenure, Retired. I will maintain a small lab here and continue to supervise a graduate student and research associate. I am still on a number of doctoral thesis committees and will see those students through to completion of their degrees. I look forward to spending more time in the DMSE Forge and Foundry, and in the MIT Hobby Shop.

I eagerly await the flexibility that these very reduced commitments to MIT will provide. Having the time to pursue opportunities for extended travel with our children and grandchild, during any season, is something Annie and I are eagerly anticipating.

Returning to my colleagues' reactions to news of my retirement: I find it somewhat perplexing. A colleague once told me that the reason some MIT faculty don't take sabbatical leaves is that doing so would confirm that the Institute can indeed survive without them. I'm sure there is a kernel of truth in that, particularly when it comes to retirement. I can relate to the desire to play an active role in research past one's normal retirement date. I also see the appeal of being part of the innovative transformations such as those in progress through digital learning, but putting that in the capable hands of others seems like the best path for me.

An Eventful Two Years

"What does the Chair of the Faculty do?" is a question I get often from friends within and outside MIT. There are so many facets to the position that I usually keep the answer short, saying something along these lines: "I attend lots of meetings and events." "I represent the interests of the faculty in meetings with the administration." "I am positioned right at the interface between the faculty and the administration." "We have 11 Standing Committees of the Faculty, and I chair the top-level committee." While all these statements are true, they do not capture the breadth of activities with which the Chair must become engaged.

I can see my term as Chair of the Faculty as a series of overlapping events with major consequences, some carefully planned and some descending at random. Among the most significant from my perspective are: (1) The June 2011 announcement of MIT's collaboration with Skolkovo Institute of Science and Technology; (2) finding a permanent oversight structure for the Energy Minor; (3) the announcement of MITx in December 2011 by then Provost Reif; (4) Susan Hockfield's February 2012 announcement that she was stepping down as MIT's 16th President; (5) participating in the Presidential Search Committee that recommended Rafael Reif as MIT's 17th President; (6) the announcement of edX by Harvard and MIT in April 2012; (7) working with the new President and Provost Chris Kaiser as they settled in to their new roles in the summer and fall of 2012; (8) formation of the Task Force on Community Engagement in 2030 Planning by Provost Kaiser in August 2012; (9) Aaron Swartz' suicide in January 2013; (10) the Patriots' Day bombing at the Boston Marathon; (11) mourning the shooting death of Officer Sean Collier and attending his Memorial Service on Briggs Field; and (12) adopting the Faculty Resolution on Freshman Advising at the May 2013 Institute faculty meeting.

I feel very fortunate to have had the opportunity to serve as Chair of the Faculty these last two years. One of the most rewarding aspects of the position is to meet and work with so many faculty and staff colleagues to help shape the future of this great institution. MIT has provided me with a wonderful career and I have the satisfaction of retiring at what I consider the peak of my contributions here. I am truly blessed.

Thanks to all who have contributed in so many ways to making these past two years so rewarding!

With best wishes,
Sam

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Stephen Lippard Wins Killian Award

PROFESSOR OF CHEMISTRY and *Faculty Newsletter* Editorial Board member Stephen J. Lippard has won the 2013 James R. Killian Jr. Faculty Achievement Award.

Named after MIT's 10th president, the Award was established in 1971 "to recognize extraordinary professional accomplishments by MIT faculty members and to communicate these accomplishments to members of the MIT community."

Announced at the May 15 Institute faculty meeting, the Award committee honored Lippard's "groundbreaking work [that] has pushed back the frontiers of inorganic chemistry, while simultaneously paving the way for improvements in human health and the conquering of disease."

Among many awards and honors, Lippard has also been elected to the National Academy of Sciences, the National Institute of Medicine, and the American Academy of Arts and Sciences.

MIT's New Modular Learning Management System: The Evolution From Stellar

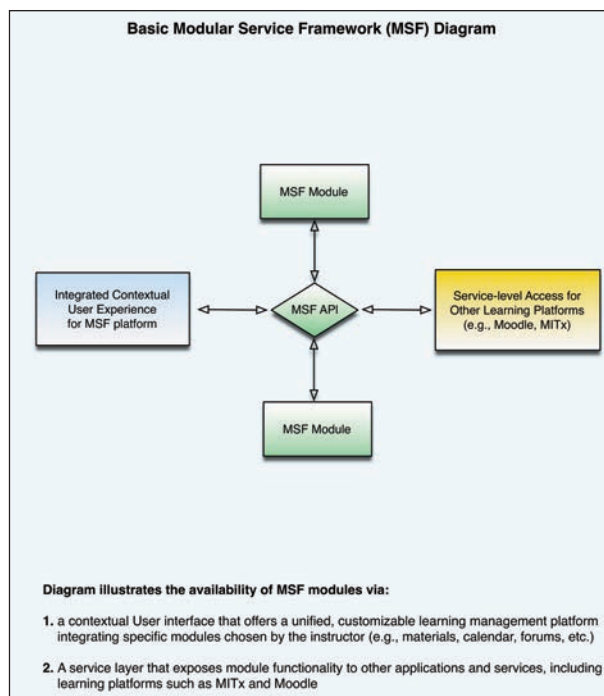**Daniel Hastings**
Christine Ortiz

AN EFFECTIVE LEARNING MANAGEMENT System (LMS) enables faculty to organize and manage the many aspects of teaching a class, for example:

- sharing and updating class materials and assignments
- managing class membership
- tracking student performance
- facilitating course-based collaboration and information exchange.

An effective LMS is also scalable and adaptable and evolves to support the diverse and advancing pedagogical models used by the faculty.

Stellar, launched by Information Services and Technology (IS&T) in 2001, has been the primary LMS for the MIT residential curriculum. During the spring 2013 term, Stellar supported 972 classes, 1,244 faculty users, and 8,864 student users across all five Schools. Since the launch, IS&T evolved Stellar to address new and changing requirements. However, as the system aged, constraints in the architecture began to limit extensibility. Key features, such as more collaboration capabilities, support for flexible learning groups and more flexible document and data management, could not be added. From 2008-2009, as IS&T worked with Stellar users and stakeholders to validate requirements for a next-generation LMS, it became clear that Stellar could no longer be sustained as an effective LMS platform at MIT.

From fall 2009 to spring 2011, the Faculty Committee on Learning Management Systems (a subcommittee of

Adapted from *The Modular LMS* by Derek Jaeger

the MIT Council on Educational Technology chaired by Prof. Eric Klopfer) worked with IS&T to gather community input and evaluate options for a more robust and flexible system. Based on this process, the Committee sponsored an experiment with the Blackboard LMS to assess whether this commercial solution would satisfy MIT's needs. The experiment clearly indicated Blackboard was both technically and functionally deficient. The Committee determined that a more appropriate solution would be to update MIT's LMS environment using a service-based framework that met three key requirements:

- modular functionality
- integration with popular third-party services
- a consistent user experience with the current LMS.

The resulting solution, named the Modular Service Framework, is currently in development. It is the foundation of MIT's new modular LMS. In this model, discrete elements of LMS functionality, such as course calendar or materials management, are implemented as individual Web service modules that can be utilized either as standalone modules or as part of an integrated, end-to-end LMS solution. This architecture allows modules to be used in conjunction with the MITx platform.

The modular MIT LMS offers:

- A customizable environment in which faculty tailor the system to include only the modules they require
- User-focused, intuitive workflow via an easy-to-use, seamless interface
- Role-based personalization
- Accessible Application Programming Interfaces (APIs) that allow faculty to leverage module functionality from other platforms, such as MITx and Moodle.

A clear evolution path from Stellar

Since this effort began in summer 2011, IS&T has made significant progress in developing, testing, and deploying core LMS modules. Initial priority has been given to the development and deployment of common core LMS functionality currently represented in Stellar. This includes materials management, course calendar, course gradebook, and membership rosters, with an emphasis on the provision of open accessibility and integration standards not currently enabled by Stellar.

The evolution process is a thoughtful one. New modules undergo extensive dual-phase beta testing by faculty and other users over two semesters, providing ample time for feedback to be incorporated before launch. At launch, the new module does not immediately replace existing Stellar functionality. Instead, users choose when they are ready to move. Once a module has been released and successfully in production for an academic year, the redundant Stellar functionality is phased out. Throughout the evolution from Stellar to the new MIT LMS, core workflow logic is maintained in order to minimize user dissonance.

Development of core LMS modules
Released:
- **Gradebook Module** – Released in fall 2012, the new Gradebook provides advanced grade management of course assignments and exams. It also includes recitation/section support, integrated student photos, and mobile device compatibility. The legacy Stellar Gradebook will be phased out in summer 2013.

In beta:
- **Course Membership Module** – provides a critical function to all other modules: consistent student membership lists and role-based instructor and TA functionality. Membership lists are centralized and disseminated to all other modules activated for any

given class. The target release date for this component is fall 2013.

- **Early Warning System Module** – enables faculty and advisors to recognize students who may be struggling academically. By using data from the Gradebook Module and instructor-set criteria, the system monitors student performance and automatically notifies faculty and advisors when students may need help. The target release date for this service is fall 2013.

Other modules in development with a target release of 2014 include:
- **Calendar Module** - manages the class timeline and includes integration with popular calendars, such as Google Calendar.

- **Forum Module** – facilitates class-based discussions.

- **Materials Module** – enables management of class-based materials and documents.

In moving ahead on this plan, IS&T is implementing LMS functionality as modular services that source course membership information in a centralized and consistent manner. Individual modules share the same course metadata, and offer users a consistent, contextual and integrated workflow that builds on the functionality offered via each module.

Putting the flexible LMS to use

As faculty begin to utilize the new LMS modules, the possibilities and impact of a more flexible and customizable system become increasingly evident.

- This semester, several classes using the MITx platform, including 18.05, CC.802, 8.011 and 5.11, are employing the API interface between MITx and the Gradebook Module to manage online assignment grades.

- Urban Studies and Planning classes 11.125 and 11.127 are currently using the Course Membership Module in beta to manage student membership lists in their Moodle course Websites.

- The Early Warning System has been activated in beta for 10 departments, including 2.002, 6.00 and 14.01.

We encourage you to leverage the new LMS modules to support and enable your unique approach to organizing, managing, and teaching your classes. The modules are part of the toolset that facilitates educational innovation at MIT.

If you have questions or want to get involved in a current or future beta, you can contact the Learning Management Application & Services (LMAS) team at *learningmod-support@mit.edu*. For released modules, the LMAS team provides both online support documentation and training. Currently, documentation is available for the Gradebook Module.

The Education Systems Roadmap

The MIT LMS is one of many projects defined as part of the Education Systems Roadmap. The Roadmap is the foundation for modernizing MIT's Student Information System (SIS). Guided by the Roadmap, DUE and ODGE partner with IS&T to evolve key applications and processes central to the educational priorities of the Institute. Faculty involvement is critical to the success of many Roadmap projects. Through the SIS Faculty Working Group and established relationships with faculty and departments, the SIS team gathers requirements, garners feedback, and gains departmental participation in project pilots. Through this collaborative effort, we hope to deliver the kind of experiences that keep students engaged and on track for success, and support you in your roles as teachers and advisors. ◼

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Beyond the Classroom
Learning From Students

Rebecca Saxe

I HAVE A PARTICULAR IDEAL of teaching at university. In it, the student and professor are working together, one-on-one, on a problem. The problem is central to the student's deepest passions and life ambitions. It is a hard, multi-dimensional problem, and both the student and professor are fully intellectually engaged. There are no grades, no fake incentives; the student decides how much to work, how much help to seek, and when to stop. The professor's role is to probe the student's reasoning, to provide perspective, and to challenge the student to reach for greater clarity, sophistication, and originality. The standards are not the standards of the classroom, but of real life and adult minds. If the solution is a new kind of bridge, the standard is that you would let those you love drive on it.

Every year, I have this kind of interaction with a small handful of the best undergraduates at MIT. Perhaps unsurprisingly, it happens outside the classroom. I meet them through my service on the Distinguished Fellowships Committee. The students are applying for elite fellowships: Rhodes Scholarships, Marshall Scholarships, Truman Scholarships, Fulbright awards, etc. In their application essays and interviews, the students must articulate their personal, professional, and intellectual goals: the problems they aim to solve in the world. The Committee's job is to goad, challenge, and provoke them to do it better, to coach them to stand up for themselves while standing out from a crowd of the best students at the best universities in the world. My dream job.

Of course, I learn as much as I teach in this job. I am a professor of Brain and Cognitive Sciences, but I have mentored students working on DNA synthesis, cyber security, cheap and robust wheelchairs or NICUs or blood glucose monitors or smoke-free ovens, the morality of national defense, geodesic domes, fuel cell engineering, chronic pain, and the economics of education reform, among other things.

And in addition to learning from the students, I am inspired by them. These students are not just academically successful, they are also athletic, creative, and compassionate. Matt, for example, is the synthetic biologist. As an undergraduate, he already had a pilot's license, was a champion fencer and an active EMT, and had designed and run an engineering mentorship program for underprivileged middle school students. Lauren, the fuel cell engineer, is also an all-American pole vaulter and a director in 24-hour-film competitions, leading a team of over 20 people on an insane deadline; as she noted, she might be the only woman who is both a fuel cell engineer and a film director.

What can I do for these students? I can question their assumptions. I can add complexity, or force them to get up to date, or point them in new directions. I can be hard to impress. All of these students are good at finding the right answer, so I ask them questions that don't have right answers. All of these students are good at solving toy problems, so I give them real problems.

I like the work so much that I recommended serving on this committee to my best friend.

> And in addition to learning from the students, I am inspired by them. These students are not just academically successful, they are also athletic, creative, and compassionate. . . . What can I do for these students? I can question their assumptions. I can add complexity, or force them to get up to date, or point them in new directions. I can be hard to impress.

Of course face-to-face, individually tailored interactions cannot fulfill all of the goals and values of a university. In particular, my ideal is antithetical to a MOOC. It cannot be parallelized, and so can only be delivered to a handful of the lucky few who live on campus. It is idiosyncratic, and an inefficient way to transfer the content of our expertise.

But we all know that teaching must go beyond transferring content. I believe we grow into adults, and grow as adults, by participating in serious intellectual conversations, with high standards and high stakes and no holds barred, one-on-one with a person we admire. These conversations teach us what to aspire to. I believe these conversations are fundamentally what a university is for. ■

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Housing MIT's Graduate Students: Framing the Inquiry and Shaping the Dialogue

Phillip L. Clay

THIS ARTICLE IS ABOUT the work of the Graduate Student Housing Working Group. The charge from the Provost directs us to focus on how we might best house our graduate students and to recommend changes. This inquiry is related to the larger visioning of our campus and surrounding area that is ongoing. An important feature of the process is to make sure we remain competitive in our goal of attracting the very best graduate students.

To address this task, the Working Group needs input from a variety of sources. Faculty input is critical because faculty are in the best position to judge how we fare with respect to attracting the best graduate students and providing them with an extraordinary community in which to emerge and grow as young scholars and professionals. We are also very much aware of the current interest in campus planning and the importance of making housing a critical part of making our campus an attractive and enabling place. Clarity in framing the inquiry will greatly enhance the dialogue our report will encourage.

We will have a variety of means to collect input, including sessions at which individuals present to the Working Group. We want to share below our approach to gathering input and indicate to the community that we welcome their input throughout the process, which we expect to complete by October 1. Input early in the process as we shape our inquiry is most valuable.

We have several subgroups organized around aspects of the graduate housing question. Do we have the question right?

We want your feedback and ideas as we take deep dives.

1. Graduate student attitudes, issues, and choices

This subgroup will – using past and current surveys, open meetings, and focus groups – review the feelings, interests, and needs of graduate students about housing and community.

2. Boston-area housing issues, markets and trends

The charge to this subgroup is to understand the local housing market both in

terms of how our students impact the market (if that can be discerned) and how our students experience the market. While some students want to live off campus, we want to assess the extent to which this option will remain viable.

3. MIT graduate enrollment and expectations for the future

The subgroup will explore with deans and department heads the issues which shape the size and composition of the graduate student body and estimate how likely changes will impact those components of the graduate student body over the next decade.

4. The Competitive Environment

We will seek to understand where MIT stands competitively and what factors, including possibly housing, shape our competitive position. This includes understanding how peer institutions address the housing issue.

5. Utilization of current graduate housing inventory

MIT houses more than one-third of its graduate students. There have been major increases in the number of graduate beds in the two last decades. We want to understand how the housing we have meets our com-

> To address this task, the Working Group needs input from a variety of sources. Faculty input is critical because faculty are in the best position to judge how we fare with respect to attracting the best graduate students and providing them with an extraordinary community in which to emerge and grow as young scholars and professionals.

mitments; what we can learn about the match between our current stock of graduate housing and the campus population; and gain insight into how to think about future needs. This assessment also includes a review of off-campus housing affiliated with MIT.

We welcome your input to the Working Group in general or on any part of the subgroup work plan. You can e-mail your comments, suggestions, and questions to *gradhousing-ideas@mit.edu*. Or please contact me directly. ■

Phillip L. Clay is a Professor in the Department of Urban Studies and Planning and Chair of the Graduate Student Housing Working Group (*plclay@mit.edu*).

The Magic Beyond the MOOCs
Sarma and Chuang, from page 1

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the value of residential education. Online tools may be just the cure that saves residential education by increasing the value it provides, not the disruption that kills it.

The Magic of Residential Education

President Rafael Reif has consistently described edX as bringing "instruction" to students. Woodie Flowers, creator of two signature experiences that capture the magic of in-person education – MIT's iconic 2.007 design class and the global FIRST Robotics competition – for over two decades has contrasted the transmission of codified content, or instruction, and the much deeper, immersive experience that we refer to as education. But references to the distinction go far back and include the writings of the sociologist and civil rights activist W. E. duBois ("The true college will ever have one goal – not to earn meat, but to know the end and aim of that life which meat nourishes." – in *Souls of Black Folk*, 1903) and John Dewey ("What avail is it to win prescribed amounts of information about geography and history, to win ability to read and write, if in the process the individual loses his own soul: loses his appreciation of things worth while, of the values to which these things are relative; if he loses desire to apply what he has learned and, above all, loses the ability to extract meaning from his future experiences as they occur." – in *Experience and Education*, 1938). Over the years, the same general dichotomy has shown up in different research efforts in education with different labels: first order versus second order learning, surface versus deep learning, cognition versus meta-cognition, novice versus expert learning, and so on. Rather than seeing MOOCs as distracting or threatening to today's education business, we believe the need of the hour is for educators to figure out how this new tool might streamline first order learning and free us up to enrich second order learning.

An editorial in a recent *Faculty Newsletter* (March/April 2013) had this to say about MITx: "Many are getting on board, while others remain skeptical, but one happy consequence is unquestionable: we discuss how we teach more now than ever before." It then lays out a series of thought-provoking suggestions. We believe this is the right tack.

A key benefit of online instruction is increased time for face-to-face interaction, making it possible to further enrich the residential experience. Fortunately, several colleagues at MIT have been in the vanguard of this line of thought. David Wallace and Suzanne Weiner wrote about flipping the classroom in 1998 ("How Might Classroom Time Be Used Given WWW-Based Lectures?" *Journal of Engineering Education*, July 1998). MIT has been aggressive about reimagining the classroom experience using technology, whether it is the TEAL classroom, or iLabs, or Visualizing Cultures, or online tutoring in 6.01, or Dave Pritchard's enrichment of 8.011 using LON-CAPA (an online system developed by Michigan State University). In many ways these were the precursors to today's edX. Such early experiences at MIT and at other institutions inform our plans as we move to a world in which many more resources and courses will be available online.

The possibilities and implications are both exciting and daunting. Hal Abelson, Tom Knight, Arthur Steinberg, Gerry Sussman, and Jack Wisdom, for example, propose de-emphasizing classes and adopting a system based on apprenticeship. In an inspiring article in *The Tech*, Sam Shames, an MIT undergrad, makes the passionate case for problem-based learning – in which a problem is at the center of a class, and the learning occurs through online modules that are motivated by the problem. Cole Shaw's Master's thesis under the supervision of Dick Larson describes how traditional

curricular structures can be replaced with guided learning pathways. A range of educational models is now within reach thanks to our advances in online learning. These models seek to enhance the still intangible pathways by which higher-order learning – the magic, the

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metacognition, the deep learning – occurs: mentoring, discourse, writing, project work, teamwork, serendipity, creativity, synthesis, and the delivery of nuggets of knowledge at the time they are most relevant.

Unfortunately, many innovations in education thus far have lived in silos. Is systemic change possible? We believe that adoption of modern teaching practices is possible at the level of an institution. Tom Magnanti, president of the new Singapore University of Technology and Design (SUTD), has developed a cutting edge pedagogical approach at the new university by placing student learning ahead of other objectives. By reducing the number of traditional lectures, SUTD opens up extra time for active learning in classrooms that resemble TEAL, and with cohort groups that resemble MIT's Experimental Study Group. Well before edX was launched, Tom asked if MIT could not deliver videos to SUTD, such as those by Walter Lewin, so that SUTD could flip their classrooms completely. SUTD's high quality faculty, many of whom had received training in active learning at MIT's Teaching and Learning Lab, would then be able to provide much more face-time to their students. In response, working with TLL, we developed a concept map for SUTD and produced a number of "video vignettes" that could be used to deliver modular content to augment their in-person teaching. Imagine how a new university such as SUTD could take advantage of edX now that it is up and running.

Consider, also, how student life could be enriched. A student building an electric car for the MIT Electric Vehicle Team might benefit from modules on electric motors and electric batteries, made available on-demand online. Students in the MIT International Science & Technology Initiatives could become student ambassadors to learning groups around the world involved in MITx courses on edX, and act as mentors. A student doing a semester abroad may benefit from taking a course online so that she doesn't delay her graduation date. In fact Pedro Reis and Ken Kamrin are doing just that in the i2.002 pilot class, available online to students while away from MIT (cf., Semester from Anywhere). Or a student who takes a year off to do a startup may take the online class on differential equations or philosophy to keep her intellectual instincts honed.

In short, we believe it is time for the conversation about MOOCs to ascend to a higher question: How can we use online education to make the onsite experience even more valuable? The Office of Digital Learning was set up in part to facilitate that very conversation.

The Office of Digital Learning

President Reif installed us (Ike Chuang and Sanjay Sarma) as founding Associate Director and Director, respectively, of the new Office of Digital Learning (ODL) in December 2013. We report jointly to the Provost and the Chancellor. The mission of the ODL is to bring online learning to new level within MIT – for both residential and external use. The two of us believe deeply in the magic that occurs on campus, and are committed to enriching it.

ODL has benefited greatly by bringing OCW (OpenCourseWare), led by Cecilia d'Oliveira, and OEIT (Office of Educational Innovation and Technology), led by Vijay Kumar, under one roof, and with their support, we have created a new organization called MITx, led by Dan Carchidi. MITx develops MITx courseware, which can be deployed for both residential and global deployment. We like to think of MITx courseware as the "movie"

while edX is the "theatre" in which the movie plays. We remain committed to the historic missions of OCW and OEIT while also developing workflows that build on shared efficiencies. We are creating a single, seamless organization for supporting faculty to develop and deploy online learning material.

Curriculum development for the online world gives MIT opportunities to experiment in a number of ways, and to reach an especially diverse audience. This spring we helped Mechanical Engineering launch 2.01x, the first modular (in this case, half-semester) MITx on edX class; 2.01x also blazes new trails by employing Matlab for select assessment problems. This fall, we will help the philosophy department launch its first philosophy class, testing the effectiveness of large-scale peer-assessment capabilities in a traditional MIT humanities subject. We are also interested in helping seed experiments in the interface between online and onsite learning. Esther Duflo is teaching The Challenges of Global Poverty, 14.73x, simultaneously to MIT students and to a world audience. The worldwide student body for her class has more active female students (53%, self-reported) than male, distributed over 153 countries, with 73% outside the U.S. Locally, at MIT, over a dozen classes have created residential MITx components, using the edX platform, enhancing onsite courses with pre-lecture problems, online project problems providing instant feedback, interactive statistics tutorials, and even quiz-review preparation videos, for example. Over 1000 students at MIT have already used this experimental residential MITx system.

MIT's effort in online education has also opened up a vast array of intellectual questions. To help us address these questions, ODL launched eight MITx task forces in January of this year, consisting of faculty, students, and staff. These task

forces are looking at how to produce engaging videos, how gaming can be incorporated into online learning, how online assessments might evolve, how learning environments might look in a world with online education, how hands-on experiments can be incorporated in the online world, how concepts and learning

> In short, we believe it is time for the conversation about MOOCs to ascend to a higher question: How can we use online education to make the onsite experience even more valuable?

pathways will come together in the online world, how graduate students can benefit from and play a role in this world, and what basic research will be possible with this grand new effort. The task forces will be reporting on May 17 at a half-day ODL retreat. The retreat will, among other things, help us launch experiments to evolve our thinking further. In the second half of the same retreat on the 17th, over 50 faculty members developing MITx courses will meet in a Special Interest Group (SIG) event. Overall more than 100 colleagues will come together at the retreat and contribute to our collective mission.

The MITx task forces are different from, but complementary to, the Institute-wide Task Force launched by President Reif this April. Sanjay Sarma co-chairs this task force with Executive Vice President and Treasurer Israel Ruiz. The activity is organized into three working groups:

- Working Group on MIT Education and Facilities for the Future
- Working Group on the Future Global Implications of edX and the Opportunities It Creates
- Working Group on a New Financial Model for Education.

Karen Willcox, Associate Head of Aeronautical and Astronautical Engineering, chairs the first working group, while Sanjay Sarma chairs the second, and Israel Ruiz the third. Each working group has faculty, students, and staff members. The Institute-wide Task Force has been

charged with charting a long-term strategy for MIT and is expected to report in a year, with a preliminary report this fall.

Summary
After many years of incubation, online education is here in force. While the attention has been riveted on the first order learning it addresses, we believe that online education should really bring second order learning into focus. The timing could not be more propitious: new teaching approaches such as active learning are now increasingly well understood, and our desire and ability to adopt them are relatively high. External pressures on higher education provide another impetus. We believe that online tools, properly harnessed, will enrich the essential magic of the residential experience and enable a new, possibly more effective, model for higher education in the years to come. We have much work ahead to understand how online and classroom learning can be closely coupled. The key will be to approach the challenge in a balanced way, in which we use the aspects of online instruction that are an advantage while also enhancing unique aspects of residential education. MIT has taken leadership in education innovation before, and is poised to do so again.

[We thank Dan Butin and Katerina Bagiati, who contributed to our thinking.] ■

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How Online Education Might Impact the Future of Mathematics Departments

Daniel Stroock

PRESIDENT REIF, AND PRESUMABLY the people who chose him, have a dream about the future of higher education. Their goal has broad appeal among people who believe that by packaging educational material properly, higher education can be made available to those who have no ready access to schools like MIT, and they are undoubtedly right about that. Whether they are correct to believe that availability is sufficient to change the ratio of educated to uneducated individuals is less obvious. Ever since Andrew Carnegie provided every large city in America with a library, vast reservoirs of information have been available to the general public. However, only a small fraction of the population even attempts to tap those reservoirs, and only a small fraction of those profit from their efforts.

Even if one does not share President Reif's confidence in the success of his proposal, one might feel that his is a proposal worth trying. But to be enthusiastic about such an experiment, one has to ignore its potential dangers. For example, what is the future that mathematics departments face if his dream comes true? My guess is that they have no future.

The MIT Mathematics Department is a gem. It is an expensive gem, but its cost is justified by the role its members have heretofore played in the education of MIT undergraduates. Unlike those at Harvard and some other top schools, almost every MIT undergraduate mathematics course is taught by a regular faculty member, and often by one of the most distinguished members. Only rarely is a graduate student responsible for anything more than a recitation section.

Of course the undergraduate program is not the reason why MIT can attract some of the best mathematical talent in the world. Instead, it is the graduate program and research opportunities that attract them. However, if President Reif's vision of higher education is the future, then the role of the mathematics faculties in undergraduate education will be indistinguishable from the role that the graduate students play now. If MIT thinks that its prowess will make it immune to the consequences of this change, it is wrong. Even renowned graduate programs in mathematics like MIT's will shrink and may well disappear.

Indeed, the universities that now hire our PhDs will use our online videos to teach their undergraduates and adjunct faculty to cover recitations. As a result, MIT's present Mathematics Department will lose its *raison d'être*, and within a few years MIT will regret having hired the high-priced young talent that has joined its Mathematics Department in recent years.

Mathematicians are not the only members of the academic community who are likely to suffer. In fact, aside from the ever burgeoning administration, only those academics whose research is either immediately applicable to industry or part of the war against mortality are likely to find that their jobs bear any resemblance to the ones they have now. Maybe this is the price that one has to pay for progress, but before paying it one should be certain that it is a price worth paying. Dismantling a structure that took centuries to build is easy and fun; reassembling it is neither. ■

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Steve Hall New Faculty Chair

Newsletter Staff

Margaret MacVicar Faculty Fellow in 2002. He was a Visiting Associate Professor at the University of Michigan from 1992–93.

> Steve's research interests have been in aerospace controls systems, including flexible space structure control, control of noise and vibration, especially in helicopters, and the development of smart material actuators. He is the coauthor of seven patents, mostly in the area of smart material actuation, but also one in washing machine design.

STEVEN R. HALL, Professor of Aeronautics and Astronautics, will become Chair of the Faculty on July 1, 2013 after serving as chair-elect for the past year. Steve has been apprenticing this year under the welcoming mentoring of the current Chair, Sam Allen. Joining Steve as faculty officers this summer will be John Belcher (Associate Chair) and Susan Silbey (Secretary).

Steve grew up in Florida, living in a half-dozen towns throughout the central part of the state before graduating from high school in St. Petersburg. Living in Florida at the height of the space race, he developed an interest in aircraft and rockets early in life. He graduated from MIT with an SB degree in Aeronautics and Astronautics in 1980, and earned SM and ScD degrees in Aeronautics and Astronautics in 1982 and 1985, also from MIT. He was appointed to the MIT faculty in the Department of Aeronautics and Astronautics in 1985, and was named a

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His teaching includes graduate and undergraduate subjects within the Information Sector of the department, including a dozen years teaching Signals and Systems in the famous (or infamous) *Unified Engineering*. He has also taught undergraduate subjects in control theory, guidance and navigation, and flight mechanics and control. His graduate teaching includes subjects in modern control theory and optimal control.

Steve has been active in service in his home department and the Institute. In his department, he's served as an undergraduate advisor, Assistant Department Head, Chair of the departmental faculty search committee, Chair of the doctoral program, and Co-Head of the Information Sector. In service to the Institute, he has been a freshman advisor, a member and later Chair of the Committee on the Undergraduate Program, a member and then Chair of the CUP Subcommittee on the Communication Requirement, a member of the MIT Corporation Joint Advisory Committee on Institute-Wide Affairs (CJAC), and a member of the Institute-Wide Planning Task Force.

Steve is currently the Associate Housemaster of Simmons Hall, where he runs the Simmons Hall Residential Scholar program. He greatly enjoys living with the Simmons Hall community of students and scholars, which he describes as "warm, welcoming, and vibrant." His daughter Caitlin lives with him at Simmons Hall and is a graduate student at Emerson College. His son Michael lives in nearby Watertown. Steve is a certificated pilot, and enjoys flying his plane on weekends and on vacations.

13

Support for the Rising Complexity of MIT's International Students

Danielle Guichard-Ashbrook
Heather Konar
Christine Ortiz

MIT HAS HAD A LONG HISTORY of welcoming students from around the world. Over the past decade, MIT has seen a significant rise in the number of international students, to a total of 4,622, – an increase of 69% (see table). Currently, 28% of degree-seeking students at MIT are international (10% of whom are undergraduate and 40% graduate) originating from 112 different countries and from all regions of the world (Figures 1 and 2). Asia represents the largest fraction of the international degree-seeking student population, with China, India, Canada, South Korea, and Singapore the top enrolling countries, respectively.

The growth in MITs international student population is reflective of the Institute's extensive global engagements and commitment to global education (*global.mit.edu). Examples range from large institutional initiatives (collaborations with Masdar Institute of Science and Technology, Skolkovo Institute of Science and Technology, the Abdul Latif Jameel Poverty Action Lab (J-PAL), Singapore University of Technology and Design (SUTD), MIT-Portugal, as well as the MIT International Science & Technology Initiatives (MISTI), etc.), to curricular and co-curricular programming (e.g., Sloan Action Labs, MIT Pubic Service Center (PSC), MIT Ideas Global Challenge, MIT-Imperial Global Fellows Program, MIT-China Innovation and Entrepreneurship Forum (MIT-CHIEF), etc.), and extensive individual faculty-driven research collaborations.

MIT strives to enrich the residential educational experience of our international students in a number of ways.

Category	2001-2002	2011-2012	Change in Enrollment	% Change in Enrollment
Graduate Students	2,342	3,407	1,065	45%
Undergraduate Students	392	496	104	27%
Visiting Students	0*	606	606	–
Exchange Students	0*	29	29	–
Special Students	0*	84	84	–
Total	2,734	4,622	1,888	69%

Increase in Enrollment in MIT International Students Over the Last Decade

* Prior to 2009 international non-degree students were included in the overall international student statistics.
Source: International Students Office, unduplicated counts for the academic year

Personal Support

Various Institute offices are able to tailor their services to international students: undergraduate students may take advantage of Student Support Services (within the Office of the Dean for Undergraduate Education or DUE), while graduate students are aided by the Office of the Dean for Graduate Education (ODGE), which supplies one-on-one advising support; and all students may seek financial help with Student Financial Services (within DUE). Personal support for international students is often intertwined with immigration advising. The International Students Office (ISO), within the ODGE, is an additional resource, as staff members have significant knowledge and training in immigration expertise and the specific challenges international students face. The above resources support international students in areas such as cultural acclimation, the unique aspects of U.S. academic programs, English language proficiency, healthcare, insurance, and medical conventions, as well as personal support for students whose home countries are undergoing political unrest, natural disasters, and many other situations unique to international students. The ISO works closely with MIT Medical, which provides a variety of mental health counseling and community wellness. MIT Medical also has its own Program Manager for International Families.

Supporting Immigration Status

The ISO also handles work associated with maintaining the legal immigration status of our international students, their dependents, and the approximately 650 international MIT alumni each year who have recently graduated and are working in the United States on work authoriza-
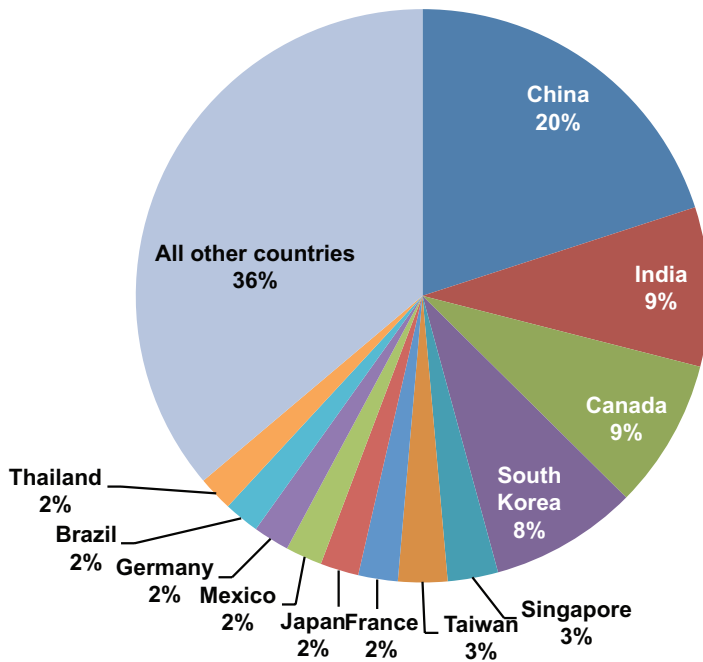
Figure 1. Percentage of Enrolled Degree-Seeking Graduate and Undergraduate International Students, by Country of Citizenship AY2013

Source: Regustrar's Office, October 2013 "Y Report"

to the culture and fabric of MIT. Activities range from serving as officers for their residence or the student government, to designing an innovative project to improve the quality of life in communities throughout the world via the MIT IDEAS Global Challenge (run by the Public Service Center), to organizing internationally-focused career fairs.

MIT is committed to fostering a caring and inclusive campus environment, which begins from the moment students engage in Orientation their first year. The International Students Office organizes an International Orientation for incoming freshmen with an emphasis on welcoming and informative activities. Sharing across cultures abounds in the residences, both in a casual way and through programs such as SPICE, the Sidney-Pacific Intercultural Exchange, co-sponsored by the Office of the Dean for Graduate Education. SPICE brings students together for approximately 85 dinner and

tion. After September 11, 2001, the scale and the complexity of immigration regulations increased dramatically, including an increase in the number of U.S. and other organizations having jurisdiction over different aspects of each international student's life.

The ISO must report to various government agencies on a multitude of data, from current registration status to areas of study and dependents. In order to electronically manage this data, the government created the Student and Exchange Visitors System (SEVIS); ISO additionally deployed SUNAPSIS in collaboration with IS&T, a Web-based application to facilitate data integration between SEVIS and MIT's MITSIS. Many of ISO's business practices have been converted from paper to electronic in the past few years, with over 5,000 international student files handled through SUNAPSIS.

Fostering an Inclusive Campus Culture

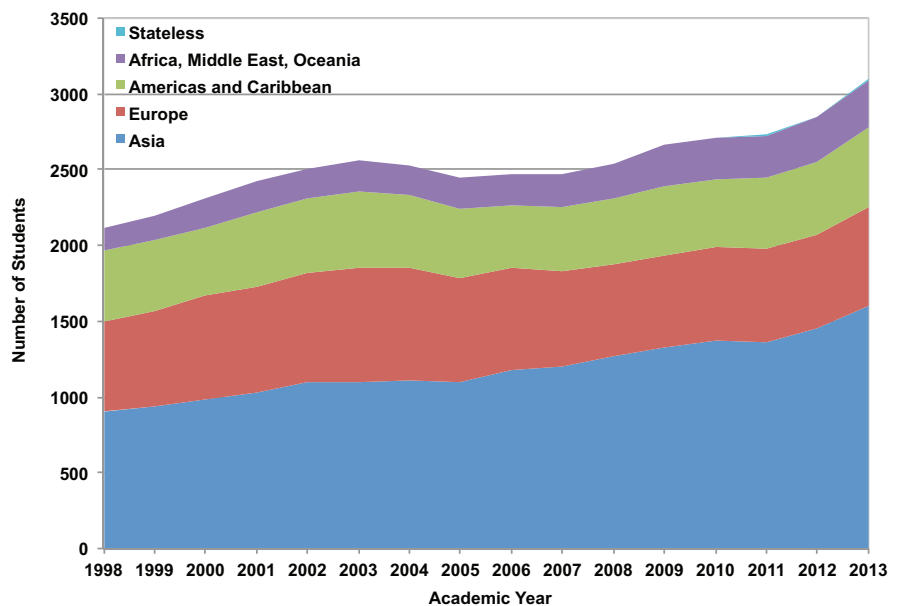International students have found an astonishing number of ways to contribute

Figure 2. Number of Degree-Seeking Graduate and Undergraduate International Students Enrolled at MIT by Geographic Region AY 1998-2013

Source: Regustrar's Office, October 2013 "Y Report"

MIT's International Students
Guichard-Ashbrook, et al. from preceding page

discussion meetings per year on topics from norms and taboos, to holidays, to interracial and cross-cultural relationships. The Addir Interfaith Program, run out of MIT Religious Life, brings students of different faiths together to learn about each other's beliefs, practices, traditions, and cultures. The International Students Office also organizes Jeanty Teas, which celebrate a specific theme, such as the Year of the Snake or Halloween, and the Host to International Students Program (HISP), which matches incoming international students with MIT faculty, staff, alums, and friends. The matches then engage in activities that expose the students to aspects of U.S. life, and allow the hosts to learn about other cultures and perspectives.

Over 60 active cultural student groups also contribute to cultural understanding, including the Arab Student Organization, the Bulgarian Club, the Organization of Serbian Students, Sangam (association of Indian students), and Stammtisch (a German conversation group). To improve campus culture for international students still further, the Office of the Dean for Graduate Education invites proposals from faculty, students and staff at any time (*odge.mit.edu/finances/activities-community/*).

Career Development
The primary source of career development support for international students is the Global Education and Career Development Office (GECD) within the Office of the Dean for Undergraduate Education. Each year GECD organizes a workshop to introduce international students to the process of a job search in the U.S.; they also run a workshop on "Business Etiquette: Mastering Meals, Manners and Business Interactions" that is quite popular with internationals. They have career counselors with international experience who are available for one-on-one meetings, as well as an extensive career library and online resources that include hundreds of job postings that welcome international students.

Increased support for the expanding international student population
The Office of the Dean for Graduate Education is pleased to announce that the International Students Office will add an additional International Student Advisor as of July 1, 2013, thanks to the support of the Provost and the Chancellor. The new advisor will join the team that counsels and advises MIT students and their dependents on all issues related to their stay in the U.S., including personal and family matters. The advisor will help not only to support the additional numbers of MIT international students, but also to help address the increasing complexity of supporting their immigration status.

To help foster an inclusive campus culture, the ISO enhanced the undergraduate International Orientation this past year. The number of mentors was increased, reducing the ratio to 1:4 (down from as many as 1:8 in previous years). A session on academic integrity was also added, the calendar was expanded with more evening social and bonding activities, and "USA 101" was enhanced. The GECD has responded to the needs of international students by adding targeted speakers to its roster of events: in April, Dan Baudry, author of "Power Ties: The International Student's Guide to Finding a Job in the United States" came to share inside information with over 200 attendees. Initiatives in this arena sponsored by the ODGE have included the MIT-China Innovation and Entrepreneurship Forum (MIT-CHIEF); a China Urban Development seminar series; and the MIT-India Conference.

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Many offices at MIT partner to form a supportive web for all our international students. As MIT increases its global reach and embraces the rich complexity of those interactions, there are many generous and capable staff members who stand ready to meet the challenge to support our international students. We are eager to engage in the continuing conversation about how best to support the changing needs of MIT's international students, and we encourage you to contact any of the authors of this article. ■

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Heather Konar is the Communications Director within the Office of the Dean for Graduate Education (*heatherf@mit.edu*);
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Working Alone at MIT

Robert W. Edwards
Carolyn Stahl

MANY OF US REMEMBER a tragic accident at Yale university a little more than two years ago resulting in the death of an undergraduate student working alone late at night. When accidents happen, the entire college and university sector cooperates on learning and applying lessons from such incidents. After this tragedy, many groups here, led by the MIT EHS (Environment, Health, and Safety) Office, examined our working-alone practices and have modified and coalesced various policies around the Institute.

A comprehensive Working Alone Policy for the Institute was adopted by Academic Council last year. This Working Alone Policy and Guiding Principles (*https://ehs.mit.edu/site/sites/default/files/Working_Alone_Policy.pdf*) applies to all departments, labs, and centers where research and teaching involves working with hazardous materials, equipment or operations that may create the risk of injury. The goal of the policy is for all parties to carefully evaluate the hazards present prior to working alone; and decide that in some cases people should not work alone.

Similar policies have been adopted by various Institute oversight committees over the years. Some committees had explicit policies that did not allow undergraduates to work in a research laboratory without supervision, while others had no policy, or an informal one. This policy unifies our local practices.

The intent of the Institute policy is to have the Principle Investigator (PI) or supervisor and anyone working with or who intends to work in potentially haz-

ardous conditions that could result in serious injury or immediate harm make a careful assessment of the activities prior to working alone. Several regulatory enforcement and court cases indicate that PIs

> The intent of the Institute policy is to have the Principle Investigator (PI) or supervisor and anyone working with or who intends to work in potentially hazardous conditions that could result in serious injury or immediate harm make a careful assessment of the activities prior to working alone. . . . The assessment will determine whether the risk of working alone is controllable under specific conditions established by the PI or supervisor.

have supervisory responsibility for the safety of personnel working in his or her laboratory. It is recognized that nearly all activities in a laboratory could, if not closely managed by all involved, result in serious injury. The assessment will determine whether the risk of working alone is controllable under specific conditions established by the PI or supervisor. If the risk cannot be minimized to a controllable level, as determined by the PI or supervisor, then the individual should perform the work only when others are present or a suitable alarm device is available that will summon help immediately. The PI or supervisor must determine hazardous conditions that can result in immediate injury or death with assistance from their department, laboratory, or center EHS coordinator or the EHS Office on a case-by-case basis.

The objective of the policy is to provide clarity and consistency around

this issue without hindering research, and to promote the development and adoption of a routine assessment process to determine whether any given operation should be allowed to be performed alone.

It is intended to mitigate those incidents or accidents where there is an immediate need for assistance to provide help and/or call for help (e.g., emergency responders).

The new policy is consistent with existing ones in MIT Human Resources for employees, the Committee on Assessment of Biohazards, Radiation Protection Committee, Committee on Toxic Chemicals, and Division of Comparative Medicine regarding supervision of undergraduates in research laboratories and animal facilities. The policy states the minimum requirements for working alone across the Institute, although any specific working-alone policies from Institute Committees or individual DLCs or individual PIs or supervisors that are more restrictive shall take precedence. It would not apply to areas outside laboratories such as offices or classrooms, where haz-

Working Alone at MIT

ardous materials, equipment, or operations would not be expected to be present.

Working alone applies to all employees, faculty, students, and staff, anytime, night or day, when no one else is in direct line of sight or within sound of the person. Devices that can be worn to sound an immediate alert to a central, continuously manned location (e.g., Police, Facilities) may be substituted for people in some situations. The use of a cell phone as an emergency contact device may also be adequate in certain situations.

Additional measures apply to undergraduates. Undergraduates shall not work alone with hazardous materials, equipment, or operations that can result in immediate injury or death without prior written approval from the immediate PI or supervisor. Written approval should only be granted after the risk assessment is performed, documented, and reviewed by the PI or supervisor with the individual. Once this review is done it does not need to be repeated for subsequent similar activities. A system will be established and maintained by the EHS Office to compile individual conditions, which a PI or supervisor can refer to for guidance. In some cases the approvals will be associated with a research registration or authorization. The EHS Office will serve to provide consistency across our campus.

This policy is linked from MIT's *Policies & Procedures,* Section 9.2.2 (***web.mit.edu/policies/9/9.2.html#sub2***) and the *Human Resources Personnel Policy Manual,* Sections 3.1.1 and 5.4.1 (***hrweb.mit.edu/policy***). DLC-EHS staff and the EHS Office will assist in the implementation of the policy. For more information contact the EHS Office at *environment@mit.edu.* ■

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Carolyn Stahl is the Biosafety Program Senior Officer in the Office of Environment, Health, and Safety *(csstahl@mit.edu).*

Memorial Resolution

officer, his family, and the MIT Police Department. In the aftermath of the shooting, the MITPD created a Web page on which comments honoring Officer Collier have been posted. A few in particular caught my attention: The parents of a current MIT undergraduate wrote, "Dear family, words cannot express our gratitude for Sean's service or our heartbreak for your loss. Your son protected our son. Sean will stay forever in our thoughts and prayers for his bravery and sacrifice. Blessings and love to your family." An MIT staff member wrote, "Thank you, Officer Collier, and thank you to all of your fellow MIT law enforcement officers for putting your lives on the line for us each day. Because of you all I am able to come to work each day, knowing I am protected, knowing you are looking out for me, for all of us."

I did not have the opportunity to meet Officer Collier, but I have been touched by the accounts I have read and heard of this young man's commitment to MIT and to his community. He was active in the Police Department's IT operations, the MIT Outing Club, and the Jimmy Fund. As others have noted, MIT was not simply Officer Collier's employer: it was his home.

We as a faculty are as grateful to Officer Sean Collier for his outstanding service and dedication as we are to the entire MIT Police Department, whose contributions

> We as a faculty are as grateful to Officer Sean Collier for his outstanding service and dedication as we are to the entire MIT Police Department, whose contributions can on occasion be overlooked, but not overstated.

can on occasion be overlooked, but not overstated. Your work allows us to do our work; as "One MIT," we are in this together, supporting MIT's mission of serving the nation and the world.

Be it resolved that the faculty of the Massachusetts Institute of Technology, at its meeting of May 15, 2013, record our profound sense of loss on the death of Officer Sean Collier, and that we express our deepest sympathy to his family and to the MIT Police Department. ■

letters

Mental Illness as a Disease

Dear FNL Editorial Folks:

I THINK IT IS FANTASTIC that the FNL printed John Belcher's story on battle with depression ("In Good Company: Professional Help Can Alleviate the Weight of Depression," March/April 2013). It is so important to get out into the open that depression (or any mental illness) is a disease (like any other) and we must study it and learn how to best treat it on an individual basis (one size does not fit all). In my case, many know me as being manic excitive: I usually zip around in a state between excessively hyper and just hyper. It is a blessing and a curse. Like many ADHD++ types (many people at MIT) it allows us to do a lot of things at once.

However, it can also not overly endear us to some when they get caught in the vortex. In my case, and in the case of many students I advise from high school (our own kids and now FIRST robotics kids) an effective treatment has been exercise: not just general workout and stay fit, but pushing the body to its limits and beyond where the body uses all its easy resources and then is driven by the mind to really dig deep. In many cases that means endurance sports (intense swim, bike, run… any aerobic activity for periods longer than one hour). This level of exercise gets the endorphins flowing and seems to push a reset button in the brain that brings calm and order to the storm so the high velocity winds blow in the same direction.

With respect to the feeling of utter depression and despondency that Prof. Belcher wrote about, I have been there several times in my life when I was literally near death, and even then exercise helped. I recall spinning on my bike for hours while hooked up to the IV line! Recently I experienced total depression after returning from a trip to India where I met many wonderful people but also saw a side of the world that had some very sad things. My depression was so bad that even my intense workouts could only bring me up to half my normal hyper/happy state, and I was ready to go to Mental Health to find out what was wrong with me. I was ready to go when I mentioned to a colleague who had been on the trip with me that he also seemed super blah, and he said "Oh, its the anti-malarial meds." I had taken my last pill and so I decided to complete the experiment and every day I got better. That problem thus solved, even though I did not seek medical help, the important thing is I had crossed the threshold, or I would have if there had not been an identifiable reason.

In view of the above and as the nation launches a bold new effort on mapping the brain, I hope MIT will take a lead on researching the true meaning of *mens et manus*: The health of the mind is directly affected by the health of the body. To ignore one at the expense of the other is to ignore evolution and that would mean we might as well ride our dinosaurs off into the sunset like our forefathers did 7000 years ago. I thus hope to see significant research on how intense physical exercise affects the brain, in addition to research on just how the brain works.

In the end, the lesson learned from all this: Even big rough tough Texans like John, or shy quiet delicate folks such as myself, are human, and as humans we must never stop seeking answers to questions including how can we make our lives and the lives of others better. Better diet and exercise = better state of mind. Better state of mind = better life. Better life may or may not include synthetic medication. Better to be human than not.

Alex Slocum
Professor
Department of Mechanical Engineering

Applauding Proposed MIT School of Education

To The Faculty Newsletter:

I AM VERY EXCITED (and more than a little surprised) at the possibility of a School of Education at MIT. I am particularly pleased to see the possible emphasis on an individualized approach. Sometime ago, I actually created what we called the "teacher preparation program" that sat in the Department of Urban Studies – partly because of my particular interest in inner city, urban schools. Interestingly, the kind of "mantra" for that program was an expression of the importance we gave to individualized instruction: "How do you come to understand someone else's understanding?" This focus grew out of our MIT students' confusion and certainly surprise upon observing the high school students during their classes in our own inner city high school – Cambridge Rindge and Latin. This was a whole other world for our students but one where, perhaps paradoxically, they are particularly well equipped to help.
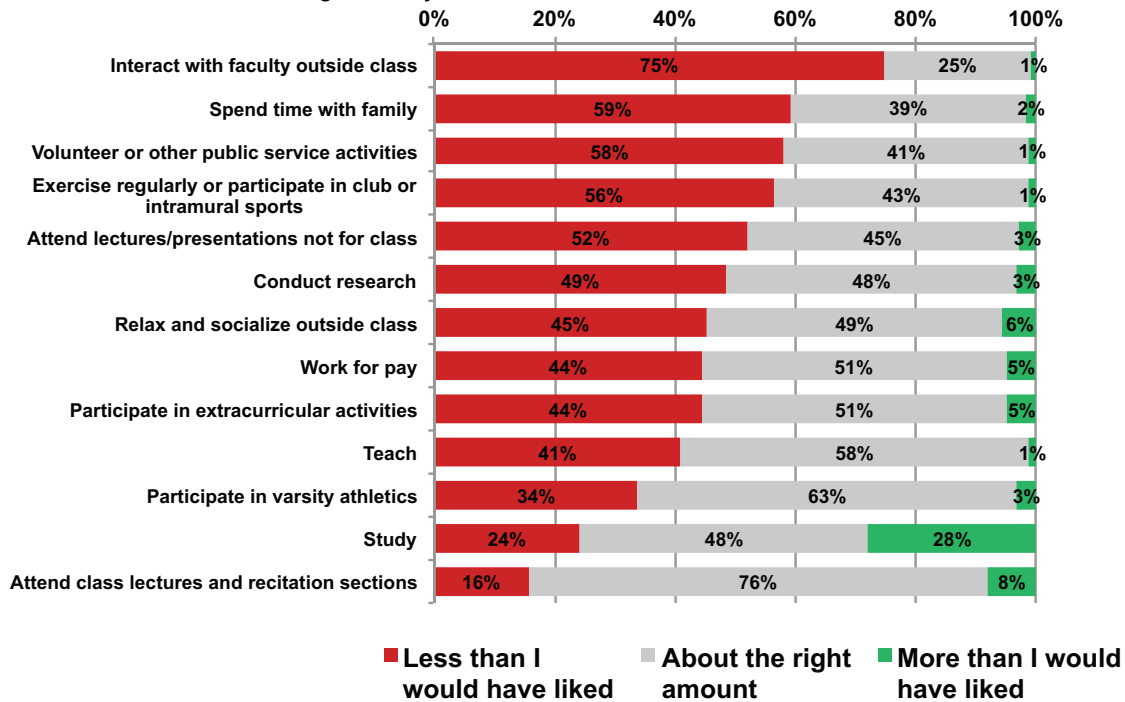
Now all of this may be moot (I hope not) if people are thinking primarily (or only) about education at MIT or other institutions of higher learning. In any case, I would be really happy to participate in whatever way might be useful and appropriate in planning and development as this program comes into being. I look forward to hearing more.

Jeanne Bamberger
MIT Affiliate

M.I.T. Numbers
from the 2013 Student Quality of Life Survey

**How do you feel about your level of participation in
these aspects of life at MIT during the current academic year?**
Sorted in descending order by 'Less than I would have liked'

**Undergraduate
Students Only**

Aspect	Less than I would have liked	About the right amount	More than I would have liked
Interact with faculty outside class	75%	25%	1%
Spend time with family	59%	39%	2%
Volunteer or other public service activities	58%	41%	1%
Exercise regularly or participate in club or intramural sports	56%	43%	1%
Attend lectures/presentations not for class	52%	45%	3%
Conduct research	49%	48%	3%
Relax and socialize outside class	45%	49%	6%
Work for pay	44%	51%	5%
Participate in extracurricular activities	44%	51%	5%
Teach	41%	58%	1%
Participate in varsity athletics	34%	63%	3%
Study	24%	48%	28%
Attend class lectures and recitation sections	16%	76%	8%

■ **Less than I
would have liked** ■ **About the right
amount** ■ **More than I would
have liked**

**How do you feel about your level of participation in
these aspects of life at MIT during the current academic year?**
Sorted in descending order by 'Less than I would have liked'

**Graduate
Students Only**

Aspect	Less than I would have liked	About the right amount	More than I would have liked
Spend time with family	63%	36%	1%
Exercise regularly or participate in club or intramural sports	61%	38%	1%
Volunteer or other public service activity	59%	39%	2%
Interact with faculty outside class	58%	41%	1%
Participate in extracurricular activities	54%	43%	3%
Relax and socialize outside class	51%	47%	3%
Participate in varsity athletics	45%	54%	1%
Teach	43%	54%	4%
Attend lectures/presentations not for class	43%	54%	4%
Work for pay	38%	58%	4%
Conduct research	27%	61%	12%
Study	17%	66%	18%
Attend class lectures and recitation sections	13%	78%	9%

■ **Less than I
would have liked** ■ **About the right
amount** ■ **More than I would
have liked**