

MIT Faculty Newsletter

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

this issue features an "Open Letter to the MIT Faculty" by Ted Postol (page 6); "Some Further Thoughts on the FPC Suggestions on Faculty Governance" by Steven Lerman (page 10); a discussion of and some suggestions for improving "Quality of Life Issues at MIT" by Jacquelyn Yanch (page 12); and a piece by Alice Gast and Claude Canizares discussing recent concerns about deemed exports, "What's All This About Export Controls?" (page 14).



Initial Impressions

Susan Hockfield

AS I HAVE BEGUN TO SETTLE INTO THE PRESIDENCY OF MIT, it has become clear to me that being named to this position is an even greater privilege than I first understood it to be. Obviously, I am still learning about the Institute – there is an inevitable information cost in moving from a place that you know very well to one that is new to you. But what has most struck me about MIT, as I have gotten to know it better, is the extraordinary depth and breadth of the excellence here.

I knew MIT's superb reputation, of course, and I had the highest respect for colleagues here in the fields I knew well from my own work. But without first-hand experience of the Institute, I could not fully appreciate the uniformity of the excellence I have now had the chance to see. The quality of research and teaching – the intellectual creativity and vibrancy of the faculty – is exceptional in every corner of the Institute. Departments here draw strength not just from one or two leading figures but from throughout their faculty as well as from collaborations within and beyond MIT.

This uniform excellence is what has made possible MIT's remarkable success in both discipline-specific and cross-disciplinary research. While we absolutely must maintain strong disciplinary foundations, I think that our continued leadership will depend even more than it has in the past on collaborations across disciplines. Since I am a creature of a collaborative culture, I am pleased that this is very much part of the air we breathe at MIT. People here have no reluctance to cross a disciplinary divide to find the ideas and resources needed to solve a particular problem or to think productively about a compelling issue.

I have also been particularly impressed by the dedication here to teaching and educational innovation. The same creativity that has made MIT a powerhouse of research innovation goes into the classroom and the teaching lab. The role MIT has traditionally played in establishing and promulgating new curricular directions has been further advanced through our international collaborations and OpenCourseWare.

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Photo credits: Page 16, Donna Coveney/MIT

Initial Impressions

Hockfield, from page 1

Of course, MIT's excellence is not confined to the faculty. It is equally the hallmark of students and staff. From my first meeting with the student advisory group during the search process, it was clear to me that the students here are exceptional young people, who are articulate, engaged, and passionate about what they

MIT reminds me of a friend's description of Silicon Valley – as a place where everyone seems to be carrying an extra battery pack.

do. Indeed, their passion is characteristic of the place. Moreover, the quality and professionalism of our administrative and research staff should be the envy of our peer institutions.

Along with excellence, I have been struck by the tremendous sense of energy that pervades the Institute. MIT reminds me of a friend's description of Silicon Valley – as a place where everyone seems to be carrying an extra battery pack. There seems to be no limit to the enthusiasm for taking on new ideas and exploring new directions.

The passion and the energy that are so characteristic of MIT reflect the importance of the work undertaken here. The questions we tackle are deeply important to people's lives. Our ability to work at the highest levels along an unbroken continuum from theory to practice is very unusual among leading universities, and it gives us unique opportunities to make a difference in the world. Moreover, as the world has become increasingly reliant on technological innovation and the intelligent integration of technology into our lives, MIT's leadership becomes ever more important.

All of this is not to say that I don't see some challenges ahead for MIT. Seizing the great opportunities before us will require careful deployment of our financial resources. There is some good news here. The budget cuts and reductions in staff necessary over the last two years have positioned us to move forward, as they were intended to do. Still, we will need to be prudent as we pursue new ventures, not least because the environment for federal research support is once again increasingly uncertain.

Over the last decade and a half, the Institute has successfully diversified its revenue stream, relying more than ever on private support. While this has inevitably exposed us more directly to prevailing economic conditions, we must accept and manage this uncertainty going forward. With federal research budgets flat if not actually declining, we must continue to expand our current resources and explore new revenue sources if we are to maintain our institutional momentum – especially since we are competing for faculty, students, and research opportunities with the wealthiest private universities. We will need to continue our commitment to effective communication with each other so that we can wisely make the inevitably difficult choices in revenue allocation.

And we face some tough issues relating to our institutional culture. One of the most important and complicated is the challenge of creating and sustaining a truly diverse community of faculty, students, and staff. It is certainly true that MIT can be proud of what it has accomplished so far. Our undergraduates benefit from interacting with a group of peers from a remarkable variety of backgrounds, cultures, and perspectives. And I can say from experience that MIT's commitment to women faculty has been an inspiring model to colleagues and institutions across the country. But we must do much more to translate our success at the undergraduate level to the graduate and faculty levels as well.

Obviously, this is a difficult issue within our society, and there are no quick fixes. It will take all of us, pulling together, to make progress. That is why the faculty's commitment to these issues, expressed resoundingly in the resolution adopted at the faculty meeting last May, is so important. In tackling an issue like this, the Institute's robust traditions of faculty governance, and of close collaboration between faculty and administration, are tremendous assets.

Research universities in America now also face constraints on the people and practices of research. The federal responses to important concerns about national security have slowed the flow of talented scholars from around the world to our universities and have precipitated a re-examination of information transfer in our communities. MIT must continue our engagement at the national level to guide the development of education and research policies. I am inspired by the large number of MIT faculty who participate in national service and believe that the nation and the world will be well served by MIT's continuing to engage in Washington.

MIT is, famously, a place where people love to solve problems. I know we can apply our problem-solving expertise to these and other challenges. The opportunities before us are extraordinary, and I firmly believe that we will find ways to take full advantage of them. I have much more to learn about MIT, and I will continue to welcome your insights and observations in the weeks and months ahead. Overall, my sense is that MIT has never been stronger. We are uniquely positioned to build on our traditional strengths, and to forge new directions that take advantage of new opportunities at the interfaces between the more established disciplines. This will be a tremendous adventure for all of us, and I am happier than I can say to be a part of it. ■

Susan Hockfield is President (hockfield@mit.edu).

From The Faculty Chair

Food for Thought: Issues for the Next 10 Years

Rafael L. Bras

MIT WORKS - AND IT DID SO at its best during the selection of Prof. Hockfield as our new president. The process that evolved and the seamless collaboration among the Corporation Committee on the Presidency, the Faculty Advisory Committee to the Corporation, and the Student Advisory Group, was exemplary. It is a story and a process that should be shared, perhaps another day. At the center of that process was the joint committee's outreach to the faculty in their different academic units, the students' compilation of their thoughts and opinions, and the seemingly endless hours of general discussions.

Following are some of the **issues that were raised that many in the community** believe will be most important during the next decade. I do want to emphasize that this is my personal interpretation and in no way represents the opinion of anybody else involved in the process of selecting the new president. Furthermore, the issues I present in what follows are not in any particular order, nor do they represent a comprehensive list.

The next decade will not look the same as the last 14 years. As successful as the last 14 were, the next decade will require new approaches, processes, and even organization. MIT, at all levels, must maintain its nimbleness, novelty, and willingness to evolve within the broad confines of its research and education mission. **Evolution does not refer only to what we do but also to how we do it.**

Many on the faculty and staff feel that **communication** among the various parts of the institution – faculty, students, corporation, and administration – **needs to**

improve. Some expressed the opinion that some significant academic and policy decisions had been made without sufficient consultation.

Improvement in governance is one of the mechanisms to deal with improvements in communication. It is not only an issue of the “administration” communicating with the faculty and the community, but also of the faculty governance structure (and the faculty officers) communicating better with the faculty and offering opportunity for dialog. There is a need to engage the faculty better and have them “buy into” major decisions and initiatives.

There is no doubt that concerns about participation were amplified when the financial winds turned sour. **Getting a handle on the financial situation** and reassuring people that we are out of the woods, (or on the way out), is terribly important. **People at MIT are “doers” and hate pessimism;** they like an optimistic, problem-solving attitude. The challenge of taking advantage of exciting opportunities, however difficult, is better received than messages of doom and gloom.

There has been **significant progress in the recruitment of women, but we are far from declaring success. The recruitment of underrepresented minorities** to the graduate student body and the faculty lags behind; in fact it is **very bad.** Last year's faculty resolution and Faculty Policy Committee white paper on the subject of minority recruitment and retention has energized the community. **Now there is a great opportunity for positive action.**

We have capitalized well on the move to a knowledge-based World economy. Technology and science are driving pro-

ductivity and we have the leadership, with excellent but limited competition. This situation presents three challenges. First, how do we satisfy the demand we helped create and the implication of (necessary) **growth and corresponding resources?** Second, how do we keep the advantage and deal with the unavoidable **increasing competition?** Third, how do we resist the temptation to become a single issue **institute of technology (or a few issues, e.g., biology, information technology, management) versus a university** with the responsibility to maintain excellence in social sciences, humanities, and yes, other less glamorous fundamental sciences and engineering (e.g., environment, physics).

MIT generally acts responsibly, and through knowledge creation, should impact positively on generations to come; but should it have a **more explicit agenda for social responsibility?** Outside of OpenCourseWare and other isolated initiatives, the Institute has no position on social responsibility. One example would be efforts on sustainability and environment; another would be activities to improve health and reduce poverty in developing countries.

A review of the educational commons is under way. It is unclear how it will ultimately shape up or how deep into the total educational culture will it go. Nevertheless, this review has the potential for triggering dramatic changes in MIT and its culture. This is just what happened 50 years ago in a similar effort; all attempts since then have failed. If this review is going to be a constructive exercise it will need to engage the faculty in serious debate. This could be a vehicle for

positive change or the source of divisiveness and unhappiness. **The challenge lies in distilling the uniqueness of the MIT undergraduate education and maintaining it, while discarding those elements that are obsolete or have a net negative impact on the undergraduate learning experience.** On a related issue, we must deal with the need for more and better undergraduate residence alternatives if we are to bring back the undergraduate population to the levels that existed in the past and that the academic system is able to support.

Our ability to attract the best of the world is threatened by outside, sometimes valid, barriers related to homeland security. **MIT must work to maintain the principle of open scholarly pursuits and educational opportunity for all.**

The cost of research must be kept under control. This could come with increasing emphasis on graduate fellowships. The recently completed fund raising campaign fell short in that dimension. At the same time, attention to the

well being of graduate student postdoctoral fellows must increase. There is a need for more centralized monitoring of what goes on in graduate admissions, particularly in relation to the recruitment and retention of underrepresented minorities and the size of the graduate student body.

MIT has been a wonderful community, generous to its employees and to the fellow citizens living nearby. Keeping that tradition is an important challenge. **Top on the list of concerns is the need to get a handle on medical insurance benefits, as well as to maintain what has been a much valued and cherished benefit by active and retired employees.**

Despite the fact that over one-third of the faculty has been hired in the last 10 years, many academic units are aging rapidly. The majority of these units are heavily tenured. Most of us love our job and MIT, and thus the lack of mandatory retirement within the existing tenure system is an invitation to stay as part of the active faculty as long as possible. There is no incentive to do otherwise. The problem

is not lack of productivity and contribution to the education and research agenda by the older faculty. Generally we are more than capable of holding our own, even in advanced age. **The omnipresent issue is how to bring fresh blood into the system at the pace that a trail-blazing institution requires.** The young are not brighter and not necessarily better, but they are different and bring new ideas. They also have the energy and fresh ambition to carry those ideas to fruition.

As I said at the beginning, the above set of issues arose during the presidential search and I find them compelling. I have not attempted to develop the ideas, let alone suggest approaches or solutions. I do hope that they can spark debate in the community that will result in improved collective wisdom about potential solutions, clarification of concepts and, I am sure, even more important issues. ■

Rafael L. Bras is a Professor, Civil and Environmental Engineering and Earth, Atmospheric and Planetary Sciences; Faculty Chair (*rlbras@mit.edu*).

Teaching this spring? You should know . . .

the Faculty regulates examinations and assignments for all subjects.

Check the web at <http://web.mit.edu/faculty/termregs>.

Questions: contact Faculty Chair Rafael Bras at x3-2117 or rlbras@mit.edu.

First and Third Week of the Term

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

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

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

Tests Outside Scheduled Class Times

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

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

No Testing During the Last Week of Classes

Tests after Friday, May 6 must be scheduled in the Finals Period.

An Open Letter to the MIT Faculty Maintaining Integrity at MIT

Theodore A. Postol

JUST FIVE DAYS BEFORE stepping down as MIT's president, Charles M. Vest announced that MIT has decided to not pursue an internal investigation of evidence of possible obstruction of a federal investigation and scientific fraud at MIT Lincoln Laboratory. President Vest's explanation was that the Pentagon had classified everything about the investigation, including MIT's internal final inquiry report.

In other words, MIT has decided to accept an assertion by the U.S. government that it has the right and authority to promulgate potentially fraudulent science in MIT's name by simply declaring an unclassified internal investigation to be classified. Furthermore, MIT's decision to acquiesce on this matter has implications for all university-based research in this country. And if the allegations of obstruction and fraud have merit – and I can show that they do – it would mean that MIT has willfully involved itself in a cover-up of critical information about fundamental flaws in a missile defense that is supposed to defend millions of Americans.

The Test

The allegations of fraud involve a critically important test, known as the IFT-1A (Integrated Flight Test 1A) that was conducted in June 1997. This test, and a second test, the IFT-2, were to determine if the currently deployed National Missile Defense (NMD) could tell the difference between warheads flying through space and simple balloon decoys designed to look like warheads. If the IFT-1A and 2 experiments could not demonstrate that the NMD could perform this critical task,

NMD could never have a realistic chance of working in combat.

After the IFT-2 experiment, the Missile Defense Agency removed all of the credible decoys used in both the IFT-1A and 2 from all subsequent flight tests. This almost certainly occurred because the data from the IFT-2 confirmed pre-experiment planning calculations done prior to the IFT-1A. These pre-flight calculations showed that the NMD was incapable of discriminating between mock warheads and very simple spherical balloons and cone-shaped decoys. The evidence also shows that MIT's Lincoln Laboratory produced a fraudulent scientific report in support of the false claims of success in the IFT-1A.

The Lincoln Laboratory report was written in 1998 for federal agents from the Departments of Justice and Defense. The agents were sent by the Ballistic Missile Defense Agency (now the Missile Defense Agency) to MIT for help in evaluating evidence they had collected that indicated researchers at TRW, which was analyzing the data, might have fraudulently tampered with data to make the IFT-1A test look like a success when it had in fact failed. Since Lincoln Laboratory had been deeply involved in early analysis of the IFT-1A, and had special status as a Federally Funded Research and Development Center (FFRDC), it was in a unique position to evaluate all the evidence uncovered by the federal agents.

We know from publicly available unclassified documents that the infrared sensor in the IFT-1A was designed to work at 11°K, but because of a problem with the cooling system it only reached

14.5°K for the first 30 seconds of its data collection period. In the second 30 seconds of the roughly one minute data collection period, the flow of hydrogen gas in the sensor's malfunctioning cooling system changed, and the sensor cooled slightly to between 13.2 and 13.5°K. At 14.5°K the sensor dark current was 400 times larger than that planned for the sensor's operation, and at 13.2°K it was still 100 times larger than intended. Data from the experiment shows that at the planned acquisition range the signal-to-noise ratio for the main targets to be studied was well below one. Yet the experimenters reported that the targets had been acquired at a range seven percent larger than that expected with the sensor operating at the intended temperature of 11°K. One result of this cooling malfunction was that the sensor completely lost calibration, and no valid data was collected for any time period. In other words, the experiment totally failed.

Other publicly available documents, such as letters from the lead federal investigator to Lincoln Laboratory, show that Lincoln Laboratory failed to cooperate with the federal agents, and withheld critical information not known to the agents. Information that Lincoln did not disclose included the fact that the sensor in the IFT-1A did not perform as designed; that the first 30 seconds of data was so swamped with noise that even with tampering, the data could not be disguised to look like it was valid; and that even when there was tampering with data and signal-analysis techniques, it was not possible to make it look like the warhead could be identified relative to decoys. Further

unclassified documentation, created in 1997 after the IFT-1A flight test, and in the General Accountability Office reports published in March of 2002, show that Lincoln Laboratory was fully aware of the sensor's performance failure.

Alerting the Administration

In April 2001, I began a process of alerting President Vest and Provost Robert Brown that MIT Lincoln Laboratory had failed to cooperate with the federal agents and had withheld from the agents critical information not known to them.

After nine months with no substantive response to my allegations, I filed a complaint in January, 2002, against Brown and Vest with the then Chair of the Corporation, Alex D'Arbeloff.

Initially I received no response to my letter of complaint, but in February, 2002, after the *Boston Globe* published an article about MIT's lack of progress in investigating the publicly available evidence of possible fraud, MIT finally started two simultaneous "inquiries" into the matter. One inquiry dealt with my allegations of fraud, and the other dealt with my complaint against Brown and Vest for not acting on my allegations.

The Inquiry

For the inquiry into my complaint against Brown and Vest, D'Arbeloff appointed Frank Press as the fact finder. Press was described by D'Arbeloff as a former "Science Advisor to President Jimmy Carter, a former President of the National Academy of Sciences, former head of MIT's Department of Earth, Atmospheric and Planetary Sciences, and is a Life Member Emeritus of the MIT Corporation." Press was asked to investigate my allegation that Brown and Vest had failed to comply with MIT's (and federal) policies and procedures and to report his findings to MIT's Executive Committee.

In May 2002, more than 12 months after my initial letter of complaint to Vest, MIT's Executive Committee unanimously accepted Press' inquiry report. Press found that in spite of Brown's and Vest's failure to act on my allegations of scien-



IFT-1A on launch pad

tific fraud that "the Provost (Brown) satisfied the promptness requirement of MIT's Policies and Procedures."

Press explained that the delays were acceptable, because Vest had been involved in secret negotiations with the government on my behalf. Press concluded that since no actions had been taken against me by the government "we assume President Vest's efforts were successful." (Note that at no time had I requested that MIT try to protect me from government action. I was asking MIT to investigate its own failure to take action.) Press also reported that "Because of the sensitive nature of his activities, and President Vest's desire for confidentiality, we did not ask President Vest to tell us

exactly who he had spoken to and what he had said."

Additional "understandable" reasons that contributed to the then nearly one year of delays were the complexity in determining how to conduct the inquiry, the difficulty in identifying an appropriate fact finder, and the intervening Thanksgiving and Christmas holidays. The Chair of the Corporation also informed me on behalf of the Executive Committee that "MIT's policy [is] that complaints are to be handled confidentially" and in accordance with these policies you must "maintain the confidentiality of the complaint handling process and of this decision."

continued on next page

Maintaining Integrity at MIT
Postol, from preceding page

Even before Provost Brown had been found by MIT's Executive Committee to be not guilty of failing to respond to the charges of scientific fraud, D'Arbeloff put Brown in charge of the second inquiry into whether obstruction and fraud had occurred at Lincoln Laboratory. Brown appointed Professor Ed Crawley, the then chair of the Department of Aeronautics and Astronautics, as the single individual fact finder.

The Response

In July 2002, roughly 15 months after my initial letter of complaint to Vest, Professor Crawley presented me with his "interim" inquiry report after it had first been reviewed by MIT's lawyers – presumably to check it for content and accuracy. The report praised Lincoln's work and concluded, "The good news is that the management and culture of the Lincoln Laboratory . . . have created processes to insure that the nation's trust is protected."

The report's conclusions were based on assertions of fact that directly contradicted those in letters from the federal agents to Lincoln. In addition, the MIT interim report contradicted the unclassified technical reports that were produced immediately after the IFT-1A and two General Accountability Office reports issued in March 2002.

I immediately called to Crawley's attention the contradictions in his interim inquiry report. After four more months of delays, he completely reversed the findings of his interim report. Thus, 20 months after I presented my initial allegations to the MIT administration, Crawley found that there was sufficient evidence to justify proceeding with a full investigation. Although the final inquiry report found that my allegations merited a full-scale investigation, I was not allowed to see the report.

This is the investigation that MIT now says it cannot pursue because material is classified.

Moving Forward

MIT should promptly take two steps to address its ongoing failure to investigate evidence of obstruction of a federal investigation and of scientific fraud.

First, MIT should appoint a panel to review the available unclassified information. Its members should be independent of MIT, have no conflicts of interest with the Pentagon, and possess the appropriate technical skills to evaluate the information. The report of this group, including the technical analyses underlying its findings, should be made public. Legitimate concerns about privacy and confidentiality can be dealt with by removing names from the public report.

Second, MIT should assemble a small group of lawyers, judges, and teachers of

law with impeccable reputations for independence and integrity to report directly to MIT's new president, Susan Hockfield, and to the faculty. This group would provide a legal analysis of the following issues:

1. Whether there is sufficient public evidence to indicate that fraud and obstruction of a federal investigation may have occurred at Lincoln Laboratory. If so, to whom should MIT report?

2. Whether MIT complied with federal regulations and its own internal policies and procedures in its handling of the allegations.

3. Whether MIT's contract with the Department of Defense allows the Missile Defense Agency to bar MIT from investigating its own work at MIT Lincoln Laboratory.

MIT's more than three-and-a-half years of foot-dragging and mishandling of this affair poses threats to the integrity and credibility of all university-based research in this country. If the faculty does not address this problem, it will reflect adversely on the credibility of each of us as scientists, engineers, and scholars. Perhaps of greatest significance, we will properly be remembered as a group of scholars who looked the other way when we saw evidence of wrong-doing in a matter that directly affects the defense of our country. ■

Theodore A. Postol is Professor of Science, Technology, and National Security Policy (postol@mit.edu).

M.I.T. Numbers

Research Expenditures By Primary Sponsor, 1997-2004

Sponsor	1997	1998	1999	2000	2001	2002	2003	2004	% Change	% of Total
Dept. of Defense	\$82,256,830	\$80,000,417	\$80,805,979	\$86,744,020	\$80,494,203	\$80,376,585	\$85,866,327	\$86,948,119	5.7%	16.4%
Dept. of Energy	\$85,278,459	\$82,045,839	\$71,613,204	\$64,157,549	\$64,402,561	\$65,454,867	\$65,175,340	\$69,182,764	-18.9%	13.1%
Health & Human Ser.	\$60,353,472	\$62,596,037	\$62,145,921	\$70,614,062	\$75,234,197	\$83,517,355	\$93,253,564	\$159,028,963	163.5%	30.0%
NASA	\$43,383,539	\$35,706,931	\$33,331,682	\$29,050,187	\$26,970,230	\$34,326,287	\$35,734,657	\$31,442,216	-27.5%	5.9%
NSF	\$40,889,479	\$41,364,798	\$40,546,248	\$42,185,465	\$44,036,858	\$52,612,377	\$57,718,368	\$65,442,998	60.0%	12.4%
Other Federal	\$8,123,282	\$9,987,713	\$8,347,357	\$8,872,099	\$8,642,670	\$12,142,651	\$13,149,017	\$12,113,758	49.1%	2.3%
Industrial	\$55,790,372	\$58,688,571	\$61,623,382	\$61,510,439	\$80,310,841	\$77,684,031	\$73,264,891	\$60,497,827	8.4%	11.4%
Non-Profits	\$7,724,289	\$12,746,186	\$11,444,435	\$8,849,853	\$11,727,774	\$14,428,282	\$18,325,666	\$15,721,218	103.5%	3.0%
State/Local/Foreign	\$3,732,112	\$2,686,121	\$3,412,712	\$6,985,532	\$9,653,225	\$11,164,569	\$15,948,770	\$18,930,431	407.2%	3.6%
Internal	\$347,722	\$532,005	\$2,776,393	\$5,018,499	\$5,950,659	\$7,476,293	\$13,317,853	\$10,145,868	2817.8%	1.9%
GRAND TOTAL	\$387,879,557	\$386,354,619	\$376,047,311	\$383,987,705	\$407,423,217	\$439,183,297	\$471,754,452	\$529,454,162	36.5%	100.0%

Note: Above totals do not include Lincoln Laboratory, whose 2004 research expenditures totaled \$498,229,806 [CAO]. Source: Office of the Provost

MIT Poetry

by Barry Spacks

THEMES ON LOVE

Grading themes on love at MIT,
one-man Symposium at 3
A.M., across the court I saw a light,
another office-holder working late.
While Plato on a silver pillow rode
above the waves of pre-sophistic prose,
I jotted teacher's notions that were not
as brave as our two lamps against the glut
of dawn. But when I clicked mine off
his too at once was gone: had been
my echo in a distant sheen
of glass: had been my own, and I
was lonely then, and wrote
these English words.

LIKE THIS

In my box of a cinderblock office in Building
14, I doze on the narrow couch and you
haven't phoned and it strikes me that lying
dead will be packaged and cold and straight
like this, exactly like this, only minus
the clock you bought me, the books, the sketch
Caren sent from Rome – and yes, of course,
no window, no rising to watch a boy
and his dog below; but otherwise just
like death, only adding the chair the lamp the
chess column clipped from the *Thursday Times* and your
voice your laughter the wind on the way
to the car that claims it's real that says
it will slap my face awake or push me
down or twist me in half if it wants to.

WITHIN ANOTHER LIFE

Those whose days were grudging or confused
may end up trapped within another life

as a boulder or a pane of glass,
or a door that suffers every time it's slammed.

If I return a boulder, love, some summer day
come sit by me and contemplate these horses and these hills.

And if a windowpane, gaze through to see
the meadow on our walks where brown geese strut.

And if I am a door, come home through me,
be sure I'll keep you safe.

And if a knotted, twisted rope
from long self-clenching and complexity,

oh love, unbind, unbraid me then
until I flow again like windswept hair.

Barry Spacks taught in the Literature Section at MIT from 1960 to 1983 (barry.spacks@verizon.net). The author of nine books of poetry, including most recently *Regarding Women* and *The Hope of the Air*, he currently teaches English at the University of California, Santa Barbara. The poems above are reprinted by permission.

Some Further Thoughts on the FPC Suggestions on Faculty Governance

Steven Lerman

THE PROPOSALS FOR CHANGING faculty governance published in the September/October issue of the *Faculty Newsletter* (Vol. XVII, No. 1) and the comments by Professors Bailyn, Graves, and Vandiver in the subsequent issue have stimulated a useful discussion about how we, the faculty, organize ourselves to be a part of policy decisions at MIT. As a former Chair of the Faculty, and in the spirit of encouraging continuing dialog within the faculty on this matter, I thought it useful to add my own views to the debate.

In thinking about the merits of FPC's recommendations, I found it helpful to first reflect on the intended and actual roles of faculty governance at MIT. My overall sense of what faculty members want from their governance system is as follows:

1. Most of us want a governance system that allows the faculty a significant voice in major policy decisions without taking a great deal of time away from the core mission of teaching, research, and service. In the absence of the rare major schism between the faculty and administration, most faculty members are content to have a small number of us represent our collective interests.
2. We want the administration not to over-manage research and educational directions. The success of MIT largely rests on faculty members pursuing research and education in a way that is minimally directed by the administration. The real work of the Institute is largely accomplished in individual faculty members' labs, departments, and research centers.

This does not preclude the administration's coordinating and directing initiatives that require such central leadership, so long as this does not limit individual initiatives. And, the faculty clearly wants the administration engaged in developing the resources needed for many of the initiatives we view as important.

3. Faculty members see certain decisions on matters such as grading policies, academic requirements, and major student disciplinary questions as mostly within the domain of faculty governance. In these areas, we want our governance system to lead rather than follow.
4. The faculty, for the most part, wants policies in areas other than those covered in point 3 above to be formulated and implemented by the senior administration, trusting that this administration will seek input from faculty leaders to inform such decisions. To a great extent, we trust that the administration will make policies and budgetary choices that are in the best interests of the university.
5. In the rare situations in which the administration considers or makes decisions that run contrary to strongly-held views of a substantial fraction of the faculty, we want a governance system that can be mobilized to have a major voice in those decisions. In short, the faculty wants to be able to provide a balance to administration decision-making in those situations where the issues are important enough to warrant our time and energy.

With these broad goals in mind, I concur with the views expressed by the Faculty Policy Committee (and Professors Bailyn, Graves, and Vandiver) that in general, our governance system meets our needs and for the most part, serves us well. Nevertheless, I think some of the FPC's proposals would improve the system in important ways.

While I understand the arguments of Professors Bailyn, Graves, and Vandiver against increasing the term of the Chair of the Faculty from two to three years, I nevertheless support that FPC recommendation. During my own experience as Chair, I felt that by the time I reached the point where I was comfortable in the position, the incoming Chair and I were already thinking about the transition to the next Chair's term in office. A third year, which could be optional, would allow for the faculty's major representative in administrative decisions to be much more effective.

I agree with Professors Bailyn, Graves, and Vandiver that increasing the size of FPC isn't necessary, and that doing so might make an already large committee unmanageably large. The FPC (led by the Chair of the Faculty) is the only representative body that can legitimately speak on behalf of the entire faculty; enlarging it could make it difficult to reach consensus.

The idea that the Nominations Committee should be appointed by the faculty rather than by the administration is one I personally endorse, even though it would probably not substantively change that group's decisions. If nothing else, having the Nominations Committee formally independent of the administration

would enhance the perception that the leaders of the governance system are representatives of the faculty.

One of the recommendations of the FPC that I think would improve governance considerably is to find ways to better coordinate the work of the various faculty committees. Even more importantly, the work of the faculty committees should be better coordinated with the various committees, councils, and task forces that are appointed by the administration. Too often, we find the same issue being worked on by multiple groups without any communication among them. In addition, I believe that some of the issues that have been handled by these various administration-appointed committees should be part of the agendas of existing standing committees of the faculty.

The expansion of the resources available to the Chair of the Faculty, within some reasonable boundaries, would also be useful. Professors Bailyn, Graves, and Vandiver point out that they had adequate resources to be effective, and my experience was similar. However, it was always clear to me that these resources

were provided completely at the administration's discretion rather than as part of a clearly defined budget. The people who support the work of the Chair don't report to the Chair, and their services can be withdrawn at any time. It is just good overall operating practice that individuals who have responsibilities to accomplish specific tasks have an allocated budget for doing so. Having a budget for the office of Chair of the Faculty allows the office holder to make tradeoffs in how that budget is expended rather than constantly asking administrators for the time of other staff to help with various things.

I would propose a compromise between the current practice in which the President chairs the meetings of the faculty and the FPC's proposal that at times this responsibility be given to the Chair of the Faculty. Specifically, I believe the President and Chair of the Faculty should co-chair the faculty meetings. Agenda items that fall most naturally into the domain of faculty governance such as new degree programs, grading policies, GIR requirements, and agenda items brought forth by the standing faculty committees should be led by the Chair;

those items outside that domain, such as reports on the budget, administratively-directed changes in policies, or items arising from Academic Council, should be led by the President. The agendas for the faculty meetings should continue to be set jointly by the senior officers of both the administration and the faculty.

Finally, I concur with Professors Bailyn, Graves, and Vandiver that we should take our time in implementing any changes in how we govern ourselves. This is indeed a time of adjustment to a shift in leadership. Certainly we have every reason to believe that the strong, cooperative relationship between the administration and the faculty that has long characterized MIT will continue, and that this will remain a source of tremendous strength for the Institute. However, each MIT president needs and deserves adequate time to build this collaborative relationship, and we run the risk of putting this process in jeopardy if we change the faculty governance system abruptly during this transitional period. ■

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Aimee Smith Found Not Guilty

IN A TRIAL AT the Middlesex County Courthouse on Thursday, January 13, Dr. Aimee Smith was found not guilty of charges of disorderly conduct and resisting arrest growing out of an incident at MIT on August 25, 2004. On that date, MIT police officer Joseph D'Amelio arrested Dr. Smith outside of the MIT Student Center during a dispute about First Amendment rights and the appropriateness of Dr. Smith's earlier arrest on

June 4. Dr. Smith was arrested by MIT police on June 4 at Commencement as she and three other members of the MIT Social Justice Cooperative were distributing leaflets discussing the proposed NIH-funded bioterrorism laboratory to be built in Boston. Those charges against her were later dropped at the request of MIT President Charles M. Vest.

In the trial on the charges growing out of the second arrest, the judge, after listen-

ing to testimony from the MIT police involved and one Cambridge policeman, made an immediate finding that Dr. Smith's speech in this case was protected free speech, and rendered the not guilty verdict on that basis. This was in response to a motion by Dr. Smith's lawyer, Mr. Daniel Beck, for the dismissal of the case. The defense presented no witnesses and Dr. Smith did not testify. ■

Quality of Life Issues at MIT

Jacquelyn C. Yanch

I AM A TENURED, full professor. I am also the mother of three children, 10 years of age and under. I love many aspects of my job; MIT is an incredibly exciting and stimulating place to work. However, the demands of my job make it next to impossible for me to feel satisfied that I am doing a good job as a mother.

Fortunately, MIT has started taking steps to investigate the dilemma of balancing work and family life. In 2001, the MIT administration charged its Council on Family and Work to conduct a survey investigating factors that affect quality of life. The results were clear. Fewer than half of all women faculty at MIT are satisfied with their overall quality of life. In other words, they are not satisfied with their ability to integrate a fulfilling and productive work life with a fulfilling personal and/or family life. The same is true for junior men. Less than half of untenured male faculty are satisfied with their quality of life. However, at the same time, over two-thirds of tenured MIT male faculty over the age of 45 years are satisfied with life at MIT.

How does this lack of satisfaction arise and why is “senior men” the only faculty group satisfied at MIT? Perhaps it’s because 64% of tenured men have a spouse/partner at home who tends to home responsibilities either full- or part-time, whereas a mere 10% of tenured women and no untenured women have a spouse who takes on the major share of home and family responsibilities.

At the same time, MIT faculty work significantly more hours than they did a decade ago. In 1989, fewer than half of

MIT faculty reported working 60 or more hours in an average week. By 2001, however, nearly two-thirds of MIT faculty members reported working these hours. According to the survey data, over 90% of tenured women and 77% of tenured men feel that no matter how hard they work,

Gone are the days when MIT could count on faculty who came equipped with a spouse or partner at home who took primary responsibility for caring for the children . . .

they cannot accomplish everything they need to – and 62% of all faculty, regardless of gender or tenure status, feel that the pace, pressure, and stress of MIT negatively affect their personal and family life. Exacerbating the “time” crunch is the fact that salaries have lagged woefully behind the soaring cost of housing in the Boston/Cambridge area, forcing faculty with children to live further and further away from MIT in search of affordable housing in communities with highly-rated public school systems. The longer commuting time adds more hours to the work day. Less income also leaves fewer resources for housekeeping assistance and high quality child care. No wonder stress and burnout levels are inordinately high – no wonder satisfaction levels are dispiritingly low.

Gone are the days when MIT could count on faculty who came equipped with a spouse or partner at home who took primary responsibility for caring for the children, for management of the

home, and for establishing and maintaining links with the local community. As the older (satisfied) male faculty retire, the typical MIT faculty member will be one who needs to, and wants to, save some of their energy and their time for family and community.

If MIT does not become a place where a thrilling academic career (and it *is* thrilling) can be had simultaneously with a satisfying personal life, then MIT will surely suffer. First, we will suffer as Harvard University ramps up their efforts in science and engineering and as they make good on their goal of bringing in and mentoring large numbers of junior faculty. We will run the risk of losing the best and the brightest to a place, just down the road, that offers better salaries, attractive faculty housing initiatives, and a comparable name. Second, we will suffer in terms of diversity, since we will self-select for one type of individual. (Already the fraction of women faculty at MIT who have children is far below the national average; the same is not true for male faculty.) This will not be good for the long-term health and vitality of the Institute. Third, and most importantly, we will be substantially reducing the size of the pool of high-quality applicants from which we will be selecting our new faculty.

The problem of how to combine a demanding work life and a satisfying personal life is difficult and it is not a problem that is unique to MIT. However, MIT is in the business of solving hard problems, and we need to solve this one.

grad students from the Middle East could teach about their culture; there could be math clubs, chess clubs, even movies, – the possibilities seem exciting, endless, and inexpensive. Instead of a burden to me, my spouse, and my chil-

that means the non-MIT spouse really has trouble maintaining any sort of career for themselves. This friction seems to be a particular problem for women faculty. There are many other advantages to a school on campus, such as the richness in terms of ethnicity and religious background of the children and parents and the excellence and variety of the “after school programs” we could (and would need to) create. Out-of-class faculty contact with MIT students could dramatically improve as undergrad and grad students become intimately involved with the lives of our children (teaching, coaching, even babysitting). The existence of a well-run, high-quality school would also be a significant recruiting tool. I think this would certainly be true for women faculty; it would also be significant for junior men faculty. Since, in its ideal formulation, the school would really help develop the community feel of MIT, it may also help in the recruitment of undergraduate students who would see a warmer, friendlier, more “whole” MIT environment as they leave their own home, perhaps for the first time.

This problem of balancing a demanding professional career with a satisfying personal life is not a local one. It affects employers/employees across the country and in many sectors of society, not just academia. And while the problem itself does not have the cachet of an exciting scientific discovery, robust creative solutions could have an enormous societal impact. This is a difficult problem but we’re all pretty smart people here and, after all, solving hard problems is something we spend a lot of time doing. ■

[Editor’s Note: Results from a similar survey conducted in 2004 are not yet available in published form. Questions asked on the 2001 and 2004 surveys are not identical, making direct comparison of survey results difficult.]

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MIT could relax its expectations of effort and productivity and redress the decade-long trend toward increased working hours among its faculty.

There are perhaps two options. MIT could relax its expectations of effort and productivity and redress the decade-long trend toward increased working hours among its faculty. This is not likely to happen. Although not impossible, MIT directly benefits from the productivity and would be hard pressed to make the substantive changes that would result in faculty spending less time/less effort on MIT activities.

The second option is for MIT to think of creative ways for faculty to meet both sets of needs and obligations. Here’s an easy (and low cost) way to start. What if we simply choose one evening per week, or one Saturday per month, to be that time when all/most/many after-hours activities requiring faculty participation should be held? Departments would be strongly encouraged to hold anything that needs faculty involvement on that particular evening of the week. Age-appropriate activities for children, from toddlers to teenagers, could be simultaneously offered so that “MIT night” could become exciting for my kids, instead of the night their mother doesn’t come home for dinner and isn’t there when they go to bed.

Given the richness of the backgrounds of the entire MIT population, one could imagine a wonderful range of possibilities of activities or learning experiences for children. Grad students from Germany could teach German (for example), undergrads from Japan could teach origami, undergrads who love intramural soccer could teach soccer,

dren, “MIT night” could be a night when my kids are excited to be doing something interesting, a night when they are “with me” for at least part of the evening instead of not with me at all, a night when my spouse gets a few hours to himself instead of, once again, having to do all of the at-home and bedtime activities on his own. Everybody wins.

Here’s a bigger-impact idea but one that also comes with a significant price tag. What about a K-12 school on/adjacent to the MIT campus for children of faculty and staff? The idea of a school on campus is not a new one, but perhaps the justification for it is. Although expensive there are many advantages, all of which decrease the stress for faculty with kids and simultaneously improve the sense of community at the Institute. If the quality of school district were no longer an issue in buying a home, junior faculty could now afford to buy a house in those close-to-MIT communities made less expensive by the fact that their school systems are poorly rated. A shorter commute means more time for either MIT or for family, and a reduction in stress. Parents could easily and productively participate in their kids’ school, say a few hours each week. And, the pressure on the spouse at home would substantially diminish since the MIT spouse would likely be the one who drops the kids off, picks them up, responds if the child becomes sick, etc.

Currently, the other spouse typically has primary responsibility for the children. A lot of friction is generated since

What's All This About Export Controls?

Alice P. Gast
Claude R. Canizares

YOU ARE ON AN AIRPLANE at about 37,000 feet, heading abroad. You have remembered your passport and you are perusing the OSP (Office of Sponsored Programs) briefing document on deemed exports and suddenly you wonder whether you are exporting something. As you look around the airplane and see many fellow international travelers pounding away on laptops, using personal digital accessories, and listening to iPods, you think, what is an export anyway?

Our research and academic lives have become so collaborative, so interactive and so global that the real issues in export controls needed to be stated so that all of us can get some sleep on those airplanes. This article is intended to be a brief overview of this complex but important issue, and how it affects us.

Export control laws have for many years been a mechanism to control the transfer of goods having military applications; in the late 1970s they also became a means to limit the export of goods or technologies having commercial value.

Export of military hardware and technical data is controlled by the International Traffic in Arms Regulations (ITAR) dating back to 1954, while the export of commodities of commercial interest (and the technical data related to their design, manufacture and utilization) is controlled by the Export Administration Regulations (EAR) from 1979. The ITAR are administered and enforced by the Department of State, whereas the EAR are under the Department of Commerce.

Increased national attention to export controls occurred in the early 1980s with concerns about technology

transfers to the Soviet Union. University reaction led to a set of changes and a status quo we have lived with ever since. In 1999, concerns about transfer of missile and satellite technology to China rekindled national attention to export controls, and the climate chilled further after September 11, 2001. Now many federal agencies, as well as industries, are incorporating export control language into research grants and contracts. **But even without such language, export controls are the law, and we all must obey them (the law, and the penalties, cover individuals as well as institutions).**

What is controlled?

Generally speaking the ITAR and EAR regulate items and materials (equipment, biologicals, chemicals), and information (technical data, including “services” associated with the controlled items and materials). In addition to more obvious military hardware, the ITAR controls all satellites, including research satellites, associated equipment, and some devices with military applications like accurate GPS equipment and even research submersibles. EAR controls a long list of equipment, for example high bandwidth oscilloscopes, large fermenters, certain microprocessors, and encryption software. Both regulations control chemical weapons convention chemicals, select biological agents and toxins, and certain other hazardous chemicals and biologicals.

What is an export?

The term export, as used in export control

regulations, has an expansive meaning. The transfer of actual goods between countries (whether the transfer abroad is to a U.S. citizen or a foreign national) is controlled, as well as the disclosure or transfer of certain technical information to a U.S. citizen abroad or to a “foreign person” abroad or even within U.S. borders. The term “foreign person” essentially includes anyone who is not a U.S. citizen or permanent resident (although for some purposes, citizens of certain countries may be exempt). As is evident in many instances, export is defined so that it could preclude the participation of foreign graduate students or post-docs in research that involves covered technology, without first obtaining license from the appropriate government agency.

The Fundamental Research Exemption

Since 1985, the federal government’s policy, as articulated by President Reagan’s National Security Decision Directive, NSDD-189, has exempted most university research from the export control regulations.

NSDD-189 (issued in 1985 and reaffirmed in 2001):

“Fundamental research” means basic and applied research in science and engineering, the results of which ordinarily are published and shared broadly within the scientific community, as distinguished from proprietary research and from industrial development, design, production, and product utilization, the results of which ordinarily are restricted for proprietary or national security reasons.

“It is the policy of this Administration that, to the maximum extent possible, the products of fundamental research remain unrestricted. It is also the policy of this Administration that, where the national security requires control, the mechanism for control of information generated during federally-funded fundamental research in science, technology, and engineering at colleges, universities and laboratories is classification... No restriction may be placed upon the conduct or reporting of federally-funded fundamental research that has not received national security classification, except as provided in applicable U.S. Statutes.”

may remove the fundamental research exemption, and the decision about whether export control licenses will be needed should be discussed with our Office of Sponsored Programs.

The fundamental research exclusion applies literally to information (but not to export controlled materials or items) resulting from or arising during basic and applied research in science and engineering conducted at an accredited institution of higher education located in the United States that is ordinarily published and shared broadly within the scientific community and that is not specifically restricted. This exclusion permits us to allow foreign members of our community

of controlled technology to foreign persons, usually in the U.S., where the transfer is regulated because the transfer is “deemed” to be to the country where the person is a citizen. Fortunately once again, most of our research and interactions with students, postdocs, visitors, and colleagues are covered by the fundamental research exemption. However, a recent set of reports by the Inspectors General (IG) of several federal agencies have put the spotlight on deemed exports at universities, as well as at national labs and in industry. MIT, together with other major research universities and organizations like the American Association of Universities, are actively involved in discussions with these agencies to clarify the implications of the IG reports. While we are hopeful that the spirit of NSDD 189 will prevail, it is too early to predict the outcome of these discussions.

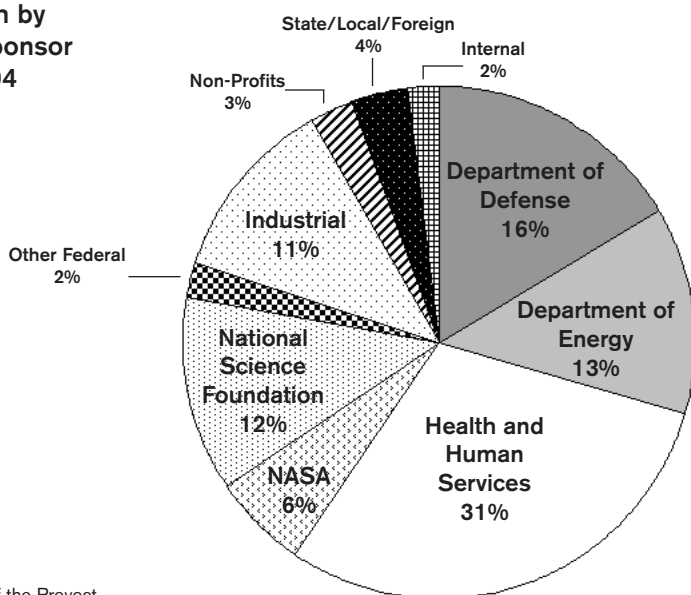
What does this mean for you?

We believe that the majority of the research carried out by MIT faculty and research staff should not be affected by export controls. On the other hand, some individuals have already had to modify their research activities or seek licenses in the conduct of their research projects. We recommend that anyone who thinks that his or her activities might be subject to export controls consult the resources noted below and, if necessary, contact your OSP representative for further information.

One thing that is clear is that we cannot ship items or communicate technical data covered by ITAR or EAR to certain other countries without seeking permission to do so. While most of our research and many countries are not on this list, it is important to understand its scope. There is an excellent table and other resources available on the OSP Website: http://web.mit.edu/osp/www/resources_export.htm. If in doubt, use these resources and/or contact our Office of Sponsored Programs with your concerns. ■

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Source: Office of the Provost

Both the ITAR and EAR contain specific language exempting fundamental research and, in the case of EAR, instruction in catalogued courses in universities from export controls, and in the case of ITAR basic math and science commonly taught in schools. Under our current interpretation of the fundamental research exemption, we can continue to carry out research without export control licenses provided that the research is openly published and shared broadly. Note that any research involving proprietary information or other publication restrictions or participation restrictions

to participate in research projects involving export-controlled information on campus in the U.S. without a deemed export license. This exclusion does not permit the transfer of export-controlled information, materials, or items abroad, even to research collaborators, except under very limited circumstances.

Deemed Exports

Much of the recent concern over export controls centers around the concept of “deemed export.” What does this mean that I can make a “deemed export” on U.S. soil? “Deemed” exports are transfers

In It But Not Of It: Nine Years in the MIT Administration

Samuel Jay Keyser

MY NINE YEARS AS MIT associate provost began in 1985. I served first under John Deutch, who appointed me, and then under Joel Moses, who followed John and then Mark Wrighton, who followed Joel. It was Joel who changed my title from Associate Provost for Educational Policies and Programs to Associate Provost for Institute Life. My tenure overlapped three provosts and two presidents, Paul Gray and Chuck Vest.

One would have thought that in such a distinguished company of administrators, some of their know-how would have rubbed off. Alas, it never did. I think I know why. About a year after John appointed me he took me aside one day and said, “Keyser, you are in the establishment but not of it.” John was absolutely right. I never quite got the hang of administration. I treated it more like a Noh drama than a football game. For example, I remember once informing Paul before an important faculty meeting on apartheid that I intended to vote for divestment. Since this was not Paul’s position, I thought it only right that I tell him how I was going to vote. Then I offered to resign. Paul said, “What on earth for?”

Looking back on it now, I realize that a major difference between Paul’s career and Chuck’s had far less to do with the character of the two men than it did with the character of the times. When I first came to office under John and Paul, I remember sit-downs in the corridor outside the president’s office, sit-ins in the Faculty Policy Committee lunchtime meetings, tear-downs of the student-built shanties outside the student center, and whistle-blowing during commencement.

Each confrontation was like sitting through a Frankenstein movie as a 10-year-old.

current student-run ambulance service, an extraordinary development for the common good. Between Paul and Chuck



Jay Keyser and John Deutch

And then there was the matter of dealing with harassment at MIT. John put me in charge of a 21-person committee that met for over a year trying to come to grips with those painful issues. What I remember most was anger, sometimes so palpable you could cut it with a knife.

None of that sort of thing rocked Chuck’s boat. It wasn’t that he didn’t have his storms, but they were of a quite different order. In Chuck’s day at the darkest end of the spectrum students drank themselves into oblivion. But for the most part they were other-directed. They gave themselves as never before to community service, the finest flowering of which is the

there was not a dumbing down of the student body, but a calming down of the student body.

That was a blessing for Chuck. Confrontations with the likes of Steve Penn, Frank Fernandez, Ron Francis, and Shiva Ayyadurai were like trying to make love to a porcupine. It just doesn’t work unless you’re a porcupine, too. These names will be familiar to only a handful of you, but to those of us who were in the “conflict resolution business,” they are carved on our hearts the way Calais was on Mary Tudor’s.

Perhaps that is a bit too strong. Times do change and hearts do mellow. I

remember running into Shiva Ayyadurai several years after he had graduated. It was in the Bread and Circus on Prospect Street (when it was still Bread and Circus). I braced myself for a tirade on institutional racism and was treated, instead, to a testimonial on the great advantages of a high colonic. Who knew one could have a normal conversation with a student activist?

From my perspective certainly one of the most important changes during Chuck's tenure was the radical alteration of R/O (Residence/Orientation). Now all freshmen have to live on campus. It was extraordinary how hard it was to bring that about. I remember a meeting in 6-120 to discuss the Potter Report. It was in the spring of 1989, I believe. The report recommended, among other things, that all students live on campus during their freshmen year. The hall was filled with students, not an empty chair in the 150-seat house. John Deutch was there as was I to answer questions and hear comments and generally test the temperature of the student waters. At the end of the meeting

a straw vote was taken. How many were against the recommendation? 149 hands went up. How many were in favor? One hand went up. Naturally I was curious. I asked the lone dissenter why he was in favor. He said he wasn't but that as a matter of principle he always voted against the majority.

As everyone knows, it took a tragedy to move MIT off the R/O dime. Of course, moving it took something away from the students; an element of choice in an important area of their lives; namely, where they lived. A revered Boston shrink, Elvin Semrad, once said that a psychiatrist should never take something away from someone without also giving him something in return. Chuck took a leaf from Semrad's book. He gave the students Simmons Hall, the Z-Center, and Sydney and Pacific. Apparently it was enough. MIT is much the better for it.

What is the take-home from all this? It is that the ethos of the student body is a sign of the times. The students do not, I think, make their culture at MIT. Rather they bring that culture with them when

they come. The culture of protest of the '70s extended well into the '80s at MIT. Then the culture of conservatism of the '90s produced the same at MIT to such an extent, in fact, that for the first time in my life, I find myself far more liberal than the student body in which I am immersed, an impedance mismatch of a completely novel kind in my experience as an academic.

What of the current student culture? What does it signal? Even though I no longer have a great deal to do with students, as Special Assistant to the Chancellor – a position I have held since I retired in 1998 – I hear things. What I hear is that the current freshman class is neither radical nor conservative. Rather it stands somewhere around the "S" end of the spectrum, where "S" stands for "serious and sad." Can you blame them? The country is at war. ■

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Nuclear Engineering Department Changes Its Name

THE DEPARTMENT OF NUCLEAR Engineering has changed its name to the Department of Nuclear Science and Engineering (NSE).

According to Department Chair Ian Hutchinson, "This is a change that the department has desired and promoted for a number of years, and unanimously endorsed on three separate occasions. In November, the request was discussed without dissent at the MIT faculty meeting

and approved by the Executive Committee of the MIT Corporation in December."

Hutchinson lists three major reasons for the name change: "First, the phrase Nuclear Science and Engineering is a more accurate representation of the mission of the department, expressed in our strategic plan. Second, the breadth represented by the name Nuclear Science and Engineering is a better description of what we already do. Third, the name

Nuclear Science and Engineering is widely accepted and understood by those inside and outside the field as describing our discipline."

Hutchinson also assures, "We are still one hundred percent the Nuclear department at MIT. But our new name conveys the exciting diversity of research and development in the discipline of nuclear science and engineering." ■

An Update on the Cambridge-MIT Institute

Edward Crawley

THE HIGH LEVEL OBJECTIVE of the Cambridge-MIT Institute (CMI) is to improve national economic competitiveness by stimulating universities to be even stronger engines of economic growth. We focus primarily on the knowledge exchange mechanisms between universities and industry, including the diffusion of knowledge that takes place as students graduate. CMI uses evidence of best practice at MIT, Cambridge, and elsewhere to develop generalizable models of these processes, to test these models, and to disseminate them widely outside of Cambridge and MIT, and within our two institutions.

CMI was established as a joint venture of Cambridge University and MIT in the summer of 2000, with financial support from the Department of Trade and Industry in the United Kingdom (UK). As such, the specific mission of CMI is “to enhance the competitiveness, productivity and entrepreneurship of the UK economy by improving the effectiveness of knowledge exchange between university and industry, educating leaders, creating new ideas, and developing programs for change in universities, industry and government using a partnership of Cambridge and MIT, and an extended network of partners.”

In the four years of its existence, CMI has initiated a range of important experiments, particularly in the multi-faceted interaction with industry in the areas of emerging technology. In the absence of a pre-existing model of transatlantic university/industry co-operation, the earliest CMI activities were built wherever

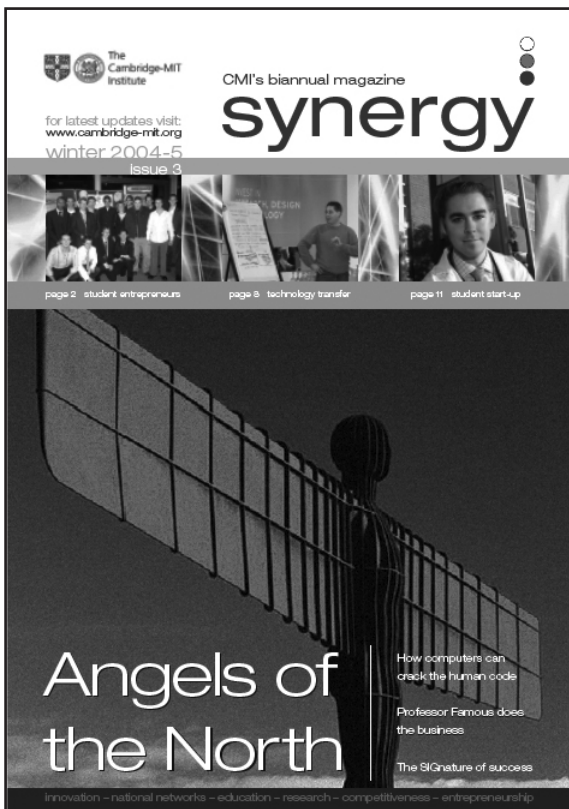
possible on existing complementary high-quality efforts at both universities. The aim was to identify points in both universities where effective collaborations could be developed that fit the CMI mission. The first programs had four principal strands: a student exchange program, integrated research, executive education, and the formation of a National Competitiveness Network (NCN). The early results from these programs led to a further coalescing of CMI’s strategic goals in early 2003, producing a strategy that focused increasingly on knowledge exchange (KE) at the intersection of research, education, and industry.

In order to reach its goals, CMI has organized its efforts into three strategic thrusts: education, which develops educational programs and materials aimed at increasing learner knowledge, skills, and attitude in the domain of KE; research, which funds programs centered on important ideas, and with imbedded innovations in KE; and the education in and the practice of KE at the boundary between universities and industry. In addition, we have a program to systematically learn from our innovations, produce materials for education programs, and create the basis of evidence for policy and practice.

In addition to the outputs of all of the individual projects of CMI (currently about 60), the systematic outcome will be the development of models for enhanced KE. Each of these models will be developed, tested, evaluated, codified, and disseminated throughout organic networks

at MIT, Cambridge, and more broadly in the UK. To date, CMI has created three major and interrelated meta-models: (i) knowledge integration in research, (ii) education for innovation, and (iii) the engagement of industry in the universities. The central concept unifying these meta-models is the effectiveness of two-way knowledge exchange at the academic-university interface.

(i) We view research as an integrated activity of the development of new ideas in the context of education and involvement of appropriate external stakeholders. The key features of “knowledge integration in research” are: (a) deep contact with those who develop even more fundamental innovations and technologies, so that ideas can be identified and developed with a consideration of use; (b) ongoing dialog with external stakeholders aimed at developing insight into their needs; and (c) an integrated team of university researchers, industry, and public and regulatory representatives who will develop the idea or technology. The most prominent manifestation of this meta-model is the Knowledge Integration Communities (KICs), in which CMI has brought together stakeholders to craft, own, and operate a program of research, educational, and industrial outreach in areas that go to the heart of future industrial prosperity. At present the KICs are focused on emerging technologies. In each, the fully developed model would include several universities, the industrial supply chain from component makers to systems builders, users, regional development



synergy: CMI's biannual magazine

agents, and regulators. During 2003, CMI launched four KICs in Connected Worlds (next generation communications), Silent Aircraft, Pervasive Computing, and Systems Biology. Two new KICs have recently been added for the Center for Competitiveness and Innovation and Quantum Computing.

(ii) Working with colleagues, CMI has identified what we feel are the essential features of an “education for innovation”: (a) a deep conceptual knowledge of the fundamentals, (b) an ability to develop new products working in a team and in an organizational context, and (c) a deep sense of self-efficacy. A deep conceptual understanding of a material is necessary to rework knowledge to create new ideas and products. An aptitude for working in teams is essential to function in modern enterprise. And a sense of self-efficacy underlies the willingness to take risks necessary for innovation. CMI has established a suite of educational

programs at the undergraduate and graduate levels that embody these features. Elements range from short courses for budding student entrepreneurs, a renewed emphasis on skills and practice in engineering education, the definition of new undergraduate streams that focus on interdisciplinarity, and new postgraduate courses that marry technical and business learning and experience. An important experiment, centered in the Department of Mechanical Engineering, aims to understand the significant differences in the pedagogical styles at Cambridge and MIT, and determine hybrids that might further enhance deep conceptual learning of our students.

(iii) CMI has crafted a number of experiments that go to the heart of KE between universities and industry. For example, our Special Interest Groups are engaging senior executives in sectors not known for extensive interactions with universities (e.g., in construction, ground transportation, and retail). CMI facilitates these executives in defining the common threats and opportunities for their sector, and crafts programs of research, education, and other academic engagement. Through the National Competitiveness Network we have held seminars on regional prosperity and the requirements for new skills. We experiment with both human and electronic networks and spaces, such as D-Space, and electronic repository of research results, in which our partner is the MIT Libraries.

CMI has a plan to codify and disseminate each of the models developed. Working together, participants from industry and university will systematically review best practice, identify hypotheses, influence the KE experiments, monitor

outcomes, and codify success. CMI will then disseminate each model by identifying the appropriate partner with whom to work, and engage that partner at a formative stage. CMI will co-develop the models, and then disseminate them with and through the partner and their network. In this way, CMI will have widespread impact.

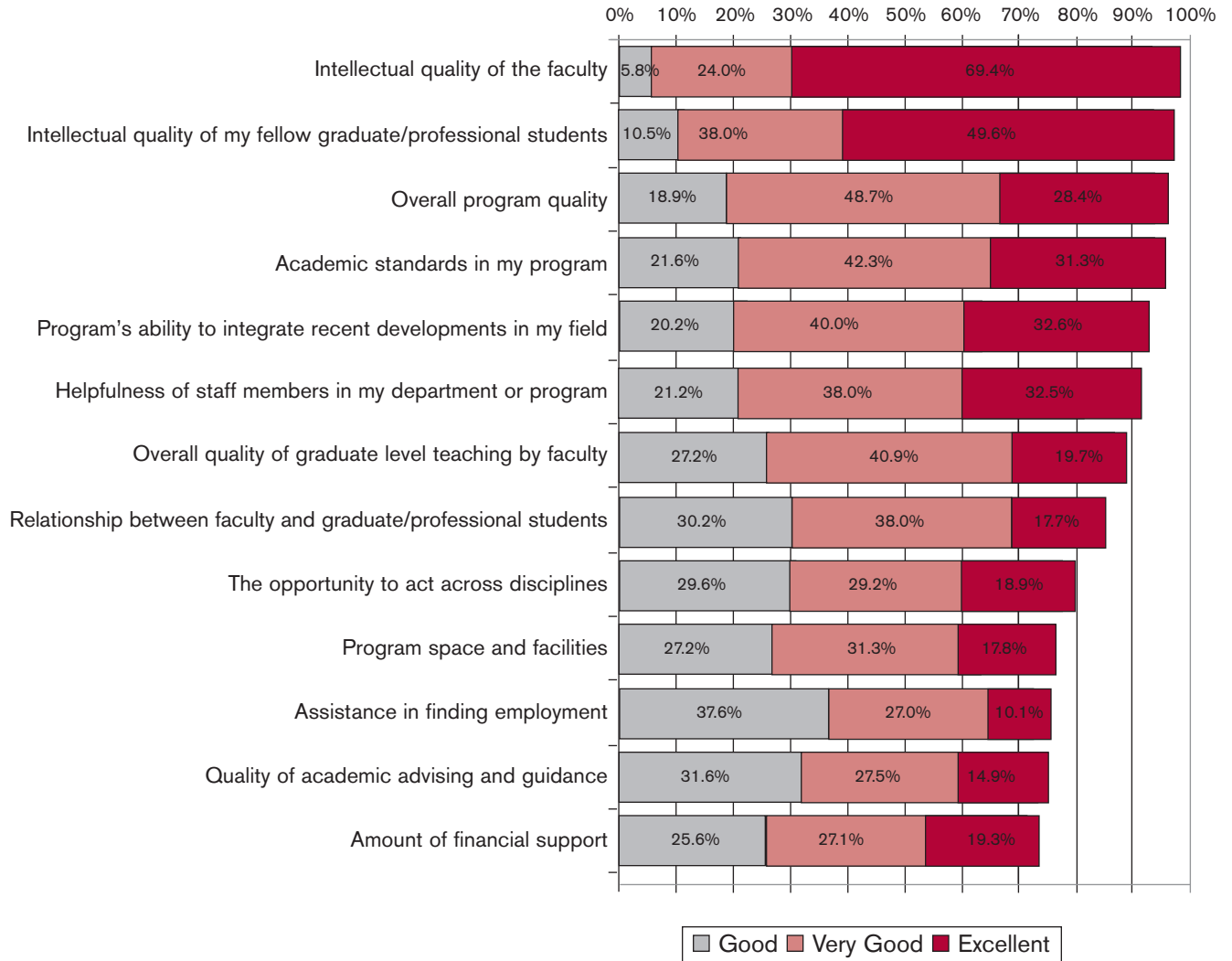
The initial phase ends in the fall of 2006, and discussions about a continuation are underway. There have been a number of lessons learned from the experience of CMI. We have found that establishing an effective U.S.-UK collaboration involves deep mutual commitment and a much greater effort than was anticipated. However, the returns are very high, raising the ambitions of all parties. One of our great strengths is our ability to provide effective and adequate seed-corn funding to new experiments and to exit once the initiative has proved itself by securing alternative funding.

What are the benefits of CMI to MIT? Numerous. At its highest level, CMI can be viewed as one of several key experiments at MIT aimed at understanding the development of the global university. CMI is about partnerships. Over the life of the project, CMI has developed strategic networks that allow us to interact deeply and broadly with peers. CMI has led to the development of the undergraduate student exchange program. Exchanging about 40 students per year, the opportunity to study at MIT and Cambridge is an important distinguishing feature for students considering coming to MIT. Finally, and perhaps most importantly, CMI has given us the opportunity to study ourselves, to understand a bit more about how MIT works, and therefore to learn how to have an even greater impact on our society. ■

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M.I.T. Numbers

**“Please rate the following dimensions of your program”
[from the Graduate Student Survey 2004]**



Source: Office of the Provost