

# The MIT Faculty Newsletter

Vol. XIII No. 1

September 2000

## The Implication of Mega-Partnerships for MIT Faculty

Robert B. McKersie

This piece deals with the “sacred” territory of faculty workload norms and how we relate to our employer, the Institute. Hence, some of the items in this piece will be seen as quite controversial.

Currently, most of us, as faculty members at MIT, work under an explicit understanding that specifies our teaching requirements each year. Alongside this is an implicit contract that, in varying degrees, suggests that we will step forward to involve ourselves in a variety of service or outreach activities.

My proposal is that we need to make many aspects of what is the implicit side of our relationship to MIT much more explicit, in order to deal with some very big developments.

So, what is the challenge at hand? Over the past several years, various leaders at MIT (including the central administration, deans, research directors) have negotiated major partnerships with a variety of companies, governments, and even

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## Who Owns Your Online Courses?

Phillip L. Clay and Helen W. Samuels

Digital technologies have changed the environment in which faculty members teach and disseminate their intellectual work. We are at the beginning of what will be many years of change. The new digital order that greatly expands our opportunities to share and disseminate ideas also alters the ability to control the dissemination. The Institute has a continuing obligation to encourage the unfettered propagation of ideas. But we also want to protect the Institute and advance its mission.

This article initiates a discussion about how intellectual property issues should be viewed in the new digital world.

### Case 1

*Professors Lexington and Newton decide to transform their biomedical engineering course by creating a Web-based platform containing content, images, and simulations. Their department funds the TAs to help develop the content, and an NSF grant plus MIT Alumni-sponsored funds support the work by the Educational*

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## A Word on Origins

John Hildebidle

How do poems happen? It seemed a simple enough question, to form a talk for a dinner – and, since I knew the caterer, I could be certain it would be a *good* dinner – with one of those astounding gatherings of the brightest of the brightest, in this case the “Leonardos.” But then I confronted the task of converting a baffled shrug into half an hour or so of articulate speech.

So too here. I raise the topic because this is a time of continuings and beginnings – those odd moments that mark the start of a new academic year, but which are at the same time full of repetitions and recurrences. Poets encounter such moments every time they set out to write, or are prompted to do so. A poem is a radically new thing, if it is to have any value at all. But then again it arises and lives in the shadow of all other poems ever written, particularly those composed by its author. “Am I just repeating myself?” It is one of the most fearsome questions a poet faces. Another is the question that sometimes occurs when a poem reaches a satisfactory state of “completion” – “was that the last one, ever?”

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## From The Faculty Chair

# Transitional Adulthood

Steven R. Lerman

In what at times seems to be the very distant past, there was a widely accepted notion that colleges were, in at least some sense, serving *in loco parentis* for their undergraduate students. This largely mythical notion provided the foundation for regulating students' lives to an extent today's students (and to a lesser extent their parents) would find intolerable. Sometime between the often idealized times of *in loco parentis* and now, we created an equally mythical notion that undergraduates are entirely adults and that we, as faculty, have no significant role in their non-academic lives. This view is reflected in the oft-cited mantra, "We treat students as adults." that pervaded the debate following President Vest's decision to house all freshmen on campus.

The problem with either the quaint, antiquated view of students as simply very large children or the view of them as full-fledged adults is that neither really provides much useful guidance in how we should best serve the huge diversity of real undergraduate students. The truth is that students differ enormously in their readiness for adult life of responsibility and freedom. Some come to us as freshmen fully prepared for adulthood, while others have never made any serious decisions at all. Most of our students arrive somewhere between those two extremes, making efforts at rigid categorization as "adult" or "child" particularly useless. More importantly, the models of "student as child" and "student as adult" are both so divorced from reality that they don't provide much in the way of useful guidance in making hard decisions on academic

policy. Both extremes lead us to decisions that are counter-productive.

A far better way to think of our undergraduates is as a group of transitional adults. By that, I mean that most undergraduates are far more like adults than children, but that most of them are still on a developmental path to what we generally conceive of as full adulthood. For most of them, their four years at MIT are spent in finishing that transition process; part of our job as a faculty is to help them along in that process.

Viewing college students as transitional adults resonates with the experiences some of us have with our own children who are in that 18-22 year old bracket. We no longer try to regulate their schedules or social lives, but we also don't expect them to bear all the responsibilities of adulthood. At a minimum, they are usually not financially self-sufficient. They may well need our help in many domains of their lives, and we expect to be actively involved in some advisory capacity in their important decisions. Society also acknowledges their transitional status by respecting their right to vote as adults, while until age 21 restricting their access to alcohol and gambling.

At some level, the approach of treating students as fully-developed adults is seductive because it simplifies so many things. In this mythical world, we no longer have to worry about issues such as housing policies, substance abuse, or other behaviors unless they cause immediate damage or harm to other members of the community. After all, one might argue that in the adult world, it's not really

any of my business if my neighbor drinks himself into a stupor each night as long as he stays out of his car and doesn't make a nuisance of himself while doing so.

The messier reality is that we do, in fact, care whether a student drinks to excess or engages in other potentially self-destructive activities. Our concern derives not just from our worry about damage to others, but also from our concern about the student's development. In short, most of us accept the idea that our responsibilities to our students go beyond that arm's length relationship we often have with adults outside the MIT community. We may choose to disavow the responsibility of being our brother's keeper in general, but we shouldn't have that luxury when dealing with our students. Moreover, the truth is that we routinely impose restrictions and provide help to students that, at least implicitly, reflect our view of them as transitional, rather than full-fledged, adults. We limit how many subjects they can take as freshmen, we restrict their choices of residence, we require them to have health insurance, and we enforce a variety of strictures on the parties they hold. Rather than skirt the issue with rhetoric about treating students as adults, we should embrace the concept of students as transitional adults and make more explicit what we mean by it.

One area where this idea comes to the fore is in making hard decisions about parental notification. Current federal law places some limitations on the circumstances when MIT can discuss a student's problems with his

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or her parents. Some of these strictures are open to interpretation. There have always been cases where experienced counselors in the Office of the Dean of Students (now the Dean for Student Life) involved parents or guardians, particularly when the mental health and safety of the student was of great concern. While we should continue to make these decisions on an informed, case-by-case basis, we should probably move to involve parents earlier and more often when doing so is legally permissible.

We should also recognize that undergraduates do change during their four or more years here. Freshmen and seniors are very different in the degree to which they have transitioned to full adulthood, and our policies should reflect those differences. For example, for many years we treated subject prerequisites as advisory rather

than mandatory. The Physics Department has in recent years enforced the restriction that students must have passed or placed out of 8.01 to register for 8.02. This seems an entirely sensible restriction. However, I would grant much more flexibility to a senior who wants to register for a subject for which he or she might not have taken a prerequisite. In making policies, we should be comfortable with restricting the options of a freshman while respecting the decisions of seniors.

I have discussed the issue of how we deal with undergraduates with many of the housemasters, counselors, administrators, and staff who work directly with our students outside the classroom and laboratory. These dedicated individuals often implement policies on substance abuse, issue sanctions for inappropriate student

behavior in dormitories and other living groups, and provide counseling support for students. Many of the decisions they have to make daily implicitly reflect the model of transitional adulthood. One of their problems is that we, as faculty, haven't caught up with the shift in expectations that students and their parents have for universities. As a result, they sometimes see us as disengaged in the non-academic lives of our students and as unsupportive of their efforts to help build a more constructive community for students. It would be far better if we, as faculty and staff, shared a common view about the role of the university in the transition of incoming freshmen to full-fledged adults, and worked in partnership.♣

*[Steven R. Lerman can be reached at lerman@mit.edu]*



## Provost Announces Request for Nominations for Margaret MacVicar Faculty Fellows

The Margaret MacVicar Faculty Fellows Program was established in 1991 to recognize and enhance undergraduate teaching at MIT. This program honors the life and contributions of our late colleague, Margaret MacVicar, who was dean for Undergraduate Education. Any member of the MIT community may submit nominations.

The nomination should be a substantial case. Along with three

supporting letters from students, it should include a nominating letter documenting the contributions of the nominee, three supporting letters from faculty, a curriculum vitae of the nominee and an endorsement by his or her department head. Nominations should be submitted to Provost Robert A. Brown no later than Friday, October 27, 2000 (mail to 5-208). If you have any questions about the nomination process, please contact Helen Samuels, 8-0310, hwsamuel@mit.edu, 5-208.

All tenured, fulltime members of the regular faculty are eligible for appointment as a MacVicar Faculty Fellow. In addition, the Advisory Committee will consider three-year MacVicar Faculty Fellowships for junior faculty. These are convertible to regular 10-year MacVicar Faculty Fellowships if tenure occurs. A MacVicar Faculty Fellow may simultaneously be the holder of a named professorship.♣

## TEACH TALK

# Educational Innovation Moving Ahead at Full Speed

Lori Breslow

Educational change is afoot at MIT. While individual faculty, and even entire departments, have always undertaken educational experimentation and innovation at the Institute, I can't remember a time in the decade I've been here when so much was occurring on the educational front. Prompted, in part, by the report of the Presidential Task Force on Student Life and Learning, supported, to a large extent, by grants made by Alex and Brit d'Arbeloff and Microsoft, and managed, in many cases, by the Council on Educational Technology (CET), educational reform is being pursued on a broad and ambitious scale.

What is particularly exciting, at least from my point of view, is the cooperation and collaboration that is occurring among faculty, administration, staff, graduate students, and undergraduates from many different corners of the Institute. For example, faculty from the departments of Aero/Astro, Civil and Environmental, Mechanical, and Ocean Engineering are working together under a Microsoft grant to construct a collection of online modules to teach fluid mechanics. The approximately 150 first-year graduate students at MIT, who had all previously enrolled in courses within their own departments, will be the beneficiaries of this work. Remarking on this kind of collaborative effort, one faculty member recently told me, "I've never talked to so many people outside my department about teaching and education in the 25 years I've been here."

The advantages of this kind of teamwork are potentially enormous: Resources can be shared efficiently; knowledge and experience can be leveraged so that the successes (and failures) of one experiment can be used to inform others; curricula can be created that will build upon and reinforce previous learning; infrastructure, including educational technology, can be planned so that it effectively services various constituencies. In a report of the 1999 symposium, "Redesigning More Productive Learning Environments," sponsored by the Pew Charitable Trusts, author Carol A. Twigg writes, "In order to have maximum impact and to achieve the highest possible return on one's investment, redesign efforts need to have a strategic focus." (*Improving Learning and Reducing Costs: Redesigning Large-Enrollment Courses*, p. 5.) In this time of educational reform at MIT, the differences between and the needs of individual departments and disciplines are certainly being kept in mind; at the same time, "maximum impact" and "high return on investment" have also been defined as important goals.

In this Teach Talk, I'd like to describe a particular project designed to create synergy among these educational initiatives. Called the Educational Change Seminars, it is an activity being sponsored by the CET. The aim of the Educational Change Seminars is to bring together all members of the MIT community who are interested in educational innovation, to provide opportunities for people to learn from and work with one another. As part of

this effort, educators from around the country, including those who have been involved in the successful design of educational technologies, will be invited to campus. The hope is that this will facilitate a larger shift in MIT undergraduate education than any one individual project could accomplish alone.

But before describing the Seminars, let me give you a very short history of how these educational projects have developed.

### **A Burst of Educational Innovation**

In the spring of 1999, Alex and Brit d'Arbeloff announced they were donating \$10 million to establish the Alex and Brit d'Arbeloff Fund for Excellence in Education. The d'Arbeloff Fund, called "unique in its focus on the process of education itself," was established to support innovations in teaching science and engineering. In the late spring of 1999, a group of about 50 faculty, administrators, and students came together to look at undergraduate education at MIT, to identify its weaknesses, and to explore new approaches to better it. That meeting began an ongoing conversation that eventually led to the decision to use the d'Arbeloff funding specifically to improve the first-year educational experience at MIT. In December 1999, Rosalind Williams, then dean of Students and Undergraduate Education, distributed a request for proposals for d'Arbeloff funds. In the call for proposals, Williams quoted the Committee on the Undergraduate Program who had identified three

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goals for strengthening MIT's freshman year: (1) increase the level of intellectual excitement; (2) increase the opportunities for "learning by doing"; and (3) foster mentoring relationships between faculty and students. The projects to be supported by the d'Arbelloff fund were to address those issues.

A subcommittee of the Council on Educational Technology agreed to serve as the grants review board. The CET had been formed in September 1999 "to provide strategic guidance and oversight of MIT efforts to develop an infrastructure and initiatives for the application of technology to education" (*Tech Talk*, September 29, 1999). The Council's mandate, in other words, was to supervise and coordinate projects that would experiment with ways in which technology could enhance not only the quality of an MIT education, but the teaching and learning of science, engineering, and technology worldwide.

No sooner had the CET been appointed, than it was announced that MIT was entering into an alliance with the Microsoft Corporation to work on that same objective: to improve higher education through the research and development of educational technology. Microsoft was to allocate \$25 million over five years to the new effort, called I-Campus. President Vest was quoted at the announcement of the collaboration as saying, "Education-focused research supported by Microsoft will lead to new learning environments for our students . . ." (*MIT News Release*, October 5, 1999). At the end of November, a call for proposals went out for projects to be funded by I-Campus.

By spring 2000, fourteen proposals from faculty and administration and five student proposals had been funded by I-Campus, and three proposals had been given planning grants. Initiatives include, for example, building laboratory instruments that can be assessed via the Web, and using these to create six to eight new Web-enabled laboratories in at least

Technology program) Engineering Research Center, whose goal is to improve bioengineering education; a new orientation toward engineering education, called CDIO (conceive, design, implement, and operate), devised by the Department of Aeronautics and Astronautics; and, as I wrote at the beginning of this article, a host of other efforts in many parts of

**By spring 2000, fourteen proposals from faculty and administration and five student proposals had been funded by I-Campus, and three proposals had been given planning grants. Initiatives include, for example, building laboratory instruments that can be assessed via the Web, and using these to create six to eight new Web-enabled laboratories in at least three different disciplines. . . .**

three different disciplines; experimenting with "Just in Time Learning" by creating modules to support project-driven needs in Mechanical Engineering; and moving first-year physics subjects away from the lecture/recitation format and toward a classroom model in which students will work with computers and desktop experiments in small groups. (For the full I-Campus proposals, please go to <http://mit.edu/i-campus>.)

This is not to say that the only educational innovation going on at MIT are those projects being funded by these two sources. There has been the establishment of the Educational Media Creation Center (EMCC) to support the production of media and Web-based educational materials; the VaNTH (the acronym stands for the five schools participating, including the MIT-Harvard Health Sciences and

the Institute. MIT is a hotbed of educational experimentation!

### **Will the Whole be Greater than the Sum of its Parts?**

Each of the projects now underway at MIT is exciting in its own right, but as Helen Samuels, special assistant in the provost's office and staff to I-Campus, has written, "The sum total . . . is potentially transformational" (e-mail message, May 3, 2000). The challenge is to create a shared vision of an MIT education. The Educational Change Seminars provide one way – though by no means the only way – to meet that challenge.

Last May, approximately 40 people involved in the I-Campus and d'Arbelloff initiatives met to begin that work. The idea was to bring people together so they could share techniques and technology, brainstorm how to

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solve problems, and cross-fertilize each other's initiatives. Participants were divided into small groups and asked to identify educational themes common to the projects. Common themes could be about, for example, innovative pedagogical methods; new ways to organize and present content; shifts in the relationships between students and instructors, between students and students, or between students and the outside world (e.g., MIT alumni); or changes in the physical location of where learning occurs. In other words, a "theme" was one component or characteristic of the educational process that was ripe for change. In all, seven themes were identified, and I'd like to describe each briefly. For each theme, I'll first give examples of the ways in which the MIT community is working to make gains in that area, and then I'll identify some of the difficulties that may lie ahead.

*Interactive learning in the classroom.* This term encompasses a wide variety of educational innovations, including learning by doing, project-based learning, and projects in which students work in small groups and teams. The common element underlying all is that instead of asking students to only sit, listen, and take notes in class, these techniques require students to actively engage with the subject matter and with one another. For example, Professor Kip Hodges and his team will debut a subject this fall called "Mission 2004." Fifty freshmen will be put into groups of five to work together for the entire semester to answer the question, "Is there life on Mars?" Students will be required to use a variety of sources from an array of disciplines in order to answer that

question. Along the way, they will learn teamwork and Web-based skills.

There are many challenges for using interactive methodologies in science and engineering classrooms. Will content be sacrificed in order to give students the time they need to explore? How do we make sure that both more advanced and weaker students are not

Many in higher education (myself included) have been myopic when it comes to seeing opportunities for learning outside of the classroom. (Others would argue, I suppose, that the classroom is the last place learning takes place!) But MIT faculty and students are exploring novel sites for learning. For example, Professors

**There are many challenges for using interactive methodologies in science and engineering classrooms. Will content be sacrificed in order to give students the time they need to explore? How do we make sure that both more advanced and weaker students are not shortchanged when we use these interactive methodologies? How can we measure if we have successfully taught skills like communication and problem solving?**

shortchanged when we use these interactive methodologies? How can we measure if we have successfully taught skills like communication and problem solving? (As will become clear below, assessment and evaluation need to be an integral part of each of these experiments.)

*Learning outside of the classroom.* In "Organizing for Learning," an oft-cited article in the literature on higher education, Peter Ewell, senior associate at the National Center for Higher Education Management System, identifies two "compelling insights about learning" that are particularly applicable here:

- Every student learns all the time, both with us and despite us.
- Direct experience decisively shapes individual understanding. (*AAHE Bulletin*, December 1999, p. 4).

David Mindell, Deborah Fitzgerald, and Evelyn Hammond are working on a project that will take students into factories and laboratories to see first hand the work of scientists and engineers.

But, again, moving learning outside of the traditional classroom brings with it a host of its own problems. For example, how can we be sure that these activities are worth the time of both faculty and students? What kind of supervision is needed in order to guarantee that these are quality learning experiences? And, how can activities outside the classroom be integrated with what goes on in class?

*Integration across the curriculum.* The fluid mechanics proposal described above is the best example of how one subject can be used to

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meet several different curriculum needs. But other projects are exploring the concept of *modularity*, which has tremendous potential for integration across the curriculum. By breaking down a curriculum into smaller parts, each of which has its own integrity conceptually, instructors are given the opportunity to “mix and match” modules to meet an assortment of needs. This flexibility can help instructors tailor curricula to students who come to a class with different abilities, with different interests, and with a different level of preparation. In the VaNTH bioengineering consortium, for example, engineers and learning scientists are working together to create a series of modules that can be used in a number of different courses to fulfill a variety of functions. The very nature of bioengineering – particularly its interdisciplinarity – makes modularity an especially useful format for that discipline.

Yet as the module designers have undertaken this work, they have been confronted by a series of questions: How “big” should a module be? (By that I mean not only how much material should be covered, but how are the conceptual boundaries defined?) Should there be standards in place both for the format of the modules, as well as for the platforms used to create online material? And what criteria should be used to determine the right “level” for the modules? Should they capture the most elementary, basic knowledge of the discipline? Does more advanced material lend itself more readily to modularity? Are both equally fair game? The concept of modularity holds a great deal of promise, but as we actually begin to construct modules, we find the challenges, well, challenging.

*New educational technologies.* The potential for new technologies to change the landscape of education is, of course, enormous, and we have only scratched the surface of possibilities. Here is just a sampling of the tools MIT faculty and students are currently developing: Web-based “super lectures” that Mechanical Engineering students could download

to access because of the limitations of the human senses.

- Break the constraints of time and space allowing for communication with a wider group of individuals than is available in the traditional classroom (or, for that matter, the traditional university).

- Allow students to tailor their educational intake depending on their

**A collaboration between MIT, the National University of Singapore, and Nanyang Technological University. . . gives Singaporean and MIT students the opportunity to take master’s and doctoral-level courses in advanced materials, high performance computation for engineering systems, or innovation in manufacturing systems and technology. Classes are held simultaneously in Singapore and Cambridge with live video transmission over Internet 2.**

at their convenience; “virtual aircraft” that Aero/Astro students could use to explore design and operational concepts; the use of remote instrumentation to allow students in Civil and Environmental Engineering to examine various structures on the MIT campus; and the “Classroom Communicator,” a multi-faceted system designed to increase the level of interaction and feedback between student and lecturer in the classroom.

It seems to me that, in general, the great gains being made by these and other educational technologies can be placed into three broad categories. Educational technology can:

- Bring experiences or information to students that they would not be able

own preferences and needs.

Those involved in current projects at MIT understand, I believe, that these capabilities cannot be taken lightly. They will have tremendous consequences for our roles as teachers and learners, for the operation of institutions of higher learning, and for our very definition of what it means to be a “learned” person. (For an excellent discussion of current and potential impact of the Web on school and learning, see John Seely Brown’s “Growing Up Digital: How the Web Changes Work, Education, and the Ways People Learn,” *Change*, March/April 2000.) We need to experiment, and we need to evaluate the results of those experiments. We can best

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maximize our resources and efforts in education in the same way that resources are best utilized in research: by proceeding in a methodical, organized way while remaining open to serendipity, to the unexpected, and to the unplanned for.

*Distributed learning.* Because educational technologies can break the boundaries of time and space, they allow us to spread learning far beyond the traditional boundaries of both the classroom and the campus. The concept of distance learning has captured the imagination not only of the academic community, but of entrepreneurs as well. Indeed, the strategy subcommittee of the CET has spent much of the last year considering MIT's options in this arena. The Singapore-MIT Alliance (SMA) is one example of distance learning at the Institute. A collaboration between MIT, the National University of Singapore, and Nanyang Technological University, SMA gives Singaporean and MIT students the opportunity to take master's and doctoral-level courses in advanced materials, high performance computation for engineering systems, or innovation in manufacturing systems and technology. Classes are held simultaneously in Singapore and Cambridge with live video transmission over Internet 2.

Much print has been spilled debating the potential benefits and dangers of distance learning, but one thing is for sure: We still don't have all the kinks worked out. Everything from getting handouts to students before class (photocopying 15 minutes before lecture won't work anymore) to managing discussions has to be rethought. Faculty who have taught

distance learning classes say they would benefit from training in how to manage this new kind of educational environment. We also need to assess what the benefits and costs associated with distance learning are (monetarily, in terms of manpower, and in terms of learning), so we can determine when those costs outweigh the gains and vice versa.

*New kinds of learning communities.* The M.ArchNet Project, supported by I-Campus, aims "to sustain and enhance a community of scholars by electronic means." In the opinion of the M.ArchNet's creators, the power of the Web lies in its ability "to create and enhance learning communities that have a sense of cohesion, identity, and purpose, that have effective mechanisms for producing, accumulating, adding value to, managing, and distributing intellectual resources among their members and that allow all members to function as both contributors and consumers."

John Seely Brown, in the article cited above, also writes of the creation of electronic "communities of practices," which, he maintains, will lead to a new kind of "learning ecology," new complex systems in which learning will take place. What skills and attributes will members of this far-reaching electronic community need? And, more importantly for us as educators, how will we make sure that our students are equipped with those skills?

*New methods of assessing educational methods and student performance.* I hope it is clear from all that I have written above that we are moving into uncharted territory. Our job is not only to explore the territory, but to map it as well.

That means we need to build methods of assessment and evaluation into every project we undertake. But here lies more potential pitfalls, for the process of measuring effectiveness in educational enterprises – particularly measuring anything as vague as "learning" – is, to put it mildly, not easy. But that does not mean we should not do it.

These new ways of learning that we are experimenting with will also require new methods of evaluating student performance. If we wish students to learn how to solve novel problems, for example, we have to guide them in that process, and then we have to set up methods of evaluation that will allow them to demonstrate that skill to us. This will take some invention on our part, as well.

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In this column, I've tried to describe the excitement and give examples of the challenges that lie before us. MIT has excelled in research because of both individual enterprise and powerful collaborations. That same model will serve us well in the educational sphere. We need to put energy, creativity, and commitment into individual projects while focusing on how those individual projects can be woven together into a more comprehensive understanding of and approach to undergraduate science and engineering education.

The Educational Change Seminars are one venue for accomplishing this goal. (Dates, times, and speakers for the Seminars will appear in *Tech Talk* as well as elsewhere.) We invite everyone to join us in these conversations.✦

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## The Implication of Mega-Partnerships for MIT Faculty

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other universities. The list is growing longer by the month and includes partnerships with Microsoft, Merrill Lynch, the Government of Singapore, the sponsoring companies of Leaders for Manufacturing, Ford Motor Company, and Cambridge University. I have only focused on those arrangements that deal with the development and transfer of knowledge, in distinction to programs that are primarily educational (such as the new SDM Master's program).

Most parts of MIT have celebrated with enthusiasm the announcement of these large undertakings. But a growing number of voices from the faculty have been saying something to the effect: "My arm is being twisted to get involved in a particular partnership." Clearly, the workload is not evenly distributed across the faculty.

In a number of the partnerships it is the case that a high percentage of the work is done by people who are hired exclusively for the partnerships, in other words, the "bench" work is not being done by our regular faculty. This is true of first generation projects such as IMVP, Lean Aerospace Initiative (LAI), and Lean Sustainment. To be sure, faculty are in charge of these projects, but the extent of faculty involvement is not as large as originally envisioned.

A further difficulty that has developed in some instances (and I saw this first hand from my vantage point as Deputy Dean for Research at the Sloan School – a position that helped foster a number of these partnerships) is that given the difficulty in recruiting faculty to "come on board," sponsors feel short-changed. Further, the deliverables that were promised as part of the negotiations to

establish the partnership are not always forthcoming in full measure.

Another problem can occur when these partnerships approach faculty as free agents and are successful at securing their participation, but do so without consideration of the consequences to the faculty's home department. For instance, the partnership buys out some of the faculty teaching load, leaving the department with a void. This inevitably results in conflict between the program and the department, and can make it even harder for the two to cooperate and coordinate plans. This is further exacerbated when the program, like the Singapore initiative, is a school-wide or Institute-wide activity that must draw upon faculty from multiple departments and schools.

So, what is the solution(s)? Actually, my main purpose in this piece is to raise the subject and to provoke discussion. But I cannot duck that easily. One thought would be to move toward an understanding between the faculty and the administration at MIT where a service or extension function is seen as a regular part of the explicit employment contract. I use the word "extension" in the historic sense, wherein land grant universities (and MIT for a while was one of these) assume a responsibility to extend knowledge beyond the clients who are in residence on the campus.

Before going any further, I'm sure someone is raising the question: Why do we have to have these partnerships if we are experiencing difficulty in staffing the programs and delivering the "goods?" Well, we are in a new era, and aside from the dollars that these partnerships provide, they connect us to interesting problems in

industry and in a variety of organizations, and for a place like MIT, which is very much on the applied side as well as fostering basic research, they are a welcome development.

Returning to some of the practical questions as to how such a revision of our work norms would be defined, I would recommend that this part of our portfolio only apply to tenured faculty. It might work as follows:

In discussions between an individual faculty member and a department head/dean, an understanding would be reached as to what percentage of the workload would be charged to these extension-type projects over, say, a five-year period of time. It might be desirable, in some cases, to reduce the classroom teaching load so as to leave ample room in each faculty member's schedule for research and activities of his/her own choosing. And it would be desirable that these discussions be complemented with concurrent discussions with the leads for the partnership programs, so as to coordinate on how faculty are engaged in these activities and to assure that the same signals are sent on what is expected and encouraged.

Now, what are some of the advantages of moving in this direction, aside from the practical result that all tenured faculty would play their part in helping implement these partnerships? First, if faculty see these partnerships as part of their regular workload, then I am sure that faculty will insist on being involved at the conception and birth of these partnerships, and we will not be in a situation where faculty feel that somebody "at the top" is out prospecting for deals and then bringing

*(Continued on next page)*

## The Implication of Mega-Partnerships for MIT Faculty

*McKersie, from preceding page*

them back with gusto to present to the various labs and faculty for execution. It is possible that we might engage in fewer of these partnerships, and that would not be all that lamentable. For sure, where we do sign on to deliver certain research programs and to generate new knowledge for a particular client, since we would do it

only with faculty involvement, we would do it well, and the project would become part of the faculty's social contract at MIT.

Right now, the partnerships are not embedded in our culture, and unfortunately too often junior faculty (who find it more difficult to say "no" than tenured faculty) sign on, only to

find at tenure review time that their activities on some of these projects are not given high value. This is a very serious disconnect – we either need to cut back on partnerships or bring them into a tight embrace with senior faculty.♣

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## School of Humanities, Arts, and Social Sciences to Celebrate its 50th Anniversary

MIT MUSEUM EXHIBITION: *A Fifty-Year Reflection: Humanities, Arts, and Social Sciences at MIT*

Opening preview: Wednesday, September 20, 2000, 5:00-7:00 PM.

Ongoing exhibition: September 21, 2000 - January 26, 2001.

Compton Gallery.

COLLOQUIUM: *Asking the Right Questions*

Friday, October 6, 2000, 12:00 - 5:30 PM: "What do we know about human nature?" – with Noam Chomsky, Steven Pinker, Hilary Putnam, Jay Keyser; and "How do artists tell their stories?" – with Anita Desai, John Harbison, Louise Gluck, Ellen Harris.

Saturday, October 7, 9:00 AM - 3:00 PM: "How do history and memory shape each other?" with John Dower, Pauline Maier, Dame Gillian Beer, Rosalind Williams; and "Is capitalism good for democracy?" – with Suzanne Berger, Robert Solow, Kenneth Arrow, Joshua Cohen.

Tang Center (E51), Wong Auditorium.

ANNIVERSARY CONCERT: Friday, October 6, 2000, 7:15 - 9:30 PM.

Balinese Gamelan Galak Tika, MIT Wind Ensemble, Festival Jazz Ensemble, Chamber Music Society, Concert Choir, Symphony Orchestra.  
Kresge Auditorium.

*For more information: <http://web.mit.edu/shass/anniversary/index.html>*

## A Word on Origins

*Hildebidle, from Page 1*

I can even use the label “poet” in introducing myself. Sometimes. Hesitantly. But that doesn’t mean I really know the answer to the question that is the title of my talk. You know how unsettling it is to be asked to answer questions that baffle you. How much more so, when the question is of your own devising.

The Classical poets developed, of course, a whole array of legends, about the nine daughters of Apollo, each of whom took charge of one art (including, oddly, both history and memory). They were inspiring, and seemed to have loved to be invoked or prayed to. But they were also tricky and aloof. As Mick Jagger put it, “You can’t always get what you want.” Least of all if you want to be inspired to write a poem. There are, of course, “occasional” poems, written for a specific event. But they are not a distinguished *genre*, by any means. The muses seem to be tired old mythological artifices – but not so worn out, perhaps. More on that in a moment.

At least I can claim good company, in my bafflement. It is rather fun, at times at least, to be in the grip of the unknown – listen to Frank O’Hara, who is usually a rather gruff, street-wise, urban poet:

*here I am, the  
center of all beauty!*

*writing these poems!*

*Imagine!*

Or this, from another American, a West Coast outdoorsy type, Gary Snyder:

### HOW POETRY COMES TO ME

*It comes blundering over the  
Boulders at night, it stays  
Frightened outside the  
Range of my campfire  
I go to meet it at the  
Edge of the light.*

I rather like the resistant hesitancy of that poem. It surely, whatever it is, won’t come when it’s called. Another taste

of a modern invocation, by a contemporary of mine, Kate Daniels, who is invoking “the muse of everyday life”:

*If you are here,  
where are you?  
If you exist,  
what are you?  
I beg you  
to reveal yourself.  
I am not fancy.  
My days are filled  
with wiping noses  
and bathing bottoms,  
with boiling pots  
of cheese-filled pasta.*

Adrienne Rich is a woman of firm beliefs, so she has an unequivocal, if not exactly “tactical” answer to my title question:

Poetry . . . begins in this way: the crossing of trajectories of two (or more) elements that might not otherwise have known simultaneity. When this happens, a piece of the universe is revealed as for the first time.

That last bit sounds rather grandiloquent, I admit. And it’s as though she is trying to claim for poetry something of the clout of, say, NASA. But why not?

You are no doubt well aware of the Muses, the classical myths which account for the sources of the arts. Nine sisters, daughters of Apollo, each of whom takes responsibility for one area, each of whom (as in the current film) can be summoned or invoked or prayed to, but each of whom reserves the right (again, as in the current film) either not to reply or to reply in a where does it *come* from, this stuff we call poetry? I taught a seminar on contemporary poetry last spring, and I kept bumping into injunctions like this one, from A. R. Ammons: “To pay attention is the beginning of wonder.” Or, I am arguing, of poetry. And lest we think that poetry and science are wholly disparate realms, this from a poet who happens, along the way, to write wonderful essays about natural history, Diane Ackerman:

*(Continued on next page)*

## A Word on Origins

*Hildebidle, from preceding page*

Both science and art have the habit of waking us up, turning on the lights, grabbing us by the collar and saying *Would you please pay attention!*

Or this, offered by – of all things – a mathematician from Brooklyn whose specialty is computer security systems:

The job of the poet is, in part, to see around the corners, through the darkness and to find the darn simple elegance of the human situation.

Or this, from a poet-critic of some renown, based at Yale:

this too is the work of poetry: to absorb and transfigure the reach of the eye or the underworld of the heart.

J. D. McClatchy

We are back in mystery-land, I think – at least the “reach of the eye” in the physical/optical sense is a lot easier to grasp and measure than the “underworld of the heart.” And therein lies the adventure. An interesting poet named Kathleen Norris has gotten very involved with Benedictine monasticism in recent years, despite a prior religious autobiography that drifted from wishy-washy Protestantism to fashionable intellectual skepticism. She propounds a formulation very close, as it happens, to that averred by Robert Frost: that a poem, a *good* poem at least, “begins in delight and ends in wisdom.” I should offer, parenthetically at least, my understanding that the question before us is how *good* poems happen – not Hallmark cards or those abhorrent verses to be found at the Blue Mountain Crafts Website or (to make my position clear) most if not all of what is offered at “poetry slams.”

The bottom line is that the Muses can be invoked but not commanded; poems can be encountered or experienced but not forced very effectively. The Nobel Prize winner Joseph Brodsky once observed that “Poetry is a tremendous school of insecurity and uncertainty. You never know whether what you’ve done is any good, still less whether you’ll be able to do anything good tomorrow.” The Muses, fickle as they are, do not always sing, and when they resist the poet’s summons, she/he is left in the posture defined, painfully, by an intriguingly-named Irishman: Iggy McGovern.

## MUSELESS

*The sullen page  
will not engage  
with the thin pen;  
no prayer or Zen  
mantra divine  
a single line  
nor scan of ceiling  
stir up feeling  
nor cups of tea  
breed verity,  
just the curse  
of being worse  
than (m)useless?*

The final question mark is syntactically dubious, but spiritually and metaphorically right on the mark.

But let us take seriously the injunction that poems arise from attention. What do we need to pay attention to, we poets (and, for that matter, readers of poetry)? First, language itself. The American W. S. Merwin has offered this:

*At the last minute a word is waiting  
not heard that way before and not to be  
repeated or ever be remembered  
one that always had been a household word  
used in speaking of the ordinary  
everyday occurrence of living  
not newly chosen or long considered  
or a matter for comment afterward*

Some advice from a woman who for a while taught at MIT, Denise Levertov, who all-too-neatly combines my two principles – pay attention to the words, and pay attention to the world:

I think it’s like this: first there must be an experience, a sequence or constellation of perceptions of sufficient interest, felt by the poet internally enough to demand of him their equivalence in words; he is *brought to speech*. Suppose there’s the sight of the sky through a dusty window, birds and clouds and bits of paper flying

*(Continued on next page)*

## A Word on Origins

*Hildebidle, from preceding page*

through the sky, the sound of music from his radio, feelings of anger and love and amusement roused by a letter just received, the memory of some long-past thought or event associated with what's seen or heard or felt, and an idea, a concept, he has been pondering, each qualifying the other; together with what he knows about history and what he has been dreaming – whether or not he remembers it – working in him. . . [T]he condition of being a poet is that periodically such a cross section, or constellation, or experiences . . . demands, or wakes in him this demand: the poem. The beginning of the fulfillment of this demand is to contemplate, to meditate; words which connote a state in which the heat of feeling warms the intellect. . . [T]o meditate is “to muse,” to muse comes from a word meaning “to stand with open mouth” – not so comical if we think of “inspiration” – to breathe in.

I won't be so presumptuous as to offer declarations about whether this “constellation” of psychic events is the point of genesis of, say, a new experiment or computer program. Of course, “paying attention” in areas outside of poetry must extend to numbers, black holes, and petri dishes.

Where then do poems begin, or arise, or whatever it is they do, to get to the page? Nobody seems to know, but it has something to do with an almost mystical impulse. That is what the myths of the Muses try to encompass, and I would humbly offer a proposition. We, all of us, rely on Muses. Some of us work in fields – like music or lyric poetry – with a long-standing name for our Muse. Some of

us need to find new names. I borrow the idea, in part, from yet another Irish writer, Dawn Sullivan, who insists, “We need the Muse now, more than ever before, as an inspirational symbol of restoring (in all fields) symbolic thought.” I will go so far as to offer (having called upon some advisors, one Greek and a neighbor, one a computer scientist and long-standing cyberchum) an expanded catalog of Muses, for many of the other areas at MIT:

- for physics, ARCHIMEDIA
- for chemistry, deriving from the Greek word for Hydrogen, HYDROGONA
- for math, a choice: either NUMERIA (from the Greek for number) or APEIRA, from the Greek for infinite
- for biology, KYTARIA, from the Greek *kyttaro* (cell)
- computer science has been a baffler. But surely Babbage needs to be honored; so how about BABBAGA. The fact that this bears an eerie resemblance to the folk-witch Baba Yaga is, to my eyes, all the better, since from the outside at least, computers bear a distinct resemblance to tools of witchery and voodoo.

On the one hand, what does it matter what they are called; my point is that we honor the more-or-less mystical sources of inspiration that drives the work of all of us. But then again, if the muses are anywhere near as touchy as they seem to be, in legend, calling them by the right name may be all-important. I encourage you to subject my notion to empirical test, and to report your results as they emerge.♣

*[John Hildebidle can be reached at [jjhildeb@mit.edu](mailto:jjhildeb@mit.edu)]*

# Construction on Campus

## BUILDING THE FUTURE

Charles M. Vest

**A**s a community, a campus and a culture, MIT has always been defined by the ideals of innovation and improvement.

Our physical campus is, in many ways, a visible manifestation of MIT's commitment to a better future through innovation and new knowledge. Though never entirely quiescent, there are times when our campus building program is particularly ambitious – times of intense intellectual ferment, creativity and opportunity. This is one of those times.

We have embarked on the most ambitious program in forty years to improve and enhance our physical campus and infrastructure. This program closely mirrors our

intellectual agenda and our commitment to enhance the quality of student life and learning. Our strategic initiatives, as well as the broad strengthening of support for faculty research and teaching, carry major implications for our campus buildings and infrastructure.

Over the next several years, we will construct and renew facilities for academic programs and the enhancement of campus life in such areas as the communication and information sciences, chemistry, aeronautics and astronautics, neurosciences, the arts, media, management, student residences, and sports and fitness, to name just the highlights.



In the meantime, the construction work will temporarily consume some of the grassy areas on campus. When that occurs, it will be kept to a minimum and plans for restoration and enhancement of that space will be an explicit part of the project.

### Decisions on New Buildings

The Building Committee is the primary decision-making group on the building program. Chaired by Executive Vice President John Curry, the committee's objective is to guide the overall development of the campus and its facilities.

In order to involve the community in the planning for new facilities, the Building Committee establishes a client team for each project. With some of the larger projects, a member of the client team is invited to be a member of the project team, which is the group that determines uses of the building. That way, they have first-hand involvement with the decisions made about their space.

Clearly, a campus transformation of this magnitude will create disruptions and inconvenience for all of us, and will prove challenging to our everyday lives. In order to mitigate the disruptions, we will take special care in the phasing and coordination of all construction activity and will do our best to keep the lines open with all affected parties about upcoming and ongoing activities.

This era of physical change is both exciting and crucial to the future of the Institute. It is a necessary part of our preparation for a new century of innovation and progress – and we owe it the benefit of our participation and our informed support.♣

## THE ROLE OF THE DEPARTMENT OF FACILITIES

Victoria V. Sirianni

**A**s construction continues on campus, I believe it's important to explore the role of the Department of Facilities in this building boom, and discuss how we can work with the MIT community to ease the burden to all affected.

Because signage is critical to helping people navigate around the construction sites, we're studying where it works best. You will soon see an increase of it at various points on campus.

### Green Spaces on Campus

We are developing an integrated landscape plan that will not only provide green spaces but also will connect the campus more effectively. There will be places for people to congregate outside and spend time in a relaxed way, something we need more of at MIT.

### Capital Project Management

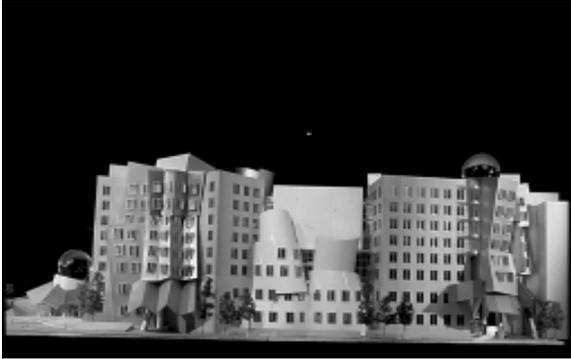
Two outstanding people to lead our construction efforts were hired by the Department of Facilities this past spring. They are Deborah Poodry, director of capital project development, and Paul Curley, director of capital construction. Both have a wealth of background in building design and construction. These partners are responsible for ensuring that the flow between project development and construction is a coordinated, disciplined, and smooth process.

### Renovation and Renewal

The Committee for Review of Space Planning (CRSP) makes the decisions on renovations' budgets and schedules. Chaired by Chancellor Larry Bacow, CRSP is charged with space planning and capital budgeting to ensure the most strategic allocation and use of the Institute's physical and related financial assets.♣

*(Construction continued on next page)*

# Construction



## Stata Center

The 350,000-square-foot Ray and Maria Stata Center for Computer, Information and Intelligence Sciences will create a gateway to MIT at the northeast sector of the campus. The building includes office and research space, a “student street,” a large lecture hall, four classrooms, a child care center, and a new fitness space adjoining the existing Alumni Pool. *Approximate construction period: May 2000 – Fall 2003. Architect: Frank O. Gehry and Associates*



## Dreyfus Building (Building 18)

Laboratory facilities and infrastructure in this Department of Chemistry building will be renovated and modernized in order to meet today’s research demands and to enhance life-safety systems. *Approximate construction period: Summer 2000 – August 2003. Architect: Goody, Clancy & Associates*



## Sports and Fitness Center

A sports and fitness center, to be built between the existing Johnson Athletics Center and the Stratton Student Center, will include a 50-meter pool, seating for approximately 450 spectators, recreation and team locker rooms, a health fitness center, a sports medicine training facility, an equipment desk, and a laundry room. The barbecue pits currently on the site will be relocated for future use. *Approximate construction period: Fall 2000 – May 2002. Architect: Roche & Dinkeloo and Sasaki Associates*



## Media Lab Expansion

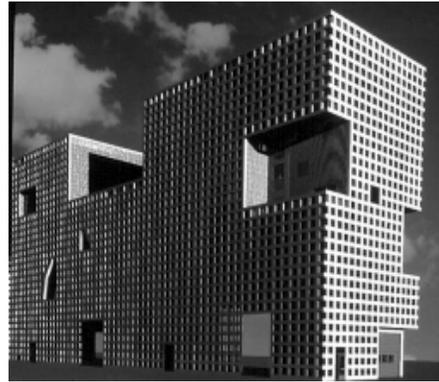
The Media Laboratory will expand to its existing facilities. The new structure will house educational programs, information and learning application for both expression. Prior to construction will occur in the adjacent. *Approximate construction period: Spring 2000 – August 2003. Architect: Fumihiko Maki and Weinzapfel Associates*

# Construction on Campus



## Guggenheim Laboratory (Building 33)

The Department of Aeronautics and Astronautics is currently renovating its facilities to create a new 38,000-square-foot Learning Laboratory for Complex Systems, which will bring faculty and students together around the synthetic product development process. *Approximate construction period: June 1999 – August 2000. Architect: Cambridge Seven Associates*



## Undergraduate Residence

This Progressive Architecture Award design winner will house 350 undergraduates. Incorporated into the design are public and private spaces for the residents including study lounge areas and computer rooms. The building is designed in an open plan – open to light and air, and open to the residents who will live, work, eat, study, and be entertained within its welcoming spaces. *Approximate construction period: September 2000 – August 2002. Architect: Steven Holl Architects and Perry Dean Rogers & Partners*



## Expansion

will expand on a site adjacent in the Wiesner Building. The use a range of research and relating to the future of ing technologies and their everyday life and creative construction, utility relocation adjacent streets. *Approximate construction period: 2001 – December 2003. Architect: Skidmore, Owings & Merrill & Associates, with Leers*



## Chiller 6 CUP Expansion

The Central Utility Plant will be expanded to support the Stata Center and other new facilities on campus. *Approximate construction period: October 1999 – October 2000*

This three-page *Construction on Campus* update was coordinated and provided to the *Faculty Newsletter* by Department of Facilities Communications Manager Ruth T. Davis. We are most grateful. Thanks also goes to Janet Snover. For more information, see the Department of Facilities Website: <<http://web.mit.edu/facilities/www/>>.

# An Appeal to Faculty

Felix AuYeung and Julia Steinberger

The MIT community takes pride in celebrating its legends, people such as Henry Kendall and Philip and Phylis Morrison. These people will be honored and remembered forever not simply because of their contributions to the Institute, but because they devoted their lives to peace and the society by using their knowledge and skills responsibly and generously. Yet, although their values and contributions are highly esteemed, few faculty members today are following in their footsteps.

Technology has been responsible for bringing almost as much bad as good to humanity. And many scientists, including MIT greats, have taken great time and effort to manage the use of technology they sometimes helped to create, such as nuclear weapons. The work of the Union of Concerned Scientists, for example, spans numerous issues and has been an invaluable benefit for society.

Issues of demilitarization, non-proliferation, and nuclear arsenal reduction persist in our society today, despite a time of supposed peace and prosperity, despite the end of the Cold War. Our government continues to increase military spending, subsidize defense contractors, export military "aid," and seek inane programs such as Star Wars. A talk about the resource waste and foreign policy dangers of the missile defense program last semester by Congressman Barney Frank and UCS and MIT Security Studies Professor Lisbeth Gronlund, with expert testimony from former TRW Senior Engineer Dr. Nira Schwartz, was sparsely attended by both MIT students and faculty.

Regardless of field of research, engineers and scientists, like all fellow

citizens and human beings, have a responsibility to the common society, especially in a participatory democracy. Furthermore, as academics and intellectuals, we believe you are in a position to lead public discourse and peace campaigns, a role Kendall and the Morrises have accepted and at which they have excelled. By solely

attempts to negotiate nonproliferation and disarmament treaties) and Institute economist Paul Krugman will continue to write articles proclaiming that "as long as you have no realistic alternative to industrialization based on low wages, to oppose it means that you are willing to deny desperately poor people the best chance they have of

**Regardless of field of research, engineers and scientists, like all fellow citizens and human beings, have a responsibility to the common society, especially in a participatory democracy. Furthermore, as academics and intellectuals, we believe you are in a position to lead public discourse and peace campaigns . . . . By solely focusing on your respective laboratory, you are in essence giving away your power to make decisions to politicians and economists, who present us today with a world of over-consumption/pollution and concentrated wealth, and a country armed to the teeth to defend that polarity.**

focusing on your respective laboratory, you are in essence giving away your power to make decisions to politicians and economists, who present us today with a world of over-consumption/pollution and concentrated wealth, and a country armed to the teeth to defend that polarity. Such an abdication of responsibility is unworthy of the best minds of humanity. If MIT researchers have world class laboratories and do world class research, you must also make sure that your guidance in technology application and distribution is equally world class.

Everyone who respects life and desires a just society has a part in creating that peace, students and faculty included. Otherwise, Congressman Jesse Helms will continue to make declarations such as "not on my watch," (referring to his recent commitment to block any White House

progress. . ." ("In Praise of Cheap Labor: Bad jobs at bad wages are better than no jobs at all," *Slate Magazine*, March 20, 1997.) Dare we stand aside and allow self-centered and unimaginative people to answer unchallenged such important questions that affect us all?

It is our hope that you, the faculty, will continue the positive legacies at MIT and confront fully our common contemporary problems, offering both service to people and ingenuity for change where they are lacking. We implore you to get more involved with social issues, to participate more actively in peace movements, and to encourage your students as well to engage themselves in civil society.✦

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## NIH Regulation Affects MIT Principal Investigators

Julie T. Norris and Thomas B. Duff

**B**eginning on October 1, 2000, the National Institutes of Health (NIH) will require education on the protection of human research participants for all NIH projects in which human subjects are involved. This requirement for education extends not only to individuals who have face-to-face contact with humans as subjects, but also to anyone who uses blood, specimens, or data from human subjects.

NIH also will require a letter with the proposal from principal investigators who use humans as subjects describing the education that each person working on the project has received. The letter must be countersigned by the authorized institutional official. For non-competitive renewal applications that involve human research, investigators must include a description of such education in their annual progress reports.

The NIH requirement extends to subcontract personnel and consultants if they are involved with the design and conduct of research that utilizes human subjects. The details of the requirement are posted on the NIH Website at <<http://grants.nih.gov/grants/guide/notice-files/NOT-OD-00-039.html>>.

“This seems to be a response by the NIH to the gene therapy tragedy at Penn earlier this year,” Dr. David Litster, MIT’s vice president for Research, commented. “In addition, it’s important to note that the new regulations apply not only to research activities where there is direct contact with humans as subjects, but NIH also has explicitly included social science and behavioral research,” Dr. Litster said.

To implement the requirements of the NIH notice, MIT plans to develop a Web-based education and training program over the next several months, but in the interim, the Institute has adopted the training and education program developed by the University of Rochester.

deal of power, and faculty and other principal investigators need to respond proactively to the education requirements. Submission of proposals to NIH may be delayed pending successful completion of the University of Rochester course. We are investigating other ways to

**NIH also will require a letter with the proposal from principal investigators who use humans as subjects describing the education that each person working on the project has received. The letter must be countersigned by the authorized institutional official. For non-competitive renewal applications that involve human research, investigators must include a description of such education in their annual progress reports.**

According to Dr. Leigh Firn, chairman of MIT’s Committee on the Use of Humans as Experimental Subjects (COUHES), individuals may request a copy of the book on protecting research subjects directly from the MIT COUHES office (E23-230, phone 253-6787) and take the test in that book. Tests should be submitted to the COUHES office for scoring. Please note that this is a change from Provost Bob Brown’s 6/28/00 memo to NIH principal investigators, which indicated that the University of Rochester would do the scoring. Although there are wide differences between individuals, a reasonable estimate is that it would take 2-3 hours to read the text and complete the exam.

Dr. Litster also said, “The Public Health Service agencies have a great

comply with the education requirements in the future, but the Rochester course is the best way to comply on the short notice we have been given.”

Dr. Firn commented that it’s important to recognize that all individuals who work on NIH-funded research that uses humans as subjects or uses specimens or data from humans must pass the Rochester course in order to participate in such research activities. “We are confident that the MIT community will respond appropriately to these new requirements,” Dr. Firn said.

For further information, please contact the COUHES office at 253-6787.✦

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## Account Reconciliation in a Paperless Environment: New Guidelines for Financial Review and Control

Janet Sahlstrom

“*Plus ça change, plus c'est la même chose.*” With the electronic revolution bringing dramatic changes to every area of life, one wonders if even that old adage will itself change. In less than five years offices at MIT have become electronic workplaces. This is as true for faculty who propose, conduct, and report on research projects as it is for the administrative and support staff who monitor, reconcile, and report on faculty research project spending. Where there has been a paper trail, increasingly there is an electronic trail. In MIT's rapidly changing environment how does the responsible administrator comply with audit requirements and standards for faculty projects, especially where there may be strict rules relative to spending?

Recognizing the changing realities, MIT Controller Jim Morgan and Chuck Shaw from the Audit Division convened a team in spring 1999 to review existing procedures for reconciling cost objects (accounts), and to recommend new guidelines for financial review and control (FRC). The recent move to the electronic general ledger system SAP, with the resulting significant changes in MIT's financial systems, improved electronic controls, and the Institute's increasing reliance on electronic documentation made this project necessary.

The team included representatives from central offices, departments, laboratories and centers (DLCs), as well as participants from the Institute's Audit Division. Research on this issue clarified the fact that while government regulations specify that there must be a process to review activity on a federal grant or contract, there is no specific guidance as to how this must be done.

A survey of how other colleges and universities perform reconciliation of accounts revealed that only 3 of the 25 major research institutions surveyed require the line-item by line-item reconciliation that MIT requires. Within MIT there is also inconsistency among departments, labs, and centers as to how they reconcile their cost objects.

“It is my belief that MIT can improve its control process and reduce the effort by using the tools resulting from the

Coordinator Bob Davine, who has conducted training sessions for the pilot groups. “In 10 years technology has enabled us to do a simplified and streamlined financial review and control.”

The overall approach is to provide options allowing a paperless review for those who want to perform the review electronically, while accommodating those who choose to continue to use the existing paper-based system.

**A survey of how other colleges and universities perform reconciliation of accounts revealed that only 3 of the 25 major research institutions surveyed require the line-item by line-item reconciliation that MIT requires. . . . The overall approach [of the new procedures] is to provide options allowing a paperless review for those who want to perform the review electronically, while accommodating those who choose to continue to use the existing paper-based system.**

Financial Review Team's work,” commented Morgan.

### The New Procedures

The new financial review and control procedures allow for less paper retention. One physical reality in the office will be a reduced need for file storage space.

The new policies and procedures for performing the monthly financial review are being tested among pilot groups around the Institute. The new guidelines relate primarily to the month-end review process, and do not dramatically change the basic system of financial controls in place at the Institute.

“The last financial review policy was issued in 1990,” said School

There is now a choice of methods for performing the month-end financial review: on paper, online within SAP, through a set of queries developed for the Data Warehouse, or by a combination of these three methods. The electronic review allows the local administrator to review costs by accounts, by transaction type across several accounts, or for more than one month.

If a faculty member wants to review cryogenic costs on all research projects, for example, this can be done online using either SAP or a Data Warehouse report. Pilot users have agreed that they like this ability to get an overview of spending by category.

*(Continued on next page)*

## Account Reconciliation in a Paperless Environment

*Sahlstrom, from preceding page*

Financial review and control guidelines have been documented in an online manual available on the Web <<http://web.mit.edu/cao/www/FRC/>>. "MIT's Guidelines for Financial Review and Control" outline the new policies and procedures for performing the monthly financial review, and have been used as a reference manual during the pilot period. A quick guide, which describes suggested ongoing and statement related review procedures by transaction type, is also available through the same Website.

### Risk-Based Financial Review

The requirement for checking off detailed transactions line-item by line-item on printed detail transaction reports or accounting statements has been eliminated. The suggested approach is risk based. Transaction types where the risk of error or abuse is intrinsically high should be reviewed in detail, while transaction types where internal controls are extensive require less detailed review.

Robin Elices (ASO) and Gill Emmons (CAO), two members of the Financial Review and Control Team, stated that although the proposed procedures may not save time while the reviewing staff are still on a learning curve, the new process is designed to encourage a more comprehensive review. The new Financial Review should be faster and of a better quality because it focuses on the risk areas by size and type of transaction. "Under the old method, the procedures called for all of the detailed charges to be reviewed for an account, but did not address whether the account was overrun or underspent. We want our new procedures to focus the staff on an overall review and understanding of the account and why they are

performing these activities and not simply check off charges in a routine manner."

"Reviewers had been required to apply the same level of effort to every type of transaction, regardless of the potential for a real problem to be observed," said Institute Auditor Deborah Fisher. "In the audit profession we have found the concept of risk-based testing to be useful in reducing effort while improving controls. That is, we want to encourage reviewers to use risk analysis for controls, which will most likely result in the '80/20 rule,' freeing up the rest of their time to concentrate on real problems in addition to their other duties. It will be a goal of management to help reviewers understand how to employ these procedures."

Ron Hasseltine, assistant director of the Center for Materials Science and Engineering, comments that he likes "not having to save documents for those transactions where strong internal controls are built into the system."

While staff may choose to retain a wide variety of documentation for their own purposes, a DLC must retain documents only for those transactions where no copy is held within a central unit such as Accounts Payable, or for which no copy exists electronically. The only documents that must be retained within the DLC are packing slips (or other evidence of receipt), credit card receipts, time cards, and signed consolidated salary expense analysis sheets (DACCAs). The requirement for the "four way match" (invoices, packing slips, requisitions, and POs) has been eliminated. Most financial information is now available online and most audit trails can now be followed electronically.

### Training

A training program is being developed for Administrative Officers, Financial Administrators, and Administrative Assistants who will use these new procedures. It is being designed to convey the new concepts and recommended procedures and to demonstrate the electronic tools now available. As they learn to use these new tools staff will better understand how the system works and how to use the tools best to serve the faculty and their projects.

### Pilots

New policies and procedures for performing monthly financial review were tested during the summer through a series of pilots. Feedback from pilot groups, which were selected within each School and from an interdisciplinary laboratory as well as within the central units, will be incorporated into the procedures. A formal announcement of the new procedures will be made by Deborah Fisher and Jim Morgan for Institute-wide implementation.

Because the pilot efforts help assure that the new program meets the needs of the MIT community, the team is giving particular attention to whether or not the guidelines and the new methods behind the new, online procedures are clearly understood.

This is an evolving process, and new procedures will continue to be developed as needed in order to respond to the needs of the MIT community. If you would like to communicate your thoughts on these issues, or would like additional information or clarification, please contact Assistant Controller Gill Emmons at [gemmons@mit.edu](mailto:gemmons@mit.edu).♣

*[Janet Sahlstrom can be reached at [janets@mit.edu](mailto:janets@mit.edu)]*

## Who Owns Your Online Courses?

*Clay and Samuels, from Page 1*

*Media Creation Center (EMCC) staff, who design the Web-based platform. Who should own the intellectual property rights? What rights should Professors Lexington and Newton have, and what should be owned by MIT? Is the contribution made by the TA's and the (EMCC) staff considered part of their work assignments ("work for hire")? Finally, if a Web-based publishing company wants to commercialize this course, who should negotiate a deal? How should the resulting profits (if any) be distributed?*

The hypothetical cases described in this article (which are based on similar scenarios developed by the Association of American Universities [AAU] and Harvard-MIT Division of Health Sciences and Technology [HST]) are becoming more common as members of the faculty increasingly use educational technology, and particularly Web-based environments, as part of their courses. One of the most challenging questions that arises in this new environment is of the ownership of the intellectual property contained in these materials. MIT's policies reflect a tradition in which faculty members own the copyright in their textbooks and course materials. Given the role that technology now plays in the development and dissemination of course content does this understanding need to change in any way?

To address these issues, Provost Robert A. Brown has asked Associate Provost Phillip L. Clay to chair an *ad hoc* faculty committee to explore issues related to intellectual property for educational material and conflict of commitment. Members of the committee are Professors Hal Abelson, EECS; Randall Davis, EECS; Peter S. Donaldson, Literature; Steven R.

Lerman, Civil and Environmental Engineering; D. David Litster, vice president and dean for Research; Dava J. Newman, Aeronautics; Steven Pinker, Brain and Cognitive Science; Thomas M. Stoker, Applied Economics, Sloan School.

The charge to the committee is to develop a set of guiding principles that will address the following areas:

- *Faculty Commitment to MIT:* Implicit in faculty governance is the notion of a faculty member's

- *Faculty Dissemination of Scholarly Material:* A critical part of the academic enterprise is the control by the faculty of the dissemination of the products of their scholarly work. Any new principles must be consistent with this understanding. How has the new media changed the dissemination of the faculty's work and how would the principles be effected?

The Provost has asked the Committee to submit their report by December 2000.

**Traditionally MIT has exerted ownership over intellectual property created from research and only rarely done so in the arena of educational material. Ownership has been determined based on the use of MIT resources in the development of the intellectual property. What constitutes intellectual property in the arena of new educational technology and how should our principles apply in deciding whether the intellectual property was developed using Institute resources?**

commitment to MIT. What is that commitment and what constitutes a conflict of commitment in the new world of educational delivery?

- *Ownership of Intellectual Property:* Traditionally MIT has exerted ownership over intellectual property created from research and only rarely done so in the arena of educational material. Ownership has been determined based on the use of MIT resources in the development of the intellectual property. What constitutes intellectual property in the arena of new educational technology and how should our principles apply in deciding whether the intellectual property was developed using Institute resources?

### Case 2

*Stellar University has asked Professor Bedford to develop an Internet-based course in computation structures, which they intend to market to their alumni and corporate partners. The course, which will be based on Professor Bedford's highly successful MIT course, will be created using the facilities and staff of the Stellar University Learning Lab. In advertising the course, Stellar will note that Professor Bedford is a member of the MIT faculty. Stellar University offers Professor Bedford a "fee for service" payment or a royalty stake in the revenues generated by the*

*(Continued on next page)*

## Who Owns Your Online Courses?

*Clay and Samuels, from preceding page*

course. Would this arrangement pose a conflict of commitment for Professor Bedford?

Critical to the Committee's efforts to establish a set of principles is an ongoing discussion with the faculty. This edition of the *Faculty Newsletter* is the first step in a series of events designed to open and stimulate a conversation that will take place this fall. This article initiates that process by presenting a set of issues identified by the Committee during its preliminary work. We encourage you to consider the following list and send your comments and suggestions for additional ones to the Committee (ip-feedback@mit.edu).

### **Ad Hoc Committee on Intellectual Property**

Following is a summary of the charge to the faculty committee.

*Overall guiding principle* – How does MIT maintain an environment that cultivates individual creativity, entrepreneurship, and collaboration, while also enhancing the educational goals of the Institute?

*Context* – Existing policies and regulations define our current understanding of the ownership of intellectual property including scholarly works and educational materials. If we now assume an environment in which faculty are creating courses that make significant use of technology, what current policies must be reconsidered and what principles and practices will be needed to clarify rights in this new environment?

Current understandings that should be reconsidered in light of this new environment:

- The agreement that faculty members own the copyright in the scholarly works and educational

materials they author while at MIT is based on a traditional understanding between the Institute and the members of its faculty. These policies give faculty discretion and control over how their work is disseminated, including the freedom to make contractual agreements with third parties. Given the heightened role of technology in the creation and dissemination of knowledge should this agreement change in any way?

- How does MIT's policy on significant use of MIT resources apply to the questions of the creation of online courses? What should be considered significant use of MIT resources: computer-intensive applications such as streaming video and simulations, extensive utilization of the network (high bandwidth applications), hosting and maintaining large Websites, utilization of technical staff such as faculty liaisons and EMCC staff?

- The creation of online courses can involve a variety of stakeholders: the faculty who create the content; the TA's and technical developers/designers who design and enable content; and the internal and external funders. What principles should guide how the interests of the various stakeholders are managed?

- The digital environment is being used to market educational offerings by the commercial sector. Commercial interests sometimes attempt to use the MIT affiliation of faculty consultants to promote their products. What should MIT do to "protect its brand" in the digital environment? What principles are needed to provide guidance about the marketing of courses by MIT faculty?

- Conflict of Commitment – The digital revolution facilitates faculty

participation in education programs at other institutions, enabling faculty to be "present" in a variety of real and virtual ways. When does acceptance of these opportunities conflict with a faculty member's commitment to MIT? How should we define faculty commitment? What constitutes a conflict of commitment?

### **Case 3**

*As part of Sara Weston's assignments as a TA in Biology she has designed the Website, written problem sets and exams, and created simulations for the class. After graduation, Sara gets a job at another university where she is asked to teach a similar course. In addition, a company that markets end-user interfaces has asked her to sell them the rights to the Web design. Who owns the problem sets, exams, and Web design? What should Sara own, if anything? What should the supervising professor, the Department of Biology or MIT own? Should Sara be able to use these materials in her new course? Who should have the right to sell the web design to the private company?*

Please send your comments on the list of issues and these cases to the Ad Hoc Committee on Intellectual Property (ip-feedback@mit.edu).

Throughout the fall the Committee will sponsor forums to engage the faculty in discussions of these issues. You will receive notices of these forums and we encourage you to participate. We will continue to make relevant information available through the Faculty Resources page on the MIT Web <<http://web.mit.edu/faculty>>.✦

*[Phillip L. Clay can be reached at [plclay@mit.edu](mailto:plclay@mit.edu); Helen W. Samuels can be reached at [hwsamuel@mit.edu](mailto:hwsamuel@mit.edu)]*

# Academic Computing Resources for You and Your Students

Lee Ridgway

**A**cademic Computing at MIT provides a rich environment to promote varied uses of educational technology for teaching and learning. A robust infrastructure of facilities, systems, and services is in place to support a diverse spectrum of educational goals. For an overview and links to detailed information about Academic Computing, see <http://web.mit.edu/acs/>.

## Resources for Faculty

Academic Computing maintains the following resources to help faculty and their assistants understand and implement educational technology in their courses.

## People Who Can Help You

The Academic Computing Faculty Liaisons help faculty and other instructional staff use educational technology in their teaching. They will help you:

- get started learning about electronic educational media, the Athena computing environment, and the campus network (MITnet);
- find appropriate software for your courses;
- write courseware;
- create multimedia and hypermedia materials, including course Web pages.

Their expertise supports the use of computers and other technologies in teaching, including use of the Web and other network-based applications.

You can contact the Faculty Liaisons in the following ways:

*Home page:* <http://web.mit.edu/acs/fl.html>

*Offices:* N42 (211 Mass. Ave)

*Phone:* x3-0115

*E-mail:* [f\\_1@mit.edu](mailto:f_1@mit.edu)

## The Educational Media Creation Center (EMCC)

The EMCC helps the MIT community implement a wide variety of initiatives that require sustainable Web-based environments and other forms of educational media. The EMCC supports the design, production, maintenance, support, and assessment of Web-based educational materials, including multimedia components such as animation or video, and other tools for on-campus and distance learning. For more information, go to <http://web.mit.edu/emcc/>.

## Print and Web Resources

A new brochure, *Educational Computing Resources at MIT*, was recently mailed to all faculty. It outlines a variety of resources available on campus. For a Web version see <http://web.mit.edu/acs/instr-comp.html>.

The *Electronic Teaching Toolkit* at <http://web.mit.edu/faculty/ett> contains links to electronic resources that can assist faculty in preparing and conducting classes.

The *Academic Web Page Creation Guide* at <http://web.mit.edu/acs/webguide/> was developed to assist faculty and TAs in creating course Web pages.

*The Insider*, published three times a year with news from Academic Computing for faculty and TAs, may be received on paper or viewed online at <http://web.mit.edu/acs/insider>.

## Other Activities and Initiatives

Crosstalk, a forum sponsored by Academic Computing and the Dean of Students and Undergraduate Education, brings together interested faculty for discussions, presentations, and feedback to Information Systems on a variety of topics. For more information see <http://web.mit.edu/acs/crosstalk.html>.

Proposals for support of educational computing initiatives may be submitted to Academic Computing. Details are available at <http://web.mit.edu/acs/guidelines.html>.

An Institute-wide Council on Educational Technology, chaired by the Provost and another faculty member, has taken up the issues identified in the 1997 report of a previous, similar council. It is considering new strategic directions, evaluating opportunities, and fostering discussion of continuing programs.

## Athena Clusters, Tools, and Software

The Athena system is a centrally managed, scalable, secure campus-wide computing environment consisting of networked client workstations, servers, and printers available to MIT students and faculty to help them achieve their academic goals.

On campus, 17 general-purpose clusters house over 400 Unix workstations, while several departments and other facilities maintain their own clusters. Athena course tools include:

- electronic "course lockers" for storing course materials;
- electronic tools for delivering course materials, including Web pages, mailing lists, and conferencing systems;
- software for use by students and faculty in doing the actual work of the course;
- software for communication among students and between students and instructors;
- cross-cutting and specialized applications: ArcInfo, ArcView, FrameMaker, Mathematica, Matlab, Maple, Molecular Simulations, SAS, SPlus, Tecplot, and Xess;

*(Continued on next page)*

## Academic Computing Resources for You

*Ridgway, from preceding page*

- standard compilers, Web browsers, communication tools.

For links to detailed information, see the Athena home page at <http://web.mit.edu/is/athena>.

For a comprehensive list of Athena software, see *What Runs Where* at <http://web.mit.edu/acs/whereruns.html>.

### Classrooms and Other Facilities

Facilities for preparation and delivery of educational technology include:

- three fully electronic classrooms, with an Athena workstation at each desk;
- fourteen classrooms with an instructor's Athena workstation and projector;
- over 25 classrooms with an MITnet drop and projection for a carry-in computer;
- over 60 additional classrooms with an MITnet drop;
- two New Media Center facilities for preparing and teaching with multimedia.

For information on electronic classroom locations, equipment, and reservations, see <http://web.mit.edu/acs/eclassrooms.html>.

For information about the New Media Center facilities, see <http://web.mit.edu/nmc>.

### Resources for Students

To help MIT students use Athena successfully, Information Systems offers a comprehensive series of "minicourses" on a variety of Athena-related topics. These courses are scheduled frequently throughout the academic year.

During Orientation week, incoming freshman, graduate, and transfer students have the opportunity to attend four basic courses:

- Athena: The First Course
- Working on Athena: Files and Unix
- Word-Processing Options
- Math Software Overview

By offering these courses before classes start, new MIT students can become familiar with Athena before they receive their first problem sets and paper assignments.

During the year, IS schedules minicourses for all levels of users. Minicourses are held the first six weeks of each semester, the week after Thanksgiving and spring break, and during IAP. Days and times are Monday through Thursday at noon, 7 pm, and 8 pm. All sessions are in Room 3-343. No registration is necessary and minicourses are free.

We encourage you to remind your students to take advantage of this excellent opportunity to learn more about the computer system that will be part of their MIT experience.

Below is a listing and brief description of the minicourses. The two basic courses, Athena: The First Course, and Working on Athena, are suggested as pre-requisites for the other courses. [See the next page for the fall 2000 schedule.] Current and future schedules, and contact information for the Athena Training Group, are available at <http://web.mit.edu/minidev>.

### Athena Minicourses

*Athena: The First Course (First Course)*

An introduction to the Athena academic computing environment: what you can do on Athena, your account, finding help, and other basics. Also includes E-mail, Zephyr, WebSIS, and Residential Computing.

Suggested pre-requisite: None

*Working on Athena: Files and Unix (Working)*

Just the basics: files, directories, setting permissions, job control, and more. What every new user should know about Unix, Athena's operating system.

Suggested pre-requisite: First Course

*Word Processing Options: (WPO)*  
A survey of the text-editing and word-processing packages available on Athena: FrameMaker, LaTeX, EZ, Emacs. Pick the right tool for the right job.

*Advanced Word Processing: EZ (EZ)*  
Introduction to EZ, a combination text editor and formatter, with text-editing commands that are similar to Emacs. As a formatter, it is menu-driven and easy to learn, in the popular style of the "What You See Is (pretty much) What You Get" packages.

*Advanced Word Processing: FrameMaker (Frame)*

FrameMaker is a powerful word-processing and document preparation package now available on Athena.

*Advanced Word Processing: LaTeX (LaTeX)*

An introduction to Latex, a widely-used text formatter, used for converting a text file into an attractive, professional-looking document. It is a powerful and flexible program, with the capability to typeset many foreign characters and very complex mathematical text.

*Serious Emacs (SerEmacs)*

The text editor introduced in Basic Word Processing has many useful features not covered in that course. This course is a must for anyone who uses Emacs more than an hour or two each week.

Suggested pre-requisites: Emacs online tutorial, some Emacs experience

*(Continued on next page)*

## Academic Computing Resources for You

*Ridgway, from preceding page*

### *FrameMaker for Your Thesis (FrameThs)*

FrameMaker, with a special template, can be used to produce an MIT thesis that meets all Institute formatting requirements.

Suggested pre-requisites: Frame, some FrameMaker experience

### *LaTeX Thesis (LaTeXThs)*

Using the LaTeX text formatter to produce a fully-featured thesis that meets all MIT format requirements.

Suggested pre-requisites: LaTeX, some LaTeX experience

### *Math Software Overview (MSO)*

A survey of major mathematics and graphing packages available on Athena.

### *Matlab (Matlab)*

An interactive program for scientific and engineering numeric calculation. Applications include: matrix

manipulation, digital signal processing, and 3-dimensional graphics.

### *Maple (Maple)*

A mathematics program that can perform numerical and symbolic calculations, including formal and numerical integration, solving algebraic or transcendental systems and differential equations, and series expansion and matrix manipulation. It also has extensive graphics capabilities.

### *Xess (Xess)*

A powerful and easy-to-learn spreadsheet, with a full range of mathematical, statistical, matrix, and string functions. It will be useful for scientific and engineering computations, as well as for general and financial uses.

*Information Resources on Athena (Info Res)*

A survey of the communications, help, and other resources available on Athena.

### *HTML – Making a WWW Home Page (HTML)*

Covers the basic features of HTML (Hyper-Text Mark-up Language), the language of the World Wide Web, as well as the steps needed to post your own Web page on Athena.

### *Customization on Athena (Dotfiles)*

Intended for the intermediate-level Athena user, this course will discuss the Athena login sequence and the user-configuration files (dotfiles) that affect it, as well as changes users can make to those and other files to customize their working environment. Suggested pre-requisites: some Athena (or other X Windows) experience.♣

[Lee Ridgway can be reached at [ridgway@mit.edu](mailto:ridgway@mit.edu)]

## Athena Minicourses\*

	Mon		Tue		Wed		Thurs	
noon	Sept 11	Matlab	Sept 12	Matlab	Sept 13	Maple	Sept 14	Xess
7pm		MSO		MSO		Maple		Maple
8pm		Matlab		Matlab		Xess		Xess
noon	Sept 18	First	Sept 19	Working	Sept 20	First	Sept 21	Working
7pm		First		First		WPO		WPO
8pm		Working		Working		EZ		EZ
noon	Sept 25	Holiday	Sept 26	HTML	Sept 27	SerEmacs	Sept 28	Dotfiles
7pm		No classes		HTML		SerEmacs		SerEmacs
8pm				InfoRes		Dotfiles		Dotfiles
noon	Oct 2	Frame	Oct 3	FrameThs	Oct 4	LaTeX	Oct 5	LaTeXThs
7pm		Frame		Frame		LaTeX		LaTeX
8pm		FrameThs		FrameThs		LaTeXThs		LaTeXThs
noon	Oct 9	Holiday	Oct 10	Holiday	Oct 11	First	Oct 12	Working
7pm		No class		No classes		First		WPO
8pm						Working		MSO
noon	Oct 16	Dotfiles	Oct 17	HTML	Oct 18	SerEmacs	Oct 19	First
7pm		Dotfiles		HTML		Frame		First
8pm		SerEmacs		SerEmacs		LaTeX		Working

\*All minicourses are presented in Room 3-343; Athena® is a registered trademark of the Massachusetts Institute of Technology.

## New Environmental, Health, and Safety Team Formed

Janet Snover

All of the MIT offices charged with providing services and oversight to the MIT community on Environmental, Health, and Safety (EHS) issues have been reorganized into a single EHS team reporting to MIT's Managing Director for Environmental Programs and Risk Management and Senior Counsel Jamie Lewis Keith. The reason for consolidating the offices is to provide improved service to MIT clients and to create clearer accountability than was possible under a more fragmented organization. EHS service can now be obtained by calling a single number: x2-EHSS. (You can continue to reach your EHS contacts by their individual extensions as well.)

### Which offices are involved?

The EHS team is composed of the following three offices:

1) the new **Environmental Management Office (EMO)**, which includes former staff of the Safety Office who provide hazardous waste services and deal with environmental compliance and hazardous materials. (The EMO was created to raise responsibility for environmental matters to an equal level with health and safety issues.)

2) the **Safety Office**, which will concentrate on fire safety, accident prevention, and emergency response, as well as confined space rescue, pressure vessels, and miscellaneous safety concerns; and

3) the **Environmental Medical Service (EMS)**, which will continue to manage environmental health and safety concerns involving industrial hygiene, biosafety, and radiation protection.

These three offices are now operating as the EHS team under Ms.

Keith's Environmental Programs Office. The team provides service and has oversight for every EHS regulatory program that governs MIT's work. Primary responsibility for good management, including compliance, remains in the labs, centers, and departments in order to preserve their independence.

Executive Vice President John R. Curry said that this consolidation is part of a continuing effort to bring together and align closely related activities and to clarify who is responsible for what.

In the past, these offices had overlapping responsibilities and shared jurisdiction as well as different reporting structures. This, combined with the absence of a single manager with overall EHS authority, had created some confusion for departments, labs, and centers as well as inadequate accountability of these services.

Now, the EHS team has assigned service and oversight responsibility for every EHS regulatory program that governs MIT's work to a single position within one of the three offices. In addition, the appropriate EHS team members will represent MIT in dealing with regulatory authorities.

Our wide range of research programs means that the Institute must comply with many more regulations than most other universities face. And as principal investigators know, the number and the complexity of these regulations have been growing steadily. Two years ago, the Environmental Protection Agency (EPA) inspected about 25 percent of MIT's labs and research centers and noted that the Institute did not have a clear delineation of roles, responsibilities,

and accountability for compliance. Nor was there a centralized management system or organization.

EPA will be requiring MIT to implement an EHS management system. "Our challenge will be in designing an EHS management system that both works for MIT by preserving the independence and responsibility of labs, centers, and departments, and that satisfies EPA's requirement for clearer overall management and accountability," Ms. Keith said.

In order to avoid EPA requiring MIT to hire an accounting firm to impose a commercially focused off-the-shelf management system that won't work at MIT, Ms. Keith wants to work with the MIT community to design a system that reflects a balance of local control and central service and oversight.

The comprehensive EHS management system will integrate three key components: compliance, positive initiatives, and education. To meet this challenge, Ms. Keith and the EHS team will work closely with representatives of the faculty, researchers, administrative departments, and students to ensure that the system functions well for the laboratories, research centers, and departments it is intended to serve. The Provost and the Vice President and Dean for Research are working with Ms. Keith on effective ways to involve faculty in this initiative.

EHS team members also will work with MIT's Environmental Programs Task Force on positive initiatives and with the Green Building Task Force on the development of sustainable building guidelines. The Environmental Programs Task Force is a group

*(Continued on next page)*

## New Environmental, Health, and Safety Team Formed

*Snover, from preceding page*

of volunteers from across MIT, including students, which was convened by Ms. Keith last fall. So far, the group has made significant progress on helping to increase both recycling and the purchasing of “green” products at the Institute. The Green Building Task Force was formed by Ms. Keith and Director of Facilities Victoria Sirianni in January, and it includes Professors Leon Glicksman and Leslie Norford.

### New EHS phone number – x2-EHSS

The single phone number to call for environmental health and safety services – x2-EHSS – will relieve the community of the burden of figuring out which office within the EHS team has responsibility for any particular issue.

“The number one priority in this reorganization is client service,” Ms.

Keith has said. “For example, with EHS’s cross-training initiative and consolidation of legally mandated regulatory training programs in EHS issues over the coming year, every lab visit made and every training program offered by the team will provide service and assistance on a full range of environmental health and safety issues,” she said. “It will be the EHS team’s job, not the MIT community’s responsibility, to find the right person for assistance on any EHS issue.”

### EHS Leaders

**Gerald Diaz** will continue to direct the Safety Office. **William Van Schalkwyk**, formerly deputy director of the Safety Office and environmental compliance manager, is now director of the Environmental Management Office. **Lou DiBerardinis** is director of operations and administration at

EMS, as well as continuing his role as Institute industrial hygiene officer. He is responsible for all EMS services, staff, and resources. **Dr. Robert McCunney** is EMS’s director for occupational medicine, policy, and education, coordinating efforts in those three areas. He and Dr. David Diamond, an MIT Medical physician, will continue to see faculty and staff who need occupational and/or environmental medicine evaluations at MIT Medical.

Faculty members who have questions about the reorganization or who have comments about the development of the EHS management system may contact Jamie Keith or Bill Van Schalkwyk at 452-2082 or send email to billv@mit.edu.✦

*[Janet Snover can be reached at jsnover@mit.edu]*

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## Since You've Been Gone . . .

**H**ere are some administrative news items that were announced over the summer (and the issue of *Tech Talk* where you can read more about them <<http://web.mit.edu/newsoffice/tt/>>).

- Dr. William Kettle was named Medical Director of MIT Medical, effective August 1, 2000. Dr. Kettle replaces Dr. Arnold Weinberg, who retired this summer after 14 years as Medical Director. (*Tech Talk*, 8/23/00 and 7/12/00)

- MediaLab Europe held opening ceremonies in late July in Dublin, Ireland. (8/9/00)

- Plans for a new 400-unit residence hall for graduate students at Sidney and Pacific streets were unveiled at an MIT-sponsored meeting in July in Cambridgeport. (8/9/00)

- The Cambridge-MIT Institute (CMI) became official in July as President Charles Vest, Chancellor Lawrence Bacow, and CMI Director Professor John Vander Sande signed the agreement negotiated among MIT, Cambridge University, and the UK government. (8/9/00)

- Larry G. Benedict, dean for Student Affairs at Johns Hopkins University’s main campus since 1992, was named MIT’s Dean for Student Life, effective August 21. (7/12/00)

- The Office of the Dean of Students and Undergraduate Education (ODSUE) has been restructured into two new organizations, the Office of the Dean for Undergraduate Education (DUE) and the Office of the Dean for Student Life (DSL). (7/12/00)

- Dr. John C. Crowley, Special Assistant to the President and Director of the MIT Washington Office, was promoted to Vice President for Federal Relations, effective July 1. (7/12/00)

- Since the beginning of MIT’s expanded recycling program last December, MIT’s recycling rate has grown from 5 percent to just under 17 percent of its total waste (April figure). Purchasing of recycled products, particularly paper, also is growing as some of the largest buyers have switched from virgin to recycled stock. (7/12/00)

- Effective this month, MIT boosted the subsidy for employees and students who purchase MBTA passes and raised the regular commuter parking fee by \$30 to \$390. (7/12/00)

## Student Leaders Report

### Undergraduate Association

#### **The Name of Education**

Peter Shulman

Last semester, I engaged in what became a heated discussion with a very respected professor about the importance of learning the names of his students. It began as a casual discussion regarding potential changes to the freshman year. We tossed around several radical alterations of the system (which had somehow been presupposed as necessary) when I made the offhand comment that perhaps undergraduates would become more invested in the educational process if their professors would simply learn their names. I did not expect this to be a particularly controversial point, but this comment was met with an incredulous, “Why should that matter?”

The irony of this entire exchange was that this particular professor was one I could always rely upon to flash a warm smile and a wave when we passed in the Infinite Corridor. But the conversation revealed a wide disparity in perspectives regarding the boundaries of the educational process. For him, or at least according to his argument, the classroom was ideally a venue of anonymous information exchange; having completed and digested the previous night’s lesson, the students now listen to their professor lecture at the blackboard, receiving knowledge as a vessel receives water – passively. According to this model, the deep fountain of knowledge amassed by the professional is transferred in the classroom to the student.

As a student, I cannot emphasize enough how strongly sociological and psychological forces enter into the educational process. I do not purport to have discovered either the causes or solutions for students sleeping in class. Nor am I suggesting that fault somehow lies with either professors or students at all – these phenomena exist, and it is our responsibility as members of the MIT community to fix them. (Though I regret that we students will continue to fall asleep probably despite any possible change – this is usually a reflection of attending one of the most demanding and rewarding educational institutions in the world.)

That different fundamental attitudes towards education exist has already been recognized by both faculty and students. Last semester, the Student Committee on Educational Policy (SCEP), a committee of the Undergraduate Association, chartered a group to investigate the current state of faculty-student relations, with an eye

*(Continued on next page)*

### Graduate Student Council

#### **Graduate Students in the New Millennium**

Soulaymane Kachani

A new millennium with a constantly changing mindset. This is the challenge faced by undergraduate and graduate students alike. True.

In most respects, graduate students’ needs and ambitions, however, differ greatly from their undergraduate counterparts. The Graduate Student Council (GSC), the closest link for the bulk of 5,700 graduate students, identifies and brings to the fore most of these demands by identifying the needs and setting up the foundations to help graduate students achieve and satisfy those needs. With the assistance of the MIT administration, the GSC helps the Institute better guide graduate students.

However, given the rapidly evolving world, adapting to those needs has to be a collective effort. Along with the main administrative sections, faculty have a big role to play in helping and assisting the graduate students achieve those targets.

Sampling a set of graduate students reveals a series of common beliefs and ambitions: Coming to graduate school, especially to a highly prestigious one like MIT, is a means of enabling them to gain a greater thrust in propelling them in their future careers. Most of the students look for quick throughput, to enable them to begin their careers early.

A comparison of students graduating from grad school over the last decade indicates that what was generally termed alternative careers in the past, are now main stream career options for most graduate students. The reason is simple: With the New Economy (startups and venture capitalists) fueling growth across the world, there is an ever-increasing demand for talented individuals with a wide scope. Industries such as finance and consulting are in a constant hunt for such people. Given the high remuneration, it is no surprise that most graduates opt for the so-called “alternative” path.

Students keen to jump on the bandwagon look for ways to add value to themselves. This is evidenced by the large demand for places in Sloan School courses, increasing interest in the TPP (Technology and Policy Program), and demand for interdisciplinary research. Essentially, it is about learning other technical fields, participating in courses outside their departments, and learning about the business

*(Continued on Page 31)*

## The Name of Education

*Shulman, from preceding page*

towards how to improve them for the future. What has already been found reflects deeply ingrained habits of the MIT educational system; among them: (a) few undergraduates have any sort of relationship with their formal faculty department advisors beyond receiving the proper signatures on Registration Day; (b) many students have no relationships with faculty at all; and (c) while faculty members regularly announce their office hours, often few students appear (including those whose academic performance would suggest that such meetings would be beneficial). Undoubtedly, several variables interact to produce these situations, but it is undeniable that something is broken somewhere. We find ourselves living in several MITs simultaneously: the MIT as experienced by the faculty, the undergraduate community, the graduate community, the administration, the staff. Of course, these communities serve different roles at the Institute, but little exists now to make use of the very large potential for overlap; in the case of faculty and students, this will come from a recognition that the responsibilities of learning and teaching extend beyond the few hours of classroom time each week.

There is one week in the term that far surpasses every other in importance. This is the one week when no problem sets are due, no papers are turned in, and the grade books remain empty. This is the first week in the semester, when the relationships between teacher and student, and individuals to group have yet to be formed. This is the primordial stage of social genesis – the moment during which at least 50 percent of the class is thinking, “Is this going to be the first class to go when sleep-deprivation sets in?” This is the moment when an exchange of names

constitutes an assumption of responsibility – responsibility to answer to that name. For a classroom, that is the responsibility to attend in the first place, but it will also manifest in the desire and the will to devote oneself fully to education.

The pursuit of a grade for a grade’s sake will forever remain as the dangling carrot in front of the starving donkey – external motivation. The donkey proceeds forward not because

conditioned us to desire that grade, that GPA, that portfolio that will neatly sum up the depths of our knowledge so as to permit us to continue our educations, our careers, our lives. This is life as defined by a resume.

But subject to an internal motivation, an example of philosopher Martin Buber’s authentic relationship between a student and a teacher, both student and teacher proceed because that is their responsibility – a

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he chooses to, but because the carrot is presented as the easiest way, and perhaps the only way, to satisfy his hunger. The presence of the carrot is so overwhelming, he does not notice the far larger pile of carrots underneath his hooves. . . .

Every semester yields the same frustrating experience for faculty – those perennial e-mails from students: “What grade do I need on the final to pass this class?” or “What is the dividing line between B+ and A-?” These questions exist because the goal for many of us is the grade itself. These questions offend professors because they reveal the motivation of students as not residing in actually learning as much of the course’s material as possible. But of course, our entire educational system has

responsibility to learn out of interest in the material. This responsibility grows from a sense of interest and expectation cultivated by the teacher. This is the responsibility to answer to a name.

Let’s face it – there are just a lot of people around and it’s hard to remember everyone’s name. Sometimes it’s just a temporary mental glitch – if only I had a nickel for every time I remembered someone’s name after we’d passed in the hall. . . . But speaking a name may be the first step in changing the course of a student’s life, the beginning of a new approach to the course’s material, or at the very least, a guaranteed way of developing the relationships between students and faculty.♣

*[Peter Shulman can be reached at skip@mit.edu]*

## Graduate Students in the New Millennium

*Kachani, from Page 31*

environment. The result is that increasingly students spend less time on their main research. Furthermore, students are looking to graduate quickly so that they can engage in the New Economy.

Student lifestyles have also evolved a great deal. Nowadays, graduate students are more extroverted, looking to engage in a host of extracurricular activities. These serve as networking and socializing sessions, also demanding time out of their labs.

Even selecting the appropriate school is no longer simply based on prestige. It is about a having a healthy stipend, convenient and comfortable accommodations, a vibrant social life, and the ability to network and interact with future trendsetters. Students who come to graduate school at MIT are fully aware of the other opportunities that are available to them. The choice of their preferred graduate school boils down to a few important issues. Quality of life, added value, work/study environment, intellectual stimulation, etc. Other universities with reputable graduate schools (such as Stanford and Northwestern) offer higher stipends and better standards of living. That is why these schools continue to attract more and more bright students. It also has to be remembered that students opt to attend graduate school at the expense of working in industry. It is easy for students to drop out, if things do not go their way in graduate school.

The announcement of the building of the new graduate dorm at Sidney/Pacific is a positive step in showing MIT's commitment towards improving the housing situation faced by graduate students. However, a great deal of perseverance and collective effort will be required to see this project through to the end. Similarly, the quick completion of the new athletic facility will help improve MIT's image of offering students more facilities outside of the laboratory.

Preparing students to face the outside world is one of the issues in which the GSC is directly involved. Through its committee on Academics, Research and Careers, the GSC organizes a series of Professional Development Seminars (PDS) aimed at

highlighting the current career trends, identifying the career choices available, and discussing the skills required for various fields. In addition, the GSC organizes the annual graduate career fair at MIT in an effort to bring together employers and students under one roof. This has proven to be a great service for graduate students with last year's event attracting over 2000 graduate students and 270 companies. This year's career fair will take place on the 28<sup>th</sup> and 29<sup>th</sup> of September.

The need for the GSC to organize these events stems from the fact that there are no staff members at MIT fully dedicated to catering for graduate students and their career needs. This is a rather surprising and disappointing situation, given that graduate students constitute more than half the student population, yet lack administrative support in certain critical areas.

It has to be acknowledged that the Office of Career Services and Pre-professional Advising (OCSPA) had proposed changes to the existing setup in order to accommodate graduate student needs as well. This, however, failed to gain support from the MIT administration. In the meantime, OCSPA leadership has gone out of their way to redress this situation by providing the GSC advice on PDS and logistic support with the career fair. Unfortunately, this is by no means sufficient, and hopefully the current status can be rectified through the recommendation of the Presidential Career Working Group, instituted by President Vest and the GSC, to quantify, during fall 2000, the career needs of graduate students in terms of budget and staff.

The GSC has also been instrumental in initiating a seminar series aimed at incoming graduate students. Entitled Grad School 101 and moderated by Dr. Ike Colbert, dean for Graduate Students and Professor Steve Lerman, chair of the faculty, the series of five sessions will address some of the critical issues facing incoming graduate students. We strongly recommend new graduate students attend these seminars and your assistance in

informing them about them will be most appreciated.

It has to be understood that it is the graduate students who help the faculty to build the image of MIT. That is why attracting them is important. From the GSC's perspective, attracting the best and the brightest graduate students to MIT will be a challenge in the coming years, if it's not already. Graduate students now look for those details mentioned above in making their choice. One of the things that will help improve the standard of living is having decent and affordable housing options close to campus. Another is supplementing the stipend by subsidizing health and even dental insurance, similar to that offered to employees of MIT.

An issue that tingles in the mind of many continuing graduate students is their funding status. This determines if the student can continue with his/her work or requires additional sources of funding. Some sort of transparency whereby the students are aware well ahead of time about the availability of funding or lack thereof will be helpful. While some departments do have channels for identifying such positions well ahead of time, many do not. Lacking also is a clear Institute-wide policy of making the funding situation transparent. The GSC will look to working closely with the Dean for Graduate Students, the Chair of the Faculty, the Faculty Policy Committee (FPC) and the Committee on Graduate School Policy (CGSP) towards achieving some sort of transparency.

All in all, there is a fair bit of work to be done in order to make the graduate experience at MIT truly enjoyable and in line with some of the other competitor schools. Some courage on the part of the faculty in understanding the demands and needs of the new-generation graduate student will go a long way towards achieving that goal. I invite you to help MIT keep up with its tradition of being at the cutting edge!❖

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## M.I.T. Numbers

## Construction Cost Estimates for Imminent Capital Projects

[See Construction on Campus, Page 15]

	<b>Estimated Construction Costs</b>
<b>(1) Campus Life Facilities</b>	<b>\$ 164,400,000</b>
Undergraduate Student Residence on Vassar Street	
Sports and Fitness Center	
Graduate Student Residence at 224 Albany Street (Building NW30)	
Graduate Residence at Sidney and Pacific Streets	
<b>(2) Instruction and Research Facilities</b>	<b>\$ 284,800,000</b>
Dreyfus Chemistry Building (Building 18)	
Ray and Maria Stata Center for Computer, Information and Intelligence Sciences	
Media Lab Expansion	
<b>(3) Related Utility Relocations and Landscape Projects</b>	<b>\$ 14,900,000</b>

**Note:** Costs are estimates prior to construction bids.

**Sources:** *Office of Budget and Financial Planning*  
*Department of Facilities*  
*Real Estate Office*