

The MIT Faculty Newsletter

Vol. XII No. 2

November/December 1999

Interview with Executive Vice President John R. Curry

The following Faculty Newsletter (FNL) interview with John Curry (CURRY) took place on September 23, 1999.

FNL: There's a perception at MIT that there has been a diminution in the quality of life. Years ago, the faculty had \$800 towards travel to a scientific meeting once a year. That's disappeared. We once had free parking on campus. There was a slight fee and it increased at one point, but now the subsidy has essentially disappeared. It was once easy to find a parking space. Now if you go away in the middle of the day and come back, forget about it. There's some perception that building services have not been quite as good as they used to be. Some of this comes under facilities and services, all of whose people report to you. So we wonder two things. One, what's your general read on this perception? Of course, you don't have the history here, so it's hard for you to make a comparison. And two, to what extent does the quality of life of the faculty enter into your decision-making process?

CURRY: It's got to be critical to that process in many ways. I have to think broadly as well about the quality of life for our staff and students on the campus, and how what we do affects that. I have learned as much history as I could absorb in my 10 months here and can't speak very well for how the past was. I think we have some work ahead of us to improve the overall look and cleanliness of the campus. And parking is a tough issue. Our operating context is the City of Cambridge, and I am just coming to understand

(Continued on Page 7)

Annals of Reengineering

Reengineering is Over But Change is Not

Janet Snover

MIT's Reengineering Project – with capital letters on the “R” and the “P” – technically ended June 30, 1999. The *Faculty Newsletter* has asked me to write about whether Reengineering was a success, a failure, or something in between. I worked on the Project for its last several years as the head of the Community Involvement team and have written regularly about Reengineering for this and other campus publications.

My personal view is that although MIT's Reengineering effort accomplished some critical work in improving administrative processes, we were not able to achieve all of the Project goals. I think it's safe to say that everything MIT tried to do in the Reengineering effort was harder and took longer than anticipated. And even though Reengineering is over, MIT is still very much in transition. Tools such as SAP have not been easy to use, and the learning curve has been steep. In fact, some administrators would probably tell you they have more work now than they did before Reengineering began. But it's also important to note that the various tools initially provided by Reengineering continue to improve, and staff throughout the Institute are becoming more adept at utilizing them.

There is certainly more to be done to simplify and improve the quality of administrative procedures at MIT and some of that work, such as in Financial Systems Services (FSS) and in the human resources area, continues.

(Continued on Page 18)

From The Faculty Chair — Page 4

d'Arbeloff Fund: Call for Proposals — Page 16

A Day in the Life of CAES — Page 28

MIT at Crossroads — Page 32

Y2K Team: The Horseless Carriage — Page 34

Also: Letters; M.I.T. Numbers

Contents — Page 2



MIT Faculty Newsletter

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Managing Editor

Address: MIT Faculty Newsletter, Bldg. N52-419a
Cambridge, MA 02139; (617) 253-7303.

E-Mail: fnl@mit.edu.

FAX: 617-253-0458

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

Subscriptions: \$15/year On-Campus
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Contents

Interview with Executive Vice President John R. Curry	1
<u>Annals of Reengineering</u> Reengineering is Over But Change is Not	1
<u>Editorial</u> You're O.K. We're ???	3
<u>From The Faculty Chair</u> Partnerships and Faculty Governance	4
<u>The d'Arbeloff Fund</u> Improving the First-Year Experience at MIT: A Call for Preliminary Proposals	16
A Week in the Life of CAES (Center for Advanced Educational Services)	28
<u>Letters</u> Engineering Systems; Feedback; Your Wonderful Meditations Article; A Sore Thing	30
MIT at Crossroads Over Housing Decision	32
<u>The Year 2000 Team</u> The Horseless Carriage Revisited	34
M.I.T. Numbers	36

Authors

Peggy Enders is Associate Dean and Co-Director, Office of Academic Services.

Richard C. Larson is Professor of Electrical Engineering; Director, Center for Advanced Educational Services.

Steven R. Lerman is Professor of Civil and Environmental Engineering; Faculty Chair.

David Pooley is a graduate student, Course 8; Member, MIT Choice.

Helen Samuels is Staff to the MIT Council on Educational Technology.

Janet Snover is Special Assistant to the Executive Vice President.

Gayle C. Willman is a member of MIT's Y2K Team.

Editorial

You're O.K. We're ???

We're beginning to hit our stride. This issue of the *Faculty Newsletter* exemplifies almost everything we hoped to achieve when we started the *Newsletter*. We have an interview with an important new member of the administration regarding matters that will affect the Institute (p. 1): an informal, collegial conversation that presents new information and clearly invites further discussion. We have a very thoughtful analysis of the controversial Reengineering Project by someone who had a key overview of the whole project (p. 1). This will probably not be the last word on this topic.

The Faculty Chair (p. 4) has room for a discussion of the impacts of large-scale Partnership arrangements on the mission and culture of the Institute. He bruits a proposal of a new committee to structure and monitor future partnership agreements. The proposal is at an early enough stage that concerned faculty can bring their comments to the Faculty Policy Committee before the committee is charged and staffed. We've got a report by one of our colleagues (Richard Larson, in this case) on something he thinks will be of interest to us (p. 28). We have a student using the FNL as a medium to reach the faculty on an issue of interest to him (p. 32). At last, our Letters section (p. 30) is becoming seen as a useful forum for debate and "correction" on a smaller scale than article length, as well as an easy way to bring matters to

broader attention. Where else can you gripe about the photocopiers in our libraries and have a reasonable chance to achieve at least sympathy, and possibly even improvement?

There's more in this issue and more that was squeezed out for lack of room. Teach Talk, a very popular series on the art of teaching, will reappear in the next issue. We can't predict the occasional essay, travel report, poem, or rant. We print them when we get them, and our colleagues are generally very appreciative.

There's also more than meets the eye, at least in hard copy. The FNL now appears on-line simultaneously with hard-copy distribution: <<http://web.mit.edu/fnl>>. The on-line issue often has expanded content, via links to original sources and data. We have also archived the FNL, with all issues back to September 1991 on-line. Issues dated May/June 1991 and earlier are available in hard-copy and soon to be on-line as well.

We have unfinished matters. We need to broaden, or at least turn over, membership of our Editorial Board while maintaining the open access voluntary nature of the Board. We have to find a way to attract more unsolicited articles. We'd really like to get a contributing artist or two. All in all, however, we think the work we put into the FNL is well worth the effort, and we think we have shown that our unique form of governance really works. Now we need to know if you agree. We're conducting a survey of the faculty, with responses solicited

either by e-mail or on our Website: <http://tute.mit.edu/fnl/www/faculty_survey.html>. A general e-mail distribution to the faculty will come your way in a few days. Please respond: it may be spam, but at least it's not about money or sex. Both the e-mail and Website will invite detailed comments. We have two goals for the survey. The first is to demonstrate, if we can, that the FNL makes a measurable contribution to the Institute. The second is to tap the faculty for good ideas.

Finally, we can not resist the temptation to remind you that the most certain way to change the *Faculty Newsletter* is to do it yourself. Contribute an article or join the Board. You'll be among friends.♣

Editorial Committee

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CUP Requested Report Now Available

The July, 1999 Report from the HASS (Humanities, Arts and Social Sciences) Overview Committee requested by the CUP (Committee on the Undergraduate Program) is available on the HASS Office Website, at: <<http://web.mit.edu/hass/review/>>.♣

From The Faculty Chair

Partnerships and Faculty Governance

Steven R. Lerman

What do Amgen, Dupont, Ford, Singapore, Microsoft, Nippon Telegraph and Telephone, Cambridge University, Merrill Lynch, and Merck have in common? The answer is, us. Each of these organizations has signed either a memorandum of understanding or a contract to form a major alliance with MIT. These alliances differ in various ways, but they all fund a variety of research and educational initiatives. Our ties to Microsoft and Cambridge University were announced this academic year, and it is safe to assume that there will be more such agreements in the future.

These new relationships differ from “business as usual” for MIT in several ways:

- *scale* – They are large scale, multi-year relationships, generally on the order of \$5 million per year or, in some cases, considerably more. While we have had research funding from governmental sources of this scale (and larger) in the past, most of our earlier industry and foreign funding has been much smaller.

- *external visibility* – Each relationship links us with a partner in a way that is highly visible.

- *senior administration involvement* – Each involved substantial work of the senior administration, and many were first initiated by the administration. This contrasts with traditional research funding from sources such as NSF, which is granted through peer review of proposals from individual or small groups of faculty.

- *confidential negotiations* – Our industrial and governmental partners in these new relationships generally want their negotiations with us to be

confidential before an agreement (or at least a memorandum of understanding) is finalized. They are understandably concerned that the publicity of a more public negotiation would be difficult to manage and might make reaching any agreement with MIT impossible. Our partners often face sensitive political issues that must be carefully handled and that could not be realistically dealt with in a public negotiation.

In the past, MIT has entered into agreements with other organizations where some of the above has been true. The large number of recent agreements in which virtually *all* of these issues have been important, signals the emergence of a new model of research funding, called strategic partnerships. We at MIT have, in fact, invented a distinct, new mode for supporting our core mission of education and research.

But having invented something new, we, as a faculty, need to understand the rewards and risks of strategic partnerships, and, as importantly, invent the appropriate governance mechanisms that maximize the benefits and minimize the risks.

Let me begin with the obvious benefits of strategic partnerships. In an era of flat, or in many fields declining, research support, strategic partnerships offer an infusion of stable, large-scale funding. When appropriately constructed, these relationships can engage us in important new areas of inquiry that might otherwise languish. The truth is that research is expensive, and without funding it often cannot be done.

In addition, there are considerable benefits in diversifying our funding

sources. Any system totally dependent on support from a single source – the U.S. government – is arguably unstable. It is unlikely that there will come a time when our government isn’t the single largest source of funding for on-campus research. However, with some imagination, one can envision a future in which as much as half of on-campus research comes from a wide range of other sources. In my view, as long as our contractual relationships with these other sources are consonant with our core values as an educational institution, a more diversified set of sources would be far better than our current over-dependence on the federal treasury.

Beyond the sheer monetary advantages of these partnerships, they offer the potential for working on new problems of real relevance to society. Corporations are the means by which discoveries and innovations are migrated from interesting science to affordable products and services. This is how new drug treatments become actual pharmaceutical products and how electronics innovations become new computers and communications technologies. Working collaboratively on long-term ideas with industrial partners can accelerate this process of adoption of innovations. Our industrial partners can provide real-world examples of product design and diffusion that can enhance the quality of our educational programs.

Our partnerships with foreign universities and the governmental sponsors of those relationships reflect the globalization of knowledge and research. These relationships offer our faculty and students real experience

(Continued on next page)

Partnerships and Faculty Governance

Lerman, from preceding page

with different places and cultures that would be difficult to obtain otherwise. The Cambridge University partnership, for example, will offer as many as 50 MIT undergraduates the opportunity to study at Cambridge each year. Most of the agreements involve informal exchange of visits and, in some cases, deep engagement of our faculty and students with counterparts in our partners' organizations.

The risk side of strategic partnerships is more complicated. By its very nature, industry wants to see measurable benefits from its expenditures. Funding research at MIT requires those companies to sustain a long-term view of such benefits. As an institution, we are not, and should not be, set up to respond to quarterly or annual profit measurements or rate of return calculations.

Our tradition of publicly disseminating new discoveries is integral to our mission and culture. Any relationship that undermines this core value threatens the very nature of the research university. Our current agreements with our strategic partners reflect this by ensuring complete rights to publish our work and disseminate it widely. However, in the future there may arise forces that require us to be vigilant in sustaining that tradition.

The need for these relationships to be negotiated in relative secrecy poses yet another threat. MIT makes decisions through a complicated balance between administrative leadership and consultation with the faculty. We, the faculty, have traditionally accepted that the senior administration should have the authority and flexibility needed to move the university in directions that serve our long-term interests. In turn, the senior administration historically

engages the faculty in serious discussion whenever major decisions are being made. This careful, and largely implicit, balance of powers has served us well, and the occasional faculty-administration disputes that have arisen have almost always come about when this social contract was violated.

Still another potential side effect of strategic partnerships, is that the faculty's involvement in them may take time away from other activities, particularly ones focused on our current base of residential students. Faculty time is our scarcest resource,

membership on the Academic Council) and circumspect discussions with small groups of faculty who are directly involved in the partnerships. Our more open style of consultation in the regular faculty committee structure or in open debates at faculty meetings won't work particularly well in creating strategic partnerships. We need a new governance mechanism that strikes a reasonable and realistic balance between the need for confidentiality in the early phases of partnership formation and the legitimate role of consultation with the faculty in major decisions.

The risk side of strategic partnerships is more complicated. By its very nature, industry wants to see measurable benefits from its expenditures. Funding research at MIT requires those companies to sustain a long-term view of such benefits. As an institution, we are not, and should not be, set up to respond to quarterly or annual profit measurements or rate of return calculations.

and we should make sure it is being dedicated to activities that best serve our mission. Some partnerships may actually free up faculty time by reducing the resources we put into seeking funding from other sources; others may divert attention from our core mission. We need to judge each one separately on its individual merits.

It is clear (at least to me) that negotiation of major strategic partnerships will require a somewhat different model of faculty-administration balance. Generally, these agreements reach the faculty as "done deals" rather than as "works in progress," with consultations limited to the chair of the faculty (through

I have discussed this issue extensively with members of the senior administration, and they agree that we need to build a better way of engaging the faculty in these partnerships before they are finalized. I propose we do this by creating a subcommittee of the Faculty Policy Committee that would be part of any negotiation process involving strategic partnerships. The group would operate as follows:

- The subcommittee would be appointed by the chair of the faculty and would consist of both members of the Faculty Policy Committee and other senior faculty members.

- Once formed, the subcommittee would develop a statement of principles

(Continued on next page)

Partnerships and Faculty Governance

Lerman, from preceding page

to guide the formation of future partnerships. This would be done in an open process and would involve both graduate and undergraduate student representatives. The subcommittee would seek views of the entire community and present the resulting principles to the faculty as a whole.

- When a negotiation with a new, potential strategic partner is started, we would inform the potential partner that the subcommittee would be involved in reviewing the proposed relationship. The subcommittee would work under the same non-disclosure rules that anyone else involved in the discussions would be bound to. The

examine our strategic partnerships to decide when each should be ended. Any partnership involves a commitment of the faculty's time and energy, and our priorities may shift over time.

- The development of the principles for strategic partnerships would involve the entire MIT community. However, it is my view that working with confidential information in reviewing specific, proposed partnerships may be one of those rare areas that should not involve student representatives. My primary reason for this has nothing to do with students' abilities to contribute to the discussion; in fact, having student input would be

with about this have widely varying opinions, and further discussion may provide some compromise solution that retains the benefits of student involvement without compromising their future employment opportunities.

This proposal leaves open the question of how, after such consultation, irreconcilable differences of opinion between the faculty and the administration might be resolved. This isn't a unique situation for MIT's governance system, and it rarely causes significant problems. As an institution, such issues are resolved in part by good faith negotiations and in part by a clear understanding that MIT works best when the administration leads in directions that the faculty wants to go anyway. Ultimately, any major divergence of views might be resolved through the involvement of the Corporation. One of MIT's best features is that such mechanisms rarely need to be used, and everyone understands that something has gone seriously wrong when they are needed.

In my view, we have already demonstrated that we can create strategic partnerships that are wholly consistent with our traditions of open research and dissemination of new knowledge. MIT is uniquely positioned to create strategic partnerships, and our recent experience suggests that there is a wide array of opportunities for us in this new arena. We already have invaluable experience. With some further fine-tuning that institutionalizes governance processes to ensure we continue to remain true to our mission, this expertise will be an enormous comparative advantage that will allow us to continue our leadership role among research universities.♣
[Steven R. Lerman can be reached at lerman@mit.edu]

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involvement of subcommittee members would include discussions with the senior administration well before any memorandum of understanding or contract is entered into.

- If there remain significant disagreements between the subcommittee and the administration over the acceptability of the proposed terms in the strategic partnership, then the entire Faculty Policy Committee would be used to further discuss the proposed agreement. This would bring a wider array of faculty, student, and staff views into the discussion.

- We should periodically re-

examine our strategic partnerships to decide when each should be ended. Any partnership involves a commitment of the faculty's time and energy, and our priorities may shift over time. Rather, students shouldn't be involved in specific negotiations because I do not think it is healthy for them to have to sign non-disclosure agreements as part of their involvement in MIT governance. It places serious restrictions on their ability to work effectively for future employers who may be competitors to, or regulators of, our strategic partners. I fully understand that many students do sign non-disclosure agreements in various summer jobs. That is unfortunate, but it at least isn't something that MIT directly requires of them. The students I have spoken

Interview with Executive Vice President John R. Curry

Continued from Page 1

through permitting processes, among other activities, just how much focus there is on traffic and parking. And I must say that sometimes we were looked at by others as having low parking rates, and thereby encouraging traffic in the city, when many people in the city would like to discourage people driving their cars and instead coming to work on the T or another way. So I think we have a real balancing act in front of us in how we retain sufficient parking here for our faculty and our staff and how we balance the pressing issues of the city. Coming from L.A., I'm accustomed to high institutional parking rates. I paid extraordinary parking rates, as did everyone. We need to thoroughly think through relationships among number of parking spaces, how we charge for parking, and how we facilitate other kinds of travel, perhaps through increased subsidies for T travel. At this point, I'm much more aware of the problems than I am of the solutions.

FNL: What precipitated a 20% increase in this year's parking fee?

CURRY: Fairly simple. When Bill Dickson [former Senior Vice President] introduced the parking fee, (this is where I do understand some history), he said that it should be held constant for a specific period, which was three or four years; after which one should expect an increase of 5% a year cumulatively. And that time came. Let me mention one other thing. We have very little capability through our charging mechanisms for parking to reinvest in and refurbish a parking garage. We have some great problems, for example, with the East garage and the Albany garage. And so one would like to see some resources available through the parking revenues themselves, not necessarily through the general fund, that would enable us to keep those facilities in better shape, and we just don't have the resources to do that. So in fact our parking infrastructure, primarily the garages, is in a pretty sad state. There has been a very thoughtful parking committee on the campus that has taken a hard look at these issues. Frankly, I anticipate a much larger agenda in the coming year to try to pull many things together.

FNL: One of the prominent issues is the failure to recognize that the salary disparity at the Institute is extraordinary. We charge heads of laboratories the same parking fee as incoming secretaries.

CURRY: This issue should be considered. One thing that I have learned is that huge numbers of people who work near the Kendall Square station use the T to get to work. And I do know, but I can't quote the amount, that we have an incentive program for people who need to use the T, and this came about some time ago. It's certainly not for everybody. It probably depends on things like the number of changes between train lines that you have to make, and other factors. But we are under considerable pressure from the City to encourage the use of public transportation to reduce the flow of traffic into and out of Cambridge. This is also a function of the fact that development in the area is substantially greater than it used to be, especially as you look to the north of campus. That, too, brought with it traffic and parking issues that we have to deal with.

FNL: You mentioned the infrastructure of the garages, and that brings up sort of a general, physical plant question. In your time here, what has been your assessment of the infrastructure, particularly with respect to buildings and grounds, and what are your plans? How are you attacking the problem of finding out what buildings need to be repaired, replaced? Is the East garage safe? Are the buildings safe? You can walk along the Chemistry building and see exposed steel girders.

CURRY: I've seen them. Let's say this: We have a significant problem and I think we have a pretty good handle on it. We had, before my arrival, a very thorough study of all of our buildings and ratings of where they stand between optimum functionality and their present position. And it's a serious problem, there's no question about it. You can see it in the exterior of the Chemistry building, for example. You can see it in many buildings' interiors. You can see it looking at the windows of the main group. So, yes, you can see it. I will say what has been done to date. We have the study. In the initiatives that Chuck Vest has announced, which include the tuition benefit for Ph.D. students on grants in summer and the presidential fellowships, we have \$20 million a year to contribute to the deferred maintenance problem, which is a serious amount of money compared to what it was, which was very, very little.

FNL: What was the previous number, do you know?

CURRY: The previous number was \$4 to \$5 million.

(Continued on next page)

Interview with Executive Vice President John R. Curry

Continued from preceding page

FNL: So it's going up by a factor of four or five.

CURRY: Yes. And in fact we have supplemented that in the present year with additional financing to kick start some critical projects. One of the large projects, as you know, is the Chemistry building. Also, we have ranked our deferred maintenance issues with respect to things like safety, where we know, for example, that given facilities need renovations in their fire safety programs or have other safety-related issues. We are starting there first.

FNL: What about the mechanical safety of buildings? Has that been considered?

CURRY: It has been evaluated, yes. And from what I've seen and what I've read, we are comfortable today, but we do know where we need to put our first-order efforts. So the good news is we have comprehensively reviewed all of the buildings on the campus and have good documentation of what needs to be done. We have prioritized the work and kick started the deferred maintenance program. Now there's more work that needs to be done, and sometimes it's hard to get a feeling that you're getting ahead of this, because some areas will not be treated immediately and will continue to show their signs of age. The biggest single problem we saw in this study is how many of our buildings were constructed in a relatively short period of time and turned 30 years old at roughly the same time, which is basically the life cycle time for HVAC systems and all of the infrastructure supporting the buildings. One of the examples is the Chemistry building.

FNL: Sort of changing the subject a little bit, what about vehicular traffic on campus? It has long been a problem, from the day in which Paul Gray was nearly struck by a vehicle on his way from the President's house to his office, until today, where there's a constant battle to limit and control the number of vehicles on campus. With the forthcoming renovations, it seems like that's only going to get worse. Has there been a study of that?

CURRY: Yes. And we have not solved it, but we have a very active study under way of how traffic will flow when we have the Stata site, for example, under construction, and when we have another site to the west on Vassar Street, the undergraduate residence, under construction. We should also note that we are not in total control of our destiny here.

The city and the state will be tearing up a major portion of Massachusetts Avenue, probably during our construction period, to replace the storm drains. It's a much-needed replacement, as you can tell by some of the flooding on this campus because the storm drains simply can't carry the water. When we include the fact that Massachusetts Avenue will be under major repair, I think we will have a serious traffic problem to try to manage and solve. Some of our issues with parking and with each new building that comes online are in the traffic studies that we have to review with the city. Those traffic studies are as much for our benefit as they are for the city's benefit in thinking through flows on the campus and in particular, in thinking through how we cope through the construction periods. I don't have an answer for you yet. I can't tell you what the traffic patterns will be, but we are painfully aware of the potential problems.

FNL: The delivery of certain supplies like compressed liquefied gases has brought 18 wheelers onto the campus.

CURRY: A lot of them are right out here, too. [LAUGHTER] You can hear them daily. BOC is a set of initials I've learned to know well.

FNL: In other institutions and corporations they find ways to bring supplies in and store them in a central location – and this also includes waste, which is an increasing problem – and then pipe them in and out, which would, of course, require a huge infrastructure cost, but in terms of effectiveness it's really spectacular. You don't see people delivering individual tanks of gases to any individual laboratories or liquefied gases or taking wastes out of individual laboratories. It all goes through piped areas to central storehouses.

CURRY: Let me say first order, that that seems like a dream we may not realize in the foreseeable future, because it's an extraordinarily costly one. Creating a whole new infrastructure of its own, actually. But with the advent of new buildings on campus and traffic issues, we are looking at materials handling in a serious way. First of all, it would surely be desirable to get the large trucks off the malls. And we have to think about it systematically. It appears we may have thought about materials handling one location at a time. But the amount of construction that we would anticipate on the campus in the next several years and the

(Continued on next page)

Interview with Executive Vice President John R. Curry

Continued from preceding page

frequency with which key areas are being developed, provide an opportunity to focus on the broad issues of materials handling, everything from gases to paper deliveries to chemical supplies.

FNL: What is the construction schedule for this? What are the definite projects, definite go and then the order in which they're going to come down? Which ones are considered on hold? Which ones are being eliminated?

CURRY: I gave a brief talk at the faculty meeting last week on that subject. The things that are "go" right now, without perfectly precise start dates, are the undergraduate residence on Vassar Street, which is about halfway between Massachusetts Avenue and where Vassar Street ends on Memorial Drive at the river; and the Stata Complex at the corner of Vassar and Main.

FNL: And the residence will be to the south of the railroad tracks?

CURRY: Yes. To the south of the tracks, but north of and facing Vassar Street. And that is a definite go.

FNL: How big is that building?

CURRY: It will house about 350 students and will have five faculty apartments in it, as well as two suites for faculty master and faculty associate master. And then it will have some rather wonderful common spaces for students and faculty to gather, and in fact for others around the campus to enjoy. And it's scheduled to start late this fall and to open in September 2001. That's a very fast track. And there's a lot of pressure around it.

FNL: We know why.

CURRY: Well, I guess we do. It's very fast track, yet we do not control all of the components. I mean, on issues of permitting and traffic and those kinds of things, we do them one at a time. Stata is the other project moving rapidly forward; it is in, as they say, design development. We've seen the schematic design, which is on the picture over at the corner of Main and Vassar.

FNL: The question is, will the picture have faded before the first hole gets dug? [LAUGHTER]

CURRY: Well, it may. We've started the hole by taking the top off the hole; we have one of the big gravel fields out there now, and you'll probably see the hole some time around the dawn of the new millennium. This is a somewhat longer construction project, looking more like 2002, 2003 as an opening date. It's a very large building, very complex.

FNL: Will there be any disruption for faculty parking in the East garage during that construction?

CURRY: No. It won't be quite as easy to get in, but the garage will live through the construction. I'm thinking that this is a personally relevant question? [LAUGHTER]

FNL: For probably 400 faculty. . .

CURRY: That's right. Now, those buildings are the two that are right up front and center on our radar screen. There are attendant projects that go with that. We do not have the capacity for steam and chilled water to serve the increased square footage that these two buildings would bring, and therefore we have some major work to do on the energy corridor on Vassar Street, where the co-gen plant is, the chilled water facility is. That's probably going to cause some construction bother along that portion of the street. And that's fairly major.

FNL: Can you take the co-gen plant off-line on December 31st this year?

CURRY: Meaning off the grid?

FNL: Right.

CURRY: We're thinking about it.

FNL: We think that would be very wise.

CURRY: We are thinking about it. I can tell you a couple things —

FNL: I don't know how many of us are going to drive in here with our families in the hope of finding heat and warmth. [LAUGHTER] We're wondering how many people might walk in.

(Continued on next page)

Interview with Executive Vice President John R. Curry

Continued from preceding page

CURRY: We do have a pretty extensive Y2K program underway. We know that our energy facilities are compliant. We've run them with forwarded clocks; we've reviewed the embedded chips; we're confident that they'll be working properly. We are told with confidence that our suppliers of energy are compliant, but it's important to know, among other things, that our co-gen plant will run on both oil and gas, and we want to be doubly secure so we will have a maximum supply of stored fuel oil for that time period.

FNL: How long will it run on the maximum supply?

CURRY: Maximum supply, seven days. You should know that we are already lining up suppliers and orders for stand-by trucks to get ourselves in the queue if there is an issue with respect to electricity delivery or gas delivery to the campus. That's one of the things. So we expect that one to run. There are always worries if you're running on a grid that you could import somebody else's Y2K problem, and that's been looked at pretty carefully. I think we're now fairly confident, though, that the local energy systems will be up; but we will be there for the whole weekend. We'll start early and we'll stay through around the fourth with all kinds of technologically talented people. I did say something the other day in a meeting, though, that is amazing to me. In the time in our lives when we will be among the few people on earth ever to witness the turn of a century and the turn of a millennium, an awful lot of us are going to be working on New Year's Eve. [LAUGHTER] Rather than drinking the champagne of a lifetime.

FNL: It appears the Institute has been very extensive in its Y2K preparation.

CURRY: We have been all over our enterprise systems. We have provided a service from an outside company to look at the embedded chips in the equipment across the campus, and where they can, to do serial number match-ups with data they have that tells them when the equipment was made, whether it's compliant, etc.

FNL: If not MIT, then who else? Because if something horrible happens here, the embarrassment factor would be enormous.

CURRY: It would be enormous, and the only thing about it is that surely others will have bigger embarrassments,

except they won't have an IT at the end of their initials. We've also looked at 800 vendors who provide us with key supplies and have done our best to get positive affirmation from them that they are Y2K compliant. It's been an extensive effort.

FNL: Back to the construction: are there some old projects that you'd like to tell us about?

CURRY: We had considered starting, as early as last summer, a central athletics facility.

FNL: Wasn't there a multi-million dollar donation for the swimming pool? I don't remember the exact numbers.

CURRY: There is a key donation that seeded fundraising for that building but we put it on hold last year, although we committed to going forward with design development because we wanted to take some time to raise more money for it. Pending the fundraising success on that building, it's scheduled to start next summer. Now, what else can we talk about?

FNL: What about the concept of a teaching center?

CURRY: It would be good to talk to [Provost] Bob Brown about that. Let me tell you my understanding, but I'm less than confident in what I'm saying. As part of the Stata site, where the garage is now, there is a site for a teaching and learning center, as I've seen it named. And there's even a sketch of a design for it that's a Lego block shape that occasionally you will see when you look at a three-dimensional mockup of the Stata Center. East garage is scheduled to come down after the Stata complex is finished.

FNL: Is the garage going to be reconstructed underground?

CURRY: There are two thoughts right now about the garage. There's an Albany site that has a garage designed for it that could constitute the replacement parking. And there's active consideration of the potential of parking under the Stata complex itself. And we haven't reached a conclusion on the two. And there are important pros and cons of each. Although the proximity of the underground parking and the aesthetic character of it, which is to say it is out of sight, have some positive components to them.

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Interview with Executive Vice President John R. Curry

Continued from preceding page

The flip side, of course, is that underground parking is quite expensive to design and build. *[Editor's note: Underground parking has now been approved for Stata.]*

FNL: Let's make a big switch to MIT Medical. What do you foresee in the future there? There are some quality of life issues, such as long delays in getting appointments. A tremendously large increase in the number of people who belong to MIT Medical has put pressure on the physicians who work there. We know that the Lexington site has recently opened. Some physicians have left and not been replaced. What's your sort of overview of the medical service here? It's been one of those wonderful things that has been available to the faculty and community. Some people are beginning to wonder, is that going to be able to continue under the current pressure on modern health plans?

CURRY: I think the question is an important one, but I'm far from an answer. Among the many things I looked into in my early days here, that is not the first. I have had more than one occasion to have direct appreciation of the benefit to people. Just in special ways, including a very minor moment for myself, which was just something very quick, a minor infection that got out of hand; but it got fixed, boom. And I just walked over there.

FNL: It's a tremendous resource. They do report to you, ultimately, is that true?

CURRY: Yes, they do. Certainly, we're coming to understand it as a service business model, which is important because we need to understand and think about the benefits versus the costs. Five years ago, I might have thought I knew more about the right health care model than I know now, because it seems like we are trying to work our way towards possibly yet another paradigm. Managed care is under serious attack. I have a very open mind about it and my first-order sense is to value enormously what the Medical Department provides locally. If there are service issues, and I've heard only a couple, then I think they should be addressed. And I think there's a reason for the fact that it's popular, meaning it's local; it has good connections with Massachusetts General and with other health care facilities in Boston, the superstar city in the health care world. And while in the past one might have said that this is a kind of local, expensive institution whose

time has passed, I wouldn't be surprised if we prove that we're just on the cusp of the moment in which its time has come again. I think it's extremely high quality care.

FNL: Has the new director been appointed?

CURRY: No. Arnie [Arnold Weinberg] is retiring at the end of this fiscal year and we are just starting to get the wheels rolling for a search. I should say this, however; it will report again to the vice president for HR (Human Resources). The person we have recruited, Laura Avakian, was the senior vice president for HR for Care Group and for many years the VP HR at Beth Israel. She is deeply knowledgeable in the health care business; and is a world-class HR person. Beth Israel under her leadership had a national reputation as one of the top ten best places in the country to work, and that was no accident. So she knows the health care business, she's deeply connected within the medical community, and I think she will bring an added dimension of thoughtfulness about how we should think about the future of the Medical Department.

FNL: Good. Hopefully there will be faculty input on this issue.

CURRY: There absolutely will be, make no question about that. We had strong input into the search for the VP HR from faculty, and this one is a benefit to all members of the campus community, so we should have broad participation in the search and any thoughts about the individual characteristics we're seeking.

FNL: One suggestion for faculty input is that, rather than just simply appointing some faculty members to a committee, that one uses the power of modern computers and gets more invited input through e-mail. I can't remember when we were last asked by the central administration for our thoughts on this, that, or the other thing that might affect our everyday life.

CURRY: That's a wonderful idea.

FNL: Faculty do read e-mail; they're as hooked on it as the students.

CURRY: So that might be an interesting way to start the
(Continued on next page)

Interview with Executive Vice President John R. Curry

Continued from preceding page

search: a few constructive questions. I might ask some of you to help me with the questions; meaning, I need to know the perspective before I know the stuff to ask.

FNL: The Medical Service is just one of a whole variety of areas where, at least you get the faculty feeling they have the opportunity to give input. Whether or not it's listened to depends on a variety of complicated factors, but it might work. You could even connect that e-mail to a site on the Web where people could then offer their views.

CURRY: We did not necessarily use cutting-edge technology in the HR VP search. But we did wind up with broader participation than anyone could ever imagine; the search committee had 23 people. And people told me it was absolutely impossible, but it wasn't. It turned out to be a wonderful committee partly because Bob McKersie chaired it and it was a stellar group. But I think e-mail participation is a terrific idea; and given that this affects a lot of people very, very personally and directly, it would be a good way to assemble the value, importance, and characteristics of the service that would help us write the job spec, and do a better job of identifying the right individual.

FNL: Let's turn to IS [Information Systems]. You may or may not know from history, but that has been an area that has caused some friction among the different operating units on the campus and the outside world. What's the plan for improved quality of service?

CURRY: I've had three IT groups in my life reporting to me. From the standpoint of concentration of talent, it's good to be here.

FNL: Technical talent.

CURRY: Yes, technical talent. And that's a hell of a start. The second part is that I am very aware that IS is growing self-aware, through some of their own querying of people, using standard questionnaires that the Gartner Group uses to help IT organizations evaluate their customer-friendliness. But they have some customer issues to deal with. I was at a session yesterday in their strategic planning effort and the service issue was very thoroughly looked at. I was gratified because it's the kind of awareness you must have before you can get at customer issues. We are also

very aware that rate structures involving voice/video data, telephones, and the network haven't been looked at in years and are undergoing a fundamental rethinking. And that will become the subject of a lot of conversation around the campus in the coming months, because we need to think it through, have a rational basis for the charging that you can understand. So there's a lot of stuff going on. Bob Brown and I both talked with Jim [Bruce] about the fact that we would all find it useful to examine IT. I think an appropriately constituted visiting committee is a fine way to go; in part because we learn a lot, in part because we benchmark ourselves, and that can give us a real impetus to change where it's necessary and important to do so. So I would anticipate doing something like that in the relatively near future. There is one initiative being developed at the moment that I think is useful to get a sense of, which is Bob Brown's Educational Technology Council and academic computing in the purer of terms – around the educational side of it as opposed to just say software application development for enterprise systems. As the Council begins to shape itself and begins to redefine aspects of academic computing, then I think it begins to look at the connections inside of IT or the IS organization, and the relationships and appropriateness of them. I think that would be an ideal time to engage in a review and I know Jim Bruce is comfortable with it because I talked to him about it.

FNL: Does he report to you?

CURRY: Yes he does.

FNL: You may want at some point to do an independent evaluation of what the problems have been.

CURRY: I'd be happy to do that.

FNL: It has been difficult, financially, to support the human/computing service needs in connection to the outside world when so much was being charged for every individual drop, etc.

CURRY: Well, that's got to be part of a real pricing strategy; meaning there should be some real recognition in pricing strategies of scale. And if you're looking at the way the outside world is going in just pricing telephone these days, and the way some of the network connections are

(Continued on next page)

Interview with Executive Vice President John R. Curry

Continued from preceding page

going, it's a rapidly, rapidly changing world. Increasingly, you're seeing companies with flat rates for a huge quantity of consumption, if you will, and then a stair-step kind of a system. So it's in that sense, I think, that this whole issue needs to be deeply reexamined.

FNL: Let's talk about safety and security. We talked a little bit about the Y2K situation and transportation on the campus, but other important issues include thefts, making sure buildings are locked, and so forth. Lighting, in particular, is one area that a large number of people, particularly women, workers and spouses, have been concerned about. If you walk, for example, from the T to the Infinite Corridor in the evening, you notice that it's pretty dark as you come across those plazas. And there's limited security in any of the parking garages. They've improved, and they've done the windows outside and there are cameras; but there was a problem with a rapist last year, plus some questions about the route for Safe Ride. So there's this whole issue of security.

CURRY: This has not, in fact, arisen, but I do know something about considerations of lighting. In recognition of the amount of construction that's going to be going on and in recognition of the fact that the campus is in some areas less than congenial, which is to say not a garden spot, there's work to do on some streets. Very serious work on just Vassar Street itself, for example, which is from end to end an extraordinarily unattractive street. And in recognition of making sure that as options for new buildings come along through dreams and fundraising starts to match them, then we have siting issues, traffic issues, pedestrian flow issues, and common space issues. And we need to be sure the solutions are attractive. We've engaged a great planner and landscape architect, Laurie Olin, and among his assignments is to look at lighting all over the campus with two issues in mind, issues of safety, of course, but another from the standpoint of consistency with design so that we begin to integrate the campus through some common elements. We haven't hired Laurie to be on our staff. He's a consultant with a worldwide practice, but he's brought some real thoughtfulness to pulling the campus together through preservation of sight lines, through a change in traffic patterns, through being sensitive to strategically locating quads or parks. We'll have a first pass at that work in November, meaning a kind of what I'd call a schematic design of the campus with those issues.

FNL: That's sort of the physical plant architecture. What about the human architecture, the assurance that the police department, Campus Police, has sufficient numbers of people on patrol? They're very good after the horse is out of the barn. But, you know, when you walk around the campus at almost any time you rarely see a police officer.

CURRY: I'm never sure when you know you have enough. My initial impressions are that for the openness of this campus, it's a remarkably safe place. Campus crime, as I see it, is surprisingly low for being a city institution and being as open as we are without gates, fences, with many of our buildings open 24 hours a day, seven days a week. I'm certainly willing to think through those issues. I haven't thought much about them because nothing much has hit the radar screen yet.

FNL: You get blips from time to time. I think that the most recent blip that I can think of was the student who was killed by Cambridge youths right in front of the library on Memorial Drive one evening. It was five years ago, I think. They had been walking from the graduate house, Ashdown House, where there's a pub, to the Muddy Charles, when they ran into a couple of kids. As luck would have it, these kids ran on over to Kenmore Square and were caught by B.U. police, of all things, arrested, arraigned, charged in Cambridge Court, and brought up on murder charges. And so, you may want to do a little review of the history with the chief at some point.

CURRY: Oh, I'm more than willing to do that.

FNL: A couple of other things because we're running close to the end of the time. Coming from Caltech, how do you see MIT versus Caltech from the viewpoint of your position at this institute?

CURRY: Wow, I've got to be careful with this one. [LAUGHTER] I still have friends there. One of them knows MIT intimately! In fact, many do. Well, the first order, is that it's remarkable how many people I knew at Caltech who had gone to school as either undergraduates or graduates at MIT. Let's say this, there's a difference here I plainly like and I knew it when I made my decision. I like some of the real-world feeling at MIT. It's part of the

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Interview with Executive Vice President John R. Curry

Continued from preceding page

mission statement that says MIT deals with real-world issues. It's exciting to be around a business school again. It's terrific to have the opportunity to interact with some of the finest economics and finance people and stay a little bit sharper as a consequence. I should note that one of the people who joined me as a newcomer at MIT is Steven Ross. Steve was a member of the Caltech board and came from Yale where he was one of the great finance people in the country; he was on my investment committee at Caltech. Well, I can seek his advice now as a faculty member rather than as a trustee, and I like that. I like having an architecture and planning school on campus and I like having a strong performing arts component here.

FNL: Are you a musician yourself?

CURRY: I play piano a little and used to play trumpet a lot. The chops are in sorry shape today, but I like the mixture of discipline and professions here that are not part of Caltech. Caltech is very, very concentrated as, I'm sure you know, although the concentration is extraordinary. I generally am more at home in MIT's kind of mixture of science and technology, which I'm very familiar with, and some aspect of the professions. Many of them are quite related in important ways, so as you start to work through the humanities, you can come to linguistics and then you start to migrate toward artificial intelligence and chemistry and biology. Those are exciting links.

FNL: Is there anything they do that you'd like to see done here?

CURRY: There's something that we have just begun to do that they've done for a long time. Caltech has systematically invested in its physical facilities to maintain them at a relatively high level, and we need to get into that mode. If you walk on campus, inside or out, you can see a difference. Now, it's a somewhat younger campus than this one, there's no doubt of that, and on the other hand, it's a somewhat more congenial climate

FNL: No argument. [LAUGHTER]

CURRY: But systematically, there was investment in infrastructure and it was not just in the buildings themselves. It was in the landscape and interconnections. Caltech's kind of a garden spot that stays green year-round. I'm very

pleased with our new sensitivity to those issues at MIT. And it is certainly part of Chuck's long-term plans to invest in infrastructure, to focus on quality architecture, and to engage our campus planner to try to pull it together. And I'm just pleased to enter that mix.

FNL: Do you get involved in resource development?

CURRY: Not directly. It happens to report to me, but it's really kind of an administrative oversight where managerial issues can arise and be debated, but certainly that area receives its primary direction from the President.

FNL: There are some activities on the campus that have generated income, such as the summer program where faculty have brought people in from the outside, and I'm sure there must be a program at the Sloan School that they do with executives. Some people believe that more of that sort of thing might be done, taking advantage of MIT's resources in a way that would generate revenue and that would improve the quality of life overall. Is that something to which you've given thought?

CURRY: It is. In part, because through a significant portion of my existence I spent time developing revenue incentives through various budget structures at other institutions. I think it's important to focus on, and here's my sense of it. MIT is, in significant ways, defined by its long-term federal sponsorship relationship, all the way back to Vannevar Bush, who invented the national model, in effect through today. Now the kind of entrepreneurship of individual, principal investigators and the development of programs through partnerships with the federal government has been enormously productive. At the same time, if you look at MIT's sources of funds over the years, the percentage that's federal is declining. The percentage that's growing is private, and MIT is developing its sense of the private side through both the fundraising campaign and our increasing awareness that there is a rebalancing broadly between private and public, not just at MIT but elsewhere. And there's a significant opportunity for MIT to participate in that. Then we begin to look at other sources of revenue. I think that if programs are carefully done and are of extraordinary quality, then there would be real revenue opportunities in this. I've seen them developed elsewhere.

(Continued on next page)

Interview with Executive Vice President John R. Curry

Continued from preceding page

FNL: Can you give us a couple of specific examples?

CURRY: Well, I don't want to predispose anything with respect to, say, the Sloan School, but I've certainly seen what high-level executive education programs do at management schools. They can be very cost-effective and help provide resources to subsidize high-cost programs like the Ph.D. program, for example.

FNL: What about other than that, because that's a fairly well-known model.

CURRY: And it's a fairly well-developed one.

FNL: What about for a physics department or for a math department, where some people can't pay themselves summer salaries?

CURRY: Let me think a little bit about that, but I'll give you an instance, and I can't define it perfectly, but it's a neat idea. A couple of professors at my former institution were applied mathematicians and they had their own consulting relationships with private enterprise that they mutually benefited from. They assembled a kind of focal point of fellow travelers, broadly across Caltech, and made it known that they were a small think-tank SWAT team to tackle complex industrial problems. And when I'd left, they'd had some real successes. Now, they've involved graduate students in the work, to introduce them to this sort of thing and to get them doing some applied research.

FNL: It's an interesting concept.

CURRY: And it was just beginning. I said I can go through the professional schools, what medical schools do and law schools do and business schools do and they're kind of naturals, but this one was unusual because Caltech has no professional schools at all.

FNL: There is a balance, of course, between the free spirit of inquiry and the industrial strengths of proprietary research.

CURRY: Of course. And I think that the folks involved in that were very, very sensitive to it. On the other hand, what they also recognized is that there were some really interesting problems out there that, in fact, could lead to areas of purer inquiry, so there's a kind of constant source of ideas.

FNL: One last thing. It's a fairly localized question and has to do with the Family Resource Center; the issue of daycare, the two-parent working family, etc. Working routines have changed, of course, as have the difficulties faculty face. We've tried to address it from the academic side, department heads and so forth, but the sort of general question of a family resource center and a little broader than that, the dream of affordable faculty housing. You know, there's a community at MIT that wouldn't necessarily be only a daytime community, but more full-time.

CURRY: Let me address the first one, the daycare. Phil Clay has been chairing a committee or a task force that's been looking broadly at that and as part of the capital construction coming up, there are sites for development in parts of the new structure including, as I understand it, space for daycare programs. It's certainly on the radar screen, certainly known and understood as important, but I would urge a quick question to Phil with respect to where he stands and where that committee stands.

FNL: Maybe we can get him to write an article for us.

CURRY: I don't know what's in the pipeline specifically, but it's a very active topic that he's got the lead on and knows far more about it than I do, especially from a needs assessment standpoint. The second thing I'd like to add to that is that when I mentioned our new HR VP, part of the reason her former institution was known as such a good place to work is that they developed an extraordinary sensitivity around family issues, recognizing specific needs of two-profession families, and how to work that out, and that's from one end of the spectrum to the other. She'd be worth talking to.

FNL: She may be a little gun-shy.

CURRY: Give her a couple of months. You were very generous to me giving me ten months. My honeymoon's over. [LAUGHTER] I've no allusions any more.

FNL: Well, thanks a lot for your time.

CURRY: Well, thank you. This was really fun to do.❖

[John R. Curry can be reached at jrcurry@mit.edu]

The d'Arbeloff Fund

Improving the First-Year Educational Experience at MIT: A Call for Preliminary Proposals

Peggy Enders and Helen Samuels

This article was written on behalf of the Committee on the Undergraduate Program and the MIT Council on Educational Technology.

Earlier this year, President Vest announced a \$10 million gift from Alex and Brit d'Arbeloff to support educational innovation in the teaching of science and engineering at MIT. "Educational change is in the wind at MIT and throughout academia," he said. "This magnificent gift will enable our faculty to translate into action the wealth of new pedagogical ideas welling up through MIT."

The report of the Task Force on Student Life and Learning, <http://web.mit.edu/afs/athena.mit.edu/org/c/committees/sll/index.html>, paved the way for a number of discussions within the Committee on the Undergraduate Program (CUP) and elsewhere regarding ways to strengthen our undergraduate program. The recently-released report of the Educational Design Project (EDP), <http://web.mit.edu/faculty/reports/edp.html>, as well as the findings of an educational "charrette" held last spring, reached similar conclusions with respect to the need to improve the first-year experience. The Task Force recommended that a priority for MIT should be increasing the level of excitement in the first-year program, and the EDP found that "the current curriculum does not do enough to sustain student enthusiasm for learning, or to leverage upon their enthusiasm and sense of academic direction to achieve better educational results." More recently, the MIT

Council on Educational Technology has joined this effort by endorsing this RFP and agreeing to serve as the grants review board.

In their recent review of these findings, the CUP identified a discrete set of goals for students during their first undergraduate year. Among these goals are several that will require the creative energies of faculty in new curriculum initiatives and are thus the target for this request for proposals:

- Increase the level of intellectual excitement in the first year program;
- Increase opportunities for "learning by doing" experiences in the first year;
- Foster the development of mentoring relationships between students and faculty.

The groups supporting this effort understand that two of the greatest impediments to change are the constraints on faculty time and the apparent intransigence of Institute requirements, rules, and regulations. Through this grants effort we are prepared to buy out faculty time, and in collaboration with CUP, waive rules and make change possible through other substantive actions.

Preliminary Proposals for Ambitious Projects

We are writing to solicit your *preliminary proposals* for ambitious projects that would enhance and potentially transform dramatically the experience of our first-year students.

We can imagine the following experiments:

- Design a project-based program for the entire freshman class that would involve students, faculty, and alumni.
- Revamp the freshman advising

and seminar systems. Involve the housing system and alumni in this new model.

- Totally revamp the teaching of a core science subject.
- Integrate engineering and science core subjects.
- Design a tutorial-based HASS experience.

The preliminary proposals can utilize one or more of the following:

1) Cooperative initiatives between Schools and departments, between first-year subjects, and/or between first- and second-year subjects. An example in this area would be a collaborative effort involving engineering curricula and first-year math or science subjects.

2) Subjects that introduce real-world situations, hands-on activities, or laboratory experiences in the freshman year. Proposals may include educational experiments as alternatives to the present Institute Laboratory Requirement. Also welcome would be proposals to develop UROP or UROP-like experiences appropriate for first-year students.

3) Ideas that promote one-on-one and small group interactions between faculty and first-year students, including ones that encourage mentoring, better advising, and greater interactions between faculty and students, especially in residence hall settings.

Criteria

In light of the goals and target areas outlined above, proposals are preferred that include one or more of the following elements:

(Continued on next page)

A Call for Preliminary Proposals

Enders and Samuels, from preceding page

- Projects that are sustainable, in the sense that they can lead to a long-term commitment and are likely to become a regular part of the MIT curriculum (i.e., not dependent upon the long-term involvement of one or more key faculty);

- Projects that are scaleable, so that they are likely to affect a large number of first-year students;

- Projects offering incentives for students and faculty to participate (e.g., satisfying a requirement or departmental goal, providing teachers with intrinsic or extrinsic rewards for participating, etc.);

- Collaboration among faculty in one or more departments or Schools, and among faculty and other community members (alumni/ae, undergraduate and graduate students, senior research scientists, staff, etc.);

- Proposals that highlight and leverage those educational opportunities that come from the fact that MIT is a residential campus, i.e., an educational community with learners in the same place at the same time.

Requirements and Restrictions

- Funds may be used for faculty release time or summer salary, employment of graduate assistants and/or undergraduate research or hourly employees, compensation of technical support staff, purchase of software and other materials, travel, hiring consultants and ancillary equipment purchases.

- Since sustainability is a key criterion, funds may be requested that would be used to develop and then to sustain a project over a period of several years.

- The d'Arbeloff Fund is intended primarily for faculty-led initiatives, with the understanding that many such initiatives may involve non-faculty

participants. Non-faculty members of the MIT community who have an interesting idea are encouraged to submit a preliminary proposal, which can lead to further discussions about appropriate faculty involvement.

Preliminary Proposal

The preliminary proposal must include:

- A brief description of how the innovation will enhance MIT education,

- How it will fit in with departmental and Institute programs, and

- How its success will be measured.

preliminary proposal and in responding to more detailed questions about deliverables, evaluation, incentives, key participants, and the like. In this stage applicants may be asked to contact others to encourage collaborative development. Preliminary proposal discussions will also provide information about other sources of funding for educational innovation that might supplement the d'Arbeloff Fund, or that might be more appropriate (e.g., Class of 1951/55/72 Funds, or, for technology-intensive proposals, the Microsoft-MIT Alliance).

The d'Arbeloff Fund is intended primarily for faculty-led initiatives, with the understanding that many such initiatives may involve non-faculty participants. Non-faculty members of the MIT community who have an interesting idea are encouraged to submit a preliminary proposal, which can lead to further discussions about appropriate faculty involvement.

Submission Details and Timeline

In order to make the submission process as simple as possible, the Grants Subcommittee wishes to emphasize the preliminary proposal and to give applicants considerable assistance at this stage. Assistance will include staff consultation and may include financial support in the form of seed money.

The Committee invites one- or two-page preliminary proposals submitted by e-mail to Helen Samuels, staff to the MIT Council on Educational Technology (hwsamuel@mit.edu, x8-0310, E32-335) by January 15, 2000.

Applicants will be contacted by a member of the Office of Academic Services, who will help in refining the

Preliminary proposals will be reviewed by the Grants Subcommittee by mid-February. Applicants who pass the initial screening process will be contacted and invited to submit more detailed proposals, again with help from the Office of Academic Services. Awards will be applied beginning with the 2000-2001 Academic Year. No decision has been made in advance regarding the overall pace and scale of the distribution of the d'Arbeloff funds: these decisions will be guided by the range and scale of proposals submitted to the Committee.✦

[Peggy Enders can be reached at peggy@mit.edu; Helen Samuels can be reached at hwsamuel@mit.edu]

Reengineering is Over But Change is Not

Snover, from Page 1

[FSS was described in the April 1999 *Faculty Newsletter*.]

It is also worth noting that Reengineering has had an important impact on the ways people work at MIT, and this goes beyond the many employees who served on redesign, implementation, or support teams. For example, the idea of focusing on “customer service” was fairly foreign to the MIT culture when Reengineering began. Now, many people know and understand that serving clients well is a basic part of their job. In addition, many staff members developed skills in project management, running effective meetings, and collaborating with people whose expertise is different than their own. These cultural changes may be as significant, long term, as the more tangible accomplishments of the project.

This article will review some background on the Project, the original goals, what we were able to accomplish, what wasn't done, and why. Costs and savings estimates are also included.

Background

As many of you probably remember, Reengineering at MIT was begun in response to the growing gap between the Institute's operating income and its expenses. Even after the budget cuts that were planned for fiscal years 1994-96, the Institute was forecasting serious operating gaps. Since the vast majority of our budget is spent on salaries, wages, and benefits, MIT needed to become smaller in terms of staff. However, the senior administration decided that simply cutting positions, as had been done in the early 1980s, was not the best way to proceed. That experience had shown that eliminating jobs without changing the work resulted in a steady regrowth

of positions until, a few years later, we roughly matched the staff size before the cuts. Instead, senior leaders decided to use the principles of Reengineering to help us take work “out of the system.”

The Institute also wanted to demonstrate an organizational commitment to containing costs and managing resources carefully so that when a parent, a donor, or a sponsor asks, “Are you managed well?” the response would be positive.

The Reengineering Project began with some fanfare. There was a special edition of *Tech Talk* (on November 22, 1993) and a community-wide Town Meeting the following week. The special issue of the paper focused on the deficit and introduced the concept of Reengineering as being central to correcting the imbalance. Not surprisingly, what got the most attention in the community were the “Goals of the Plan,” which were to “reduce the operating gap by \$40 million (\$25 million net of indirect cost recovery) and operate more effectively with a smaller work force.” One estimate was that 400 positions would be eliminated.

Looking back, it's pretty clear that the announcement about savings and job reduction targets created a variety of problems and barriers for the people who were ultimately asked to redesign administrative processes. I believe that the senior administration hoped that the MIT community would pull together during Reengineering and work for the collective good of the Institute. However, when people felt that their jobs and their livelihoods might be at stake, many were less than anxious to embrace the Reengineering concepts or the redesigns that might put them out of a job. In a numbers-

oriented place like MIT, it's not surprising that the target goals were announced, but it's important to remember that they had a serious impact on the work that followed.

Early in the Reengineering effort, Sloan faculty members were approached about assisting with the Project. But since they did not want to consult “in their own backyard,” an outside firm, CSC Index, was brought in to help. This angered many in the community, but MIT leaders believed that we needed some guidance from people with experience in Reengineering and managing change.

For these and probably other reasons, Reengineering became kind of a dirty word at MIT. Anything that people didn't like was attributed to it, and the Project divided the community rather than pulling it together. Despite our best efforts to involve people in the work and to communicate what was going on, perceptions such as the following were fairly common in the community:

“Things were fine as they were before, so why do we need to change?”

“I don't understand what Reengineering is trying to accomplish.”

“I can't afford to lose my job!”

“Who do these Reengineers think they are, trying to improve how I do my work?”

“If they weren't spending so much money on consultants, then maybe MIT wouldn't have to lay off anybody.”

“My department head doesn't seem so keen on Reengineering, so maybe we can just duck and we'll be spared.”

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Reengineering is Over But Change is Not

Snover, from preceding page

Genesis of the Project

The Reengineering work actually began in March of 1994, as an eight-member Core Team started to identify and map the Institute's key administrative processes and recommend several for the initial redesign efforts. The Core Team analyzed major processes on the basis of cost, impact on revenue, potential for improvement, significance of changes to MIT's future, and the ease of implementing changes.

The six areas initially selected for redesign included facilities operations, the mail service, supplier consolidation, management reporting, information technology, and the appointment process. The two other major areas that were added to the Reengineering effort later were student services and human resources. In addition, there were "enabling" teams such as training and development, community involvement, and the help desk.

And What is Reengineering?

Here is the definition of Reengineering that MIT used: "Reengineering is the fundamental rethinking and radical redesign of support processes to bring about dramatic improvements in performance." Good support processes were defined as being simple, lean (with little non-value-

added work), results-focused, and consciously organized to achieve goals.

The method MIT used in its Reengineering work was to appoint redesign teams whose members either had expertise in the area and/or who were "customers" of the particular process. The teams were charged with analyzing the processes and proposing a redesign that simplified the procedures, reducing handoffs and the possibility of error. In addition, customers and the bottom line should see improvements from the redesigns.

Most people in the community would probably agree that simplifying administrative processes while improving quality, enhancing customer responsiveness, and reducing costs was a tall order, but that's what MIT's Reengineering Project set out to do.

In order to evaluate the Project, it's useful to have some context about the Core Team's analysis of administrative processes at MIT prior to Reengineering. The table below characterizes pre-Reengineering procedures in the "From" state and indicates where we hoped they would be after the redesigns in the "To" state.

Though we've certainly made progress, we haven't achieved the "To" state in every category.

What Specifically was Accomplished?

Physical Plant (now Facilities)

The most radical changes occurred in Physical Plant, now called Facilities. In terms of the number of its employees, Facilities is the most heavily unionized of MIT's support areas. And most of its operations were reviewed and changed. In 1994, before Reengineering began, the total work force in Physical Plant was 587 employees, who were responsible for maintaining 7.47 million gross square feet of MIT space. Today, the size of the total work force is 550 employees, who are responsible for maintaining 9.3 million gross square feet.

The redesign of **Custodial Services** resulted in the formation of 26 self-directed teams who are cleaning an additional 300,000 square feet of new buildings with no increase in headcount. Weekday and weekend services were increased, again with no additional employees. Service measurements for quality, costs, communication with customers, timeliness, and safety were established and continue to be tracked on a monthly basis. Four supervisory positions were eliminated.

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From	To
Fragmented and redundant processes	Integrated and streamlined processes
Most transactions treated as exceptions	Exceptions are rare
Narrowly defined jobs focused on completing tasks	Broadly defined jobs focused on achieving results
Policies and procedures orientation	Customer-driven
Inconsistent, ad hoc job training	Continuous professional development
Administrators who serve	Managers who support and partner
Command and control	Empowerment and accountability
Ad hoc and anecdotal measures	Systematic performance management
Non-integrated, stove-piped information	Integrated, shared, and accessible information

Reengineering is Over But Change is Not

Snover, from preceding page

The redesign of **Repair and Maintenance** functions called for moving from a centralized to a zone-based system with teams of workers stationed in five zones on the campus. The resident team in each zone corrects problems in the following kinds of systems: electrical, heating and cooling, structural and mechanical, and plumbing. Customers report problems or make requests for routine service via a form on the Web. (Emergencies are, of course, reported by telephone.)

The mechanics have become very familiar with the buildings in their zone, and often spot potential problems before they become serious. In addition, the team members have a greater sense of accountability and connection to their customers. A survey was sent last fall to 500 customers who had requested Repair and Maintenance services. Of the nearly 300 surveys that were returned, 93 percent rated the service they had received as meeting or exceeding their expectations.

In the **Grounds Services** area, the redesign resulted in the formation of an Athletics/Grounds zone with new job classifications and descriptions, as well as four other Grounds zones across the campus. Staffing in each of the four other zones now consists of a gardener and four landscapers. Ultimately, six Grounds positions and one management position were eliminated in this section of Facilities, saving about \$350,000 annually.

The **Mail Services** redesign, although initially unpopular, was necessary for the Institute in order to process our large volume of mail effectively, take full advantage of technology, and respond to both changing U.S. Postal regulations and

changing requirements of the Institute. The redesign began with the hiring of a professional mail manager and the creation of a centralized Mail Services operation. In order to establish the new organization, union job responsibilities were broadened, providing for three levels of mail worker positions. The number of full-time equivalent staff was reduced by 10.5, with associated annual savings to the Institute of approximately \$511,000.

The following are some of the specific changes in Mail Services. A new model for distributing mail began in the spring of 1995, and MIT now has 38 Distributed Mail Centers across

cost and service-level improvements for international mail and overnight carrier services. A new Central Mail Facility opened for operation in March 1996 in Building WW15.

The original redesign had shown that if MIT wanted to reduce its costs by bar coding and presorting outgoing mail, then Mail Services had to get its arms around that mail. This meant that its employees needed to do different work – essentially less delivering and more picking up and processing of outgoing mail. Some people in the community, including faculty members, have complained that asking customers to pick up their own mail from the Distributed Mail Centers is

In addition to the \$511,000 savings from staff reductions, annual savings of more than \$490,000 have been achieved through minimized costs for presorted domestic mail, international mail, second class and bulk mail, the express courier contract, and the reduction of postage meter rentals.

campus, where customers have 24-hour access to their mailboxes. This model replaced an inequitable delivery service in which a portion of campus received desktop delivery, while at the other end of the spectrum some buildings received a single unsorted bag of mail. In July 1995, Mail Services implemented a new centralized outbound mail processing service that has helped MIT achieve a 2.5 cent reduction per envelope in domestic postage charges. (The department is now handling about 95 percent of MIT's daily outbound mail from offices.) Mail Services also negotiates

simply shifting work from central to local departments, and there's some truth in that. However, the old "system" was broken. It consisted of an inequitable delivery service, more than 140 postage meters used by staff with little expertise, no volume discounts, and no economies of scale because the mail operation was so decentralized.

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Reengineering is Over But Change is Not

Snover, from preceding page

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Student Services

The establishment of the Student Services Center (SSC) was one of the most visible successes of Reengineering. Centrally located in Building 11, the Center offers students the convenience of "one-stop shopping" for many administrative services, thus reducing the need to visit numerous offices across campus. The SSC brought together staff from the Registrar's Office, the Bursar's Office, and the Financial Aid Office, with technical support from Student Information Systems.

Those who staff the front desk at the Center are cross-trained, so they are able to deal with a broad range of student questions. Another important improvement is that many of the frequent and basic student transactions were changed to be self-service via the Web, freeing staff to assist students with more complicated transactions.

Prior to the establishment of the Center, Student Services Reengineering teams had focused on all the business and administrative processes that students encounter outside the classroom. These included finding out about MIT and getting admitted, orientation programs, enrolling, housing, dining, paying bills, and paying students. Teams also reviewed academic support systems for advising, social support, and help with job searches, further schooling, and summer employment. Some of the Reengineering successes in this area include automated access to student financial and academic records, electronic pre-registration for courses, on-line graduate awards and

appointments, and major improvements in loan and financial aid processing.

Another effort, involving Dean's Office and Physical Plant staff, involved a facilities audit of all the space in the Campus Activities Complex, the Athletics department, and the residence facilities. The audit provides a comprehensive tool for making decisions about deferred maintenance and capital renewal. It details replacement value, provides a rating of maintenance needs (including, for example, life-safety and major mechanical systems), and gives the costs of repairs. All this information

receiving, and paying for goods and services.

When the project began, MIT was buying supplies and services from more than 14,000 different vendors, with about half of those involved in one transaction per year. That large number was partially a result of the specialized and often unique needs of Institute researchers. Nevertheless, purchases of routine goods and services were being spread out among far too many suppliers. For example, MIT was using more than 20 different agencies for temporary employees and consequently we were not receiving any volume discounts.

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is housed in a Facilities database available to the administrators who make the decisions about maintenance and renewal.

Supplier Consolidation

The specific goal in Supplier Consolidation was to reduce the cost of purchasing goods and services while improving the buying process for the MIT community. The redesign called for eliminating steps and handoffs in areas such as finding sources, approving, pricing, ordering,

Another issue that was found prior to the redesigns was that purchases of under \$500 represented only three percent of MIT's business but 80 percent of the resulting paperwork. This was clearly an area that needed to be addressed in the subsequent redesigns.

MIT's efforts in Supplier Consolidation include new ways of acquiring office and laboratory supplies, bottled gases, publishing services, temporary help, furniture, computers and software.

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Reengineering is Over But Change is Not

Snover, from preceding page

The **Office of Laboratory Supplies** closed in July 1995, and MIT began partnerships with Office Depot in the office supply area, VWR for scientific apparatus and supplies, and BOC Gases for industrial gases. Although Lab Supplies had provided good service to the Institute community, the department had to mark up its costs in order to be self-supporting. The Reengineering teams who reviewed purchasing in these areas had found that large and specialized outside vendors could provide these supplies and services more economically and often with better delivery time.

As I noted in the November/December 1998 issue of the *Faculty Newsletter*, the Office Depot partnership got off to a rocky start, primarily because the vendor wasn't sufficiently geared up to handle the initial volume of orders from MIT. However, once the start-up problems were resolved, the partnership has been working well.

After thorough reviews by two Reengineering teams, MIT decided to change the support services it provides for **publishing**. As a result, the Graphic Arts offset printing and binding operation was closed in August 1996, and Design Services was phased out of operation in fall 1996. (The Copy Technology Centers, which had long been the most successful part of Graphic Arts, continue as an Institute operation.)

The new organization that was formed is called the Publishing Services Bureau (PSB). Opened in February 1997, the PSB is an MIT service for coordinating the Institute's print and electronic publishing activities. The staff of publishing professionals serves as advisors to help plan projects and as brokers

between MIT customers and outside service providers. Bureau staff also work with MIT publishers to help them improve the effectiveness of their communications. In addition, efficiencies are achieved through more careful planning and the use of "smart" design and new technologies. Partnerships with a small number of outside designers and printers reduce overall costs through volume discounts.

A redesign of the **MIT Computer Connection (MCC)** changed the operation from a retail storefront to a Web-based electronic ordering and

The savings for fiscal year 1999 are still being calculated, but in fiscal 1998, the direct savings from the five major partnerships (Office Depot, VWR, BOC, Olsten Staffing Services, and NECX) were more than \$1.5 million. (And that does not include what we are saving as a result of processing significantly less paperwork for purchasing transactions.)

It's also important to note that the large MIT spaces formerly used for warehousing and selling office and laboratory supplies and for the Graphic Arts printing plant are now being used for other Institute

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direct-delivery mode for computer and software purchases. MIT's partner company is NECX. On-site pre-sales consulting and a product showroom remain available to individual and departmental purchasers.

By consolidating the number of external suppliers we use, negotiating volume discounts, and establishing partnerships with outside vendors, we are reducing not only our costs but also the paperwork involved in ordering and paying for these products and services. And, although the administration prefers that MIT community members buy from partner companies whenever possible, they are not required to do so.

purposes. The cost avoidance for all the spaces that could be reused as a result of Reengineering was calculated at \$1.2 million.

Other Purchasing Options

Another Supplier Consolidation project was the development of ECAT, MIT's electronic catalog. ECAT2 now integrates the partner companies' Web-based catalogs and ordering systems with SAP at MIT for quick, all-electronic shopping and requisitioning by MIT purchasers. The vendors' catalogs, with MIT-negotiated pricing, also have improved searching and browsing features.

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Reengineering is Over But Change is Not

Snover, from preceding page

Community members also have the option of using the MIT VIP credit card as another purchasing tool. Use of the credit card is helping to eliminate the need for many small-dollar requisitions and purchase orders, blanket orders, requests for payment, and petty-cash transactions.

Management Reporting and the Installation of SAP R/3

The installation of MIT's new financial system, SAP R/3, was the largest, most expensive, and most difficult project associated with Reengineering. It also was probably the most critical. Even if MIT had not embarked on its Reengineering Project, it would have been necessary to replace and integrate our financial systems.

Many of MIT's "legacy" financial systems were more than 30 years old and needed to be replaced. They were essentially a collection of minimally coupled, separate applications that operated on different computers. In addition, transactions were often entered several times in various central and departmental financial systems. This duplication of effort added to workloads, slowed processing, and increased the possibility of errors.

Because MIT departments are responsible for managing their own budgets, many areas had developed independent financial systems to monitor their expenses and uncommitted funds. While often very efficient in meeting the needs of a particular unit, the systems were not capable of interacting effectively across the organization. And, as both the central and local systems aged, they would have required significant upgrading of hardware and software. Rather than maintaining our old model of many distributed systems, the senior

administration decided instead to focus on using a single, integrated financial management system.

Following an extensive review process, SAP's R/3 system was selected to replace our general ledger, accounts payable and receivable, and procurement systems. Functions in the new integrated system also ultimately replaced EREQ and SumMIT.

The Management Reporting team's role was to devise a process that would deliver to each Institute manager the information – financial, personnel,

part, these were caused not by SAP but by the methods we used to bring data over from existing systems. For example, in our old financial systems a vendor's name was often entered differently by the various offices involved with invoices; in SAP, a vendor's name must be the same throughout the system. Resolving difficulties such as this one became the primary task for the team, which delayed the rollout of SAP to the academic departments, laboratories, and centers.

Some in the MIT community have expressed the opinion that SAP was not developed for decentralized organizations such as universities, and is therefore not as conducive to our work as some other system might be. However, the original decision to purchase SAP R/3 was made after a thorough review of our existing capabilities, our long-term requirements, and the systems available to ultimately meet those needs. We are working as a partner with SAP, which has further developed its funds module in response to our requirements.

property, space, etc. – needed to operate the manager's organization in an integrated, relevant, accurate, and timely manner. The idea was that MIT could improve decision making by providing consistent data and administrative processes throughout the Institute.

Difficulties in Implementing SAP

In the first few months after the central financial offices began using SAP in September 1996, there were some significant problems and delays in processing invoices. For the most

Another issue that affected the rollout schedule was the concern raised within the MIT community about the visibility of purchase order data. The senior administration therefore asked Management Reporting team members to explore and present options for shielding such data. They found that MIT would either have to build an authorization structure outside SAP or build a significant modification to SAP's structure to perform authorizations from within the software. Either of these shielding

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Reengineering is Over But Change is Not

Snover, from preceding page

alternatives would have required a great deal of system maintenance, removed important SAP functionality, carried a risk of incompatibility with future versions of the SAP software, and increased the cost of the project. Furthermore, since SAP gives users the ability to get at certain data from a wide range of paths, we would never be sure that we had restricted access to every possible path to purchasing data.

Discussions with other universities that have “open” purchasing systems indicated no problems from open access. In March 1997, MIT’s Academic Council decided that we would move forward with SAP’s standard authorization system, which does not restrict access to purchase order data but does restrict access to accounting statements.

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An aspect of the SAP project that caused considerable upset in the MIT community involved organizational structures. Team members were asked to look at how the various administrative roles in the financial areas of departments, labs, and centers could be restructured for more effective work processes. One idea that was announced somewhat prematurely was the concept of an administrative

“cluster,” in which a team would provide relevant services to more than one department. Many administrators and some faculty members were very upset by this suggestion, because it raised both the specter of job loss and of radical change in work relationships. I believe the “cluster concept” was a major factor in community opposition to SAP.

As it turned out, simply getting SAP up and running was an extremely complicated endeavor, and the idea of redesigning how financial work would be done was postponed. (A variation of the cluster model is being tried in MIT’s Administrative Services Organization, ASO. This group was created by the dean of Engineering, then Bob Brown, when the administrative officers in the Departments of Chemical Engineering and Materials Science and Engineering both elected to retire early through the retirement incentive program.)

The complexity of SAP – like that of the other enterprise resource planning systems – created anxiety in the community for a variety of reasons. People had to learn new financial terminology in addition to learning the software because there wasn’t an effective way to retain MIT terms in the SAP system. However, the Institute’s development of the more user-friendly SAPweb application meant that the majority of requisitioners could use the Web rather than having to navigate the SAP screens to do purchasing. SAPweb allows authorized users to create, change, and display requisitions for both internal and external purchases.

Some community members in the departments, labs, and centers (DLCs) felt that the concerns of central areas

were given a higher priority than the needs of DLCs as decisions were made about implementation. Although the DLCs were represented on teams considering several aspects of using SAP, the final decisions did not always follow a team’s recommendations. Clearer expectations, as well as better communication throughout that process, would have helped.

The pressure of the Year 2000 computer problem contributed significantly to putting technology solutions out ahead of people solutions. The Management Reporting team was pushing to meet deadlines while the DLCs wanted them to meet departmental needs. This resulted in a serious breakdown between key players on both sides.

How We’re Using SAP

The SAP software is now used in the MIT community for creating and approving requisitions (for outside purchases), journal vouchers (for transferring internal charges), and to manually set aside funds for anticipated future expenditures. A major advantage of an integrated system like SAP is that data entered once by someone making a purchase can be used simultaneously by all of the following: the outside vendor or partner company taking an order, the Procurement Office, Accounts Payable, and the general ledger. A requisition in SAP creates a commitment and a purchase order; the order is placed with the vendor; the goods are received at MIT; the invoice is paid; the account debited, and the account’s projected balance is updated – all without using inter-departmental mail.

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Reengineering is Over But Change is Not

Snover, from preceding page

The SAP software also is used for producing a variety of reports. A growing number of departments, labs, and centers are using the Labor Distribution System to analyze and manage labor and related effort costs. In addition, MIT's Data Warehouse contains all the current SAP data and provides standard and specialized reports to authorized users. For example, a report called "Funds Available" shows cumulative expenses and revenues as well as authorized totals by principal investigator for a specific profit center or group of profit centers. Another report called "WBS Hierarchy" displays fiscal year-to-date and cumulative activity for a multi-level sponsored project.

Information Technology

All of the redesign teams used information technology (I/T) to help simplify work and improve service, but two of the teams concentrated on computing. They were called I/T Transformation and the I/T Infrastructure Readiness teams.

The Transformation team looked at changing how I/T specialists throughout MIT work together to operate and support the redesigned technology for administrative computing, help others use it, and add new features to it. As Professor David Litster said back in March 1995, "The guiding principle for administrative I/T is a partnership committed to a shared I/T mission of 'Great Systems Fast,' where 'great' is defined by the customer." Dr. Litster, MIT's vice president and dean for Research, was the sponsor of the I/T Transformation team.

The new framework that was developed has process leaders

coordinating the five major phases of I/T work. These include the following areas:

- Discovery – helps customers evaluate processes and discover how I/T can improve them;
- Delivery – takes the work of discovery and delivers a functioning I/T system for the customer's use;
- Service – operates the Institute's central I/T environment including the telephone system, the computer network, and the academic and administrative servers;
- Support – helps the MIT community acquire, access, and use information technology;
- Integration – maintains a cohesive I/T infrastructure incorporating each new product or service.

The **Infrastructure Readiness** team was charged with implementing the underlying computing software necessary to run the redesigned business applications both securely over the campus network and easily on administrators' desktops.

The Appointments Process (TAP)

The TAP team looked at ways to enable MIT departments to newly appoint, extend an appointment, change appointment status, promote, transfer, place on leave, or terminate academic, administrative, support, and service staff. Goals of the redesign were to eliminate redundant work and unnecessary approval steps, eliminate paper and paper handling to the greatest extent possible, design an automated appointments system to support the process, and provide department access to data on appointments in process as well as to current and historical data.

However, the new process was still far too complicated and it didn't

integrate with our information technology architecture. MIT decided, therefore, not to implement this redesign. I have heard that the decision not to proceed contributed to some distrust of the process by team members and others in the community. However, a number of lessons were learned from the hard work of TAP team members, and they are being consulted by the discovery team that recently began work on investigating MIT's requirements for a new Human Resources-Payroll system.

Human Resources

During the Reengineering effort, President Charles M. Vest stated that as one of the most vigorous research universities in the world, MIT's continued success will depend on its ability to attract and retain not only the brightest faculty and students but also the best staff. Forces such as changing demographics, rapidly evolving advances in technology, an increasingly competitive labor market, and difficulties in juggling personal and professional commitments all contribute to making our work lives more complex. For that reason, MIT convened the Human Resource Practices Design (HRPD) team in June 1996 to look into the issues and challenges of our work environment.

The team identified areas of common concern across the Institute through broad outreach to many in the community, including faculty, support staff, administrative staff, and senior management. Basically, the Design team found that current human resource practices no longer aligned with the Institute's changing environment. In partnership with the Personnel Office, HRPD then worked

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Reengineering is Over But Change is Not

Snover, from preceding page

to define, test, and recommend appropriate HR practices. The scope of the work involved the following eight areas: HR practices applicable to teams; job design and classification; hiring procedures; compensation; employee recognition and rewards; effective performance evaluation; assessment, development, and training; and strategic planning.

The Reengineering Steering Committee then charged HRPD with forming project teams to develop specific programs on the following five topics:

- Orientation about MIT
- Generic Roles and Competencies
- Training Policies and Administration
- Performance Management, and
- Recognition and Rewards

HRPD has made recommendations on ways to improve our HR practices through an integrated, competency-based system. Some of this work is already being implemented and other projects are expected to be launched as pilots in the near future. For example, HRPD's findings provided the foundation for the Classification and Compensation project in Personnel, which will reclassify all administrative staff positions on campus into a new classification model. The new model has six levels (down from 42 in our current classification system) and six "compensable factors."

As a result of the Reengineering efforts in the training and development area, MIT established the Performance Consulting & Training (PC&T) team, which is part of Personnel. The mission of PC&T is to work with departments, labs, and centers to enhance their abilities to achieve business goals.

Services include the following: needs assessment, planning and measurement, process improvement, team development, custom-designed training, meeting facilitation, and resource referrals. The team also is responsible for offering a wide variety of courses for employees to develop performance skills.

SAP classes, and professional development seminars. Comprehensive training facilities like ours are rare in higher education. For example, of the 11 schools in the Boston Consortium (Babson, Bentley, Boston University, Boston College, Brandeis, Harvard, MIT, Northeastern University, Tufts, Wellesley, and

The total one-time costs for Reengineering over the six years the Project ran (fiscal 1994-1999) were \$65.2 million, with \$41.8 million of that spent on upgrading our financial systems. Annual savings for the many processes and the reduced staffing that fell under Reengineering began to be realized in fiscal year 1996 at a rate of \$3 million, and grew to \$6.49 million in FY 1997, and to \$11.4 million in FY 1998. In fiscal 1999, the savings rate exceeded \$15 million per year. Although we would hope that the savings number continues to grow, even if it remains at \$15 million annually, we will have paid off the one-time costs of the Project by the end of fiscal 2001.

During Reengineering, PC&T offered several workshops on Change Management and identified and prepared a curriculum for the core technology training that employees will need. The team also presented workshops on both giving and receiving a performance appraisal, and more than 1,000 staff members participated.

In spring 1996, MIT opened its Professional Learning Center, which is a multipurpose employee training facility in Building W89. The Center is being used for core technology training and other computer courses,

Wheaton), MIT is the only one with such a facility.

What did we Spend and How Much are we Saving?

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Reengineering is Over But Change is Not

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Why Didn't we Accomplish More and Save More Money?

Again, these are my own opinions, but with the exception of Physical Plant, Information Systems, and the Publishing Services Bureau, we did not reorganize areas. Instead, we put new processes back into old organizations. And though we installed new tools for doing financial work, we did not significantly change the way the work is done.

Particularly in the financial areas, we did not understand all the basic elements of our existing processes, many of which had become extremely complex over the years, and that led to errors and delays in implementing changes. In some cases, there wasn't enough attention paid to the details.

It's difficult to get people to do things in new ways when there are virtually no mandates. For example, efforts in Supplier Consolidation led to several partnerships (Office Depot, VWR, Olsten, and NECX) that MIT staff are encouraged – but not required – to use. The Institute could be saving more money if use of the partner companies was mandated because our volume of business with them would be higher.

There was uneven support from leaders throughout the Institute that resulted in a lack of alignment and confusion about whether MIT was

really serious about wanting to change.

Another serious problem was that MIT didn't do a good job of coordinating all the new initiatives – both from Reengineering and elsewhere – that were coming at the community simultaneously. For example, in addition to SAP, there were other new systems to learn like COEUS from the Office of Sponsored Programs and Brio Query for using the Data Warehouse. And, there were changes in how services were provided by Physical Plant and Purchasing, as well as a reorganization of the Office of the Dean of Students and Undergraduate Education. Consequently, many people felt overwhelmed by the number and the timing of all the new efforts.

Reengineering wasn't a perfect methodology, but the senior administration believed that we couldn't wait around until the perfect one was developed. As even its "inventors" have admitted, Reengineering didn't pay enough attention to the people issues. If we had understood that better when we began, we might have started with redesigns in human resources, so people would have felt more supported before they were asked to undergo other administrative changes. In any case, we should have ensured that the early efforts were clear "winners" with the majority of the community.

What's Still to be Done?

We are not using SAP's full potential. For example, staff in some departments, labs, and centers are still rekeying data and creating their own spreadsheets for financial reporting rather than using SAP reports or those in the Data Warehouse. A goal of the

ongoing work of the School and Area Coordinators in Financial Systems Services is to assist the DLCs in utilizing the new tools effectively. In addition, the Data Warehouse must be able to provide both the data and the kinds of reports that DLCs need. Work to achieve this is underway, and community members can contact Scott Thorne or Gillian Emmons to learn more about the Warehouse or to discuss their reporting needs.

MIT's current procedures for reconciling accounts need to be simplified, and a pilot project to test an easier and faster reconciliation process has begun.

Centrally, we need to bring up other modules of SAP, such as the HR-Payroll system, once we have a clear understanding of our needs. A discovery team has begun work on this project. (However, as I mentioned in my April 1999 *Faculty Newsletter* article, the Administrative Systems and Policies Coordinating Council will ensure that the timing of projects like this one will be carefully considered.)

And, everyone in the community needs to know that periodic upgrades of software will be part of the normal course of business at MIT.

Now that the new Vice President for Human Resources has joined MIT, more of the recommendations from the Human Resource Practices Development team could be put in place.

Changes in the future may not be as radical as the cultural upheaval we experienced during Reengineering, but there's certainly a need to continue improving how we do administrative work and to systematically measure the results of the changes we make.♣
[Janet Snover can be reached at jsnover@mit.edu]

A Week in the Life of CAES (Center for Advanced Educational Services)

Richard C. Larson

“As I stood in the foyer of the Kaufman/Ford suite, I looked in on the control room operating at max capacity. The cameras capturing the student’s faces, the screen projecting intricate, animated slides. Here was technology at its finest. MIT students receiving a state-of-the-art educational experience in a virtual classroom, sharing it with future colleagues who live on the other side of the world! Incredible!”

- a CAES staff member on the first day of the Singapore-MIT Alliance program

Tuesday, September 7, was MIT’s Registration Day, a type of New Year’s Day for academia. But that day was even more significant than just marking the commencement of another year for the Center for Advanced Educational Services (CAES). Not only was it the fourth anniversary of the Center, it also marked the start of the most intense four days in our brief history.

In less than a 24-hour period, we kicked off two new major educational initiatives and expanded another, using the latest in Java, Enterprise data-base server integration, high-quality video conferencing, streaming video formats and Internet 2; as well as satellite broadcast and live Web-casts with synchronized graphics. We brought technologies together in ways their manufacturers had never envisioned. As one Center staff member put it, we “not only pushed the envelope, we pushed THE envelope!”

Internet Commerce II, part of MIT’s strategic alliance with PBS/The Business Channel was the first out of the CAES gate. On Tuesday afternoon we broadcast live to over 90 lifelong

learning students from such companies as Ford, IBM, and Polaroid. Courses developed for the Business Channel are now delivered simultaneously in three formats (satellite broadcast, video tapes, and video streaming over the Internet) all with active Websites, created and maintained by the Hypermedia Teaching Facility within CAES.

The influence of these courses has made a dramatic impact on the way professionals continue to learn their craft. A student attending the broadcast of Internet Commerce sent this e-mail to the producer, “This course is great! I manage a large IT group at Ford. It really changed our thinking and strategic approach. The session with John Williams and Abel Sanchez was outstanding!”

The week was now moving at warp speed. On Wednesday afternoon, Walter Lewin kicked off the Physics Interactive Video Tutor (PIVOT) by recording his first lecture that would later be digitized and put on the Web for student viewing.

One year in preparation, the PIVOT team has created a video-rich, interactive learning, Web-based environment that can be used to support the teaching of 8.01 Physics I (Introductory Newtonian Physics). Click on the gyroscope on the PIVOT Website and you’ll receive this greeting: “Hello. Welcome to the Physics interactive video tutor. I’m Walter Lewin, your virtual tutor. I will try to answer all your questions and teach you Physics as we go along. If you’re ready, I’m ready.”

Our goals for the PIVOT project are high. We plan to use several of the newest technologies: streaming digital

video, the Web, and search engine technologies to simulate an office hour’s conversation between a student and his/her physics professor. This on-line tutor model is one we hope to replicate for other MIT courses.

Courses such as 18.06, Linear Algebra with Gil Strang, were also taped on Wednesday. All 18.06 lectures will be recorded and digitized this semester. A Web-based platform will be created to house these lectures along with the same FAQs, textbook resources, and simulated tutoring sessions for students taking 18.06.

To prepare to meet the needs of these technology-enhanced courses and projects, staff from CAES and Academic Computing met on Wednesday afternoon with Bob Brown and Vijay Kumar to officially launch the new Educational Media Creation Center (EMC2). This has been 12 months in the planning stages. It is an exciting virtual center merging the educational media production parts of CAES and Academic Computing. It will be a one-stop-shop for MIT faculty, staff, and students needing important services in this domain. Stay tuned for more news about this Center.

The Singapore-MIT Alliance (SMA) kicked off its five-year program at 8:30 am (Boston time), 8:30 pm (Singapore time) with 16.920, Numerical Methods for Partial Differential Equations, team-taught by Dimitris Bertsimas, Tony Patera, and Jacob White. This new graduate educational initiative in engineering with MIT, the National University of Singapore, and the Nanyang Technological University, brings graduate

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A Week in the Life of CAES

Continued from preceding page

students together in one virtual classroom, live, crossing twelve time-zones using an Internet2 connection. This particular morning found 50 MIT graduate students in attendance.

Many of these highly interdisciplinary classes developed for the SMA program are offered to MIT graduate students as electives. This first morning, we hoped to comfortably fill the classroom with MIT students. To our great surprise and delight, we not only filled the classroom to overflow capacity, but then proceeded to fill an additional distance classroom in Building 9.

The evening was even more dramatic. For 6.336J/16.910J, Introduction to Simulation and Optimization, students began to arrive at 7:00 pm for a class that began at 8:00. By 7:30, the classroom was filled

to capacity. By 7:45, our second classroom was standing-room-only, and by 8:00, when the class began, our third classroom was filled to capacity. By the end of the evening, we had 30 students attending the class in Singapore and 90 students attending from MIT!

By Friday evening (96 short hours), we had launched a new educational support organization, brought into one virtual classroom dozens of students from the world community and recorded, digitized, and delivered 14 lectures, via the Internet and the Web, to approximately 700 undergraduates and 300 graduate students across MIT, the country, and the globe. What an incredible week of firsts it was!

Distance Education and "Webified-courses" have taken a lot of hard knocks from the learned

community. Nay-sayers claim that it weakens the educational experience of our on-campus students and offers inferior education to distant learners. Projects such as PIVOT, Internet Commerce, and SMA are examples that counter that argument. Distance education is not about taking away valuable resources from our students; it is about expanding their global perspective. It is about leveling the economic playing field around our planet, pushing the envelope and pushing ourselves to ask how can we do this better.

(I am grateful to Melinda Cerny for collecting the exciting vignettes depicting one week in the life of CAES and committing them to a first draft rendering of this article.)✦

[Richard C. Larson can be reached at rclarson@mit.edu]

Author's Note: The new CAES, Center for Advanced Educational Services, was born on September 1, 1995. We are in Building 9, from basement thru the fourth floor. Come and visit! Our new focus is on technology-enabled teaching and learning, for both on-campus and off-campus learners. We have an R&D lab, CECI (Center for Educational Computing Initiatives, directed by Steve Lerman), with student research opportunities for freshmen thru Ph.D. students. Our Web-oriented production facility, HTF (Hypermedia Teaching Facility) has Webified over 25 MIT subjects and has completed numerous other Web-based projects. HTF is now melding into a new virtual center, the EMCC (Educational Media Creation Center) co-directed by Vijay Kumar and yours truly. The EMCC is your one-stop shop for Web-based design and production for education and research at MIT. MVP (MIT Video Productions) has tripled the volume of educational video it has produced in the last four years. MVP can produce video for your course or lab. Much of their produced video is digitized, compressed, and stored on CAES' unique "Video Farm," a 5 terabyte video storage facility run by David Mycue that can support up to 600 simultaneous video streams. That facility is now serving the on-campus students in 8.01 and 18.06, the on-campus and off-campus students in the SMA program, and the off-campus learners of MIT's offerings to PBS/The Business Channel. Come on down!

Letters

Engineering Systems

To The Faculty Newsletter:

I am somewhat confused by the essay by Professor Roos in the September/October issue of the *Faculty Newsletter*. To begin with, the idea of systems needs some clarification. In the days of the Radiation Lab, I worked in a “components” group. Each such group was responsible for the design and even the production of a specific component: antenna, magnetron, duplexer, display, etc. These were the elements that the “systems” groups used to design and build specific radar systems. The systems were, by definition, more complex than the individual components. The systems engineers had to produce something that would work, that would satisfy the needs of the user (the armed services), and would operate within the users organizational constraints. (A “big” radar system might have a total of several hundred vacuum tubes.) From the description by Roos, I gather that these were not the kind of systems presently under discussion. Later on, in the 1950s, Lincoln Lab set out to design a radar network that would cover all of the Northeastern U.S. With its multiple radars, communication systems, and computers, these looked more like the big systems now under discussion. Again, the customer was the Air Force, and there was little or no direct interaction with the civilian society.

In the 1960s and 1970s under the leadership of Professor Corbato, the EE Department designed and built the Compatible Time Sharing System, and then the Multix computer system. These required the coordination of

engineers and programmers at MIT and at other participating companies. None of the latter felt that they were working for MIT, and it required a fair amount of diplomatic skill to keep the whole thing together. These were systems by any reasonable definition. Today’s processor chips have more than a million diodes and transistors on a single chip – they are indeed complex. However, they are only components of a desktop or a laptop computer. Somehow, they do not seem to fall within the purview of the Engineering Systems Division.

I believe the focus of the Division is on socio-technical systems – transportation systems, communication systems, airports, Big Digs, etc. Designing and building a complex system, and keeping it on time and within budget is complicated, and there have been many new tools and methodologies developed to prevent a grand plan from turning into a tower of Babel. However, I am concerned that MIT might produce the equivalent of the World War II 90-day-wonder Second Lieutenants, who were often kept alive by their more experienced NCOs. To run one of the BIG systems many sorts of skills are needed. There are lawyers who are needed for their expertise, there are businessmen who understand how to keep the appropriate number of books, there are professional lobbyists who know how to get the approval of a state legislature, there are labor relations experts, there are spokespersons who can and will explain what someone else really meant, etc.

Some years ago, several of us (Professors Bruce, Fano, Siebert, Smullin) wrote a report about Lifelong Education, pointing out that the rapid changes in science and technologies

required constant re-education of the engineering workforce. The complexity of socio-technical systems calls for mature leadership. If MIT is serious about making a difference, it should plan a program to educate experienced “working” engineers into the arcana (legal, financial, political, etc.) of organizing and running big systems. I would hope that an MIT, newly minted, systems engineer could be trusted to know something substantial about the relevant engineering, by virtue of at least a departmental degree, and several years of work in industry or the equivalent. The worst thing that could happen would be to grant undergraduate degrees in Systems Engineering.

Louis D. Smullin
Professor Emeritus
EECS

Professor Roos Responds

Professor Smullin provides three examples of different systems: Rad/Lab, CTSS/Multics, and socio/technical. Although the three systems differ, they have a common characteristic: complexity. The Rad/Lab example focuses on technical complexity; CTSS/Multics has organizational, as well as technical complexity; and socio/technical systems feature technical, organizational, and societal complexity.

The Engineering Systems Division (ESD) is interested in a range of complex systems. The balance between technical, organizational, and societal complexity will vary depending on the particular system. Analyses and design approaches will vary as well. ESD’s objective is to establish Engineering Systems as a

(Continued on next page)

Letters (continued)

new field of study. As such, ESD will develop new approaches, frameworks, and theories to better understand engineering systems behavior and design.

Professor Smullin describes the emergence of socio-technical systems and the implications for engineering education at MIT. He asks "if MIT is serious about making a difference" by planning programs that prepare leaders to develop these socio/technical systems. ESD incorporates successful educational and research programs developed at MIT over the past two decades which have achieved that objective. For example, the Technology and Policy Program (TPP), does as Professor Smullin desires, "educate experienced 'working engineers' into the arcana (legal, financial, political, etc.) of organizing and running big systems." The theme of TPP is "engineers with a difference" since TPP requires that students have a technical background, and the program combines engineering with social and management science.

TPP is but one example of the existing MIT professional practice programs in engineering systems. Other ESD programs, such as Leaders for Manufacturing and System Design and Management, also broaden the traditional engineering science based education. An objective of ESD is to build upon these successful educational programs and provide more educational and research opportunities for students in engineering systems. Many of the initiatives will be undertaken in partnership with the Engineering School departments.

Professor Smullin does not advocate granting undergraduate degrees in

system engineering. We agree; ESD does not plan an undergraduate major in engineering systems. However, several MIT departments have expressed an interest in working with ESD to develop an engineering systems minor.

After World War II, MIT pioneered in developing engineering science and transforming the engineering profession. We believe the development of engineering systems will have a similar impact on engineering education and practice in the twenty-first century.

Daniel Roos



Feedback

To The Faculty Newsletter:

I like the *Newsletter* and think that you folks are doing good work on behalf of all of us.

I would like to see a little more controversy in the articles:

- what do faculty think of these big mega partnerships that are developing between MIT and companies such as Microsoft, Ford, Merrill Lynch, etc.?

- a discussion to close the gap between the administration's decision to require all freshmen to live on campus and the thinking of the faculty which is either not focused on the issues or is opposed.

I am sure there are many more "hot" topics to deal with in the *Newsletter*.

Robert B. McKersie

Professor Emeritus

Society of Sloan Fellows

[For one perspective on the new MIT/company partnerships, see "From The Faculty Chair," page 4. Ed.]

Your Wonderful "Meditations" Article

Dear Professor Hildebidle:

I try to make sure the *Faculty Newsletter* does not stay in the "still to read" pile very long. Now you have given me a further impetus. Although the September/October *Faculty Newsletter* contained several articles on issues that, as an administrative staffer, I am personally very involved in (e.g., Y2K, administrative computer systems, academic support) and much other good information, none of this captured my attention like your "Meditations" did. My congratulations on an entertaining and educational effort. Your perspective is enriching.

It is not my usual custom but I did want to thank you for this enjoyable article.

Robert Ferrara
Director, I/T Delivery
Information Systems



A Sore Thing

Gentlesouls:

Why is it that the copiers in the libraries are AWFUL? One can't take out journals to make good copies and the copiers in most/all of the MIT libraries are some of the worst machines I've ever experienced. Outsourced and forgotten? Who's responsible? Does no one complain? Thanks and have a nice day ;).

Edwin L. Thomas
Morris Cohen Professor of
Materials Science and Engineering
Polymer Physics Lab

MIT at Crossroads Over Housing Decision

David Pooley

We are at a crossroads in the history of MIT. The administration is currently seeking to force all freshmen to live on campus beginning in 2001. This is a fundamental change to a housing system that, for over a hundred years, has given freshmen the right to make an informed decision about where they wish to live.

One would think that such a change would be made with overwhelming evidence to support it, but little such evidence exists. As the proposals of the RSSC (Residence System Steering Committee), the SAC (Strategic Advisory Committee to the Chancellor), and other groups have been finalized, it has become clear that implementing this decision in any form will have many adverse effects and is inconsistent with the findings of several well-balanced committees comprising students, faculty, and administrators.

The RSSC, the SAC, and the TFSLL (Task Force on Student Life and Learning) have stated that, despite its faults, MIT's current housing system is one of the best in the nation at fostering diversity, strong communities, and unprecedented student satisfaction.

According to the Cycles survey taken at colleges across the nation, 86.6% of MIT students said they were "satisfied" or "very satisfied" with the residential system here. Over 50% said they were "very satisfied." At peer institutions, an average of 76% said they were "satisfied" or "very satisfied" with only 34% saying they

were "very satisfied." See <<http://counterpoint.mit.edu/v11/n4/4-3.html>>. One of the main reasons cited, is the unique opportunity at MIT for freshmen to make an informed decision about housing after having seen the living groups and meeting the people in them. Many of you may take for granted the fact that you would never

to move away from supporting first-year students. Many of the independent living groups that rely on freshmen for their spirit and viability will be forced to disband and shut down. In fact, the SAC predicts that about 30% of the current FSILGs will close in the near aftermath of forcing all freshmen into dorms.

This system allows students to take an active role in shaping their lives from the moment they arrive on campus, preparing them for the adult decisions that await them in the world outside MIT. Taking away this freshmen choice removes one of the first opportunities for students to begin taking responsibility for their own lives. The mission of all living groups will begin to move away from supporting first-year students. Many of the independent living groups that rely on freshmen for their spirit and viability will be forced to disband and shut down.

rent an apartment or buy a house sight unseen, but this is a luxury among college freshmen and one of the great strengths of the MIT system.

This system allows students to take an active role in shaping their lives from the moment they arrive on campus, preparing them for the adult decisions that await them in the world outside MIT. Taking away this freshmen choice removes one of the first opportunities for students to begin taking responsibility for their own lives. It will also have a more direct effect on campus communities. The mission of all living groups will begin

Strong, supportive communities that have helped thousands of young men and women become mature, self-sufficient adults, will cease to exist.

This void will not be filled by simply adding more beds to the system. With the mission of supporting freshmen now gone, the more stereotypical "fraternities" will thrive by catering to the lowest common denominator among sophomores. Students who come to college looking for that type of experience (and many do) will surely find it.

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MIT at Crossroads Over Housing Decision

Pooley, from preceding page

It is important to realize, however, that the dorms have cultures as strong and as unique as any FSILG at MIT. When freshmen choice is taken away, these cultures will quickly become homogenized. Without strong communities with which to identify, students will feel more alone and isolated than they already do, and, frankly, this is dangerous in the high stress environment of MIT.

Perhaps the most distressing aspect of the whole situation is the way in which the decision was made. According to his letter to the MIT community, President Vest based his decision in large part on the final report of the TFSLL (*Tech Talk*, 26 Aug 1998). This report, however, was tainted. As Jeremy Sher, a member of the Task Force, later stated at a rally against the decision: "In fact, the Task Force did no deliberation on the [Freshmen on Campus] issue, except for a couple of hours in the fall, after which we decided not to talk about it.

"Then, in mid-July, one of the co-chairs of the Task Force called me into his office and told me the following thing. 'The decision was inevitable,' he said. 'It would be made with or without the Task Force's consent.' " (Public Statement, 8 Sept 1998). In the wake of President Vest's announcement, student and faculty opposition was overwhelming. Students held protests and pleaded with the administration to reconsider, and the faculty did not vote to support the decision. However, nothing changed.

In my six years at MIT as both an undergraduate and a graduate student, I have never seen such polarization of

the students and administration. At a Community Meeting during this past Family Weekend, President Vest responded to a question about student opposition to the decision with, "I'll probably get in trouble for saying this, but it's a fact of life. I will guarantee you that if you go to any campus on America, students would vote to have the current system remain." (Public Statement, 16 Oct 99). Actually, students have devoted a great deal of

administration. Students have lost confidence in the administration, and a feeling of distrust is growing. This will continue until students feel that they are being taken seriously. Please urge Chancellor Bacow (bacow@mit.edu) to delay this decision for further study. It is not at all clear that moving all freshmen to campus is in the best interest of MIT, and there are many more pressing problems, such as graduate housing,

The characterization of our concern as some stubborn adherence to the status quo has understandably upset many of us. There is a definite rift in the MIT community that needs to be mended. The only effect of the decision so far has been to create antagonism between the students and the administration. Students have lost confidence in the administration, and a feeling of distrust is growing. This will continue until students feel that they are being taken seriously.

thought to this issue and are genuinely concerned about the future of MIT. For many of us, the places where we go to sleep each night are more than just beds in a hall; they are our homes and our communities. We are not opposed to change; we are opposed to potentially harmful and destructive change.

The characterization of our concern as some stubborn adherence to the status quo has understandably upset many of us. There is a definite rift in the MIT community that needs to be mended. The only effect of the decision so far has been to create antagonism between the students and the

that simply cannot be put off any longer. Most importantly, no housing system will work without the support of those who live under it, and students will not support a system that has been forced upon them.

You can visit <http://mitchoice.mit.edu> to get more information about student resistance to the decision. Please take a look at the open letter to President Vest and Chancellor Bacow and show your support for a student voice by signing it.♣

[David Pooley can be reached at pooley@mit.edu]

The Year 2000 Team

The Horseless Carriage Revisited

Gayle C. Willman

At its first public appearance, the Stanley brothers' horseless carriage dazzled crowds. The "Stanley Steamer" made its debut at the Charles River Park bicycle track – site of the present-day MIT campus. Within a week, there were 100 orders for Stanley vehicles. Within a year, their steam-powered "Locomobile" became the first car to climb Mt. Washington.

Few working models of these turn-of-the-century cars remain, so it was a puzzle recently when the number of Certificates of Title for "horseless carriages" in Maine dramatically increased. The culprit: a computer that interpreted the "00" for 2000 model year automobiles as 1900, and categorized the new cars as antiques.

Y2K-related computer errors have been surfacing all year, some more serious than others. When this column was initiated a year ago, there was already a fair amount of hype related to Y2K, as well as serious concerns at MIT. That hasn't changed.

The presence of hype is not the same as absence of risk. Because there is a subjective element to the perception of risk, the task of communicating Y2K concerns has been complicated. Researchers, for example, tackle laboratory failures as a matter of course – so any potential challenge related to Y2K is often viewed as "business as usual."

How might Y2K differ? Two aspects focus our concerns. The most serious is the reduced availability of emergency services during the New Year's weekend. An estimated 3 million people are expected to attend festivities in the Boston/Cambridge

area on New Year's Eve. This is a crowd roughly 6 times larger than that at any recent Fourth of July event. The second impact is likelihood of multiple Y2K-related failures, further straining available resources.

Y2K represents potential risks that must be taken seriously. Risks affect not only computers, but also laboratory and building systems. Many people throughout MIT have been and continue to work on achieving and testing compliance. About 300 enterprise computer systems have been evaluated and updated for Y2K-readiness. In addition to issues related to computers, there are concerns about embedded systems. These non-programmable microchips control a huge variety of devices in facilities and laboratories on campus, and may fail in a variety of ways.

In spite of the extensive efforts already made at MIT, you could still experience unanticipated problems if local Y2K-readiness has not received adequate attention.

The 4-day Weekend

The Institute will observe a 4-day holiday weekend, and will be closed on Friday, December 31 through Tuesday morning, January 4. MIT's Business Continuity Management Team (BCMT) has been appointed to address potential issues during that period.

Preparations to Make Now

Begin preparing for the Y2K weekend now. Emergency preparedness makes good sense anytime. The information below is a partial list of the recommendations being made by the Year 2000 Team, the BCMT Transition Team, the MIT Safety Office, and the Procurement Office.

Contingency Planning

- Update contingency planning to protect your experiments and research, and to prevent potential problems. In your plans, assume reduced emergency response services. Review and verify that the Emergency Action Plan for your department, lab or center (DLC) is up to date. Here are some suggestions:

Consider the impact of a loss of:

- power (how long?)
- heat (how long?)
- A/C (how long?)
- refrigeration/freezers
- waste treatment or removal
- ventilation/hood exhaust
- chemical reactors and/or processors

- Evaluate any and all continuous processes for their potential to fail.

- Review TAVA reports. Over 6000 pieces of equipment with embedded chips were tagged by MIT's consultant TAVA Technologies. If your area has TAVA-tagged equipment, your administrative officer has a TAVA report on its Y2K-readiness. Evaluate the impact of this information on the operation of your laboratory.

- Consult with your Chemical Hygiene Officer, Safety Coordinator, or Emergency Action Plan Coordinator and plan a walk-through of all key areas before the close of business on Thursday, December 30th.

- It may be safest to curtail the more hazardous experiments during the transition weekend when safety systems and emergency response resource capabilities may be stressed.

- Determine what level of staffing is necessary, and who the personnel will be. Determine if the personnel will actually be "on duty" or "on call."

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The Horseless Carriage Revisited

Willman, from preceding page

- Ensure that MIT's "green cards" are up to date with the appropriate contact names and phone numbers, and that they are properly displayed on the doors of your laboratory. The green card emergency contact list for laboratories has been updated to reflect the transition into the year 2000. The "new" card has a neon green color. It is extremely important that labs review the contact names listed on the existing cards, and transfer – or update – the information onto the "new" card and send a copy to the Safety Office, room E17-207. For further information, contact the Safety Office at x3-4736.

- Plan resumption of normal activities when the Institute reopens on January 4: what systems or processes will need to be checked? who will perform the checks?

Services and Supplies

Without resorting to "stockpiling," make sensible precautions and order goods and services now, especially long lead time purchases, or those scheduled for December delivery. Remember that the last week of the year is a popular time for vacations, and normal deliveries and services could be delayed.

- Conduct an inventory of supplies and reagents, and order reasonable amounts (110% recommended) for critical operations.
 - Order supplies for printers, copiers and other "show-stoppers."
 - Don't stockpile hazardous materials (gases and chemicals).
 - Consider whether your lab needs to acquire dry ice. If you suspect storage issues related to hazardous materials or potentially infectious materials, order dry ice now for December delivery.

- Call for hazardous waste pick-up ahead of time.

- Check the supplies and materials in your spill kits.

[For a checklist of recommended Y2K preparation activities for desktop computers and for actions to take on December 30th, see back page.]

For further information:

- MIT Y2K Team

<<http://web.mit.edu/mity2k/>>. y2k-help@mit.edu; 253-2000

- BCMT Y2K Transition Team
<<http://web.mit.edu/bcmt/>>. y2ktt@mit.edu

- MIT Safety Office
<<http://web.mit.edu/safety/>> safety@mit.edu; 253-4736♣

[Gayle C. Willman can be reached at willman@mit.edu]

When Does the Millennium Start?

Officially, the United States will enter the next millennium with the dropping of a time ball at the U.S. Naval Observatory in Washington, DC on the eve of 2001. (The Gregorian calendar had no year zero.)

In 1830, the Navy introduced time balls to enable ships to check the timepieces used to determine longitude at sea. On the east coast of the United States, the year 2000 will be ushered in by the dropping of a similar, new Waterford crystal time ball in New York's Times Square.

Year 2000 will arrive in New Zealand at 7 am eastern standard time on December 31, 1999, and events there will be monitored for early indicators of Y2K effects. Of special interest to technology professionals is the transition to 2000 at Greenwich Mean Time (GMT), 7 pm eastern standard time on December 31, 1999. Because many computer systems depend on GMT, it is possible for Y2K-related failures to propagate several hours in advance of the chronological arrival of the New Year.

M.I.T. Numbers

A Y2K Preparation Checklist

- Assess and update desktop hardware. Links to hardware manufacturers can be found at: <http://mitvma.mit.edu/mity2k/y2kcomp.html>.
- Make decisions about backups. If local backups will be done, make sure you have an adequate supply of backup media; if the online ADSM service will be used, sign up now: <http://web.mit.edu/is/help/adsm/>.
- Change desktop computers to display 4-digits for the year. Instructions can be found at: <http://mitvma.mit.edu/mity2k/dtsteps.html>.
- Obtain new Web certificates if you haven't within the last 3 months: <http://web.mit.edu/is/help/cert/>.
- Update Kerberos software: <http://web.mit.edu/kerberos/www/index.html>.
- Install recommended Service Packs for Microsoft Windows and Office software, and check other commercial software Y2K readiness: <http://mitvma.mit.edu/mity2k/y2kcomp.html>.

Preparations to Make December 30th

Offices

- Perform backups.
- Shut down desktop systems.
- Shut down local servers not required over the New Year's weekend.
- For servers that will be running over the millennium boundary, recheck the recommendations Web page at: <http://mitvma.mit.edu/mity2k/mitonly/recomnds.html>.

Laboratories

- Verify that processes that can be shut down for the weekend, have been shut down.
- Store all hazardous materials properly and ensure that all containers are closed or sealed.
- Close shutters on lab hoods.
- Conduct a walk-through of all key areas before the close of business on December 30th.