

# The MIT Faculty Newsletter

Vol. V No. 2

October 1992

## Minority Freshmen Express Both Typical and Unique Concerns

Arthur Mattuck

Underrepresented minority students have in recent years been about 1/6 of the freshman class: roughly equal numbers of Blacks and Hispanics (Chicano, Puerto-Rican) and a smaller number of Native Americans. There are a lot of them and they seem to me highly individualistic, on the whole better described by anecdotes than statistics. Still, there is one statistic of which faculty should be aware.

A recent study of UROP participation showed that while 75% of MIT students

## EECS Plans Major Curriculum Changes

Paul Penfield, Jr.  
John V. Guttag  
Campbell L. Searle  
William M. Siebert

The Department of Electrical Engineering and Computer Science (EECS) is planning some major changes in curriculum, both undergraduate and graduate. Our plans require two new degrees, the Master of Engineering (M.Eng.) and Engineer in Computer Science (E.C.S.). Motions to authorize these degree names will be introduced (by the School of Engineering) and discussed at the November faculty meeting, and then voted on in December.

The motions themselves are relatively straightforward, but the changes they are designed to permit are rather fundamental and far-reaching. We believe that these changes are of importance to the entire MIT community, and we hope that the motions will stimulate a wide discussion.

Our plans extend the length of the professional degree from four to five years. The need for this extension can be explained in two ways.

First, four years isn't long enough for everything we think is essential. Modern

## Editorial

## Forging A National Education Funding Policy

The candidates in the three Presidential debates all gave lip service to the importance of education; Clinton even explicitly proposed a financial mechanism to increase access to colleges and universities. But no substantive comprehensive debate on financing education is taking place, even in this election year – other than side shows, such as the voucher debate. No developed “National Education Platform” has been forthcoming responding to the extraordinary changes in the world situation and the full integration of modern technology into production, communication, and all aspects of social life.

The nation needs a national education policy: Its centerpiece must be that everyone in the country deserves not only a first-rate high school education, but financially guaranteed access to two or four years of college or university. The technological, economic, and political complexity of an integrated world requires this high level of universal education for full and productive

*(Continued on Page 3)*

### The Freshman Year: Part Two

Mel King – Page 6  
Arthur Steinberg – Page 11

were in UROP at some point in their time here, only 3% were from underrepresented minority groups. Interviews and questionnaires were used to find out why. According to Claude Poux, the UROP administrator,

*(Continued on Page 10)*

**From The Faculty Chair — Page 5**

**Intervention at MIT — Page 12**

**Research Libraries — Page 14**

**Also: Teaching at MIT; Letters; M.I.T. Numbers**

**Table of Contents — Page 2**

# MIT Faculty Newsletter

## Editorial Board

**Stephan L. Chorover**  
(Brain & Cognitive Sciences)

**\*Nazli Choucri**  
(Political Science)

**Catherine V. Chvany**  
(Foreign Languages & Literatures)

**Ernst G. Frankel**  
(Ocean Engineering)

**\*Jean E. Jackson**  
(Anthropology/Archaeology)

**Gordon Kaufman**  
(Management Science & Statistics)

**Daniel S. Kemp**  
(Chemistry)

**\*Jonathan King**  
(Biology)

**\*Lawrence M. Lidsky**  
(Nuclear Engineering)

**Stephen J. Lippard**  
(Chemistry)

**Fred Moavenzadeh**  
(Civil Engineering)

**Merritt Roe Smith**  
(Science, Technology, & Society)

**David Thorburn**  
(Literature)

**Leon Trilling**  
(Aeronautics & Astronautics)

**Robert V. Whitman**  
(Civil Engineering)

**\*Editorial Committee for this issue.**

**David Lewis**  
Managing Editor

**Address:** MIT Faculty Newsletter, MIT Bldg. 38-160  
Cambridge, MA 02139; (617) 253-7303.

**E-Mail:** fnl@zeiss.mit.edu.  
**FAX:** 617-253-0458

**Subscriptions:** \$15/year On-Campus  
\$20/year Off-Campus

## Contents

Minority Freshmen Express Both Typical and Unique Concerns	1
EECS Plans Major Curriculum Changes	1
<u>Editorial</u>	
Forging A National Education Funding Policy	1
<u>From The Faculty Chair</u>	
Priming the Pump	5
Curriculum 92: Commonality, Creativity, Community, Politics, and Paradigms	6
Integrated Studies Program Stresses Interconnection/Experimentation	11
Intervention at MIT: Dealing with Addiction	12
Specialized Journals, Scholarly Communication, and Research Libraries	14
Teaching at MIT: It Happens	18
<u>Letters</u>	19
M.I.T. Numbers	20

## Authors

**A. Douglas Carmichael** is Professor of Power Engineering, Department of Ocean Engineering.

**Carol Fleishauer** is Associate Director for Collection Services, MIT Libraries.

**John V. Gutttag** is Professor, Electrical Engineering and Computer Science.

**Mel King** is Adjunct Professor, Urban Studies and Planning.

**Jay K. Lucker** is Director of Libraries.

**Arthur Mattuck** is Professor of Mathematics.

**Travis Merritt** is Head, Undergraduate Academic Affairs Office.

**Paul Penfield, Jr.** is Professor, Electrical Engineering and Computer Science; Department Head.

**Campbell L. Searle** is Professor, Electrical Engineering and Computer Science.

**William M. Siebert** is Professor, Electrical Engineering and Computer Science.

**Arthur Steinberg** is Associate Professor, Anthropology/Archaeology; Director, Integrated Studies Program.

**Eve Sullivan** is Senior Editorial Assistant, Annals of Physics.

**J. Kim Vandiver** is Professor of Ocean Engineering; Faculty Chair.

## Editorial

# Forging A National Education Funding Policy

*(Continued from Page 1)*

participation in society. The ability of qualified students to continue to college should not depend upon family income, as it does now. Ensuring the excellence of our 110,000 public schools distributed throughout 16,000 school districts must be a national priority. It is as important as national defense; and certainly as relevant to the nation as the national highway system, if not considerably more.

In the election campaigns of the 1970's the scientific community – groups of academics, scientists, and engineers – played major local and national roles articulating policies and framing the debates around science, education, and disarmament, among other issues. In the 1980's, equal access and affirmative action was at center stage. Yet despite the deepening current concern over the erosion of our overall educational and scientific resources, no equivalent voices emerged in 1992. Professional educators must step forward to advocate for the coming generation, in order to have the debate and the decisions we need in the post-election period. Arguments that it is self-serving for educators to advocate expanded education programs are specious; if educators together with parents do not fight for education, who will?

### **Disinvesting in Education**

The Reagan/Bush administrations have presided over large-scale federal disinvestment in education. This stance reversed the trend in the post-WWII period when the limitation of property taxes as the sole fiscal base of educational programs was clearly recognized. We do not finance B1 bombers, national highway programs, or superconducting

supercolliders by local property taxes. These projects are financed nationally by the major source of public wealth in the country — federal income taxes from individuals and corporations. At present, less than 2 cents of every income tax dollar goes to education. By comparison, 50 cents of each income tax dollar goes to defense.

One of the recent mechanisms

higher education all have large concentrations of intellectual and scientific resources that come through the public purse. These are provided by direct and indirect federal subsidies through the NIH, DOE, NSF, and other agencies. We all recognize the critical value of such programs that are funded under the rubric of research and technology training.

**We do not finance B1 bombers, national highway programs, or superconducting supercolliders by local property taxes. These projects are financed nationally by the major source of public wealth in the country — federal income taxes from individuals and corporations. At present, less than 2 cents of every income tax dollar goes to education. By comparison, 50 cents of each income tax dollar goes to defense.**

preventing the reversal of this policy was the 1990 Budget Enforcement Act, which prohibited savings achieved through reductions in the bloated \$285 billion dollar military budget from being transferred into civilian programs. In the past year, a Congressional group led by Iowa's Tom Harkin mounted an effort to amend the Act in order to allow such a transfer. Next year the Enforcement Act will run out. It will be critical that future budgetary processes permit the transfer of funds, eliminated from the military budget, into the civilian budget.

### **Importance of Federal Funding for Educational Excellence and Access**

MIT and other leading institutions of

Tuition fees cannot equip spectroscopy labs, computer graphics facilities, or up-to-date libraries. Nor do they even fully provide faculty salaries. For schools in the 21st century to provide a first-rate educational environment, they will require similar access to resources used to build up the research enterprise.

The funds available from the Department of Education are a pittance. The President's Education 2000 program is a demonstration program, to help a lead school in each of the nation's 535 Congressional Districts. The 0.5 billion dollars requested represents a drop in the bucket of what is needed. On the other hand, the transfer of 10% of the now

*(Continued on next page)*

## Forging A National Education Funding Policy

(From preceding page)

over-funded DOD budget to a national education initiative would bring us into the 21st century running, rather than limping.

We have seen the effectiveness of even piecemeal federal investment in education in the period after Sputnik. The pressure of the Cold War led to a number of federally-financed initiatives. These initiatives sharply increased the availability of math and science education at the secondary school level and up through the educational ladder. Extraordinary breakthroughs in biomedical knowledge and biotechnology represent the fruit of decades of NIH investment in educational programs (rendered politically palatable as research training programs). The recent backwards turn of the National Endowment of the Humanities has been put forward as an argument against federal programs. But reactionary forces rear their head at every level of society. They prevent investment in education. We must oppose them wherever they surface.

When critics of public investment in education argue that the problem can't

be solved by throwing money at it, we must point out there is little possibility of solving the problem without sharply increasing the money invested. How would our chemists respond if told that their request for funds to purchase instrumentation is just throwing money at chemistry? Or how would the DOD respond to the notion that rather than purchasing jets from Boeing they should recruit volunteers to build the bombers?

We cannot rely on arguments about competing with the Japanese and Germans to provide the political thrust. Many of the leaders of the High Technology Industry were formerly vocal advocates of expanding access to education. In a climate when all of them are laying off trained personnel and reducing investment in R&D, their commitment to expansion of public education is sharply reduced. Many major corporate entities in fact are investing in our competitors. Their interest is the bottom line, not the education of our citizenry, not the investment in this nation's human capital. Human capital, everywhere, is valuable.

**Editorial Committee**

### In Memoriam

**On behalf of all our faculty and staff, we extend our deepest sympathies to the family of Yngve Raustein. All our lives are diminished by this immense loss of a young life through a senseless and deplorable act.**

**To prevent such violence in the future, we need to find ways of deepening our commitment to raising the standards of living for everyone in our Cambridge community, rather than building fortress walls between them and us.**

### Next Issue

Concerns about community will be addressed in the next issue of the *Newsletter*. We also anticipate responses to the proposed EECS curriculum changes.

We welcome contributions on these or any topic of interest to the MIT community. Please address all submissions to: **MIT Faculty Newsletter, 38-160**; by FAX to **617-253-0458**; or by e-mail at **fnl@zeiss.mit.edu**.

## Luce Scholars Program Seeking Nominees

**T**he Center for International Studies is requesting assistance from faculty in identifying former students or current seniors with outstanding records of achievement who would be interested in the Luce Scholars Program. The Program, open to seniors, graduate students, recent alumni, and junior faculty, places

young scholars from a wide variety of intellectual fields in ten-month internships throughout Asia. The Program is aimed specifically at those with no prior experience in Asia.

MIT is eligible this year to nominate two applicants, but will submit the names of only those candidates whose records of achievements are clearly superior.

Last year no names were submitted because the quality of those submitting applications did not meet the high standards of the Foundation.

Application packets are available from Elizabeth Leeds, assistant director of the Center for International Studies, E38-652, x3-9861, or from Dana Lang, E38-656, x8-7610. ♣

From The Faculty Chair

# Priming the Pump

J. Kim Vandiver

For the better part of a decade, I have observed the significant efforts of Paul Gray and, more recently, Chuck Vest to increase the numbers of minority faculty members at MIT. The results have not been encouraging, with the most common excuse from Deans, Department Heads, and Search Committees, being that the applicant pool is just too small. An obvious strategy it would seem is to increase the size of the pool. We might take some pride in the fact that the percentage of under-represented minorities among the undergraduates has been on the order of 15%, better than many of our fellow science and engineering institutions. Upon closer inspection, I find the numbers not so hopeful because, nationwide, MIT included, only a few percent of minority students graduating with bachelors degrees in science and engineering go on to graduate school.

I recently made the suggestion in a group discussion that perhaps we should direct special efforts towards making graduate school more accessible. A minority colleague pointed out that I was addressing the wrong problem. The real problem was that we were failing to understand and meet these students' needs as undergraduates and until we address these needs, we will continue to fail to prime the pump with a significant supply of doctoral students.

At the risk of oversimplification, I will attempt to define the problem

we face here at MIT. First, most faculty do want to help, but make the assumption that providing a level playing field and treating everyone equally will yield the desired results. The flaw in this is that we, as dominantly white male faculty, fail to understand that many of our students come from backgrounds and experiences that have given them

students, not from my own department, but ones I knew on the basis of a single engineering subject which I teach, went on to graduate school. For each, my extra effort contribution was, from my point of view, small, but I have evidence to believe was a positive factor in the outcome.

What can we as individuals do to

**First, most faculty do want to help, but make the assumption that providing a level playing field and treating everyone equally will yield the desired results. The flaw in this is that we, as dominantly white male faculty, fail to understand that many of our students come from backgrounds and experiences that have given them little reason to trust us or to believe that we will respond well when they appear at our door seeking UROPs, guidance, or encouragement.**

little reason to trust us or to believe that we will respond well when they appear at our door seeking UROPs, guidance, or encouragement. We need to do a better job at reaching out and demonstrating that there is a future for them in this environment.

On the basis of cumulative recent experiences, I am beginning to appreciate that relatively small investments in providing such things as encouragement, respect, UROP opportunities, and recommendations does yield results. Last year, four

make a difference? Especially on the issue of race, it is very difficult to take action or speak out, even when you have the best of intentions, because there are so many ways to be wrong. But don't let that stop you from trying. My response is to suggest that we try to learn about the issues, test our ideas on friends, take collective action when it makes sense, and individual action whenever you get the chance. Beginning with our individual efforts, we too can make a difference.

## The Freshman Year

# Curriculum 92: Commonality, Creativity, Community, Politics, and Paradigms

Mel King

As we greet the new students, I challenge you to a new level of creativity and caring. These young people face a tremendous task. They must “change twenty centuries of war into a century of peace.” [Oscar Arias\*] The question is what do they need from us. As we are inducting them into the traditions of science, with the rigor and care such pursuit requires, we must put the same energy into developing in each student a vision of themselves as a custodian of our world. Their decisions must be based on our commonalities: the planet and our humanity.

We want them to seize this opportunity to get skills to improve the life chances for people everywhere. I implore you to turn your attention in this direction because I have faith that you know that no society with our level of resources should tolerate a situation where 43,000 babies die daily of hunger and lack of potable water. You know that unless we begin to act on the idea that “all the children are our children” [Khalil Gibran] we cannot say this society makes sense.

We must bring our students’ most serious attention to the choices they are making. They are now faced with the privilege of the opportunity to acquire the best information and training along with a prestigious credential which will gain them access to the institutions which produce the “leading edge” of knowledge, inventions, and policy.

*The privilege of knowledge bears a social responsibility.*

Each one of these young people is now a precious resource. What of the problems on this planet, what goals deserve them? We are teaching them whose needs to meet and how well. Opportunities to do something that will help abound. I hope you encourage

them to make choices about which skills and knowledge to acquire on the basis of the needs arising from our commonality, needs for sustainable agriculture, community economic development, political decentralization, education that works, and the elimination of hunger, lack of water, AIDS, and pollution. I hope you invite them to challenge the R&D program that has us with hardware, software, and management technology to put a bomb into an air-conditioning duct from 40,000 feet, but without the pedagogical and administrative technology to provide an education for most of the young people on the planet.

We must convey that, while they are not responsible for our problems, they are responsible for the power they will wield – the power to take care of the planet, the power to make decisions with a sense of people’s rights to pursue their dreams.

*We must commit ourselves to transform privileges into rights for all.*

The technology we need is figuring out how we can actually “beat our swords into plowshares.” That problem is economic, cultural, political – it is tough and it often seems to elude any “elegant” solution. But it is one that needs the creativity of the people who are here and it deserves our attention. What are the political and social technologies that bring out the best in all of us?

What is the moral force we can foster so that we can have a world of justice? In LA, they said, “no justice, no peace.” How do we make sure that the concept of peace we are teaching is not an absence of unrest, but a peace based on people feeling that their lives are rooted in love that values all people? Peace is not merely the absence of oppression, discrimination, and the threat of violence,

it is the presence of conscious work in pursuit of a climate where fear, violence, and oppression cannot exist and will not be tolerated.

*Peace is not the product of a victory or command....Peace is a never-ending process...an attitude, a way of life, a way of solving problems and resolving conflicts.*

I want to tell you how much I value your and their creativity. We need efficient and innovative new technologies. But no one should be allowed to just stick their heads into these technologies and exempt themselves from their consequences. We must create in a way that reflects that our humanity is not based on quantum theory, but on our ability and willingness to take care of each other, to value each other, and to take care of this planet – our home, our history, and the ground of our dreams.

The technology most needed is the technology of human development. How do we exist and be connected to people in our families, cities, and nation states? How do we relate across the gulf between the experiences of MIT professors and the people who clean the basements here? Let’s model for our students a willingness to deal with all the magnitude and complexity of what’s going on. Let’s reinvigorate our teaching with the imperative to develop their hearts as well as their minds.

I want to bring your attention to our political role in terms of the paradigms into which we are inducting these students. Thomas Kuhn describes that paradigms dictate “the entities that nature does and does not contain [and] determine the legitimacy both of problems and of proposed solutions.” Our notions of the

*(Continued on next page)*

## Curriculum 92

(King, from preceding page)

possible, constrained by our paradigms, lead us to believe that our definitions of problems and our identifications of solutions are exhaustive, appropriate, and moral. In scientific (supposedly neutral and objective) education we “acquire theory, methods, and standards together, usually in an inextricable mixture.” [*The Structure of Scientific Revolutions*] Using the word “paradigm” to describe our belief-systems and their accompanying models and techniques exposes them as powerful, authoritative,

war, hunger, and oppression.”

*Nobody can ignore the problems of today, least of all intellectuals.*

In the words of Martin Luther King Jr., “our scientific power has outnumbered our spiritual power. We have guided missiles and misguided men.” What is the goal or end of your beliefs, your paradigm? My paradigm is built around the goal of peace with justice. This goal affects my beliefs about what is possible; I believe we can develop the human technology we need to build a

these faculties. It is extremely important that we take responsibility for our power over students. We in fact have the power to destroy their courage and confidence and curiosity. One of my students described “the significant loss of intellectual passion. Freshmen arrive impatient and excited about physics and math and soon, humbled and degraded, make a hasty and severe intellectual retreat.” [Starr, *MCP XI*, 1991] Her observations are confirmed by Benson Snyder’s research on MIT students in *The Hidden Curriculum* [1971]. Educator Jeff Howard describes direct causal relationships between confidence and effective effort and between effort and learning, showing that without experiences of success to support confidence, students’ effort becomes less effective, undermining the possibility of learning and intellectual development:

*Once their belief in their abilities has been undermined, students tend to explain their difficulties as caused by deficiencies in innate ability [which] has a disabling impact on the capacity to marshal effort....On the other hand tasks that are both challenging and realistic engender commitment of effort....The challenge results in feelings of satisfaction with success and increased confidence....Strong confidence generates effective effort. [“Getting Smart: The Social Construction of Intelligence,” 1991]*

Albert Einstein confirms the import of our role in their intellectual development.

*The most important motive for work in the school and in life is the pleasure in work, pleasure in its result, and the knowledge of the value of the result to the community. In the awakening and strengthening of these psychological forces...I see the most important task given by the school....The school should always have as its aim that the [student] leave it as a harmonious personality,*  
(Continued on next page)

**If we look at what’s going on around us, the paradigms we’re using aren’t sufficient. They don’t work for bringing out the best in us or for eliminating hunger and poverty. It doesn’t mean some of the techniques aren’t useful, but they can’t be seen as ends in themselves and may not be the appropriate means to build the kind of world in which anybody would want to live.**

and incomplete belief-systems and exposes the status of our current approach – whatever its prevalence and prestige – as merely one of a diversity of distinct approaches of equal intellectual, social, and moral validity.

If we look at what’s going on around us, the paradigms we’re using aren’t sufficient. They don’t work for bringing out the best in us or for eliminating hunger and poverty. It doesn’t mean some of the techniques aren’t useful, but they can’t be seen as ends in themselves and may not be the appropriate means to build the kind of world in which anybody would want to live. We need new paradigms. In our teaching and in our research we must “develop a new morale...to rule our actions by principles. [If we do not], we will be resigning our capacity for change. We will become prisoners of the past, accomplices of

world of peace and justice. This paradigm also affects my definitions: I define research and development in human terms rather than hardware terms, as does Julius Nyerere:

*Man becomes meaningful to himself and his fellows only as a member of...society. Therefore to...work for the development of man must mean the development of that kind of society which serves man, which enhances his well being, and preserves his dignity. For the truth is that development means the development of people. Roads, buildings, the increases of crop output, and other things of this nature are not development, they are only tools of development. [Man and Development, 1974]*

Since the creativity and inventiveness of these young people is precious to this planet, we need to make sure that our teaching facilitates the development of

## Curriculum 92

(King, from preceding page)

*not as a specialist...even for technical schools, whose students will devote themselves to a quite definite profession. The development of general ability for independent thinking and judgment should always be placed foremost, not the acquisition of special knowledge....The demands of life are much too manifold to let such a specialized training in school appear possible. Apart from that, it seems to me, moreover, objectionable to treat the individual like a dead tool. [Out of My Later Years, 1950]*

Ensuring the quality of their education will require both analyzing the old educational paradigms and creating alternatives. We should encourage students to actively define learning and education. We should foster serious institution-wide questioning of the curriculum in light of the needs of this planet. (And this means demanding relevance and action from the humanities and social sciences as well as demanding life-promotion from the physical sciences and engineering.)

Developing students' creativity means nurturing their own directions of inquiry. Mihaly Csikszentmihaly recently publicized his quarter century of research on what makes people happy. He finds that the optimal human experience – consistently and independently described as “flow” – is total absorption in a task both challenging and possible. We should orient our teaching to develop in students the habit of learning, of questioning and research, because it is this level of engagement that will sustain them in work “so gratifying that people are willing to do it for its own sake...even when it is difficult” [Flow, 1990] because the work they must do is very difficult:

*If they want peace, they will have to construct it. If they do not want misery, they will have to eliminate it.*

Part of what we need to do is nurture

the spirit of challenge, the courage to change. Encourage them to challenge you in class. We obviously don't know how to create a learning environment that brings out the best in all our students and that produces caring, committed people. Their experience is a valuable resource as we struggle to move out of old paradigms. We don't know the technology of human development. This education is about their minds, not ours. They are our teachers.

*Don't ever fear the risks you will have to take to build a different world.*

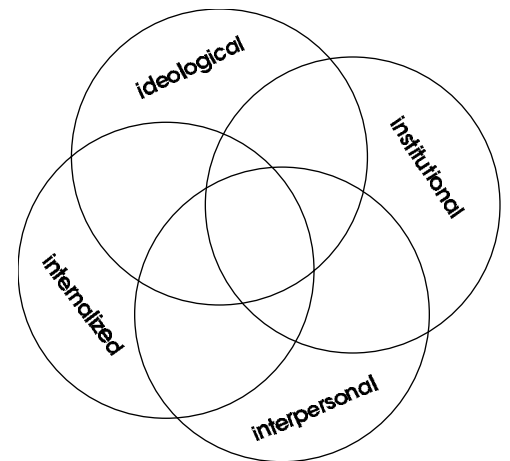
Supporting their challenges – both pedagogic and curricular – means responding to their proposals for change, greeting their requests for alternative courses with enthusiasm and alacrity. We should offer to co-design and co-teach courses and to facilitate the bureaucratic procedures. My understanding of community is based on the idea that valuing and drawing on one another enriches our work. The process of taking people seriously, including them, and learning from them can lead to community. For the same reason, we should encourage students to work together, to value one another in their own learning. We can point out to them the academic benefit at all ability levels of working in groups (now clearly established by research on motivation, learning, and productivity). I challenge you to build a community that will enhance the quality of your own physical, social, political, and intellectual experiences, a community that is safe, in which we are wise enough to be interested and stimulated by different voices, in which we all participate in a rich environment of peoples and cultures, textures and meanings.

How we shape our students is a fundamentally political task. The ideologies and techniques with which we imbue them must be compassionate

and critical. These young people are groomed for power. We must imbue them with the reality and significance of their positions and privileges if they are to participate responsibly in the shaping of our community. [Vincent Harding, 1990] They cannot do that unless they are keenly aware of the consequences of their beliefs, decisions, and actions. The YouthBuild organization has developed an analytical tool for thinking through the political landscape:

### “The Four I's of Oppression” YouthBuild 1992

In order to teach our students about their political responsibility, we must acknowledge and take responsibility for our own ideologies. What is your ideology about poverty and privilege; about which peoples on this planet



deserve and on what basis? We must see and help students to see that our lives right here at MIT are political, to recognize the relationship between an internalized belief and institutional behavior – manifest in decisions about the makeup of groups, and their rules and public statements. It is political to welcome or not welcome someone into

(Continued on next page)



## Curriculum 92

(King, from preceding page)

a study group. It is political to live a lifestyle based on a homogeneous group. It is political how we place ourselves in regard to defense work, environmental responsibility, and the financial investment of the institutions in which we participate. There are policies in this institution that are dehumanizing. Who is working to change them?

We must recognize with our students the relationship between our ideologies and the kind of world we find around us. There are political consequences to whether or not as individuals we challenge statements and policies with which we disagree. By failing to think and speak critically about our cultural values, images, and messages, we internalize negative ideas about others and about ourselves. We are all politicians because our habits of interpersonal behavior reinforce stereotypes, thereby contributing to internalized ideas, perpetuating cultural traditions (like racism and paternalism), endorsing ideologies of superiority that enable exploitation to happen, and participating in institutionalized oppression. It is political who we deem worth calling on in class.

The choice to acknowledge or deny the political consequences of our actions has manifold effects. First, as I mentioned earlier, we are deciding what issues deserve our attention and energy. Second, our protest or agreement defines the level of concern of "the body politic." Third, if we are to change, we need to get busy building something new, and each of us will either contribute or withhold contribution to that design project, thereby crucially affecting the development timeline. Fourth, we are modeling behavior for our counterparts and our students.

Our students will be creating the technology of humanity's life in the next fifteen to fifty years. Perhaps most

importantly, they will be creating the technology of our thought, of what we believe is possible. We are molding their minds for this work. I implore you to recognize that we cannot afford for these students to adopt paradigms in "accommodation with the old world, a world [of] violence and injustice, poverty and submission." We must guide their curiosity with awareness of our commonality and with the self-interest and compassion that follows from that

*automatic nor inevitable. Even a superficial look at history reveals that no social advance rolls in on the wheels of inevitability. Every step toward the goal of justice requires sacrifice, suffering, and struggle; the tireless exertions and passionate concern of dedicated individuals. This is no time for apathy or complacency. This is a time for vigorous and positive action.* [Martin Luther King, Jr., *Stride Toward Freedom*, 1958]

**By failing to think and speak critically about our cultural values, images, and messages, we internalize negative ideas about others and about ourselves. We are all politicians because our habits of interpersonal behavior reinforce stereotypes, thereby contributing to internalized ideas, perpetuating cultural traditions (like racism and paternalism), endorsing ideologies of superiority that enable exploitation to happen, and participating in institutionalized oppression. It is political who we deem worth calling on in class.**

knowledge. Our visions of progress must be for community.

Take advantage of your role here at MIT to figure out how human beings can live together and enjoy one another. You, as an individual, have the power to take apart hunger and oppression and to build peace, because these problems begin in our minds. They are merely the consequences of our beliefs, values, and goals. Recognize your power as a leader, model, and teacher and join with these young people to make this a community in rigorous pursuit of a world that is nourishing for all people.

*A solution of the present crisis will not take place unless men and women work for it. Human progress is neither*

[\*Oscar Arias, President of Costa Rica 1986-1990, Nobel Peace Prize Recipient, 1987, excerpts from Commencement Address, Harvard University, June 1988. All unattributed and italicized quotes from same.]



## Minority Freshmen Express Both Typical and Unique Concerns

(Mattuck, from Page 1)

minority students report that their interactions with faculty tend to be difficult; many of them perceive faculty members as often discouraging, and sometimes condescending, or worse. The social cohesion of the minority groups means that bad experiences become widely known. As a result, many of the students end up avoiding situations which would require one-on-one interaction with a faculty member, UROP for example.

larger number, the academic load produces stress which tends to be internalized: Instead of blaming the professor, the TA, the book, or just acknowledging the unreasonableness of the pace and pressure, minority students may wonder whether they themselves are not at fault somehow, a feeling which undercuts academic effort and can lead them to spend increasing amounts of time on more rewarding non-academic activities.

for freshmen. The XL program, now in its third year, offers small (5-8) semiweekly credit-bearing seminars in the different freshman math and physics options, led by a graduate or upper-level tutor. Students work problem-set-like problems individually and together, and present results at the board. The seminars are not aimed at compensating for a weak background; the students in them are average or above, and the aim is to get all of them into the next higher grade category. XL runs both semesters: Faculty who are freshman advisors should talk about it in January with their freshmen. (XL is not included in the freshman load limit.)

Project Interphase is an eight-week summer program for entering minority students, offering a full weekly schedule of calculus, physics, chemistry, and writing, with additional classes in study skills. The time demands approximate those of the regular academic year; the instruction is mostly in seminar format and academic credit is given. The 60-odd students in the program have very varied backgrounds. This means that some don't really need it academically, but the early exposure to the work and each other helps all the Interphase students during the freshman year; many subsequently "pay back" by becoming tutors in the OME programs, or helping out in other ways.

As to the top MIT minority students, an important challenge for the faculty is to persuade some of them to enter academic life, so as to help alleviate the severe and self-perpetuating shortage of minority faculty in science and engineering. A good place to begin might be by encouraging more minority students to take on UROP projects. ♣

**The social cohesion of the minority groups means that bad experiences become widely known. As a result, many of the students end up avoiding situations which would require one-on-one interaction with a faculty member, UROP for example.**

Of course minority students do not want to be treated differently from other students, but their background often gives them special sensitivities. For example, questions to potential UROP students that may appear routine to faculty (what do you know? what are your grades?) can be misinterpreted. This is a situation that we faculty, acting as individuals, can do something about.

With this in the background, one can say that in general the problems of first-year minority students are those of all freshmen: a heavy workload, inadequate study habits, and the need to establish a social life. For a few of the students, these problems are exacerbated by a weak high school background. For a

MIT offers special help with several programs run by the Office of Minority Education (the OME, in MIT-speak, directed by Judy Jackson, with Ruben Morfin). Since faculty should know about these, we review briefly three of them (7-143 has a complete list).

For students at any level, an extensive tutorial program (OMETs) offers individual tutoring in any subject. A student who calls in is assigned a tutor (most of whom are non-minority) and the two arrange the place and times; the OME pays by the hour. Faculty should recommend OMETs to students who would benefit from more help than the subject provides.

Two other programs are specifically

## Integrated Studies Program Stresses Interconnection/Experimentation

Arthur Steinberg

Learning by doing, hands-on experiences, questioning assumptions, reasoning clearly, arguing responsibly, life-long learning. These are what we try to demonstrate to a group of self-selected freshmen in the Integrated Studies Program (ISP).

ISP is one of the three alternative freshman programs; its difference from the others is both in goals and style. Our freshmen take their physics, math, and chemistry in the mainstream, but have their recitations taught within the Program, while their humanities subjects (a HASS-D subject each semester) are taught completely within the Program by a group of faculty. The fall HASS-D is called "Technologies and Cultures", the spring one "Technologies in Historical Perspectives"; they combine readings, discussion, writing, and hands-on workshops focused on three different technologies each semester. The freshman advisor seminar, taught by engineering faculty and various staff members, attempts to help students see "how things work" and to write clearly about their observations. Program alumni take an active role as associate advisors in these seminars, and as tutors to our current students.

We try hard to make as many connections as possible across disciplines, so that students will see how knowledge is interconnected, and so that they will begin to think analogically. We stress asking questions, and working at posing problems rather than just solving them. To limit issues, to see their interconnectedness, to isolate the important aspects – all these are skills which can be developed.

The subject matter is highly varied, but the skills are common. In the

humanities subjects we examine sociological, historical, and technical aspects of technologies, in cross-cultural contexts, as varied as food preparation, time-keeping, smithing, weaving, automobile production, and communications. We strive, where possible, to integrate concepts or thinking styles from math, chemistry, and physics into our discussions. We wish that we could make more inroads in getting the sciences to draw examples from the topics covered in the humanities subjects. We particularly stress hands-on learning (we urge our students to take 8.01-.02X because of the strong experimental bent) because we think that doing things with their hands and feeling materials and processes adds a crucial dimension to learning; a dimension that is at once tactile, visual, and visceral (thanks to Woodie Flowers for the "visceral"). And we suspect that some people learn better and make more connections using a hands-on mode rather than merely reading, listening, and doing problems.

ISP is the youngest of the three alternative programs, and owes its complexion to a perceived need for more hands-on experience for freshmen, for more integration across subject matter, for a more inquisitive style of learning, and for still another learning community in which freshmen can make the transition from high school to MIT. The more we work with freshmen, the more we have come to realize that they need special attention and flexibility of learning styles and experiences that will enable them to make a comfortable transition to this "pressure cooker" environment. These students come from high schools in which they were the best, and had few real peers; now they

are in a class with 1000 people as good as they are, and with whom they must now compete for grades. We do not for a moment want to diminish the need to adapt to MIT, but we do want to make it ever so slightly less traumatic and, in the process, convey the idea that learning should not be a chore, but should be enjoyable.

As we have developed our integrated and cross-disciplinary approach we have come to realize its potential usefulness for teaching in pre-collegiate environments. Last summer, ISP staff had a major role in designing and running the Summer Teacher Institute of the MIT Council on Primary and Secondary Education, while in previous summers we have run teacher workshops on building integrated curriculum for K-12 and vocational teachers from the Cambridge Public Schools and a variety of other urban school systems. We plan to continue in these endeavors.

Finally, since reading about an educational experience is no substitute for experiencing it, we invite anyone who is interested and can tolerate heated discussions to visit our classes. Come meet Debra Aczel (Administrative Officer), Chris Craig (Technical Instructor), Peter Dourmashkin (Lecturer in Physics and Humanities), Marshall Hughes (Administrative Assistant), Larry Bucciarelli from STS and the School of Engineering (Co-Director), Dick Thornton from EECS, Bob Whitman from Civil Engineering, and anyone else who is around. Call us for place and time and assignments (we expect visitors to do the same readings as the students!) at 253-4074, or e-mail devil@athena.



# Intervention at MIT: Dealing with Addiction

Eve Sullivan

As the daughter of an MIT graduate and now the mother of an MIT undergraduate I feel very much a part of this institution. Besides these two connections I have, for more than ten of the past thirty years, worked at the Institute on support staff. My job here means a great deal to me and contact with you, the faculty, is one of the main reasons it does. Working with creative, high-energy people is seldom easy but always interesting.

Good work is appreciated – no, more than that, outstanding performance is expected – from everyone here. Our community includes not only faculty and post-docs, students, staff, and employees, but also tradespeople on contract jobs. We each play a role in achieving the Institute’s mission of intellectual accomplishment and I do not suggest that we lower our standards.

But please look for a moment at the down side of our high goals. As I wrote in an essay for MIT: *Shaping the Future* [MIT Press 1991], I am very fearful that the pressure we put on ourselves, each other, and the students you teach can have devastating negative effects. Suicide, weekend binge drinking, and inordinate risk-taking occur with appalling regularity on our campus and on others across the country.

Bringing the problem closer to our daily work, please recall the article “On Academic Honesty” by Professor Sheila Widnall [*MIT Faculty Newsletter*, January/February 1991]. A theme she saw emerging during deliberations of the Committee on Discipline was the existence of a “prevailing culture” that condones, if not encourages, dishonesty. One aspect of this culture is an unwillingness to confront one another.

These unfortunate incidents can be placed, I believe, in a larger context. Substances both legal and illegal, behaviors both benign and inherently wrong or dangerous, and relationships as well can all play a role in an addictive process. The problems created by addictions are more visible among students – because they live here – but all of us suffer to a greater or lesser degree in either our personal or professional lives. Most of us know

violence in relationships, on stress involved with overwork, on eating disorders, and on other substance and behavior addictions are just as staggering. We all quantify in order to justify. How big? How serious?

Some reports say that only 4% of Americans are unaffected by alcoholism, directly or indirectly. If I tell you that approximately ten percent of the population suffer from alcoholism, that among 1000 MIT faculty about 100 may

**A Harvard School of Public Health survey reported in 1990 that college students’ alcohol drinking habits had changed over the previous ten years. Abstainers, formerly 1% of the population, had increased to 10% of the population. That was the good news.**

someone who has a substance abuse problem, or an eating disorder, or a money or credit problem. Some of us have been victims, others perpetrators, in harassing or abusive relationships.

I feel we must confront the problem by confronting each other and offering concern and support in new ways. Whether the issue is doubt about academic integrity in a community of scholars or concern for sobriety or safety in the workplace or at home, one approach to a solution is simply, “Can we talk?”

The addictions picture is not pretty and we all tend to look away or, at least, to minimize it. I will limit the present discussion to alcohol, although statistics on the personal and social costs of

be alcoholic, you might stop reading right now. But finger-pointing is not my purpose.

A Harvard School of Public Health survey reported in 1990 that college students’ alcohol drinking habits had changed over the previous ten years. Abstainers, formerly 1% of the population, had increased to 10% of the population. That was the good news. The bad news was that the number of frequent light drinkers, formerly about one in ten, had diminished to nearly zero. Frequent drinking among college students now means frequent *heavy* drinking. Moderate drinkers, whether they consume alcohol frequently or

*(Continued on next page)*

## Intervention at MIT: Dealing with Addiction

(Sullivan, from preceding page)

infrequently, cause more problems than heavy drinkers, however, simply because they are more numerous.

Some estimates of health care costs indicate that 20 percent of the population consume 80 percent of the medical and psychological benefits. Tobacco- and alcohol-related illnesses play a major role in these figures. About 75 percent of court cases deal with alcohol-related incidents. These include alcohol-involved automobile crashes resulting in injury and death as well as the ever present and increasing domestic violence.

Much debate on social response to addictions focuses on punishment, but I am not proposing harsher enforcement of existing laws or the creation of a new prohibition. I am asking you to consider a community-based approach, something I chose to call an intervention coalition.

This intervention coalition would begin with a survey of the community and development of a public information campaign. It would then present a coordinated series of meetings for faculty, students, staff, and employees to discuss both strengths and weaknesses in the Institute. Some of the meetings would be mandatory, as are Safety Office orientations for employees and Campus Police presentations to incoming students. Some meetings would be optional, as are trainings offered through Personnel and support groups provided by the Medical Department.

Details of this proposal are contained in a report I was asked to write for the Student Services Subcommittee on the Americans with Disabilities Act. In it I outline how an intervention coalition could work at MIT. The recently enacted Americans with Disabilities Act mandates protection for individuals who

suffer from drug addiction or alcoholism, among other physical and mental impairments. I was very pleased to have my personal experience and concern in this area called upon.

Just as war is too important to be left to the generals, addictions are too serious to be left to the treatment professionals. You, as leaders of the MIT community, can make a unique contribution to this intervention coalition effort. While you are busy with your lives and your work and you may feel confident that experts

edge entrepreneurial endeavor. If we can pull this one off, we can patent it, package it, and sell it – a new model for institutional change.

### Postscript

The publication of the above article was postponed from last month's *Faculty Newsletter*. Since the time it was originally written, Professor Thomas Allen allowed me to present the addictions survey project to his 15.301 laboratory course. Fourteen students wanted to participate! Four of them,

**The bad news was that the number of frequent light drinkers, formerly about one in ten, had diminished to nearly zero. Frequent drinking among college students now means frequent heavy drinking.**

are handling the problem, they cannot do it alone. Your participation is essential. For democracy to work, everyone must vote. For a community project of this scope to succeed, each of us must become involved, if only in a small way.

Please take a few moments to write me a short note with your comments on this idea. Or write a letter to the administration if you support a “test run” of an intervention coalition such as I describe. And please consider joining me and others who have expressed interest in this creative, positive, and goal-oriented undertaking.

MIT is world-renowned for leading-

along with their TA and administrative supervision and support by Dean James Tewhey, will conduct a poll of undergraduates and possibly graduate students on awareness of addictions.

The survey will be designed so that it can be administered – at some future time – to other members of the Institute community. MIT Medical Director Dr. Arnold Weinberg has expressed cautious interest in the addictions survey, and will discuss it with his staff during the coming months.



## SPECIALIZED JOURNALS, SCHOLARLY COMMUNICATION, AND RESEARCH LIBRARIES

Carol Fleishauer and Jay K. Lucker

One of the basic missions of the research library is to provide information needed by faculty, research staff, and students in the pursuit of their quest for new knowledge. A primary vehicle for providing this information is the scholarly journal.

Historically, faculty and research staff, and to a lesser extent, graduate students, have maintained personal subscriptions to the few most important core journals in their fields of research. These have tended predominantly to be journals

The three most common "content sources" were journals (39%), colleagues and associates (34%), and books (25%). Libraries today are the primary market for scholarly journals but there is increasing difficulty in maintaining collections adequate for the needs of the user. The spiraling cost of journals, especially those in technical and scientific fields, has outstripped acquisition budgets despite, in many cases, significant annual increases. This same escalation in prices has dramatically

papers, new journals appear constantly in new fields and in fields that splinter off from established areas (twigging). Established journals add pages and volumes, driving up the cost beyond that which is associated with inflation in editorial costs, printing, paper, and postage. Library acquisition budgets, especially for serials, have grown at a slower rate than the overall increase in prices. The result is major serial cancellation projects in almost every research library akin to those at MIT in 1988 and 1991. These cancellations will have an impact on publishing patterns and volume. Ideally, the result should be the demise of marginal, over-specialized, and over-priced journals and fewer new titles.

Another critical factor that will influence the future of scholarly journals is the emergence of electronic distribution mechanisms. These range from facsimile transmission of journal articles between libraries to a growing number of commercial providers of electronically-stored full text to explorations in "electronic only" journals.

The emergence of affordable facsimile transmission has made interlibrary transactions more acceptable in terms of delivery time. The new ARIEL technology developed by the Research Libraries Group will also improve the quality of the delivered product in terms of print and paper. These developments will set the stage for meaningful cooperative collection agreements in which one or a few libraries can agree to be the holder(s) of journal titles in specific areas. The MIT Libraries will be exploring such relationships with

*(Continued on next page)*

**Driven by pressure to publish the results of research, the volume of scholarly publishing continues to expand as the total population of researchers increases. The total number of abstracts in physics grew from 24,000 in 1962 to 143,000 in 1988....**

published by learned societies and consequently, titles with lower than average subscription prices. These same researchers have traditionally depended upon their libraries to provide access to the more specialized, generally more expensive, and generally commercially published journals that they need. In this same category are journals peripheral to their research interests but nonetheless essential for comprehensive coverage of a field.

A recent study of information acquisition among chemists, geneticists, and computer scientists, revealed that the three most common means of access were personal files (45%), libraries (31%), and face to face discussion (29%).

reduced the number of individual subscriptions to these journals, including in many cases, those published by scholarly societies. The smaller subscription base combined with high fixed costs for reviewing and editing, further escalated the price of the journal to the remaining – library – subscribers.

Driven by pressure to publish the results of research, the volume of scholarly publishing continues to expand as the total population of researchers increases. The total number of abstracts in physics grew from 24,000 in 1962 to 143,000 in 1988 with the number of pages in the *Physical Review* quintupling in that same period. In order to accommodate the growing number of

## SPECIALIZED JOURNALS, RESEARCH LIBRARIES

(Fleishauer/Lucker, from preceding page)

Harvard and Yale and with the Boston Library Consortium. These agreements will, however, be limited in their effectiveness by copyright regulations and royalty payments, and by the staff, equipment, and transmission costs of moving the information. Finally, there is bound to be a negative reaction from faculty, from publishers, and from learned societies.

The capacity to acquire copies of articles from commercial organizations is attractive because of the speed of delivery and low capital costs involved. The suppliers also take full responsibility

a continuous file of a journal and ensure access?

The entry of publishers into the electronic publishing/document delivery arena is a recent event. Commercial and society publishers are obviously reacting to library cancellations and to the rise in commercial document delivery and they are concerned about the overall impact on their primary source of income – subscriptions for printed journals. Some publishers refuse to permit commercial electronic document delivery from their journals. Others are investigating means of distributing the information

to expensive commercial publishing. Copyright resides with the institution where the work was done. It remains to be seen, however, whether this kind of publishing can be sustained over time. The journals are basically volunteer efforts and there is the question of acceptance by the larger scholarly community. Libraries will play a key role in providing interfaces and access. There is also the long-term issue of retention and storage for these and all electronic-only journals.

There is no question that technology and economics are changing the relationships among libraries, publishers, and the scholarly communication process. It is not at all clear that the changes will mean a lower price for information. The scholarly community needs a structure that enables the orderly exchange of information. Publishers need to remain economically viable and competitive. Libraries need to find ways to continue to be an effective part of the information distribution system assuring affordable and convenient access for users. While we continue to support the current information needs of our campuses, we will have to redefine our traditional role of collecting and maintaining collections to one that encompasses access and delivery. The nature of local collections as well as national responsibilities must be weighed. The MIT Libraries have set out a number of steps for the next five years to address all of these concerns. Our goal is to provide the best possible access to information for our patrons while maximizing the use of financial and staff resources. There appears to be no viable alternative to this course.



**There is no question that technology and economics are changing the relationships among libraries, publishers, and the scholarly communication process. It is not at all clear that the changes will mean a lower price for information.**

for copyright compliance (by passing the cost along to the requester!). The number of sources for full text, online delivery of periodical articles has increased significantly. The utilization of document delivery – substituting access for ownership – raises a number of critical questions that will have to be addressed. Which materials are essential to maintain on-site? Which materials are approached primarily through citation access and are, therefore, especially amenable to document delivery? What is the financial “break point” between subscription and document delivery? How can the library’s existing holdings be exploited to provide better, more direct document delivery to the end user? Who will be responsible for maintaining

themselves. The MIT Libraries will be participating in an Elsevier project involving full text of 42 materials science and technology titles. The AAAS and OCLC have published an electronic-only journal in clinical medicine. The MIT Press is exploring with the Libraries and Information Systems the idea of mounting the full text of one or two Press journals on the campus network.

There has also been a small but growing number of “desk-top published” scholarly journals appearing on the Internet. There are fewer than a dozen such titles at the present time. They are electronic only, peer-reviewed, generally originate at universities and colleges, and are generally offered without charge. They represent an interesting alternative

## EECS Plans Major Curriculum Changes

(Penfield, et al., from Page 1)

advances in electrical engineering and computer science are putting enormous pressure on the curricula. In past years, when new material was deemed important enough to be added to our curricula, we removed other topics to make room. We don't think we can do this any more, without jeopardizing our

avoid the inefficiencies that come from hitching together two separate programs.

We will notify EECS majors, at the end of their junior year, whether they are invited to stay for a fifth year and pursue the new professionally-oriented degree, Master of Engineering. We will admit

or personal reasons, will stop at the S.B. level. These students will receive an excellent foundation for a satisfying, productive life, starting in any of several ways – an entry-level position in electrical engineering or computer science; graduate school elsewhere; or professional education in another field, such as medicine, law, or management. Each student who completes an M.Eng. program will automatically qualify for one of the bachelor's degrees.

Coupled with this change, we will eliminate our research-oriented master's program. Over the years, master's theses done in our department have become more and more ambitious, often resulting in publications in archival journals. The average length of a master's program is currently five terms. Such a long program discourages some applicants, and the students who are taking so long are occupying places that could be made available to other qualified students.

The master's program is used today for two purposes. Students seeking an engineering career benefit from some experience, including a thesis, beyond the bachelor's. And students seeking an academic or research career use the master's program as a step toward the doctoral program. Neither purpose requires such a lengthy thesis experience. Our new program, with an honest 24-unit thesis, will satisfy both of these needs.

So in brief, we are planning to:

- (1) Keep our accredited bachelor's programs with only minor changes;
- (2) Introduce a new, professionally-oriented master's program;
- (3) Eliminate the research-oriented master's program;
- (4) Keep our doctoral program unchanged.

*(Continued on next page)*

**The new program resembles current undergraduate programs more than current master's programs. The fifth year will be similar in style to the first four years, i.e., classroom-oriented. It will not be research-based, although there will be a thesis. Passing from the senior year to the first graduate year will be much like the transition today between junior and senior years, and not like the current transition into graduate school.**

coverage of scientific and engineering fundamentals, basic skills, or exposure to current practice.

Second, we have observed for some time that the majority of our S.B. graduates go on for a master's degree, either right away or within a few years. Clearly they are telling us that more than a bachelor's degree is needed. Moreover, their employers seem to agree: Many students receive company fellowships for full-time master's study, or release time and tuition assistance for part-time study. And for 75 years we have run the successful VI-A internship program, which leads to the simultaneous awarding of master's and bachelor's degrees after five years.

We believe that the majority of our undergraduates will benefit from a fifth year of study. Knowing they have that opportunity, they can plan an integrated, seamless five-year program of study and

those who we think can handle graduate subjects, making the decision on the basis of the cumulative grade average. Our best estimate is that about 80% will be invited, and that about two-thirds will take advantage of the opportunity.

The new program resembles current undergraduate programs more than current master's programs. The fifth year will be similar in style to the first four years, i.e., classroom-oriented. It will not be research-based, although there will be a thesis. Passing from the senior year to the first graduate year will be much like the transition today between junior and senior years, and not like the current transition into graduate school.

While we believe the new M.Eng. program to be an ideal preparation for a career in electrical engineering or computer science (or some mix of the two), we also recognize that many students, for a variety of valid educational



## EECS Plans Major Curriculum Changes

(Penfield, et al., from preceding page)

The new plan gives our students a new opportunity, not now available, without removing any current options. Most of them will be guaranteed admission to the fifth year, to seek a master's degree. They do not have to participate; if they want to stop with the S.B., they can.

Students who want more than the M.Eng. degree can apply for regular

propose adding the new degree Engineer in Computer Science to our current degree Electrical Engineering.

What are the implications of all this for the rest of MIT?

First, we will break a standard paradigm that governs MIT and most other universities, namely that the shift from classroom-oriented to research-

Third, our plans reopen the question of the relative roles of the Institute-mandated common experience, embodied in the GIRs, and the individual departmental programs. There are those who believe we should have set aside part of the fifth year for courses dealing with leadership, professional ethics, economics, management, or the humanities. Our new curriculum actually has much more flexibility and freedom of choice than our current S.B. programs, but it does not require any increase in nontechnical areas. Many of us feel it should. We would welcome suggestions on how to do this.

Fourth, there is concern that the new plan might prove to be so attractive that many more students will want to major in our department. If that happens, we may face an enrollment crisis similar to that of ten years ago. It would not be in the best interest of MIT to have a student population any more unbalanced toward EECS than it is now.

All these issues deserve to be fully discussed in the context of the motions to be made at the November faculty meeting. We hope that all the readers of *The MIT Faculty Newsletter* will participate in this discussion.



**We will also continue to admit students from outside to our graduate program, using the same criteria as today. Since our M.Eng. program is an integrated five-year program starting with the GIRs, students from outside will not qualify for this new degree. Instead, we will award them the S.M., as we do today. However, the thesis experience will be shorter, like the new M.Eng. theses.**

admission to our graduate program, just as they currently do. We will judge such applications on the basis of whether the student is capable of completing a doctor's thesis. To keep the doctoral program unchanged, we will offer regular admission to the same number of students as we do today.

We will also continue to admit students from outside to our graduate program, using the same criteria as today. Since our M.Eng. program is an integrated five-year program starting with the GIRs, students from outside will not qualify for this new degree. Instead, we will award them the S.M., as we do today. However, the thesis experience will be shorter, like the new M.Eng. theses.

Those who want a research experience beyond the master's level but less than the doctor's level can seek the intermediate Engineer's degree. We

oriented education coincides with the change from undergraduate to graduate status, at the end of four years. We want this shift to occur after five years, not four. This can be thought of as a step toward having professional engineering education more centered at the graduate level, as is the case for many other professions.

Second, our plans might prove contagious. If we are right that a professional education for engineers needs at least five years, then in time others will come to believe it also. Probably EECS is not different in this need from other engineering disciplines, and MIT is not inherently different from other excellent engineering universities. In the future many more departments, both at MIT and elsewhere, may offer integrated five-year programs leading to a professionally oriented master's degree.

**Want a subscription to *The MIT Faculty Newsletter*?**

**MIT faculty receive the *Newsletter* free of charge, but a nominal fee is charged to all other MIT community members - \$15/year on-campus; \$20/year off-campus.**

**Call the *Newsletter* office at x3-7303 for more details.**

## Teaching at MIT: It Happens

A. Douglas Carmichael and Travis Merritt

So your proposal renewal isn't finished and it was due yesterday. And you're off to Japan on Tuesday but really should have gone Monday but that's the day your graduate student defends his thesis. So?

So somewhere in there you're probably teaching, too. And you might be new to MIT or new enough to teaching that advice about what to do and what to expect would be welcome.

began earlier this term with talks by Bob Randolph and John Southard on "Working with Students (and Students' Problems)" and by Ed Crawley and Frank Solomon on "How to Lecture." The schedule of remaining topics and speakers for the next few weeks appears in the box. These seminars begin at 4 pm and run for approximately one hour, followed by refreshments and discussion.

accurate. Should we, they have asked, strive to attain a balance of excellence in both areas, or will we be evaluated by committees that focus principally on our research contributions?

The Office of the Dean of the Graduate School is offering a separate series of similar talks designed for a student audience. "Teaching at MIT for Teaching Assistants and Instructors" will begin its series on Thursday, November 5. Further

### Planning and Teaching an MIT Subject

Donald Sadoway, Associate Professor of Materials Science & Engineering  
Wednesday, October 28, in Room 2-105

### Using the Athena Computing Environment

Anne LaVin, Academic Computing Services, and  
August Witt, Professor of Materials Science & Engineering  
Wednesday, October 28, in Room 1-115

### Teaching Recitation Sections

Arthur Mattuck, Professor of Mathematics  
Tuesday, November 10, in Room 2-105

For the past several years, the Faculty Instructional Resources Program (FIRP) and people in the Undergraduate Education and Student Affairs Office have been instrumental in organizing various programs that focus on the development of teaching skills. Several seminar series and a classroom videotaping service are available this year for faculty interested in strengthening their teaching skills and sharing their experiences with others.

"Teaching at MIT," is an expansion of the original faculty seminars offered in the School of Engineering. The series

An IAP series will repeat these topics and introduce new ones. Faculty leaders and topics are welcome and needed! Contact either of us if you'd like to sign on.

The goals of these seminars is to offer some "how to" advice on various teaching-related topics, and to foster discussion on attitudes about teaching and learning at MIT. In more than one of these discussions, junior faculty have expressed concern about whether the signals they receive regarding the apparent increased emphasis on teaching in the promotion and tenure process are

information may be obtained by calling Jackie Sciacca, x3-1958.

Classroom videotaping is available to all faculty through the Video Production Services in the Center for Advanced Engineering Study. CAES will videotape your regular class and turn the tape over to you at the end of the session. This increasingly popular service is now supported by contributions from all MIT schools. For more details or to arrange a taping session, contact Nancy Martin in the Undergraduate Academic Affairs Office, x3-6772, or Craig Milanesi at CAES, x3-7603. ❖

Letters

To The Faculty Newsletter:

*We would like to share our concerns, recently communicated to President Vest, with our colleagues.*

Dear President Vest:

**W**e, the undersigned members of the MIT faculty and staff, are writing to you regarding the renovation of 640 Memorial Drive. We have become aware of the protest by Carpenters Local 40 and are troubled by the decision of MIT Real Estate to develop that property with a non-union contractor.

As an institution with a long history in Cambridge, MIT has a responsibility to be sensitive to community concerns. Selecting a non-union contractor at a time

of major economic dislocation undermines community standards for working people. While we recognize that MIT must make sound financial decisions, we believe the Institute's commitment to community and social responsibility should not be sacrificed at the alter of the bottom line.

We urge you to intervene in this situation in order to develop a solution that is satisfactory to all parties. Perhaps this dispute can have a long-term positive outcome by opening discussions between the Institute and the trade unions to establish an overall policy similar to the one currently being developed at Harvard.

Sincerely,

Prof. Noam Chomsky  
Prof. Stephen L. Chorover

Prof. Joshua Cohen  
Mr. David Gay  
Prof. Morris Halle  
Prof. Jean E. Jackson  
Prof. Louis Kampf  
Dr. Barbara J. Katz  
Prof. Jonathan King  
Prof. Mel King  
Prof. Vera Kistiakowsky  
Prof. Heather Lechtman  
Prof. Richard Locke  
Prof. Lisa M. Lynch  
Dr. Lawrence I. Mortin  
Prof. Wayne O'Neil  
Prof. Paul Osterman  
Rev. Scott Paradise  
Prof. Michael Piore  
Prof. Charles Sabel  
Prof. Richard Schramm



To The Faculty Newsletter:

**I** am writing this letter for publication in your *Newsletter* in order to inform MIT faculty that an official review of MIT's tenure policies and procedures will soon be undertaken at the initiative of the provost, in compliance with the terms of settlement reached in my lawsuit against MIT. In keeping with my settlement obligations, I have presented to Dr. Wrighton an evaluation of existing practice and recommendations for change; the provost, in turn, will now be appointing a faculty committee to consider the issues raised. I would think that this review should be of considerable interest to faculty, especially in these difficult times when pressures of budgetary constraint are likely to impinge negatively upon tenure reviews at the expense of fair and due process.

The full text of my statement and accompanying documents are available from the Provost's Office. In short, in the interest of safeguarding the integrity of the tenure review process, I have recommended:

(1) the formulation of formal written procedures which would establish Institute-wide uniform tenure reviews at the department level;

(2) that cases denied at the department level should be regularly reviewed again at the School level;

(3) that candidates must receive an adequate explanation of a negative tenure decision at the time it is made; and

(4) the establishment of a formal appeals procedure and a standing faculty appeals committee to review appeals.

In addition, I have argued that the full tenure review file should be open to the candidate's inspection during and after the review process, as a further check against possible abuse. The key change here would be to eliminate confidentiality and thus reverse the current practice of denying the candidate access to peer evaluations and any opportunity to respond. Such a change, admittedly sweeping, would merely bring academic practice into closer conformity with the law of the land; in the wake of a recent

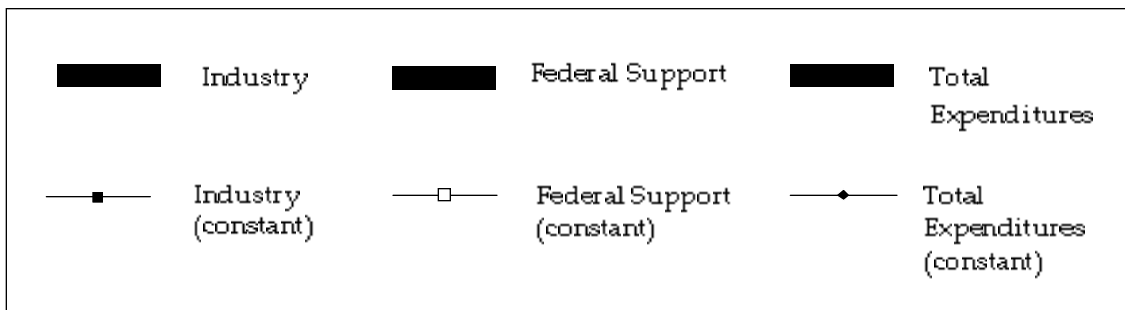
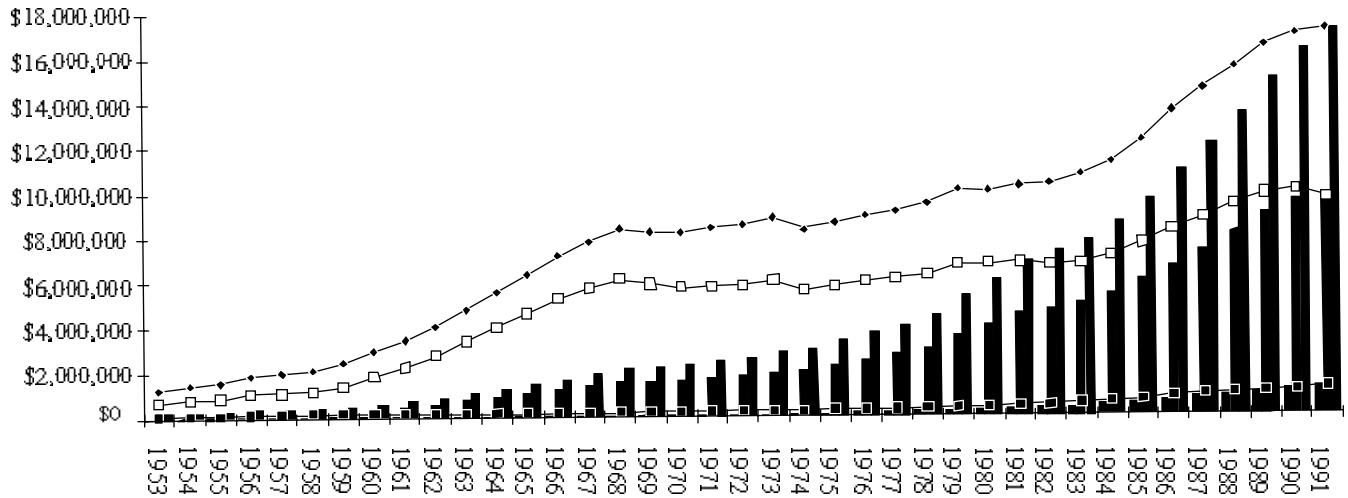
unanimous Supreme Court decision, and as the outcome of several recent court cases, including my own, attest, there is simply no longer any legal protection for existing claims of confidentiality – a fact MIT's own chief counsel Robert Sullivan has confirmed. Moreover, the elimination of confidentiality would provide candidates a measure of protection from possible abuse by further insuring fair and due process.

These are some of the issues which will be considered by the faculty committee to be appointed by Provost Wrighton. No doubt there are matters which I have missed and no doubt there is also a considerable range of opinion as to the merit of the recommendations I have made. I would therefore urge faculty members to participate in or at least stay attuned to these deliberations, for they may well have far-reaching consequences.

**David F. Noble**  
**Professor**  
**York University**

M.I.T. Numbers

# Research Expenditures Universities and Colleges



MIT Planning Office  
Source: Caspar Database System

Constant CPI Dollars  
1991=100