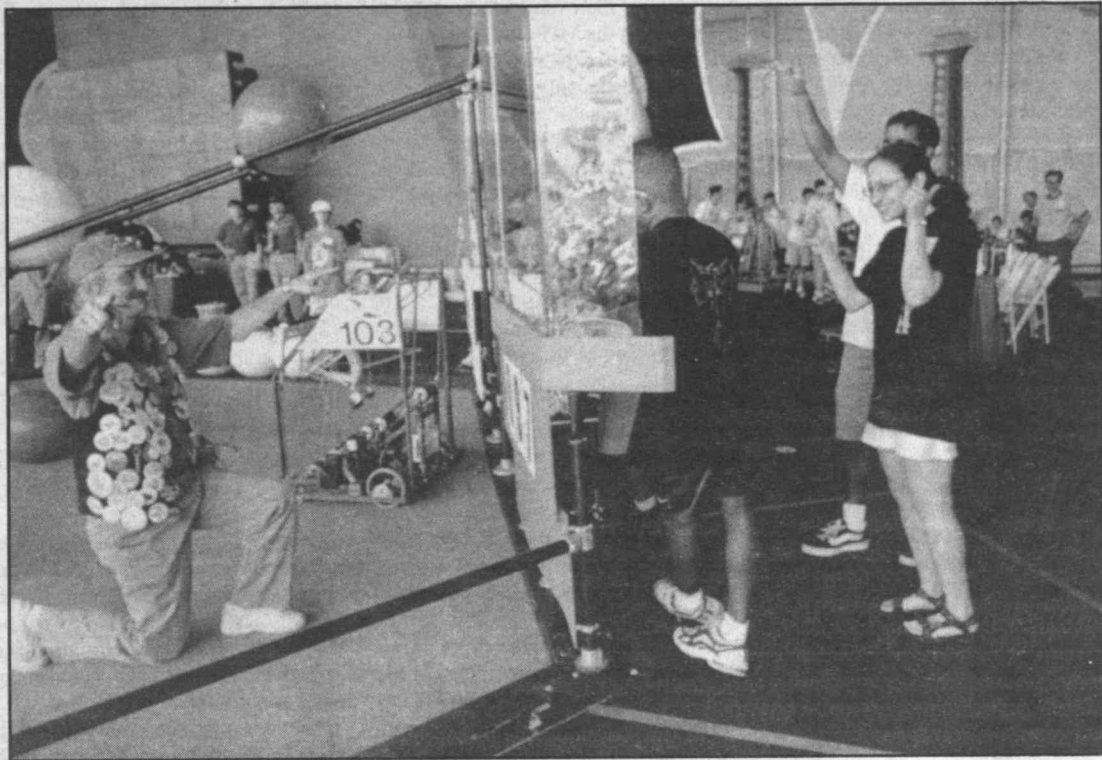


Let the games begin



Professor Woodie Flowers, master of ceremonies at the FIRST National Robotics Championship in Orlando, goes down on one knee in his customary encouraging greeting to contest participants—in this case, Onslaught, the team of students from MIT and Cambridge Rindge and Latin School. With his back to the camera is robot manipulator Cédric Jean-Louis of CRLS. MIT graduate student Ela Ben-Ur gives the thumbs-up sign, and behind her is MIT freshman Kailas Narendran. See story and more photos on page 9.
Photo by Donna Coveney

As dialogue continues, controlled alcohol use returns to campus life

■ By Robert J. Sales
News Office

A winter of introspection, dialogue and education on issues involving alcohol, freshman housing, fraternities, communication and student-faculty relationships has created an atmosphere in which social changes in the MIT culture are beginning to evolve.

As spring arrives, a number of measures have been taken, including a system of citations and sanctions for underage drinking violations and plans to erect a new dormitory in order to provide more opportunities for improving the residential experience for all MIT students. Provost Joel Moses has tripled the budget for student activities on campus to \$300,000 for the 1998-99 academic year. With strict controls, alcohol is slowly being reintroduced to undergraduate events.

In a letter to be sent to the parents of MIT students shortly, President Charles Vest says:

"Drinking behavior stems from peer pressure, social and family values and

experiences, self-image, and the enormous pressure from advertising messages and images. At the same time, these are individual decisions: everyone makes his or her own choices regarding alcohol consumption. But individual choice does not absolve us of responsibility and accountability—both personal and collective.

"I believe that we must, and can, bring about cultural change and new peer expectations on these matters. Binge drinking cannot be legislated out of existence, but we can set community standards and expect each other to adhere to them.

"Over the past several months, I believe that we have made some progress on these matters."

The changes are developing from a process set in motion by President Vest shortly after freshman Scott Krueger's alcohol-related death last September following an informal party at the Phi Gamma Delta fraternity house.

Dr. Vest immediately banned the use of Institute funds to purchase alcohol.
(continued on page 7)

Langer wins \$500,000 Lemelson-MIT award

Rabinow recognized for lifetime achievement

Robert S. Langer, the Germeshausen Professor of Chemical and Biomedical Engineering, author of 550 research papers, editor of 12 books, inventor on 320 patents and a pioneer in biomedical and chemical engineering, today was named the winner of the \$500,000 Lemelson-MIT Prize for 1998, the world's single largest cash prize for American invention and innovation.

Professor Langer is the first MIT-affiliated recipient of the Lemelson-MIT Prize, which annually honors Americans who demonstrate excellence in medicine and health care; energy and environment; telecommunications and computing; or consumer products, durable goods and industrial products.

This is the second time discoveries in biomedical sciences have been honored by the award. In 1996, Stanley Cohen of Stanford and Herbert Boyer of the University of California at San Francisco were honored for bolstering the foundation of genetic engineering.

Professor Langer, whose discoveries are at the heart of the emerging technology of tissue engineering and the multibillion-dollar controlled-drug-delivery industry, was named the winner in New York after an intensive, year-long process by the Lemelson-MIT Awards Program and three review panels of leading experts—independent of MIT—from a range of scientific, engineering and medical disciplines in academia and industry.



Langer

The Lemelson Awards Program also announced that Jacob Rabinow is this year's recipient of its Lifetime Achievement Award for a distinguished career in invention. During 80 years of inventing, Mr. Rabinow of Bethesda, MD, has earned 229 patents for military, industrial, computer and electrical devices. His research at the National Institute of Standards and Technology (NIST) was important in the development of the proximity

fuse and safety mechanisms for missiles. His technological firsts include the optical character recognition machine to use the "best match" principle to read broken or defaced characters, and storing computer memory on magnetic discs instead of tapes (the "notched disc" magnetic memory machine).



Rabinow

Both winners will receive an interactive trophy designed for the program by kinetic sculptor Arthur Ganson. Professor Langer and Mr. Rabinow will be honored tomorrow evening at a ceremony at the Smithsonian Institution's National Museum of American History in Washington, DC. "These winners represent American ingenuity at its best," said Professor Lester C. Thurow, economist, author and chairman of the Lemelson-MIT Prize Board. "Their passion and interest in invention has dramatically saved and improved lives
(continued on page 12)

Disney hack elicits sacks of e-mail

On April 1, Netsurfers around the world were treated to the "news" on MIT's home page (now archived at http://hacks.mit.edu/Hacks/by_year/1998/disney_buys_mit) that the Institute had been acquired by Walt Disney Co. An unsuspecting News Office staff member was listed as press contact.

The ensuing wave of e-mail (mostly complimentary) assumed that the News Office had something to do with the April Fool's Day hack of MIT's home page. Alas, we can't take the credit, but we can share the feedback (the source of each message is given in parentheses).

Well done! How did you ever learn of our plan?? :)
(continued on page 12)

Scientists investigate unusual X-ray burst

■ By Deborah Halber
News Office

Around lunchtime on March 31, physics graduate student Don Smith was surprised to find three e-mail alerts from the software that monitors data streaming in from the orbiting Rossi X-ray Timing Explorer (RXTE) satellite. After double-checking, he put the word out to the world: the RXTE had detected a bright new X-ray source in the sky that appeared rapidly out of nowhere.



Lewin

Twenty-four hours later, Professor of Physics Walter H.G. Lewin dared hope that this object—named XTE J0421+560 to indicate its position—was the new black hole for which he had been waiting.

Nature had not been kind to him and his 21 collaborators from seven countries. In 1995, NASA had granted them first dibs on X-ray data from the next black hole X-ray outburst. Even though black hole transients, as the temporary X-ray outbursts are called, occur on average once a year, the years since 1995 had passed without a sign.

Then, rather than outshining most other X-ray sources in the sky for several weeks, as previous black hole transients

have been known to do, this mysterious April Fool's Day stellar entity lost half its intensity in less than 12 hours. Only 2 percent of it was left four days after its initial rise.

The goal of Professor Lewin, graduate students Derek Fox and Jefferson Komers and Professor Lewin's collaborators is to further our understanding of black holes, whose existence has not been proven conclusively since they were first theorized in 1939.

Black holes, which Professor Lewin describes as "mind-boggling even for insiders," can be formed when gravity causes the inner cores of very massive stars that have consumed their nuclear fuel to collapse. This star "death" is accompanied by a supernova explosion that outshines the combined lights of tens of billions of stars for several weeks.

Although there are probably a hundred thousand black holes in our galaxy, they are only observable when they are part of a binary system in which they drain matter from the donor. This in turn can lead to strong X-ray emission.

A handful of these systems are permanent X-ray sources that can always be detected. Half a dozen are transients, in which X-ray emission is suddenly turned on. Because the mechanism that causes black hole transients is not well understood, Professor Lewin and his large team of collaborators are gathering as much information as they can in the hope that they will get new insight into this mechanism.

"We were hoping to use the RXTE's new instruments of
(continued on page 10)

IN BRIEF

FACULTY MEETING

A regular meeting of the faculty will be held this afternoon at 3pm in Rm 10-250. Agenda items are:

- Update on the "Sense of the Faculty" resolution on undergraduate life, by President Vest
- Report on the Student Information Policy Review, by Professor Clay
- Report of the Edgerton Committee, by Professor Locke
- Proposal to establish a Master's of Science in Comparative Media Studies, by Dean Khoury and Professor Jenkins
- Proposal to establish an MIT/WHOI Joint Master's of Engineering in Ocean Engineering, by Professor Vandiver
- Report of the Committee on Nominations, by Professor Hax
- Motion to implement a house-keeping change to *Rules and Regulations of the Faculty*, by Professor Bailyn

LIBRARY HOURS

On Patriots Day (Monday, April 20), the following libraries will be open for their regular hours: Barker, Dewey, Hayden Reserve Book Room, Humanities, Lewis Music, Rotch and Science. All other libraries will be closed. Spring term hours are on the Web at <http://libraries.mit.edu/admin/hours.html>.

MARATHON CALL

Are you a member of the MIT community who is planning to run in Monday's Boston Marathon? MIT Tech Talk is interested in collecting some experiences and impressions of runners affiliated with the Institute. Send us your name and contact information beforehand so we can call you next week. Or contact Tech Talk editor Alice Waugh after the race at x8-5401 or awaugh@mit.edu.

Student Notices

* Open to public
** Open to MIT community only

April 15-May 3

RELIGIOUS ACTIVITIES

The Chapel is open for private meditation 7am-11pm daily.

Baptist Campus Ministry**—Weekly events: Sunday Nights at the RAC, 6pm, Main Dining Rm. Bldg W11. Home-cooked meal at 6pm (cost: by donation), followed by Bible Study. Tuesday Vespers, 6-6:30pm, chapel. A quiet time for reflection. More info: x3-2328.

Baptist Student Fellowship*—Weekly meetings on Tuesdays, include dinner followed by Bible Study. 5:30-7pm, Bldg W11, small dining room. Sponsored by Baptist Campus Ministry. More info: x3-2328.

Campus Crusade for Christ**—Weekly meeting on Wednesdays, 8pm, PDR 1 & 2, 3rd fl Student Center. Morning prayer, Tuesday and Thursday, 8:30am, Rm W11-080 (CFL). More info: x2-1781 or <bigbob@mit.edu>.

Tech Catholic Community**—Weekday Mass Tues & Thurs 5:05pm, Friday 12:05pm, Saturday 5pm, Sunday 9:30am & 5pm. Call x3-2981.

Graduate Christian Fellowship**—Weekly meetings in Student Ctr, PDR 1&2, Fridays at 5:30pm. Also weekly Bible studies and Responsible Technology discussion group. Andrew Crabtree 868-0488 or <crabtree@mit.edu>.

Christian Science Organization**—Thursdays at 7pm. Call x3-8797 or <lnorford@eagle.mit.edu> for further information.

Communitas-Life Together**—Protestant Worship Sunday at 11am. Sponsored by: American Baptist Church, United Church of Christ, United Methodist Church, Presbyterian Church (USA). Chaplain John Wuestneck, x2-1780 or <chaplain@mit.edu>.

MIT Hillel**—Tuesdays: 5:30pm Beginning Hebrew Class; 6:30pm Intermediate Hebrew Class. Wednesdays: 12noon Hebrew Conversation Table in Walker Cafeteria; 7pm Haftorah Class. Thursdays: noon Taste of Torah. Fridays: 6pm Egalitarian Chavurah Services and Orthodox Minyan Services; 7pm Shabbat dinner. Saturdays: 9am Orthodox Minyan Services; 12:45pm Shabbat lunch. More info x3-2982.

Lutheran-Episcopal Ministry at MIT*—Regular Wednesday worship 5:10pm, followed by supper in the Bldg W11 dining room. On the second Sunday of each month, LEM assists at Common Cathedral, a gathering of homeless people on the Boston Common, at 1pm. More info: x3-0108.

Meditation and Discourse on the Bhagavad Gita*—With Swami Sarvagatanda, MIT Chaplain and Head, Ramakrishna Vedanta Society of Boston. Every Friday, 5:15-6:30pm, MIT Chapel. Sponsored by the MIT Vedanta Society. More info: 661-2011 or <meha@cytel.com>.

MIT Muslim Students Association*—Five daily prayers, Bldg W11; also Friday congregation 1:10-1:45pm, Rm W11-110. Info: x8-9285.

MIT Orthodox Christian Fellowship**—Wednesdays at 5:30pm in Student Ctr DR 1 for dinner followed by Chapel Vespers. John Kymissis x5-7649 or Costa Sapuntzakis x5-7683.

STUDENT JOBS

For other job listings and more information about the following listings, go to the Student Employment Office, Rm 5-119 or <http://web.mit.edu/seof/>.

Off-Campus, Technical: Metropolitan Area Planning Council: full and part-time summer interns for GIS lab. Data dev., database maint., map production, app. dev. and general project support. Windows NT, Microsoft Office, Arc View and ArcInfo required; MapInfo or TransCad beneficial. \$10-\$15/hr. By April 30. Slater Anderson (617)451-2770 <sanderson@mapc.org>.

On-Campus, Clerical: Draftsperson or artist to make large, beautiful, clear, educational colored drawings, probably isometric, of turbine plant that burns refuse-derived fuel from sketches. Flexible hours; salary negotiable. Dave Wilson x3-5121, <cdgwilson@mit.edu> or Rm 3-455D.

Off-Campus, Technical. North Andover hi-tech startup, Innovative Marketing Technologies Inc., is looking for a talented student with Internet based, Java programming skills. Home/dorm-based work possible. Flexible hours; \$8-\$10/hr. Alex Coisman 800-505-5484 or <acoisman@commercetoday.com>.

The following positions are for students with Federal Work Study eligibility.

Community Service: Bilingual English/Spanish legal intake worker needed at Community Legal Services to screen callers for service eligibility, and other duties. English/Spanish fluency, verbal and written comm., org., and computer skills (Word Perfect 5.1), sensitivity to people in emotional distress. 15 hrs./wk; \$10-\$11/hr. Jeff Wolf 661-1010.

Community: Group Leaders to guide educational walks for children through Boston's historic neighborhoods. Training provided. Must have experience with children and an interest in architecture, history, education or urban studies. 1.5 hr tours run 9:30am-1pm Mon-Fri, April to June. Stipend. Sherene Michlin 426-1885 for interview.

Community Service: Need interns to research and write case studies for publication on public art; organize slide and book resources; assist with projects related to townscape design. Background in the arts, public planning, and/or history required. At least 15 hrs/wk. Near Harvard Square. Ruth Shackelford 491-8952 9am-5pm for interview.

CABLE

For more information, call Randy Winchester at x3-7431, Rm 9-050 or <randy@mit.edu> or <http://web.mit.edu/org/mitcable/www/home.html>.

Continuously Running Programs—Channel 10: Physics 8.02 TV Help Sessions. Assignments will be discussed by Professor Walter Lewin. Program starts every hour on the hour. **Channel 11:** NASA Television. See schedule at <http://www.hq.nasa.gov/ntv.html>. **Channel 12:** Today at MIT - a listing of MIT events. To submit your event, send e-mail to <tv-messages@mit.edu>. **Channel 13:** International Channel provided by the MIT Language Learning and Resource Center. See schedule at <http://www.i-channel.com>.

April 15: Channel 8: 11am-12:30pm—Live coverage of EECS/RLE Optics and Quantum Electronics Seminar. (See Calendar listing.)

April 21: Channel 8: Live coverage of Lab for Computer Science Lecture. (See Calendar listing.) Channel 9: 5:30pm-2am—LCS Lecture (pre-recorded).

April 22: Channel 8: 11am-12:30pm—Live coverage of the EECS/RLE Optics and Quantum Electronics Seminar. (See Calendar listing.) 3-5pm—Live from Digital Equipment Corp. Shared Desktop: A Collaborative Tool for Sharing 3-D Applications Among Different Window Systems - Lawrence G. Palmer and Ricky S. Palmer, Digital.

April 28: Channel 8: 4-5:30pm—Live coverage of the MIT MTL VLSI Seminar. (See Calendar listing.) Channel 9: 5:30pm-2am—MIT MTL VLSI Seminar (pre-recorded).

Crimewatch

The following summary contains most of the incidents reported to Campus Police from April 2-8, 1998. It does not include medical shuttles, ambulance transfers, false alarms and general service calls.

April 2: Bldg. N52: past larceny of a computer, \$300. Bldg. 4: display case broken into and 16mm camera stolen, unknown value. Bldg. N51: report of three individuals soliciting same were issued trespass warnings. Bldg. E17: computer stolen, \$2,000.

April 3: Bldg. 14: demagnetizer stolen, \$200. Bldg. 3: harassment. Bldg. 20: room broken into, nothing taken. Bldg. 26: smoking complaint. 77 Mass. Avenue: assist MBTA Police with the removal of a non-affiliated intoxicated person on bus.

April 4: East Campus: complaint of smell of beer, officers observed no alcohol, no citations issued. 500 Memorial Drive: report of loud music, music turned down. Sigma Alpha Epsilon: noise complaint, situation calmed.

April 5: Phi Delta Theta: noise complaint, situation calmed. Edgerton House: loud noise complaint, officers arrived and found an authorized party with alcohol, no citations issued. Bldg. 54 bike rack: bicycle secured with a cable stolen, \$250. Alumni Pool: credit cards stolen. duPont gym: pants left on bleachers while playing ball, pants and contents stolen, \$310. Phi Delta Theta: report of person shining a laser pen in building next door. Fenway House: harassment.

April 6: Bldg. E15: computer stolen, \$1,600. Bldg. 14: suspicious activity. Bldg. 68: malicious damage to a fire hose. Memorial Drive: MIT Police assist other police agencies with a pedestrian struck on Memorial Dr. Individual had no affiliation with MIT and pronounced dead later at Mass. General Hospital. Bldg. 20: 1) laptop stolen, \$2,000; 2) pagers stolen, \$200. Hayden Library: indecent exposure. Student Center: male arrested for trespassing.

April 7: Bldg. 4: wallet stolen from backpack, \$10. Bldg. E40: clothes stolen, later recovered.

April 8: Bldg. 1: suspicious activity. Memorial Drive: assist State Police, reports of an individual breaking into a vehicle, suspect gone upon arrival of officers. Bldg. E51: backpack stolen, \$175. Eastgate: ID stolen. Kresge lot: bicyclist vs. vehicle accident, no injuries. Bldg. E15: annoying e-mail. Eastgate: suspicious person. Bldg. 34: suspicion of malicious damage which caused a major flood. Safety concerns required Buildings 34 and 36 to be closed for a period of time. Amherst Alley: vehicle vs. pedestrian accident.

Crime Tip: A scam often used by a thief is to pose as a solicitor for the "Hunger Walk, AIDS Walk, etc." It is illegal to solicit on the MIT campus. When you become aware of such activity, note what the individual(s) are attempting to sell or promote along with a description of the individuals and notify the Campus Police immediately by dialing x3-1212.

Spring Weekend to feature talk by Sen. Kerry, funk music festival

A Funk Music Festival featuring saxophonist Maceo Parker, best known as the sax player for the legendary James Brown, and a speech by Sen. John Kerry on environmental initiatives are two of the events in this year's Spring Weekend, an annual student-planned celebration scheduled for April 23-25.

The weekend kicks off at 9pm on Thursday evening with a one-hour study break at Lobdell, and runs through Saturday evening, when the ATO Bachelor Auction at Lobdell and Mr. Spring Weekend contest at Walker run concurrently beginning at 8pm. Other events include Friday's International Fair with food, music, posters and dance from about 40 MIT international associations, scheduled for 10am-6pm on Kresge Oval.

Saturday's events include Sen. Kerry's speech "Where Do We Go

from Kyoto?" at 11am in Kresge Auditorium, the East Campus Picnic at noon, Amherst Alley Rally and Carnival Games at 2pm, the Whopper Eating Contest at 2pm on the Student Center steps, and the Alpha Phlea Market, where students' services will be auctioned off on the Student Center steps from 3-6pm.

Most of the events are open to all members of the MIT community, with the exception of the study break, which is MIT students only. The Funk Music Festival, Bachelor Auction and Mr. Spring Weekend contest are open to the MIT community as well as students with other area college IDs.

The Spring Weekend Committee encourages MIT faculty and staff to participate with students in this weekend of fun, especially the Maceo Parker concert at Friday's Funk Music Festival beginning at 8pm in Johnson Ath-

letic Center. The bands Fishbone and Five Fingers of Funk are also slated to perform. Advance tickets are available from The Source for \$8 for the MIT community and \$10 with any other college ID. All tickets are \$10 at the door. For more information, call x3-2501.

"We think faculty and staff will have as great a time listening to Maceo Parker as the students," said Stuart Jackson, a sophomore in aeronautics and astronautics who serves as co-coordinator of the Spring Weekend Committee. Spring Weekend is held each year, but this is the first time in three years that nationally known musicians have performed.

For more information on the weekend's events, send e-mail to <spring@mit.edu>.

Denise Brehm

Architecture group plans symposium

The History, Theory and Criticism group (HTC) of the Department of Architecture will continue its 25th anniversary celebration with a symposium on April 17-18 in the Bartos Theater (Building E15).

"Architecture, Art and Cultural History: Refractions and Reflections" is the second event in a three-part series honoring HTC's anniversary. The first was last spring's festschrift for Professor Stanford Anderson, head of the architecture department, and the third will be another symposium to be held during the 1998-99 school year.

Next week's event will explore some of the changes and challenges arising from the recent rapprochement of architectural and art history with cultural history. In the last two decades, closer ties between the disciplines have created a shift in the nature and choice of research topics for historians of architecture and art. The symposium hopes to demonstrate the need

for continued collaborative relationships, and attempt to define the goals and differences of the various disciplines.

Presenters will be Anet Abu-Lughod, professor of sociology at the New School for Social Research; Martin Bernal and Susan Buck-Morss, both professors of government at Cornell University; and Carlo Ginzburg, the Franklin D. Murphy Professor of Italian Renaissance Studies at UCLA.

Professors Abu-Lughod and Bernal will speak Friday afternoon on "Constructing Cities, Constructing Histories: Illustrations from New York, Chicago and Los Angeles" and "Ethiopia: Source of the Nile, Source of Wisdom, with some Architectural Animadversions," respectively. Professor Buck-Morss' presentation, "The Tectonics of History," is scheduled for Saturday morning, followed by Professor Ginzburg on "Beyond Exoticism: Warburg and Picasso." A discussion

is planned for that afternoon.

The symposium, which is free and open to the public, will be hosted by the HTC faculty: Professors Sibel Bozdogan, David Friedman, Mark Jarzombek, Leila Kinney, Michael Leja and Nasser Rabbat.

Funding has been provided by the Graham Foundation for Advanced Studies in the Fine Arts, the Council for the Arts, the Aga Khan Program for Islamic Architecture, the Department of Architecture, the Office of the Dean of the School of Architecture and Planning, the Department of Humanities and Social Sciences, the Provost for the Arts and the Office of the Provost. No registration is required.

For more information, contact the HTC office at x8-8439, e-mail <htcanniv@mit.edu> or see the web site at <http://web.mit.edu/htc/www/25th.html>.

Building-arts prize offered

Applications for the annual Marvin E. Goody Prize, a \$5,000 award for a master's thesis that advances the building arts, are now available.

Joan E. Goody of Goody, Clancy & Associates in Boston established the prize in 1983 as a memorial to her husband, Marvin E. Goody, an MIT alumnus and faculty member. The award aims to extend building techniques and use of materials, to encourage links between the academic world and the building industry, and to increase appreciation of the bond between good design and good building—criteria intended to reflect the range of Professor Goody's interests as a teacher, researcher and designer.

The competition, open to those working on a master's thesis or equivalent (e.g., MArch, SMArch, SMBS, MCP, MEng) is held every January (for theses to be completed four months later) and May (for theses to be completed the following January). It is administered by a committee including faculty members from the Departments of Architecture and Civil and Environmental Engineering.

Forms and further information are available in the Department of Architecture headquarters in Rm 7-337. The deadline for applications is 5pm on Tuesday, May 5.

Tossing it out?

Post items to be discarded on the "reuse" e-mail list, where everything from old computers to kittens can be given away. For more information, send e-mail to: <reuse-request@mit.edu>

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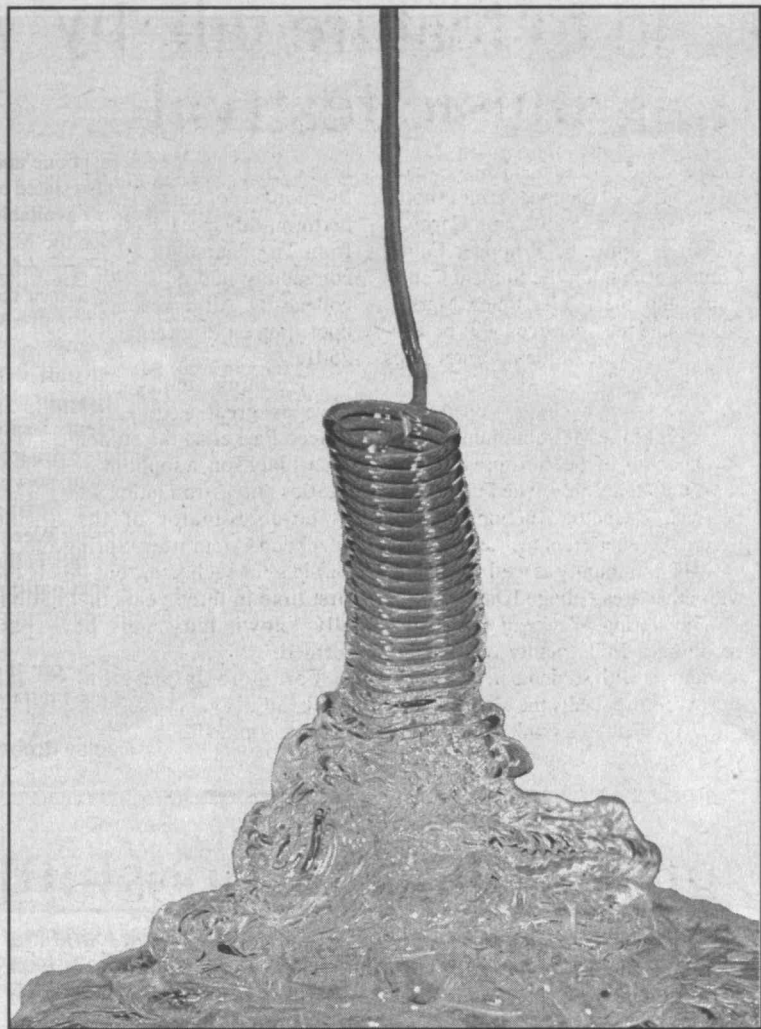
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Printed on Recycled Paper



Fluids like honey and silicone oil (shown here) form coils when poured onto a surface. An MIT researcher and colleagues recently reported mathematics describing this process. This photo, taken by MIT science photographer Felice Frankel, accompanied the original article on the work in the journal *Nature*.

Photo by Felice Frankel

Science in the News

MIT researchers have been in the news lately on topics ranging from coiling honey to an engineer's approach to molecular biology.

COILING HONEY

Pour honey on a slice of toast, and it will fall in sticky coils. An MIT professor and colleagues recently reported equations that describe the coiling process in the journal *Nature*.

The work caught the attention of journalists around the world, leading to stories in the April 7 *New York Times*, the March 12 *Daily Telegraph* (London), and the March 24 *Le Figaro*, as well as an interview March 14 on National Public Radio.

In addition to generating fun headlines—"Science Team Makes Honey Solution Stick," wrote the *Telegraph*—the work has a variety of potential applications.

"As we moved along, I found that there are people interested in this—in the glass industry, for instance, in which glass fibers must be pulled from melted glass at just the right speed, and in the textile industry, in which liquid polymer is pulled through small holes to form fibers," Assistant Professor Lakshminarayanan Mahadevan of the Department of Mechanical Engineering, who conducted the work with colleagues at Harvard, told the *New York Times*.

MIT ON TV

MIT featured prominently in a two-hour Discovery Channel program that premiered last month. "Robots Rising" included interviews with Rodney Brooks, director of the Artificial Intelligence Lab and a professor in electrical engineering and computer science (EECS), and Jay Jaroslav, an AI lab scientist. Professor Brooks talked about robotics in general, his insect robots, and Cog the humanoid robot (MIT Tech Talk 3/18/98); Dr. Jaroslav about the future of robotics. Professor Gil Pratt and technical assistant Peter Dilworth, also of the AI Lab, described their robotic dinosaur, while John Kumph, a graduate student in ocean engineering, demonstrated his robotic fish (Wanda, the robopike).

In other TV news, in late February Professor Harry Asada and Dr. Boo-Ho Yang of mechanical engineering appeared on a Channel 5 newscast. They described work on a ring to monitor vital signs, a wheelchair that con-

verts into a bed (both in MIT Tech Talk, April 3, 1997), and a wheelchair with "casters" that is much more maneuverable than current wheelchairs.

SCRAMBLING DATA

A new way to hide messages sent over the Internet was the focus of recent stories in the *New York Times* and *New Scientist* magazine.

The technique, introduced by Ronald Rivest, associate director of the Laboratory for Computer Science and an EECS professor, "could undermine the US government's attempts to limit the spread of communication methods that can't be deciphered by its security forces," according to the April 4 issue of *New Scientist*.

Professor Rivest's paper describing the technique is on the web at <<http://theory.lcs.mit.edu/~rivest/chaffing.txt>>.

BIOLOGICAL ENGINEERING

A talk by Professor Douglas Lauffenburger of chemical engineering resulted in a full-page story on "the engineering approach to molecular biology" in the March 30 issue of *Chemical and Engineering News*.

"Listening to Lauffenburger, you realize that engineers bring a very different mind-set to the problem of genetic engineering," wrote Rudy Baum.

Among Professor Lauffenburger's comments: "The goal is to change cell function by changing molecules, which also is the goal of biological sciences. The trick is that the engineering way of thinking adds an extra dimension to the approach. What we want to know is, as for any engineering system, can the output of the system—in this case cell function—be predicted based on the inputs? The inputs are not now flow rates, temperature, and pressure, but molecular properties such as biochemical binding..."

"We need circuit diagrams for living systems that are analogous to circuit diagrams for a radio or television—permitting design-based rather than empirical tuning of operation."

Mr. Baum concluded that "the implications of Lauffenburger's vision are significant... Chemists and biologists have laid the intellectual foundations for [applications of molecular biology], and their teaming up with engineers promises to accelerate progress toward these goals."

Elizabeth Thomson

TLO says government research pays off through \$3 billion in taxes

■ By Kenneth D. Campbell
News Office

The US government gets a very high return on government investment in scientific research at universities and research institutions, according to calculations by the MIT Technology Licensing Office (TLO). While research institutions and inventors share royalties worth slightly less than 3 percent of sales of licensed technologies, the government gets back about 15 percent of sales through income taxes, payroll taxes, capital gains taxes and corporate income taxes. In addition, the government has free use of any patents.

The government payback is estimated at six times the royalties that businesses pay to universities and research institutions, based on a very conservative estimate that does not include secondary economic effects such as the business generated when new employees make purchases from their salaries. The research institutions receiving royalties are required by federal law to share the royalties with the individual inventors, and the university's share must, by law, be plowed back into its research and educational activities.

The TLO analysis "illustrates a fundamental misunderstanding of the Bayh-Dole Act of 1980 seen in recent news reports claiming that the government doesn't get anything back from government-funded research," said Lita Nelsen, director of the TLO since 1986.

"The Bayh-Dole Act is working precisely as intended, developing the fruits of government-funded research for the benefit of society," she said. "Economic development through exploitation of intellectual property is now widely considered one of the major benefits of federally sponsored research."

"Only government can make, for dozens of years, the patient investment in basic science needed for scientific discoveries. Only then can private business afford to take the considerable risk of licensing the patented discoveries and investing millions of dollars more to develop the technology into a device or medicine that will bring great benefits to society. This process generates new jobs, new companies, sometimes new industries and new wealth. Government then gets back its share through taxing that wealth," while the public benefits not only from the returned taxes, but from the new prod-

ucts, new companies and new jobs that result, Ms. Nelsen said in an interview Monday.

The Senate Judiciary Committee, in discussing the Bayh-Dole bill in 1980, decided that the government should not participate in the direct income from licensing but instead get its return from taxation on the resulting increase in economic activity.

TAX PAYBACK

The TLO analysis is based on a national study by the Association of University Technology Managers (AUTM) of technology licensing in 1996 through 173 major universities, hospitals and other research institutions. AUTM found that the research institutions received \$591.7 million in royalties on \$20.6 billion of sales of licensed products and that the total economic activity from licensing supported 212,500 jobs.

The TLO analysis made a conservative estimate that the tax payback from the sales totaled \$3.06 billion, including \$1.21 billion in federal income taxes; \$1.51 billion in Social Security and Medicare contributions from the employer and employee; \$129 million in capital gains taxes from investors in stocks of start-up firms; and \$216 million in corporate income taxes, assuming a very conservative 3 percent profit as many of these companies are not yet profitable.

This did not take into account the taxes generated by more than \$4 billion invested into jobs and materials and testing before products were ready for sale.

PATENTS: FROM 300 TO 2,200

Ms. Nelsen, commenting on the success of the Bayh-Dole legislation, noted that the number of US patents granted to American universities in a year rose from about 300 in 1980 to 2,200 in 1996. More than 1,900 companies have been formed through licensing activity since the inception of the Bayh-Dole Act in 1980.

Universities and research institutions, she said, have developed policies to control the potentially conflicting interests of universities—dedicated to dissemination of knowledge—and companies, which often need to keep information proprietary for competitive reasons. MIT is acknowledged to have one of the strictest policies on managing these and other conflicts of interest arising from its licenses and collaborations with industry.

Research institutions have been much more successful than the govern-

ment was in licensing patents. Before Bayh-Dole, the government by 1978 had licensed only 4 percent of the 28,000 patents it owned, whereas successful universities now license nearly half their patents. Prior to Bayh-Dole, there was no market force to encourage licensing, and research was frequently not developed into new products.

"A key aspect of licensing of inventions under Bayh-Dole was the ability to grant an exclusive license," she said. "How could the federal government justify allowing a single company to be given the advantage of intellectual property developed under taxpayer funding? Because exclusive licenses were imperative for the development of early-stage technology. The commercial licensee must devote substantial time and money to attempt to develop the technology, with no guarantee that it will be successful."

"Exclusive licenses are an inducement and reward for a company willing to step forward and take such a risk—knowing that if it succeeds in the development, the exclusive license will protect it from having its product copied by those who weren't willing to take that risk."

Institutions sometimes share that risk by taking shares of stock in start-up companies as a form of royalties. "This practice was highly controversial initially, but it has become accepted as experience is gained and the predicted disasters have been largely averted through thoughtful formation and enforcement of policies," Ms. Nelsen said.

For universities, she said, "the direct economic impact of technology licensing has been relatively small—a surprise to many who believe that royalties could compensate for declining federal support of research. Because of the high costs of patenting, most university licensing offices barely break even."

"But there are other benefits. The local results of university licensing—new local businesses, jobs and real estate and sales tax revenues—have sweetened town/gown relationships a bit."

"Another unpredicted effect has been to motivate students to become entrepreneurs and to increase their awareness of the potential commercial and social utility of their research findings. Many engineering, design and business development courses now include a class on patenting and technology transfer, and entrepreneurship courses are very popular in business schools," Ms. Nelsen said.

Panel launches search for new VP

A committee appointed by President Charles M. Vest has launched a search for an executive vice president of MIT after President Vest accepted the group's recommendation on how to fill the position to be vacated by retiring Senior Vice President William R. Dickson.

The Search Advisory Committee, appointed in February and chaired by Professor Paul L. Joskow of economics, assessed the state of MIT's non-academic administrative infrastructure, the challenges that it faces, and how MIT can best provide for its future

leadership, continuing improvement and renewal.

It recommended that MIT search for someone to fill the new position of executive vice president, responsible to the president for the overall leadership, management and organization of the Institute's administrative and financial affairs, including operations, financial management and planning, human resources management, information systems, resource development and facilities.

The committee has retained a consultant to help conduct a national

search for candidates with management experience in universities, business, research and government organizations. Committee members are especially interested in identifying candidates who are now or have been members of the MIT community.

All applications and nominations for the position should be sent in confidence by May 15 to Malcolm MacKay, Managing Director, Russell Reynolds Associates, 200 Park Avenue, 23rd floor, New York, NY 10166-0002.

Aero/astro hosts flight symposium, lecture

To celebrate the 10th anniversary of the Daedalus human-powered flight, MIT will host the Lester D. Gardner Lecture and the Symposium on Low-Speed and Motorless Flight on April 26-27.

The event is co-sponsored by the Department of Aeronautics and Astronautics and the New England Chapter of the American Institute of Aeronautics and Astronautics.

The symposium will have two parts.

On Sunday, April 26, students will give presentations on their current and recent research and project activities in the Marlborough Lounge (Rm 37-252) starting at 10am.

On Monday, April 27 starting at 8:30am in Bartos Theater (Building E15), the invited-speaker session of the symposium will feature six talks on current research and aircraft programs around the world. These two sessions are intended to reflect the extensive

participation of students as well as faculty in the Daedalus project.

The final event, following the symposium on Monday, will be the 28th annual Lester D. Gardner Lecture by Dr. Paul MacCready and Dr. John Langford III on human-powered flight.

For more information, see the web site at <<http://web.mit.edu/aeroastro/www/current/gardner.html>>, or contact Carolyn Fialkowski at x3-3511 or <cfski@mit.edu>.

Area of brain found to play role in perception of surroundings

■ By Deborah Halber
News Office

MIT researchers have found that a sugar-cube-sized piece of the brain helps prevent us from being lost in space.

In a study to be published in the April 9 issue of *Nature*, Associate Professor Nancy Kanwisher and postdoctoral fellow Russell Epstein of the Department of Brain and Cognitive Sciences found that a part of the brain called the parahippocampal cortex is involved in perceiving the local environment. The parahippocampal cortex gets very active when people look at photographs of indoor or outdoor scenes, but not when they look at photos of faces or objects.

This reaction, which is just as strong to a grassy field as to a furnished room, seems to be tied to our ability to perceive our surroundings and know where we are.

"When you walk into a room, you don't spend five minutes trying to get your bearings," said Dr. Epstein. "These processes happen very quickly and automatically, much like the response we see in the parahippocampal cortex when people view scenes."

This is not the first time a single part of the brain has been linked to a specific task. Professor Kanwisher, who has been using magnetic resonance imaging (MRI) for several years to study how we perceive faces, objects and scenes, says the results are surpris-

ing "in that few scientists would have predicted that this particular process—perceiving the layout of the local environment—would have its own special-purpose bit of brain dedicated to it."

Using MRI, researchers can precisely pinpoint brain activity in response to a stimulus. MRI produces pictures of "slices" of the brain with brightly colored areas indicating regions where neural activity is greater in one spot than in another.

The parahippocampal cortex feeds information to the hippocampus, which is in charge of establishing memories and is involved in encoding spatial memory in rats. "Our results could have consequences for how spatial memory is set up," said Dr. Epstein, who earned his PhD in computer vision, the study of how to create machines that "see."

The area of the brain that the researchers named the parahippocampal place area (PPA) reacts consistently to complex scenes such as open fields, city streets, store interiors or empty rooms. The only thing the images have in common is that they are all places in which people could imagine walking around.

When subjects were shown pictures of places such as a Somerville street lined with cars and triple-deckers, empty rooms and rooms filled with furniture, the PPA "lit up." The brain's reaction was just as strong to an empty room as a room full of furniture, but pictures of faces, furniture alone or distorted scenes that no longer repre-

sented a coherent space elicited a negligible or weak response.

The PPA response was strong and consistent in all subjects, even though the images they saw flashed before their eyes for a mere 300 milliseconds.

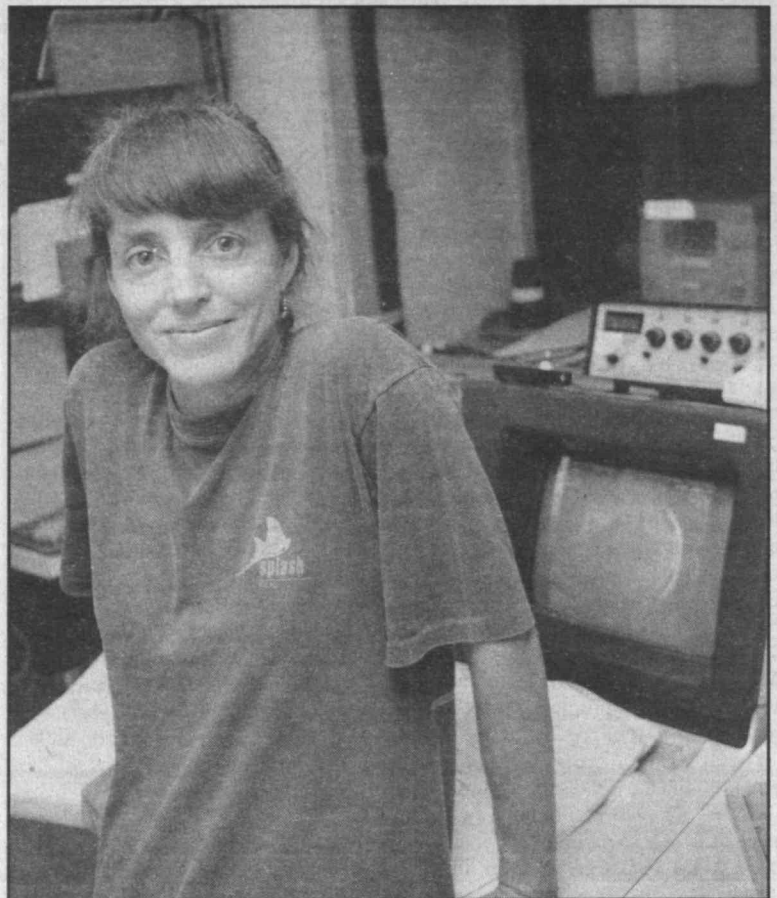
There was no difference in intensity of reaction when the subjects were shown familiar and unfamiliar scenes and places. The researchers wanted to make sure that they were not simply eliciting a memory response.

Dr. Epstein said he suspects the function of the PPA is to help us navigate through the world by providing a rough-and-ready representation of our immediate environment—for example, by figuring out where the walls of a room are.

It makes sense that humans have an innate ability to "know where we are in the world," he said. "Babies and rats use information about the shape of their environment to orient themselves, and we think the PPA might be the part of the adult human brain that extracts this information."

"To me, this is a fascinating subject," said Dr. Epstein, who pointed out that it's extremely difficult to get a computer to "see" with any semblance of the ease and accuracy with which humans take in and process visual information. "It's really incredible that we have this ability to look at our surroundings and almost immediately know where we are."

This research is sponsored by the National Institutes of Mental Health and the Human Frontiers Foundation.



Associate Professor Nancy Kanwisher and colleagues have found that the parahippocampal cortex is involved in perceiving one's local environment. Photo by Graham Ramsay

Community Service Fund drive kicks off

The Community Service Fund (CSF), which supports Cambridge-based organizations for which members of the MIT community volunteer, has begun its annual fundraising drive.

The CSF was established in 1968 by a vote of the faculty to strengthen cooperation and understanding between MIT and the Cambridge community. In 1997, 18 agencies received allocations from the CSF, which raises approximately \$60,000 a year through three events: its annual fund drive, the CSF Road Race (scheduled this year for May 9) and the Commencement plant sale.

"For members of the MIT community, the CSF serves

as a reminder that we champion those among us who volunteer their time, talent, and energy through local public service. To our Cambridge neighbors, it demonstrates our strong concern and willingness to face various challenges together," said Paul Parravano, secretary of the CSF board of trustees and assistant for community relations in the President's Office.

Institute employees will be receiving a letter from board co-chairs Rebecca Vest and Professor Woodie Flowers of mechanical engineering this week, inviting donations to the CSF. More information about the Fund and related events will appear in future issues of MIT Tech Talk.

Quarter Century Club inducts 119 members

At an April 2 Faculty Club luncheon, 119 new members were inducted into the MIT Quarter Century Club (QCC), whose membership includes faculty, administrative, research, support and service staff who have worked at MIT for at least 25 years. Glenn Strehle, vice president for finance and treasurer, was the guest speaker.

Thirty-one of the new members are women. Sixty-seven inductees are from campus and 52 are from Lincoln Laboratory. This year's group has two fewer members than last year's 121 inductees, bringing the total QCC membership to approximately 2,693 (2,223 men and 470 women).

The QCC will hold its annual summer picnic on August 18 in the Johnson Athletic Center from 4:30-7 pm. Other QCC events in 1998 include a Silver Club high tea for women on October 13 at the Faculty Club, and the QCC holiday gathering on December 8 in the Stratton Student Center.

This year's new QCC members are:

Gary W. Ahlgren, Lincoln Lab Group 108
Lyle G. Aker, Lincoln Fiscal Office
Christine M. Anderson, Lincoln Lab Division 4
Nicholas A. Ashford, School of Engineering
Robert K. Ashworth Jr., Lincoln Lab Group 98
Dennis Baron, VP for Information Systems
Ronald F. Bauer, Lincoln Lab Group 66
Jane L. Benoit, Lincoln Lab Group 105
Alan D. Bernard, Lincoln Lab Group 106
Donald L. Browne, Physical Plant
Allan S. Bufferd, Treasurer's Office
Myrna Callender, Physical Plant
Michael F. Clifford, Lincoln Lab Group 13
Louis S. DiPalma, Lincoln Lab Group 96
Patricia A. Dixon, Civil and Environmental Eng. (CEE)
Sheila A. Dodson, Lab for Nuclear Science
Viktor Dubrowski, Aeronautics and Astronautics
Theodore W. Ducas, Research Lab of Electronics
Herbert Einstein, CEE
Joseph A. Ficarra, Physical Plant
Anthony E. Filip, Lincoln Lab Group 108
Robert A. Ford, Lincoln Lab Group 102
Steven E. Forman, Lincoln Lab Group 75
Daniel G. Fouche, Lincoln Lab Group 94

Rochelle R. Friedman, Medical Department
Jeffrey L. Gertz, Lincoln Lab Group 42
Reinhard K. Goethert, Architecture
David A. Gwinn, Plasma Science and Fusion Center
Dennis R. Hall, Lincoln Lab Group 93
Monica M. Hammond, Controller's Accounting Office
Linda F. Hampson, Lincoln Lab Human Resources
Robert L. Harvey, Lincoln Lab Group 32
Jerry A. Hausman, Economics
Arnold C. Hax, Economics
Hans F. Hinteregger, Haystack Observatory
Jon H. Holtham, Lincoln Lab Group 86
Nancy H. Hopkins, Biology
Berthold K.P. Horn, EECS
James W. Hunt, Lincoln Lab Group 91
Jean E. Jackson, Anthropology
Henry D. Jacoby, Sloan School
Robert L. Jaffe, Physics
Gerald D. Johnson, Lincoln Lab Group 84
Paul L. Joskow, Economics
Paul C. Joss, Physics
John J. Kangas, Lincoln Lab Group 64
Robert L. Kehner, Libraries
Gerard F. Kenny, Medical Department
Jack G. Keumarian, Audio Visual Services
Judith T. Kildow, Ocean Engineering
Robert P. Konieczka, Lincoln Lab Group 86
John M. Kowalski, Lincoln Lab Group 72
Daniel T. Langdale, Graduate Education Office
Carmine J. LaRocca, Housing
John L. Leeper, Lincoln Lab Group 32
Barbara H. Liskov, EECS
William J. Loubsky, Lincoln Lab Group 35
Karen K. Luxton, Energy Lab
John A. Maccini, Lincoln Lab Group 42
Leonard J. Mahoney, Lincoln Lab Group 84
Carl D. Martland, CEE
Ivan Mastovsky, Plasma Science and Fusion Center
June L. Matthews, Physics
Joseph T. Mayhan, Lincoln Lab Group 34
Charles A. McClure, Lincoln Lab Group 11
Richard B. McSheehy, Lincoln Lab Group 101
Linda R. Meinke, EAPS
James M. Mullett, Service Process
Frederick J. O'Donnell, Lincoln Lab Group 83
Barbara L. O'Pray, Medical Department
Vincent A. Orlando, Lincoln Lab Group 42

Mary-Lou Pardue, Biology
Ronald E. Parker, Service Process
Claire L. Paulding, Personnel Office
Lynne Perry, Lincoln Lab Human Resources
Ruth Perry, Literature Section
Roger K. Philbrick, Lincoln Lab Group 34
Shirley D. Phillips, Housing
Marianne Pietrzyk, Lincoln Lab Group 35
Karen R. Polenske, Urban Studies and Planning
Joan F. Rice, V.P. Human Resources
Anne L. Richard, Music and Theatre Arts
H. Francis Rittershaus, Lincoln Lab Group 63
John F. Rogers, Lincoln Lab Group 72
Nicholas F. Rosato, Lincoln Lab Division 9
Mary P. Rowe, Office of the President
Antonio Sanchez-Rubio, Lincoln Lab Group 82
Marilyn D. Semprucci, Lincoln Lab Group 64
Margaret A. Shea, Alumni Association
Margarita Sifacca, Center for Cancer Research
Charles J. Simas, Physical Plant
Elliot Singer, Lincoln Lab Group 62
Victoria V. Sirianni, Physical Plant
William C. Smith, Campus Police
Fred John Solman III, Lincoln Lab Group 96
Nadine A. Solomon, Biology
Richard M. Spitzberg, Lincoln Lab Group 35
Ronald E. Sprague, Lincoln Lab Group 67
Ramaswamy Sridharan, Lincoln Lab Group 91
Stephen G. Steadman, Lab for Nuclear Science
Peter H. Stone, EAPS
George W. Tajima, Lincoln Lab Group 76
Toyoichi Tanaka, Physics
Peter C. Tappan, Center for Space Research
David M. Terry, Service Process
Lewis A. Thurman, Lincoln Lab Division 10
Robert L. Van De Pitte, Office of Sponsored Programs
John Van Maanen, Sloan School
Frederick G. Walther, Lincoln Lab Group 67
Sandra S. Wellford, Urban Studies and Planning
William C. Wheaton, Economics
Robert H. Whiting, Lincoln Lab Group 47
Clarence G. Williams, Office of the President
Lorenzo B. Williams, Jr., Lincoln Lab Group 73
Roy Williams, Physical Plant
Dieter Willner, Lincoln Lab Group 34
Michael P. Wirzbicki, Lincoln Lab Group 72
John P. Woods, Lincoln Lab Group 64

Sematech chairman to speak

Dr. William Spencer, chairman of the board and former CEO of Sematech, will share his views on the semiconductor industry on Tuesday, April 28 at 4pm in the Wong Auditorium (Building E51).

The 90-minute presentation and discussion, entitled "R&D Cooperation in the Semiconductor Industry: What It Is, What It Isn't, What are the Lessons," is part of the Industry Leaders in Technology and Management lecture series, co-sponsored by the School of Engineering and the Sloan School and hosted by the Center for Technology, Policy and Industrial Development.

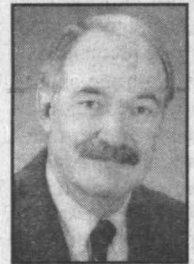
Dr. Spencer has worked in research and management at Bell Labs (1959-73), Sandia National Labs (1973-81)

and Xerox (1981-90). He joined Sematech in 1990 as president and CEO. He holds the AB from William Jewell College in Missouri and the MS and PhD from Kansas State University.

Sematech is a research and development consortium of 16 international corporations involved in semiconductor manufacturing. The consortium has worked to develop equipment and materials needed to advance existing technologies and to increase efficiency and cost effectiveness, as well as focusing on revolutionary changes needed by the industry.

Sematech and/or its member companies participate in a number of initiatives at MIT. Examples include collaboration on the modeling of advance copper-interconnect technology and industrial participation in the SRC/NSF Engineering Research Center for Environmentally Benign Semiconductor Manufacturing and the Microsystems Technology Laboratory.

Dr. Spencer's lecture is open to the MIT community. Seating is limited to a first-come, first-served basis. For more information, call x3-0404 or refer to the CTPID homepage at <<http://web.mit.edu/ctpid/www>>.



Spencer

Obituaries

WILFRED H. POWERS

A memorial service was held on April 3 at Groton United Methodist Church in Groton, VT, for Wilfred Havelock Powers, Jr., 74, of Groton (formerly of Melrose, MA), who died on March 31. He was a former metalworker at Lincoln Laboratory who was hired in 1950 and retired in 1986.

Survivors include his wife, Irene; four daughters, Judith Ring of Andover, Helen Phillips of Wilmington, Deborah Goding of Lyndeboro, NH, and Mala Hebert of Milford, NH; 12 grandchildren and three great-grandchildren. He was buried in Westview Cemetery in Lexington, MA.

LUVENIA EVELYN

Luvonia Evelyn, 67, of Cambridge, a former laboratory aide in chemical engineering, died on April 2. She retired in 1993 after working at MIT for 24 years.

Johnson tries to detect chaos before it's seen

■ By Denise Brehm
News Office

He's not a fortune teller, but if you could turn your journey to work each morning into a mathematical equation, this research engineer might be able to tell you which days' commute would go predictably and which would be chaotic. For example, the phone call that delays your departure by 15 seconds could have ramifications an order beyond what you might think if you end up missing your bus, then lose a big contract and half your income just because you were late.

Dr. Mark Johnson, a principal research engineer in the Department of Mechanical Engineering, has come up with a method for predicting whether a physical system will be chaotic or stable by applying a mathematical test to the equation that describes the system.

"Knowing whether or not a system is chaotic can help you understand its characteristics and save a lot of time," he said.

Scientists and engineers use mathematics to describe all sorts of normal physical phenomena, like blood flowing through veins, a tractor-trailer hauling lumber on a freeway or the movement of planets in a solar system.

Some of those processes are completely predictable—they're the same over and over again, and a slight initial change produces only a small change in the end. Others might appear at first glance to be predictable, but minor alterations can bring about enormous differences in outcome. And still others are completely random.

Chaos, in the scientific sense, deals with the second group—those natural processes that are very sensitive to small changes.

In the scenario above, that phone call might appear to be an ordinary variable in the equation describing your morning, but in this instance, the 15-second delay it causes has a dramatic effect on the system.

While various methods have been proposed for separating chaos from ordinary noise (or errors) in experimental data, Dr. Johnson tries to find out if a mathematical equation is chaotic by applying a mathematical technique that tests for randomness. He explained that a test like this could help researchers in industrial settings, such as chemical engineers who might need a chaotic process to achieve a certain end.

"Any type of industrial process where you have to mix highly viscous solutions will normally be enhanced by chaos, so you might want to design a process to be chaotic," he said.

One analogy of how this works is to imagine kneading a spot of red dye into bread dough. The stretching and folding required to knead dough make it a

chaotic process. That dot of red dye will be evenly dispersed throughout the dough fairly quickly, producing a pale-pink loaf of bread. A non-chaotic mixing process might be less efficient.

To date, Dr. Johnson has used his method to test eight understood systems with clear results.

"As yet, there's no theoretical proof. It's worked on the processes I've tested it on, but all you need to do is find one case to disprove it," said Dr. Johnson, whose work in fluid mechanics led him to apply a test for randomness in fluid motions to other types of systems. He describes the procedure in a paper scheduled to appear in the June 1 issue of *Physica D*. His co-author is James Habyarimana, a senior in civil and environmental engineering who worked on the project as a summer UROP.

"I'd been to a number of talks where people described their chaotic systems," said Dr. Johnson. "Whenever I asked how they knew the process was chaotic, the best response they could give was that the equation had a positive Lyapunov exponent, which is a mathematical concept commonly used as an operational definition for chaos. Yet, by starting with a very well-studied chaotic system—the logistic equation for population growth—I was able to construct an example of a chaotic equation that didn't fit that mold. So I tried to devise a better operational test."

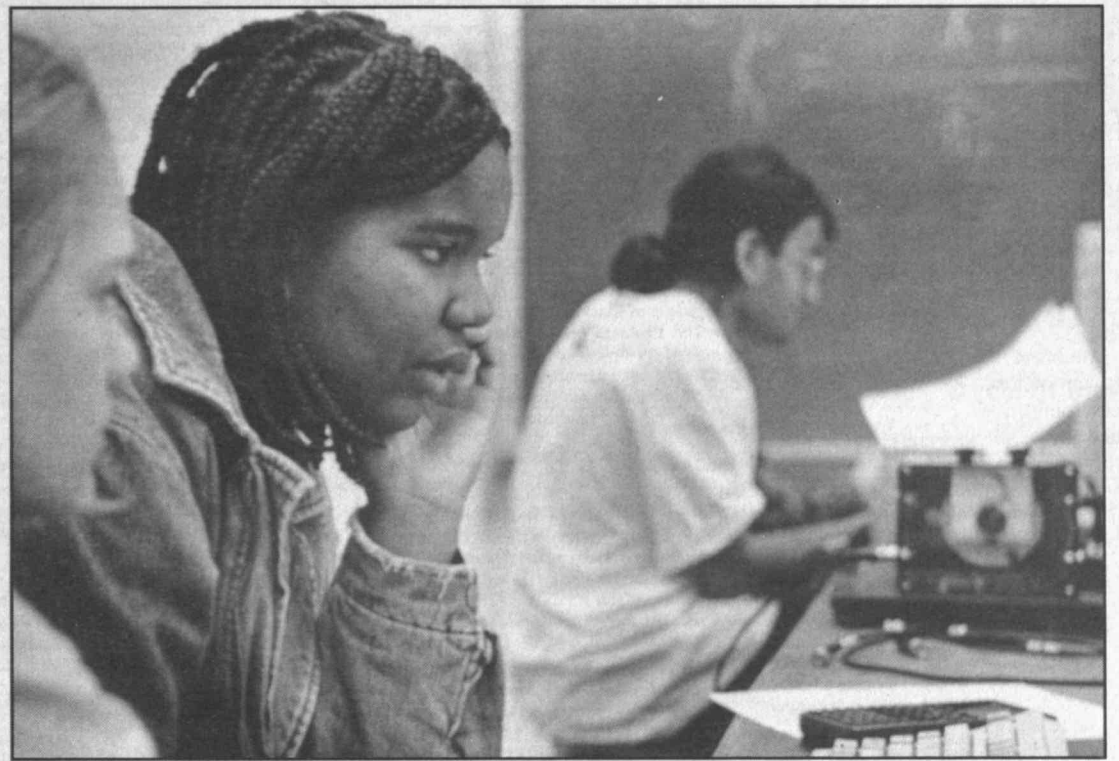
Chaos, a characteristic of some natural processes that has been recognized widely for only a few decades, is an unpredictability inherent in a system that should otherwise be stable according to classical models of physics. Before MIT Professor Emeritus Edward N. Lorenz first wrote about the phenomenon in 1963, chaos was generally written off as noise in data and ignored.

Professor Lorenz, whose initial research on chaos was in meteorology, used the example of a butterfly to describe the effect that small changes can make on a chaotic system. The flap of a butterfly's wings in one hemisphere, through a cumulative series of effects, could conceivably produce a hurricane on the other side of the world.

Chaotic systems tend to behave predictably only at very short or very long time intervals; in between, they appear to be random. This characteristic can be referred to as disorder underlying an apparently stable pattern or, paradoxically, as pattern underlying apparent disorder. It explains why weather can be predicted only a few days at a time, but can also be expected to stay within certain parameters in the long run.

While Dr. Johnson looks at the equations that describe natural systems to determine if chaos is present, some theorists start with data, then test for chaos and draw conclusions. For instance, Dr. Chi-Sang Poon, a research scientist in the Harvard-MIT Division of Health Sciences and Technology, found a method to separate chaos from noise in data sets (MIT Tech Talk, June 5, 1996) and then showed that the method could potentially diagnose heart disease (Tech Talk, October 8, 1997).

A touch of classwork



Suzie Mkandawire (center), a sophomore in mechanical engineering, works on a problem in 2.010 (*Control Systems Principles*).
Photo by Laura Wulf

Political issues complicate solutions to global warming, speakers say

■ By Sarah H. Wright
News Office

Speakers offered three different perspectives on the science, politics and potential remedies for global warming at an April 7 panel discussion entitled "Where Are We After Kyoto?" in Wong Auditorium.

Kyoto, Japan, is where the international community made agreements in December 1997 to reduce emissions and include a count of carbon-absorbing sinks in calculating reductions. At the close of the Kyoto Climate Treaty conference, the "Annex I" countries—including the United States, the European Union, Japan and the former Soviet Union countries—established national targets to reduce emissions by 2012 to below their 1990 levels.

The Rev. Jane Gould, Episcopal chaplain at MIT and coordinator of the Technology and Culture Forum, introduced moderator Eugene B. Skolnikoff, professor of political science, with a summary of his service to the Eisenhower, Kennedy and Carter administrations.

Professor Skolnikoff described the environmental issue as "unique," in that it did not arise from illicit behavior but from human population growth, and as "bedeviling the community of the world at all levels for the next century." Setting the exploratory tone for the afternoon's discussion, he noted that "there is no single solution for simply solving the problem, but there are many options."

Ronald G. Prinn, the TEPCO Professor of Atmospheric Chemistry and co-director of the MIT Joint Program on the Science and Policy of Global Change (JPSPGC), explored four questions to be answered by current and future research.

Displaying a huge vertical temperature map which showed how "climate in the polar regions has changed drastically in the past 250,000 years," he said, "Human influence is very shallow." Thus, the answer to his first question for researchers—does climate vary naturally?—is "a resounding yes," he said. The question also served to highlight the scientific challenges for environmental planners, since natural climate variations can be difficult to separate from anthropogenic ones.

GREENHOUSE EFFECT REAL

Professor Prinn's second question concerned the accuracy of current climate forecasts. "The greenhouse effect is real. That is, the physics are real but the magnitude is

uncertain," he said. "Better forecasts will require understanding and simulation of the role of the oceans, aerosols, clouds, glacials processes, chaos and predictability."

Professor Prinn's third inquiry—how easy is it to slow down global warming?—introduced scientific, economic and political elements that were also addressed by the session's subsequent speakers. Noting that global warming is caused by a combination of natural and industrial processes, he demonstrated, by means of a forecast from an integrated model that combined variables from physical and social realms, how difficult it is to plan accurately and equitably to reduce consumption and to slow down the greenhouse effect.

NOT JUST RICH COUNTRIES

"Even with Herculean efforts in reduction, warming will persist," he said. "This is not like the chlorofluorocarbon issue, which rich countries can solve pretty much on their own."

Without participation from less developed countries, rich countries would not only have to reduce emissions to zero, but, "to have an impact on global warming, rich countries would have to be sucking carbon out of the atmosphere by the middle of the next century," he said.

Professor Prinn's recommendations included enhanced forecasts in which human influence is quantified; international involvement, with significant assistance from rich to developing countries; new technologies and enhanced technological options; and societal preparation for change, especially in coastal and agricultural areas, which are most affected by climate change.

Henry D. Jacoby, the William F. Pounds Professor of Management, at the Sloan School and co-director of the JPSPGC, followed with a summary of what obstructs realization of the Kyoto agreement.

"There is a disconnect between short-term policies and the Kyoto targets. To really meet the Kyoto commitment, we have to start now to reduce emissions," he said.

If we wait five to seven years, as the administration's current position implies, the reductions would have to be 25-35 percent, which is a "quick turnaround that is not credible," he said.

The United States has set up a technology initiative of \$1.2 billion, which goes mainly to subsidies and not to long-term research and development, said Professor Jacoby. He characterized this approach as a "reverse tooth

fairy—put a billion dollars under the pillow and hope to find new teeth in 2010."

Many developing countries are firmly opposed both to emissions trading and to making commitments to reduce consumption, he said. Professor Jacoby also noted that the lack of political support in the United States for global warming initiatives undermines the possibility of universal participation in and ultimate success of the Kyoto Treaty.

Dr. Kilaparti Ramakrishna, director of the Program on Science in Public Affairs at Woods Hole Research Center and special advisor to the United Nations for the Framework Convention on Climate Change, followed Professor Jacoby's presentation with comments on developing countries' perspective on the Kyoto agreements.

From their point of view, "the tensions between industrialized and developing countries is based on [industrialized countries'] desire to keep developing countries in a state of dependence," he said.

Implementation by developing countries of the equal but differentiated responsibilities related to slowing global warming are "contingent on measures taken by the industrialized countries," Dr. Ramakrishna said. Yet, he noted, those measures have yet to materialize and the upcoming climate conference (to be held in Buenos Aires in November) is likely to be stalemated by north-south tensions.

For example, the flexibility mechanisms built into the Kyoto agreement such as emissions trading "could add up to mean industrialized countries escape doing anything active (i.e. reducing fossil fuel consumption) in their own countries," Dr. Ramakrishna said.

In essence, cutting back on energy consumption, a symptom of economic growth, makes as much sense in some developing countries as dieting does to the starving.

"But for the US role, we would not have had the current reductions," Dr. Ramakrishna said. "Yet the US lost the public relations game. US politicians were not good diplomats; they warned others at the Kyoto conference that any agreement made in Kyoto would 'never fly back home.'"

The general goal of international commitment and participation will only be met once local governments are convinced that everyone else is supporting a global warming agreement, he said. In addition, adequate compensation from the industrialized countries is essential, he added.



Johnson

Study Subjects Wanted

The MIT Research Program on Communications Policy is seeking volunteers for a study of new telephone services.

The study takes about 30 minutes. We are offering participants a \$20 incentive for completing the study. To take part in the study, you and a friend visit our offices and spend a few minutes talking by phone. We will ask you a few questions about the service and send you on your way.

For information and a complete description of the requirements for participating in the study, email usrstudy@rpcp.mit.edu, call x3-3602, or visit <http://rpcp.mit.edu/studyinfo/>

Institute Calendar

* Open to public
** Open to MIT community only

(For arts-related listings, see page 7)

Next deadline for listings: 12 noon Friday, April 24 Covers events from Wednesday, April 29 through Sunday, May 10. Listings for the Institute Calendar and Student Notices should be submitted using the web form at <http://web.mit.edu/newsoffice/tt/calendar>. Questions can be e-mailed to <ttcalendar@mit.edu> or call x3-2704. Early submissions encouraged.

April 15-May 3

■ SPECIAL INTEREST

1998 Catherine N. Stratton Lectures on Aging Successfully—Minimal Surgery: When Less is Better*—John A. Parrish, MD, dermatology and laser surgery specialist, MGH, Thursday, April 16. Sponsored by MIT Medical and the MIT Women's League. 9:30am-noon, Bartos Theater, Wiesner Building (E15). Coffee at 9am. More info: MIT Women's League x3-3656 or <http://web.mit.edu/medical/age/age.htm>.

A Symposium on Race and Cyberspace*—Speakers include Glenn Kaino and Tara MacPherson. Thursday, April 23. Sponsored by Program in Women's Studies, the Dean of Engineering, the Dean of Humanities and Social Sciences, Office of the Arts, the Film and Media Studies Department, the Markle Foundation, and the Media-in-Transition Project. 4pm, Bartos Theater. More info: x3-8844.

R&D Cooperation in the Semiconductor Industry: What it is, What it isn't, What are the Lessons?*—Dr. William Spencer, Chairman of the Board, Sematech. Tuesday, April 28. Industry Leaders in Technology and Management Series, sponsored by School of Engineering and the Sloan School of Management and hosted by the Center for Technology, Policy and Industrial Development. 4-5:30pm, Tang Center, Wong Auditorium (E51). More info: x3-0404, <conecny@mit.edu>.

■ SEMINARS & LECTURES

WEDNESDAY, APRIL 15

Extraordinary Optical Transmission Through Sub-Wavelength Hole Arrays*—Tineke Thio, NEC Research Institute. Sponsored by EECS/RLE Seminar Series on Optics & Quantum Electronics. 11am, Grier Room B, Rm 34-401B. More info: Prof. Erich Ippen, x3-8504 <ippen@mit.edu>.

What's New in Buildings: Are Green Buildings in Your Future?*—Prof. Leon Glicksman, Dept. of Architecture. Alliance for Global Sustainability Brown Bag Luncheon. Noon-1:30pm, Rm E40-496. Cookies and beverages provided. More info: x8-6368, <kgibson@mit.edu>.

Onset of the 1997-98 El Niño*—Lisan Yu, NASA/Goddard and Univ. of Maryland. Sponsored by Physical Oceanography. 12:10-1pm, Rm 54-915. More info: <http://puddle.mit.edu/~mick/sack.html>.

Global Environment Challenges for the 21st Century*—Mario J. Molina, Institute Professor, Dept of Chemistry. Sponsored by ICRMOT. 1-2pm, Rm E56-270. More info: x3-0586 or <http://web.mit.edu/afs/athena.mit.edu/org/i/icrmot/www/seminars.html>.

Corona: World's First Reconnaissance Satellite, 1960-1972*—Dr. F. Dow Smith. Sponsored by Massachusetts Space Grant Consortium. 3-5pm, Rm 37-212. More info: x8-5546 or <halaris@mit.edu>.

Fluvial Systems in Mountain Belts and Foreland Basins: An Alpine Perspective*—Prof. Trevor Elliott, Univ. of Liverpool. Sponsored by Dept. of Earth, Atmospheric and Planetary Sciences. 4pm, Rm 54-915. Refreshments at 3:30pm, Ida Green Lounge. More info: x3-3382, <bevkt@mit.edu> or <http://www.eaps.mit.edu/dept_sem.html>.

Images of the Divine: The Tombs of Saints and the Mausolea of Kings*—Catherine Asher, Univ. of Minnesota. The Aspect of the Sacred in Architecture and Urbanism Lecture Series, sponsored by The Aga Khan Program for Islamic Architecture. 6pm, Rm 3-133. More info: x3-1400, <islarch@mit.edu>.

THURSDAY, APRIL 16

1998 Catherine N. Stratton Lectures on Aging Successfully—Minimal Surgery: When Less is Better*—John A. Parrish, MD, dermatology and laser surgery specialist, MGH. See Special Interest above.

Review of Current and Future OR Applications in the Airlines Industry*—Ross Darrow, Senior Principal, SABRE Technology Solutions. Sponsored by Operations

Research Group. 4-5pm, Rm E51-149. Refreshments to follow in Rm E40-106. More info: <http://web.mit.edu/orc/www>, x3-6185 or <jdtaylor@mit.edu>.

Dissipation in Granular Matter: Clusters and Precursors*—Arshad Kudrolli, Physics, Clark Univ. Mechanics & Materials Seminar, ME Dept. 4-5pm, Rm 5-234. Refreshments prior. More info: <xray@mit.edu> or <http://lohtse.mit.edu/~maha/seminar.html>.

Languages of Class in the French Revolution: The Problem of the Missing Bourgeoisie*—Prof. Sarah Maza, Northwestern Univ. Sahin Lecture Series, sponsored by History Faculty. 4:30pm, Rm E51-275. More info: x3-4965 or <history-info@mit.edu>.

FRIDAY, APRIL 17

Overview and Status of the National Ignition Facility (NIF) Project*—Dr. Sandra J. Brereton, Lawrence Livermore Nat'l Lab. Sponsored by Plasma Science and Fusion Center. 11am, Rm NW17-218. More info: x3-8101, <rivenberg@psfc.mit.edu>.

Chemo-plasticity: Materials, Modeling, Computational Aspects and Concrete Design*—Dr. Franz-Josef Ulm, Laboratoire Central des Ponts et Chaussees, Paris. Sponsored by Civil and Environmental Engineering. Noon, Rm 1-350. More info: Oral Buyukozturk x3-7186, <obuyuk@mit.edu>.

Generation of Microwaves using Gyrotrons*—Rahul Advani, MIT. Fusion Doctoral Seminar, sponsored by nuclear engineering. 12:30-1:30pm, Rm NW16-213. More info: x8-7818, <kshadman>.

Geopolitics of North Korea's Food Crisis*—Chong-Ae Yu, Consultant to the International Security Program of the Rockefeller Foundation and the Conflict Resolution Program of the Carter Center. Sponsored by Security Studies Program. 1-2:30pm, Rm E38-615. Bag lunch, refreshments provided. More info: x3-0133, <llevine@mit.edu>.

Architecture, Art and Cultural History: Reflections and Reactions*—Symposium celebrating 25th anniversary of the History, Theory and Criticism section, Dept of Architecture. April 17: 2:45-5pm, April 18: 9:30am-5:30pm, Bartos Theater (Bldg E15). Free. More info: x8-8439, <htcanniv@mit.edu> or <http://web.mit.edu/htc/www/25th.html>.

Interesting Dynamics of Azeotropic Distillation—Implications for Process Design*—Manfred Morari, Swiss Federal Institute of Technology (ETH). Sponsored by Chemical Engineering. 3pm, Rm 66-110. More info: Arline Benford x8-7031 or <arline@mit.edu>.

Plasma Confinement in a Levitated Dipole*—Dr. Jay Kesner, MIT Plasma Science and Fusion Center. Sponsored by Plasma Science and Fusion Center. 4pm, Rm NW17-218. More info: <rivenberg@psfc.mit.edu> or <http://www.pfc.mit.edu/cgi/calendars/psfc>.

The Influence of Carbonate Precipitation and Dissolution on Seawater [Sr] and 87Sr/86Sr*—Prof. Dawn Sumner, Univ. of California, Davis. Sponsored by Department of Earth, Atmospheric and Planetary Sciences. 4pm, Rm 54-915. Refreshments at 3:30pm, Ida Green Lounge. More info: x3-3382, <bevkt@mit.edu> or <http://www.eaps.mit.edu/dept_sem.html>.

TUESDAY, APRIL 21

Some Reflections on Western Scientific Traditions from the East Asian Perspective*—Yung Sik Kim, Seoul National Univ. Dibner Institute Colloquium. Noon-2pm, Rm E56-100. Please let us know if you plan to attend: <dibner@mit.edu> or x3-6989.

The Future of Computing: Key Trends in Technology and Customer Value*—Eckhard Pfeiffer, CEO, Compaq. Sponsored by MIT Lab for Computer Science. 3:30pm, Rm 54-100. (Please note new location.) Refreshments 3:15pm. More info: x3-0145, <bbarry@hq.lcs.mit.edu> <http://www.lcs.mit.edu/web_projects/dls97.html>.

High-Pressure NMR Spectroscopy. Applications to Organometallic Reactions and Catalysis*—Prof. Claudio Bianchini, Istituto per lo Studio della Stereochemical Energetica dei Composti de Coordinazione del CNR, Italy. Arthur D. Little Seminar Series in Inorganic Chemistry. 4pm, Rm 6-120. More info: Phyllis Stevens x3-1905, <pstevens@mit.edu>.

WEDNESDAY, APRIL 22

Organic Lasers: New Materials and Resonators*—Ananth Dodabalapur, Lucent Technologies, Bell Labs. Sponsored by EECS/RLE Seminar Series on Optics & Quantum Electronics. 11am, Grier Room B, Rm 34-401B. More info: Prof. Erich Ippen, x3-8504 <ippen@mit.edu>.

Expert vs. Lay Conflicts of Risk Intuition*—Howard Margolis, Univ. of Chicago. Sponsored by Security Studies Program. Noon-1:30pm, Rm E38-615. Bag lunch, refresh-

ments will be provided. More info: x3-0133, <llevine@mit.edu>.

Chemistry and Biology of Endogenous DNA Damage: Exocyclic Adducts as a Case Study*—Prof. Lawrence J. Marnett, Vanderbilt Univ. School of Medicine and Vanderbilt Cancer Center. A Gerald N. Wogan Lecture, sponsored by the Division of Toxicology. Noon, Rm 56-614. More info: x3-6792 or <toxop@mit.edu>.

Quantifying Uncertainty in General Circulation Models*—Dimitris Menemenlis, MIT. Sponsored by Physical Oceanography. 12:10-1pm, Rm 54-915. More info: <http://puddle.mit.edu/~mick/sack.html>.

Air Force Leadership in Space**—Prof. Sheila Widnall, former Secretary of the Airforce, professor of aero/astro. Sponsored by Massachusetts Space Grant Consortium. 3-5pm, Rm 37-212. More info: x8-5546, <halaris@mit.edu>.

Some New Ideas in Stellarators*—Allan Rieman, Princeton Plasma Physics Lab. Sponsored by Plasma Science and Fusion Center Seminar, 4pm, Rm NW17-218. More info: Paul Rivenberg x3-8101 or <rivenberg@psfc.mit.edu>.

Reactions of Thiophenes with Soluble Transition Metal Complexes: Hydrogenation, Hydrogenolysis and Desulfurization Reactions in Different Phase Systems*—Claudio Bianchini, Istituto per lo Studio della Stereochemical ed Energetica dei Composti de Coordinazione del CNR, Italy. Arthur D. Little Seminar Series in Inorganic Chemistry. 4pm, Rm 6-120. More info: Phyllis Stevens x3-1905, <pstevens@mit.edu>.

Ocean Observatories: Present Effort and Future Prospects*—Prof. Marcia McNutt, president, Monterey Bay Aquarium Research Institute. Fifteenth Annual Robert Bruce Wallace Lecture, sponsored by Department of Ocean Engineering. 4pm, Rm 1-390. Refreshments follow. More info: x8-5471, <jsheyta@mit.edu>.

How to Tap Social Capital in the Arab World*—Prof. Fatima Mernissi, Andrew Mellon Visiting Professor, Tulane University. Emile Bustani Middle East Seminar, sponsored by the Center for International Studies. 4:30-6pm, Rm E51-095. This talk is cosponsored by the Peoples and States Seminar and the Program in Women's Studies. More info: x3-8961 or <gabig@mit.edu>.

On the Intangibles of Islamic Architecture*—Gulzar Haider, Carleton Univ. The Aspect of the Sacred in Architecture and Urbanism Lecture Series, sponsored by The Aga Khan Program for Islamic Architecture. 6pm, Rm 3-133. More info: x3-1400, <islarch@mit.edu>.

THURSDAY, APRIL 23

Suffering Science: US Polar Exploration and Cultures of Manly Sacrifice*—Rebecca Herzig, Part of the Graduate Women's Brown Bag Lecture Series, sponsored by Program in Women's Studies. Noon, Rm 14E-304. More info: x3-8844.

Optimal Replenishment and Rework under Multiple Unreliable Supply Sources*—David Yao, Columbia University. Sponsored by OR Center. 4-5pm, Rm E40-298. Refreshments to follow in Rm E40-106. More info: http://web.mit.edu/orc/www>, x3-6185 or <jdtaylor@mit.edu>.

Defects, Mass Transport and Microstructure Evolution in Irradiated Materials: Modeling Across All the Relevant Length and Time Scales*—Tomas Diaz de la Rubia, Lawrence Livermore Nat'l Lab. Mechanics & Materials Seminar, ME Dept. 4-5pm, Rm 5-234. Refreshments prior. More info: <xray@mit.edu> or <http://lohtse.mit.edu/~maha/seminar.html>.

Aspirin for the Next Hundred Years? Development of Covalent Inactivators of Cyclooxygenase*—Prof. Lawrence J. Marnett, Vanderbilt Univ. School of Medicine and Vanderbilt Cancer Center. Gerald N. Wogan Lecture, sponsored by the Division of Toxicology. 4pm, Rm 56-614. More info: x3-6792 or <toxop@mit.edu>.

A Symposium on Race and Cyberspace*—Speakers include Glenn Kaino and Tara MacPherson. See Special Interest above.

FRIDAY, APRIL 24

Engineering Ethics and Professionalism: The Educational Challenge*—Prof. Michael J. Rabins, Texas A&M Univ. Mechanical Engineering Spring Seminar Series 1998, 3pm, Rm 3-270. More info: Prof. Sanjay Sarma x3-1925 or <sesarma@mit.edu>.

Encapsulated Cell Therapies: Core Technologies and Their Application to the Bioartificial*—Athanasios Sambanis, Georgia Institute of Technology. Sponsored by Chemical Engineering. 3pm, Rm 66-110. More info: Arline Benford x8-7031 or <arline@mit.edu>.

Self-Organized Criticality as a Paradigm for

Turbulent Transport*—Dr. David Newman, MIT Plasma Science and Fusion Center. Sponsored by Plasma Science and Fusion Center. 4pm, Rm NW17-218. More info: <rivenberg@psfc.mit.edu> or <http://www.pfc.mit.edu/cgi/calendars/psfc>.

SATURDAY, APRIL 25

Where Do We Go from Kyoto?—Senator John Kerry and others. A Spring Weekend event, sponsored by SAVE, the student environmental group at MIT. 11am, Kresge Auditorium. More info: <unger@mit.edu>.

MONDAY, APRIL 27

Symposium on Low-Speed and Motorless Flight*—invited speakers. Sponsored by Dept. of Aero & Astro. 9am-3pm, Bartos Theater (E15). More info: x3-3511, <http://web.mit.edu/aeroastro/www/current/gardner.html>.

DOE National Laboratories in the Post Cold War Era*—Dr. Warren (Pete) Miller, Los Alamos National Lab. Sponsored by Dept of Nuclear Eng/American Nuclear Society. 3:30pm, Rm NW12-222. Refreshments at 3pm. More info: Elizabeth Parmelee x3-3801 or <parmelee@mit.edu>.

Hypotheses: Fingo or Non Fingo? The Birth of Scientific Expert Testimony in 18th Century England*—Tal Golan, Dibner Institute, MIT. Program in Science, Technology, and Society Spring 1998 Colloquia Series. 4pm, Rm E51-095. More info: STS Program x3-4062.

28th Lester D. Gardner Lecture: Human Powered Flight: Perspectives on Processes and Potentials*—Paul MacCready, president, Aeroenvironment, Inc. and John Langford, president, Aurora Flight Sciences Corp. Sponsored by Dept. of Aero & Astro. 4-5:30pm, Rm 10-250. More info: x3-3511 or <http://web.mit.edu/aeroastro/www/current/gardner.html>.

TUESDAY, APRIL 28

Amusing Physics*—Jessica Riskin, Dibner Institute Postdoctoral Fellow. Dibner Institute Colloquium. Noon-2pm, Rm E56-100. Please let us know if you plan to attend: <dibner@mit.edu> or x3-6989.

Mechanical Influences on Bone Development and Adaptation*—Prof. Marjolein van der Meulen, Cornell Univ. Perspectives in Biomedical Materials Science and Engineering Seminar Series. 3pm, Rm 8-314 (John Chipman Room). More info: x8-0537, <burkett@mit.edu>.

Reliability Challenges in a Large Microprocessor Below Quarter Micron Technology*—John Yue, Advanced Micro Devices. Sponsored by MTL VLSI Seminar Series. 4pm, Rm 34-101, Edgerton Lecture Hall. Refreshments at 3:30pm. More info: x3-4799 or <meg@mtl.mit.edu>.

Traffic Flow in Integrated Services Networks*—Rene Cruz, UC San Diego. LIDS Colloquium. 4pm, Rm 53-225. More info: Michael Schneider <mikesch@mit.edu>.

Wafer-Fused Optoelectronics for Switching*—Dr. Ali Shakouri, Univ. of California, Santa Barbara. Sponsored by Dept. of Electrical Engineering and Computer Science. 4pm, Rm 34-401B. Refreshments at 3:45pm. More info: x3-4607, <jhs@mit.edu>.

R&D Cooperation in the Semiconductor Industry: What it is, What it isn't, What are the Lessons?*—Dr. William Spencer, Chairman of the Board, Sematech. See Special Interest above.

Satire and Science in Victorian Culture**—Prof. James Paradis, Program in Writing and Humanistic Studies. Sponsored by History/Literature Workshop. 4:30pm, Rm E51-304. More info: x3-4965.

The Preservation of Urban and Architectural Heritage: A Societal Problem*—Françoise Choay, Univ. of Paris. Dept of Architecture Lecture. 6:30pm, Rm 10-250. Info: x3-7791.

WEDNESDAY, APRIL 29

Climatic Warming of Atlantic Intermediate Waters*—Brian Arbic, MIT/WHOI Joint Program. Sponsored by Physical Oceanography. 12:10-1pm, Rm 54-915. More info: <http://puddle.mit.edu/~mick/sack.html>.

Readiness of the Force*—Captain Vic Guillory, US Navy. Sponsored by Security Studies Program. Noon-1:30pm, Rm E38-615. Bag lunch, refreshments will be provided. More info: x3-0133, <llevine@mit.edu>.

New Science Results with the Hubble Space Telescope**—Dr. Eric Chaisson, Tufts Univ. Sponsored by Massachusetts Space Grant Consortium. 3-5pm, Rm 37-212. More info: x8-5546, <halaris@mit.edu>.

Pulsed Laser Deposition of Hydroxyapatite, Collagen, and Apatite/Collagen Composite Biocompatible Thin Films*—

Catherine Cotell, US Naval Research Laboratory. Perspectives in Biomedical Materials Science and Engineering Seminar Series. 3pm, Rm 8-314. More info: x8-0537, <burkett@mit.edu>.

Computer Simulations for the Post-genome Era*—Dr. Sangtae Kim, Warner-Lambert. Problems and Methods in Bioinformatics Seminar, sponsored by Metabolic Engineering Lab & Lab for Intelligent Systems Process Eng. 4pm, Rm 56-114. More info: x3-4583 or <gregstep@mit.edu>.

Shi'i Symbolism in History and Art*—Noman ul Haq, Rutgers Univ. The Aspect of the Sacred in Architecture and Urbanism Lecture Series, sponsored by The Aga Khan Program for Islamic Architecture. 6pm, Rm 3-133. More info: x3-1400, <islarch@mit.edu>.

THURSDAY, APRIL 30

Cerebellar Mediation of Servo-Control of Voluntary Movement*—Steve Massaquoi, MIT. Sponsored by Dept. of Elec. Eng. and Comp. Science. 2pm, Grier Room B (34-401B). Refreshments at 1:45pm. More info: x3-4607, <jhs@mit.edu>.

Semidefinite Programming Relaxation for Nonconvex Programs*—Masakazu Kojima, Tokyo Institute of Technology. Sponsored by OR Center. 4-5pm, Rm E40-298. Refreshments to follow in Rm E40-106. More info: <http://web.mit.edu/orc/www>, x3-1419 or <salal@mit.edu>.

Heat and Beat: A Microscopic Perspective*—Robert Phillips, Brown Univ. Mechanics & Materials Seminar, ME Dept. 4-5pm, Rm 5-234. Refreshments prior. More info: <xray@mit.edu> or <http://lohtse.mit.edu/~maha/seminar.html>.

Optimal Design of Pile Groups & Piled Rafts*—Prof. Mark Randolph, Univ. of Western Australia, Perth. Sponsored by Dept. of Civil & Environmental Eng. 5:30-6:30pm, Rm 1-390. Refreshments at 5pm. All welcome. More info: x3-9734 or <kalem@mit.edu>.

FRIDAY, MAY 1

The World's Smallest Rotary Motors*—Prof. George F. Oster, Dept of Biology, Univ of California at Berkeley. Mechanical Eng. Spring Seminar Series 1998, 3pm, Rm 3-270. More info: Prof. Sanjay Sarma x3-1925 or <sesarma@mit.edu>.

Combinatorial Catalysis: Opportunities and Challenges*—Selim M. Senkan, UCLA. Sponsored by Chemical Engineering, 3pm, Rm 66-110. More info: x8-7031, <arline@mit.edu>.

Charged Particle Spectroscopy: A New Window for Inertial Confinement Fusion*—Dr. Richard Petrasso, MIT Plasma Science and Fusion Center. Sponsored by Plasma Science and Fusion Center Seminar, 4pm, Rm NW17-218. More info: x3-8101 or <rivenberg@psfc.mit.edu>.

What Lies Beyond Bioinformatics?*—Prof. Bernhard Palsson, UC San Diego. Spring Seminar on Problems and Methods in Bioinformatics, sponsored by Metabolic Engineering Lab and Lab for Intelligent Systems Process Eng. 4pm, Rm 56-114. More info: x3-4583, <gregstep@mit.edu>.

SATURDAY, MAY 2

Roundtable Discussion: Sacred Elements in Contemporary Architecture and Urbanism*—The Aspect of the Sacred in Architecture and Urbanism Lecture Series, sponsored by The Aga Khan Program for Islamic Architecture. 10am, Stella Room, Building 7, 3rd floor. Info: x3-1400, <islarch@mit.edu>.

■ COMMUNITY CALENDAR

Spring Weekend*—April 24: Annual International Fair dance, food, music. 10am-6pm, Kresge Oval (rain location Johnson Athletic Center). Info: <icom@mit.edu>. Funk Festival concert 8pm (See Art Calendar.) April 25 events: 11am Speech by Senator Kerry, Kresge. Noon picnic, East Campus. 2pm Amherst Alley Rally and Carnival games. 2pm Whopper Eating Contest and 3pm Alpha Phlea Market, Student Center. 8pm Mr. Spring Weekend, Walker. 8pm ATO Bachelor Auction, Lobdell. <spring@mit.edu>.

Hi-Tech Swapfest*—April 19: Buy, sell, swap electronics, computers, radio parts, etc. Buyers \$4 (\$1 with MIT ID), sellers \$10/space. 9am-2pm, Albany & Main St. Sponsored by W1MX, the MIT Electronics Research Society, W1XXM/R and the Harvard Wireless Club.

Wives Group*—April 15: A Grand Design exhibit at the MFA. Meet at the MIT Coop in Kendall Square at 3:15pm. \$3 per person. April 22: Gallery Talk-Mirror Images: Women, Surrealism and Self-Representation. Meet in the lobby of the List Visual Center (E15) at 3pm. April 29:

(continued on page 7)

As dialogue continues, controlled use of alcohol returns

(continued from page 1)

hol for events at which underage students are present and called for a one-month suspension of alcohol service at all formal and informal events on campus. The general ban on Institute funds is still in effect for student-sponsored events at which persons under 21 are present.

President Vest also called for campus-wide discussions relating to the use of alcohol on campus and the quality of the living experience for students. Formal discussions were conducted in freshman seminars, residences and in meetings with students that included representatives from the Dean's office and the Medical Department. Meetings sponsored by the Interfraternity Conference (IFC) and the Alumni IFC attracted more than 2,000 participants, and included seminars with outside experts.

Throughout the year, standing and ad hoc committees and working groups—both student and faculty—have been grappling with questions of alcohol policy, the quality of the residential experience and undergraduate life in general. Countless informal discussions continue to revolve around the issues.

"MIT students have been through a year of extraordinary public scrutiny and policy change," said Dean for Undergraduate Education Rosalind Williams. "I hope we are now at a point where we can consider all that has happened and focus on developing student-managed living communities organized around the ethic of concern for each other. We have a framework for a clearer, more coherent alcohol policy. But the only way to make it a workable policy is for students to understand, endorse and implement it."

WORKING GROUP ON BINGE DRINKING

The Working Group on Prevention of Binge Drinking is completing six months of intense work toward provid-

ing a framework for key additional elements in the new era. President Vest charged the group of faculty and students with surveying literature; consulting with national experts; learning about the physiology, psychology and sociology of binge drinking among college students; and recommending preventive programs, "including the production of new and more effective educational programs and materials." Members have been meeting regularly since November.

"We're not going to try to ban alcohol on campus and therefore push it off-campus," said Professor Phillip Sharp, a 1993 Nobel laureate who co-chairs the working group with Dr. Mark Goldstein, chief of pediatrics and student health services in the Medical Department. "We have a high proportion of older students and visitors for whom modest use of alcohol is appropriate. That is the way it is in the society that our students are going into, and we should help prepare them for it."

One option under consideration is the appointment of a single individual to oversee all policies relating to alcohol in the community. A report that includes a schedule of discussions and seminars with experts for the 1998-99 academic year is expected by the end of the semester.

The Orientation Committee and the Working Group on Prevention of Binge Drinking have discussed a program on alcohol during orientation. In addition, the Working Group has considered assigning a MedLINKs representative or MedLINKs-trained person to each living group (MedLINKs is a peer-counseling service sponsored by the Medical Department). Another suggestion under consideration is to have undergraduate advisors, trained in how to raise the issue of alcohol with students, assume a more active role.

"We have to encourage FSILGs and dorms to take more responsibility for alcohol use, on how students can protect themselves," said Professor Sharp.

"The idea is to integrate alcohol education into the future of MIT."

The Campus Police citation program has become an issue. There is a feeling that many students are reluctant to call the police for help in transporting students who have overindulged, fearing they will be cited during the process. As of yesterday, the police had not issued any citations. In addition, the officer responding to the medical call will not be the one who conducts an investigation if one is called for. Nonetheless, questions about the system persist and discussions about possible alternatives continue.

"We believe that asking for help should not be asking for trouble," said Dr. Goldstein, a specialist in adolescent medicine. "We need to have a transport system that will safely and expeditiously transport a student who is ill from alcohol to medical care, yet not bring on punitive actions. The Medical Department has worked very hard to have no barrier to students who seek medical care."

"As the students have related to our Working Group, there is a perceived barrier to care due to transportation issues. All of our community must be educated in this area and work together so that there is not any real or perceived barrier to medical care for the student ill from alcohol," Dr. Goldstein said. "We must also work to ensure all members of our community, especially the students, that all medical care given in the Medical Department is totally confidential and no information is released without the written permission of the patient."

Undergraduate Association (UA) President Dedric Carter also noted that many students wondered whether they could trust the Campus Police to offer emergency assistance while being charged with issuing citations. "It's interesting that the changes in educational policy are taking a whole lot longer than the changes in the disciplinary policy," he said.

Mr. Carter also hopes that educational programs suggested by the Working Group are "interactive and hands-on" and cover other harmful substances as well as alcohol. A good model, he said, were the ads sponsored by the Medical Department in The Tech.

"They were devoid of preaching and moralizing," said Mr. Carter, a 22-year-old senior in electrical engineering and computer science. "We need more of that. We're scientists and engineers. Provide the facts and we'll draw our own conclusions. We don't like people to think for us."

Dr. Goldstein believes educational programs are a valuable tool in combating binge drinking—not a solution. "Real solutions will be complex and long-term," he said. "Changing the campus drinking culture is a task not measured in months but rather in years, and it requires leadership from the grass roots, especially the students with support and leadership from central administration. The working group will be able to begin a process, but programs, support and the creativity and interest of our community must continue over the years to effect a solution."

STUDENT ACTIONS

While the IFC resumed the certification of fraternities to serve alcohol on a controlled basis last month, many houses continue to host dry parties. A national magazine hoping to take photographs exposing underage drinking visited two frats on a recent weekend, only to discover lively non-alcohol events in progress. "There's talk of hula hoops and milkshake parties," said IFC president Duane Dreger, only half-facetiously.

In late September, the IFC instituted a ban on alcohol at fraternity events while it pondered reforms in its policies. It established a three-strike policy of sanctions for alcohol violations and issued criteria for its approval of alcohol service at planned events. The sanctions call for a 120-day alcohol ban at events for the first and second violations, and loss of rush privileges for a third violation.

The new policy requires events for new members to be alcohol-free and the appointment of risk management and safety officers at each fraternity. It also bans tap systems and kegs, and prohibits spending house funds on alcohol and the purchase of alcohol for guests by the chapter acting as a group.

Once certified, a fraternity may hold BYOB events or parties with outside vendors serving alcohol. For certifica-

tion, the IFC requires that:

- Two-thirds of house members attend a program that covers alcohol physiology, emergency alcohol medical response and safe alcohol use.
- The president, social chairs and risk manager from each house must attend a legal liability education program.
- One-third of house members must learn TIPS (Training and Intervention Procedures) on how to serve alcohol responsibly.
- At least two house members must be certified in CPR.

IFC certification must be renewed each year.

The first party certified to serve alcohol under the new policy took place at Delta Upsilon on March 19. IFC President Dreger, a junior in mathematics, said the party was sedate. "People are a lot more aware," said Mr. Dreger, a member of Sigma Nu. "We're working to change the old equation that alcohol equals fun and more alcohol equals more fun."

On the other hand, UA President Carter said many students "want to get back to the way things were." These students felt a key element was removed from their social life when alcohol was prohibited, he said, adding that some of them "drank a great deal" prior to attending dry events and others wondered why alcohol-free parties were scheduled at all. Their attitude is "if there's no alcohol, there's no party," said Mr. Carter, who does not drink.

DORMITORY RULES

Residence halls and student organizations have also started planning social events that include alcohol. The sponsors are required to submit a registration form which describes the event, estimates the attendance and the number of people under and over the age of 21, describes the amount and type of alcohol and food to be served, and outlines identification and monitoring procedures. Student organizations apply to Assistant Dean Katherine O'Dair in the office of Residence and Campus Activities.

A cash bar staffed by an outside vendor is required for all events attended by 75 or more people. No Institute funds may be used to purchase alcohol. Several graduate student groups and the Class of '98 have already sponsored events with alcohol. Baker House and Senior House, among others, have submitted forms requesting approval for upcoming events.

DEVELOPING POLICY

In October, President Vest appointed Associate Provost Phillip Clay to head a Working Group to Study Alcohol Policies and Procedures. The group articulated the goals and principles that should inform the Institute's alcohol policy, based not only on its review of policies here and elsewhere, but on numerous meetings with students, among them representatives from the Graduate Student Council, the UA, the Dormitory Council and the IFC.

The Office of the Dean of Students and Undergraduate Education was then charged with formulating or revising specific policies and procedures, working under the auspices of the Academic Council and in consultation with faculty, staff and students. An ad hoc working group was convened by Dean Williams and Dean for Student Life Margaret Bates.

This group, consisting primarily of staff and housemasters, has been meeting regularly since January. One of the first issues the group dealt with was the lack of clarification about the consequences for violating the current alcohol policy.

In February, the group proposed a system in which Campus Police may issue citations when they witness underage drinking or someone providing alcohol to minors, then turn the matter over to the Dean's Office for disciplinary action. The system includes a set of escalating sanctions, ranging from an initial conversation with a dean to the ultimate sanctions in extreme circumstances of a \$1,500 fine and expulsion.

The system has been in effect since (continued on page 10)

(continued from page 6)

China. Meetings held every Wed. in W20-400 at 3pm unless noted otherwise. Childcare provided. Info: Jennifer x3-1614.

MIT Women's League**—Informal Needlework Group: April 15, 10:30am-1:30pm, Rm 10-340 (Emma Rogers Room).

SENIOR FOCUS

To Roth or Not to Roth: IRA Questions for Retirees**—Diane Gipson, MIT benefits counselor, will discuss questions retirees should answer when considering making changes in their IRA plans. Sponsored by the Association of MIT Retirees. 10am Thursday, April 23, Bartos Theater (Rm E15-070). Coffee and pastry at 9:30am in the Bartos Lobby.

1998 Catherine N. Stratton Lectures on Aging Successfully*—See Special Interest above.

DANCE

Hustle workshops: intermediate/advanced. Sundays, April 19, 26, May 3, 10. Sponsored by MIT Ballroom Dance Team. Professionally taught by Ron Gursky. 11am-12:30pm, 3rd floor, Walker Memorial. \$10 per lesson (students: \$8). More info: <http://web.mit.edu/mitbdt>, (617) 776-0065.

Samba workshops: beginner/intermediate. Tuesdays, April 21, 28, May 5, 12. Sponsored by MIT Ballroom Dance Team. Professionally taught by Armin Kappacher. 8-9pm, Building 13 lobby. \$8 per lesson or \$25 for 4 weeks (students \$6/\$20). More info: <http://web.mit.edu/mitbdt>, x5-1153.

MITAC

The MIT Activities Office (MITAC) has two locations: (1) Room 20A-023, 9:30am-3:30pm, Monday, Wednesday, Thursday, and Friday (2) Room LLA-218, x6130, Lincoln Lab, 1:15-4pm, Thursday and Friday only. More info: x3-7990 or <julieh@mit.edu>. Cash or check only. MIT IDs must be presented.

Lady Day at Emerson's Bar & Grill (Merrimack Rep. Theatre, Lowell)**—Sun., Apr. 26, 2pm. Tickets: \$15.50 (reg. \$23).

Boston Classical Orchestra (Faneuil Hall, Boston)**—Fri., May 1, 8pm or Sun., May 3, 3pm. Tickets: \$14 (reg. \$18).

Boston Red Sox vs. Minnesota Twins (Fenway Park, Boston)**—Tues., May 5, 7:05pm. Tickets: \$16 (reg. \$20).

Loretta Lynn (Lowell Memorial Auditorium, Lowell)**—Fri., May 8, 8pm. Tickets: \$28.50 (reg. \$29.50).

Laughter on the 23rd Floor (Lyric Stage, Boston)**—Thurs., May 14, 8pm. Tickets: \$16.50 (reg. \$24). Purchase by 4/23.

Shriners Circus (Shriners Auditorium, Wilmington)**—Sun., May 17, 1:30pm. Tickets: adult \$9 (reg. \$10) children under 13 \$4 (reg. \$5). Purchase by 4/23.

Spirit of Boston/Boston Pops (World Trade Center, Boston)**—Wed., June 24, 3:30pm. Tickets: \$44 (reg. \$55). Purchase by 5/7.

Beauty and the Beast (Wang Center, Boston)**—Wed., Aug. 5, 8pm. Tickets: \$47 (reg. \$55). Purchase by 4/10.

Tanglewood and the Boston Symphony (Tanglewood, Lenox)**—Sun., Aug. 9 thru Mon., Aug. 10. Tickets: \$219 pp double occupancy. Purchase by 6/16.

Museum Passes**—Children's Museum, \$4 (reg. \$6-7). Museum of Science, \$4 (reg. \$5.50-\$7.50).

Discount Movie Tickets**—Sony Theatres \$5. Showcase Cinemas \$5.50. General Cinemas: adults \$5.50, children \$3.25. Kendall Square Cinema \$6.50.

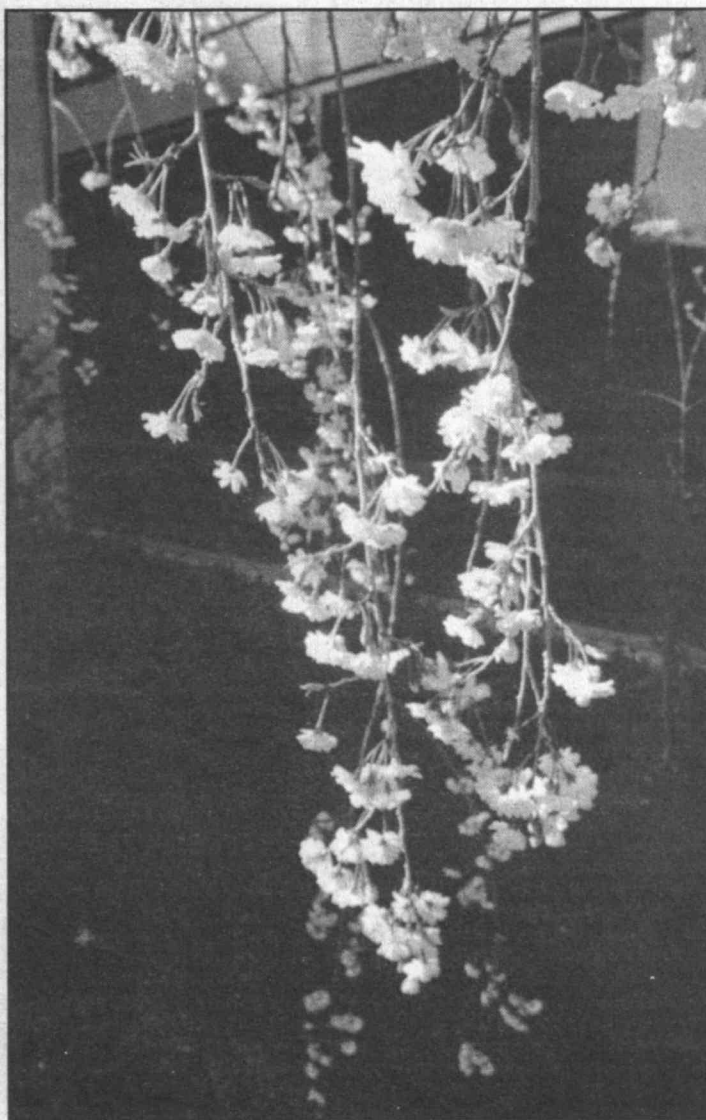
MOVIES

Lecture Series Committee Movies**—Good Will Hunting (1997): 7 & 10pm on 4/17; 7pm on 4/19. As Good as it Gets (1997): 7 & 10:30pm on 4/18; 10pm on 4/19. Wag the Dog (1998): 7 & 10pm on 4/24; 7pm on 4/26. Anastasia (1997): 3, 7 & 10pm on 4/25; 10pm on 4/26. LSC movies are in Rm 26-100 unless otherwise noted.

LSC Classics**—Lilies of the Field (1963): 7:30pm on 4/17. High Noon (1952): 7:30pm on 4/24. Two Mules for Sister Sara (1970): 7:30pm on 5/1. LSC Classics are in Rm 10-250 unless otherwise noted.

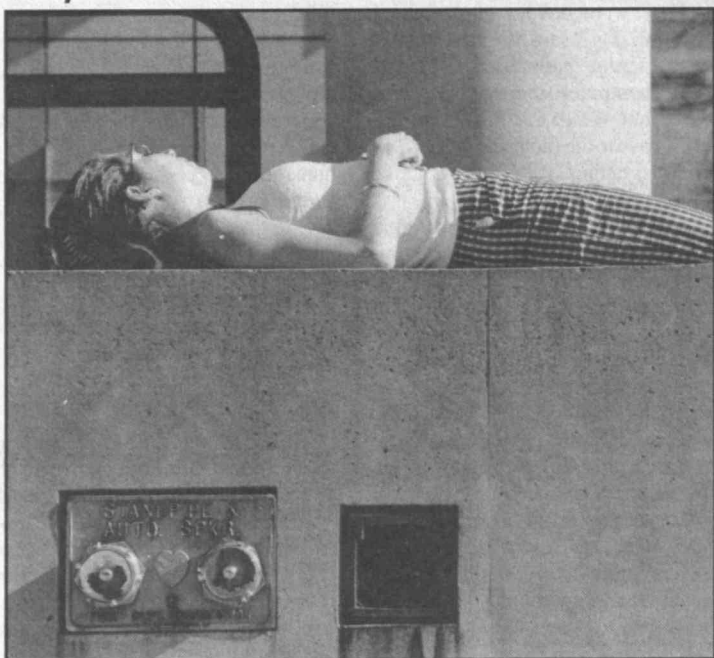
Admission to all LSC Movies is \$2.50. MIT or Wellesley identification required. For more information, call the LSC Movieline x8-8881, or see <http://lsc.mit.edu>.

Flower power



A fountain of springtime blossoms hangs from a tree near Whitaker College. Photo by Donna Coveney

Supine in the sunshine



Nuria Oliver, a graduate student in media arts and sciences, soaks up sunshine outside the Media lab.

Photo by Donna Coveney

MIT research raises international audio standard for computers, Internet

■ By Alexandra Kahn
Media Laboratory

Breakthrough audio technology developed at MIT's Media Laboratory is a key part of the forthcoming MPEG-4 International Standard.

The Media Lab contributions will dramatically boost the performance levels of computer sound, allowing CD-quality stereo music to be played on PCs and transmitted through the average user's modem. As a result, richer, more carefully tailored music, sound and audio effects can be incorporated into a new range of multimedia content.

MPEG, the Moving Picture Experts Group, is part of the International Standardization Organization, which develops industry standards for compressing, processing, coding and transmitting audio and video. These standards are used worldwide as a common blueprint for the design, development and manufacturing of audio software and hardware components.

The MPEG-4 standard will be released in October 1998 and formally become an international standard in December. Last month, the final committee draft was completed. This milestone indicates that all parts of the

specification, including the Media Lab's contributions, will proceed into the final standard. The current draft standard will change little before completion.

"The contributions the Media Lab has made to MPEG-4 are a crucial part of the audio tool set, and represent a fundamental advance in audio standardization," said Leonardo Chiariglione, MPEG convener and chairman.

STRUCTURED AUDIO

The Media Lab's new approach to sound processing, called Structured Audio, represents the first time that sound synthesis methods have been incorporated into an international standard.

Structured Audio is a powerful set of specifications for the description and transmission of sound. While existing audio standards represent sound as a stream of bits, in Structured Audio, content is stored and delivered as a computer program in a flexible language, then translated into sound on the user's computer. Because transmitting data as a program is far more efficient than transmitting streams of bits, this method enables a radical increase in the quality and efficiency

with which sound is delivered.

"Structured Audio points the way to a more powerful common platform for sound processing," said Professor Barry Vercoe, head of the Media Lab's Machine Listening group and leader of the Structured Audio research project. "By incorporating these findings into an accepted international standard, we can ensure that musicians, producers and PC users around the world can benefit from this research."

Until now, sound transmission standards have left content developers and musicians struggling with low-quality "AM radio" sound, limited interactivity and long download times. Similarly, designers of CD-ROM, game and multimedia content have been hamstrung by the low-quality, low-functionality sound cards on the customer's desktop.

The MIT technology greatly improves the sound quality of multimedia applications, enabling musicians, virtual-reality designers, and game and content developers to create high-quality, interactive synthetic music and sound environments that can be easily transmitted across the Internet.

MUSIC OVER THE INTERNET

The performance levels achieved through the MPEG-4 Structured Audio method will boost new forms of composition and commerce. Composers of popular music styles such as house music, rave music, techno and electronica will be able to efficiently sell high-quality compositions directly to listeners via the Internet.

Interactive movies and virtual-reality experiences containing music, sound-effects and dialogue will likewise be able to envelop the listener in a 3-D world of sound. MPEG-4 also allows the creation of "virtual karaoke" songs, where the music actually slows down and speeds up to follow the singer—a technology pioneered at the Media Lab.

Structured Audio will also have an impact on the music composition process itself. Composers are free to create new "virtual synthesizers" at will, so their creativity is no longer limited by the capabilities of the fixed hardware synthesizers they own.

A composer's PC system incorporating MPEG-4 Structured Audio technology can replace an entire studio of synthesizers, effects processors, and mixing consoles. The standard unifies a growing marketplace in "software synthesizers" which overcome some of these limitations, but until now have been hampered by restricted features, data incompatibility, and a small user base.

The Structured Audio method, developed by researchers in the Machine Listening Group, comprises more than 20 percent of the MPEG-4 Audio standard. This submission, which includes software, technical documentation and testing methods, was evaluated and verified by MPEG and found to meet the requirements of the standards body.

The Media Lab's Structured Audio method is designed to integrate seamlessly with the other components of MPEG-4. These include methods for the transmission of speech, recorded music, computer graphics and compressed digital video. All these tools may be combined in a single MPEG-4 presentation.

The Media Lab has executed its current standardization work in an open arena, free of patent and copyright restrictions, to encourage advances in multimedia for all computer users and technology companies. All the computer tools developed by the Media Lab in the Structured Audio project have been freely donated to the Internet, and the Media Lab maintains no control or "veto power" over the direction of the standard.

Support for this research was provided by the Digital Life Consortium of the Media Lab. Additional information about MPEG-4 Structured Audio is available on the web at <<http://sound.media.mit.edu/mpeg4>>.

Classified Ads

Tech Talk ads are intended for personal and private transactions between members of the MIT community and are not available for commercial use. The Tech Talk staff reserves the right to edit ads and to reject those it deems inappropriate.

INSTRUCTIONS: Ads are limited to one (of about 30 words) per issue and may not be repeated in successive issues. Ads may be re-submitted after skipping a week. Ads/renewals are not accepted via telephone or fax. All must be accompanied by full name and extension (or proof of MIT affiliation).

- E-mail address (return address must be mit.edu): <ttads@mit.edu>
- Interdepartmental/Walk-in address: Calendar Editor, Rm 5-111.

Please note that all Tech Talk ads are provided to the Internet on the date of publication, which makes them accessible world-wide.

All extensions listed below are campus numbers unless otherwise specified, i.e., Dorm, Lincoln, Draper, etc.

MIT-owned equipment may be disposed of through the Property Office.

Deadline is noon Friday before publication.

■ FOR SALE

Stairmaster PT4000, less than 20 hrs of use, recently serviced, looks new, \$1450. Email only <hwataylor@mit.edu>.

SUN memory: 128 meg RAM for Sun Ultra and Netra models. See <http://web.mit.edu/djbroder/www/memory.html> for description. Dave, <djbroder@mit.edu>.

Aquarium with iron stand, 15 gal, mint cond, supplies, \$50. Rachel x3-4719.

Pair of ice skate show tickets for sale, Apr 18, 8pm, Fleet Center, bought for \$65/ea, will sell for \$40/ea. Nancy Tsung x3-5128.

TV, GE, 20", askg \$120; CD tower for up to 20 CDs, \$20. Both exc cond. Call 577-5509 or <lflshen@mit.edu>.

Red Sox tickets, lower box seats, \$60/pair, 2 pair avail some games, 4/19 Clev, 5/3 Tex, 6/7 NY(M), 9/7 NY(Y), 9/13 Det. Call 508-877-9518 after 6pm.

Cape Cod kitchen curtains, white w/print ruffle (bottom 35"L, top swag 33"L), \$2.50/pr; It blue semi-sheer panels (64"L x 60"W), \$2.50/ea. All exc cond. Rosalie 617-776-3748.

■ ANIMALS

Free to good home: lop-eared rabbit complete w/cage. Debbie, Linc x1085 or <dgoodwin@LL.mit.edu>.

■ VEHICLES

1985 Toyota Camry Deluxe, 118K, white/blue plush int, 5-sp, 4-dr sedan, ps, pb, cc, tilt wheel, Jensen AM/FM/cass stereo (anti-theft detach. face), runs grt, \$2350. Call 781-259-8414 or x3-7098.

1987 Saab 900 Turbo, 5-sp, 3-dr, leather, sunrf, SPG wheels, \$3,200 or bst. Andrew 617-973-4862.

1987 VW GTI 16V, ps, a/c, sunrf, Sony CD player, Pioneer & Boston Acoustic spkrs, new paint, new rear struts/belts, recent exh/trs, 107K, \$3000 firm. Contact <trickett@mit.edu> or 781-334-5615.

1990 VW Golf, 4-dr, 5-sp, sunrf, white, v gd cond, 130K, \$1500. Call 617-924-3296 or <mgm@mit.edu>.

1992 Subaru Legacy LS, AWD, 70K, elect sunrf, Lojack, cc, new trs/whls/brakes/batt, 1 ownr, always garaged, maint records, \$8950 firm. Call 492-4364 days only.

■ HOUSING

Cape Cod: summer cottage, 50' priv pond beach, LR, DR, BR, music rm, ktchn, bath; fplc, piano, deck, sep studio, slps 6, abuts conserv land, bike trails, \$700/wk June, \$800/wk July. Andy 876-6257.

Cape Cod, Truro: bright & airy summer house, 1/4 mile to beaut bay beach, short drive to ocean, golf course, accommodates 6, avail in Aug. Call 781-862-2613.

Cape Cod, Eastham: 3BR hse 1 mi from Nauset Light Beach, 2 mi from Coast Guard Beach, 2 baths, priv yd, deck, slps 7, avail July 4-Aug 1, \$800/wk. Contact: <dooher@mit.edu> or 781-662-7046.

Cape Cod, Wellfleet: 2 BR cottages on priv road, 1/4 mi to bay beach, fplc, cable, VCR, outdr grills, decks, nr bike trail, \$450/wk May, June, Sept; \$675/wk July & Aug. Heidi 617-332-7104.

Lake Winnepesaukee: chalet fro rent, 2BR w/loft, slps 8, 5 min walk to priv beach, \$450/wk. John or Mary 617-328-3175.

Maine: Mt. Desert Isl (Bar Harbor), 2 oceanfrt cabins, secl, ea w/deck/LR/BR/k, pict windows, 2 sm BR&b, 1 or both by wk or mo, some Jun, Jul, Aug, Sept dates avail, \$700 ea/wk. Steve x3-5757.

Maine: waterfrt hse nr Wiscasset on Westport Island (w/bridge), deck, vws, rocky point, privacy, photos avail, weekly: June \$350, July \$600, Aug \$700. Call x8-7318 or 617-696-6353.

Maine: Rangeley Lake region, vacation compound on 45 acres, shorefront, slps 12, 5 bathrooms, mod ktchn, June & Sept \$1000/wk, July & Aug \$1250/wk. Call 617-332-8251.

■ WANTED

Unix (for Solaris) workstation wanted. Frank 603-673-5651.

Prof couple sk 1+ or 2BR apt. in Somerville or Arlington area, nd start date betw June 1 & Sept 1, clean, quiet, non-smkrs. Susan x3-2586 or <smaynard@mit.edu>.

Visiting faculty couple w/2 girls sk housing for 1998-1999 acad yr, MIT refs available. Contact: <meghan@geology.cwu.edu>, 509-963-2825 (w), 509-925-3435.

Quiet, resp F grad student sks sm apt in house within commuting distance of Tufts for late summer, pref Aug. 1. Call x3-3823.

Bassoon wanted to buy or rent for high school student. Contact <levey@mit.edu> or x3-7112.

Prof couple sks housing in exch for cooking, pet care

SAP journal voucher training announced

A series of "demo" training sessions for creating SAP electronic journal vouchers will be held this month. All departmental staff members who are responsible for creating journal vouchers in the classic MIT accounting system need to be trained on this function in SAP. No registration is required.

As Controller James L. Morgan announced in March, SAP electronic journal vouchers will be used for the Institute's 1998 fiscal year closing. The cutoff for paper journal vouchers, and electronic journal vouchers from the \$SumMIT system, will be June 24. Following this date, the use of paper journal vouchers and \$SumMIT journal vouchers will be discontinued.

The demo training topics will include SAP financial terminology, business rules regarding journal vouchers, and the flow of journal voucher documents through SAP. Demos will show users how to create, save, change and complete a journal voucher. Documentation and a self-study tutorial that can be done from

the user's local workstation will also be distributed at the sessions.

The schedule for demo training is:

- Thursday, April 16—9am-noon, Rm 1-390
- Tuesday, April 21—9am-noon, Rm 10-250
- Wednesday, April 22—9am-noon, Rm W20-307
- Tuesday, April 28—1-4pm, Rm 1-390

Self-study labs will be available for those who want to complete the tutorial in a classroom setting with a teaching assistant available. These labs will take place in late April and early May at the Professional Learning Center (Building W89). Registration for the labs is required and can be done on the web at <<http://web.mit.edu/sapr3/training/jv.html>>. Questions about the training should be directed to Nancy Gift at x8-0236 or <ngift@mit.edu>.

Users are strongly encouraged to complete the self-study tutorial, at their desk or in a lab, before they begin to create journal vouchers in the SAP production system.

SAP user group to discuss new features

All members of the MIT community are invited to join the MIT SAP User Group, in which SAP users can discuss the features and use of the software and the new Institute business processes that SAP supports. The group will meet next on Tuesday, April 21 from 2-3pm in Rm 56-114.

April's meeting will deal with recent changes and additions to the reports available from the SAP reporting menu. These include:

- The "Summary Statement" report, which prints in the landscape mode to include all available columns
- The "Journal Vouchers Postings Report," which shows journal voucher activity by cost object
- "Purchasing Overview" reports, which can be run by vendor or by

cost object

- An improved "Payment Report" showing check stub information
- SAP requisitions can now be printed
- The "Cost Object Consolidation Report," which allows the user to summarize the activity of many cost objects in one report.

Additionally, a new program is in the standard MIT "Accounting" menu called "Convert Legacy Architecture" that will translate legacy account numbers and object codes to SAP cost objects and cost elements.

Anyone with questions about the event may contact Robert Murray at x8-7318 or <rmurray@mit.edu>.

Looking for a back issue of Tech Talk?

Tech Talk issues published since 1990 are available on the Web. Go to:

<<http://web.mit.edu/newsoffice/tt>>

& light maint beginning Sept 98; wife is culinary school grad, husband is mech-inclined veterinary student, exc references. Call 617-492-4037.

■ LOST AND FOUND

Found: Money found in Kendall Square. Call Campus Police x3-9753 to describe.

MIT, high school students team up at robot championship

■ By Donna Coveney
News Office

It was as much rock concert as science fair. The seventh annual National Robotics Championship, sponsored by FIRST (For Inspiration and Recognition of Science and Technology), was held at Disney World in Orlando, FL, on April 2-4, with 12,000 students from high schools all over the country making joyful noise in togas, tiger costumes, and "Men in Black" outfits, while bands periodically broke out in song and marched through the stands.

MIT students, led by Ela Ben-Ur, a graduate student in mechanical engineering, collaborated with students from Cambridge Rindge and Latin High School (CRLS) for the Onslaught team, which was sponsored by LEGO, Alex and Brit d'Arbeloff and President Charles M. Vest's office.

"It's been a great experience," said CRLS student Augusto Ustariz Jr. "The brainstorming was great—everybody really worked together."

"It was great to be there and see the diversity of the kids... their enthusiasm is the big reward," said Ms. Ben-Ur.

Began in 1989 as a nonprofit foun-

with engineers from corporations and universities to design and build a robot in six weeks that will compete against one other in the competition.

Each team gets the same kit of materials and has a weight limit of 130 pounds for the robot. The idea is to build a machine with the size, speed and agility of a human. The goal is to get the most balls in the center "basket" or on racks leading up to it.

FIRST, whose first competition in 1991 fielded 20 teams in a high school gym in New Hampshire, has grown to 200 teams competing in 1998. Its founders aspire to have 2,000 teams by the turn of the century.

Mr. Kamen, an inventor and entrepreneur who holds more than 40 patents, wasn't much older than the high school students when he made his first mark in the world of inventing. His older brother Bart, who was attending Harvard Medical School, came home complaining about the difficulty of getting people medicated where and when they needed it.

Dean, who was in high school at the time, went into the family garage and invented a portable, battery-operated infusion pump to administer dosages over the desired time intervals. When



More than 12,000 high school students from all over the country competed in the FIRST National Robotics Championship, held at Disney World's Epcot Center. They were teamed with engineers from corporations and universities, and all teams built robots from identical kits of materials.



The MIT/CRLS Onslaught team (#097) watches closely as their machine prepares to drop the ball it just picked up into the center basket on stage. The team behind the plexiglas includes driver Umung Varma of CRLS (far left), Ela Ben-Ur of MIT (center) and manipulator Cedric Jean-Louis of CRLS (far right).

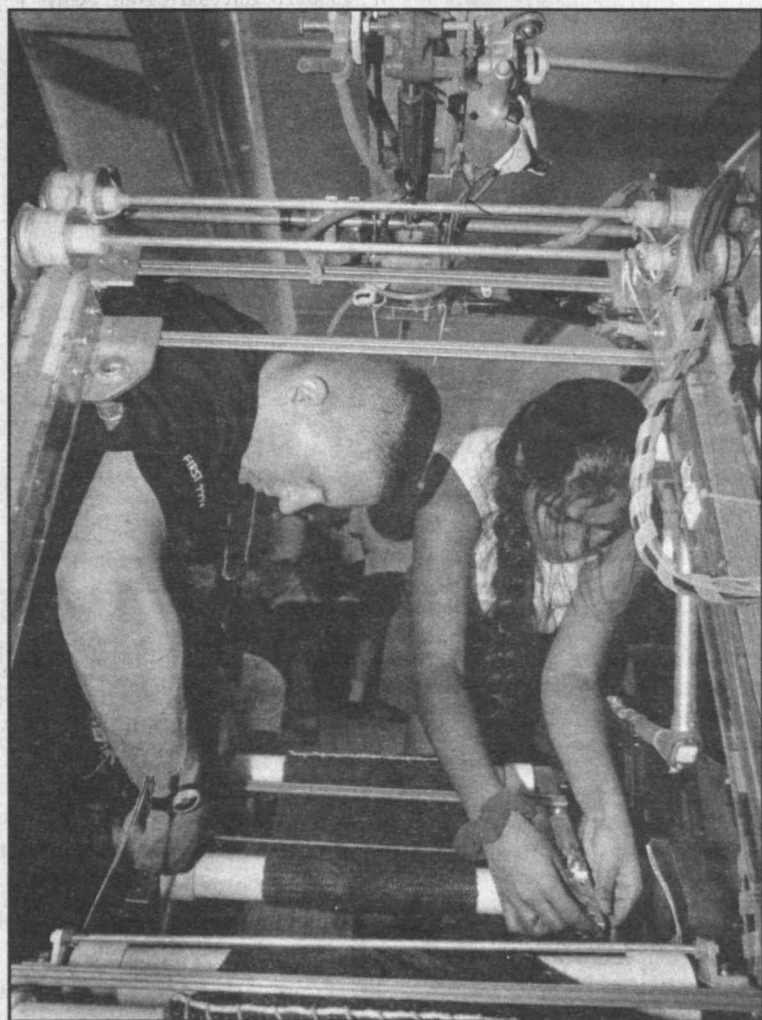
ation, FIRST was the brainchild and collaboration of entrepreneur and inventor Dean Kamen and Woodie Flowers, the Pappalardo Professor of Mechanical Engineering at MIT. At the time, Mr. Kamen (also a senior lecturer at MIT) felt he was watching "the decay of American culture, with its false heroes—celebrities with no content and no context, sports figures who bite off each other's ears and attack their coaches..."

What to do? He heard about Professor Flowers and his famous Design 2.70 robot contest, called him, and FIRST was born. Professor Flowers calls the FIRST competition "Design 2.70 on steroids." The program's vision statement says, "We see a world where science and technology are celebrated, where kids think science is cool, and dream of becoming science and technology heroes."

Hundreds of students stood and clapped as Mr. Kamen took the stage and thanked and congratulated them all for coming. When he introduced Professor Flowers, who sprung onto the stage as though launched from a catapult, the entire house started whooping and chanting in unison, "Woodie! Woodie! Woodie!"

If this was a rock concert, then Professor Flowers was the rock star. Attired in a vest and baseball cap festooned with the buttons of competing teams from all over the country, he grinned and ducked his head, waving to the crowd and exhorting them to the joyful play and "gracious professionalism" which has characterized the competition.

High school students (and in some cases, middle school students) are teamed



Andrew Curtis, a graduate student in mechanical engineering (left), and Rainuka Gupta, a junior in biology, check out the rollers in the arm mechanism of their Onslaught robot.

he won a national design engineering award, it was with some surprise that the presenters saw a 19-year-old walk on stage in jeans.

"Last year, 1.3 million technical jobs went unfilled. We could fill 130 arenas like this one, and everyone would have jobs," Mr. Kamen said. "There might be a couple of dozen jobs available in the NBA every year, and 39 million kids in grades K-12 don't have very good odds of getting those."

"It has a chance of really mattering," said Professor Flowers. "We might be able to change millions of kids' attitudes about education. Kids who are involved get a fantastically rich deal. We've got to get the other millions of kids in the country and make this the Super Bowl for science and engineering design."

The MIT/CRLS Onslaught team faced its share of bad luck and tense moments with grace, persistence and a sense of humor. They licked an intermittent power problem and happily took a first place in one match, with on-stage team members Ela Ben-Ur, MIT freshman Kailas Narendran, and Augusto Ustariz Jr., Umung Varma and Cedric Jean-Louis of CRLS jumping up and down and hugging each other while being cheered on by other team members down in front of the stage.

Just then, their machine got cornered by another in an awkward position, and the next thing they knew, one side of the grabber mechanism for picking up the balls had broken off. How could they possibly rebuild the arm in the hour they had before the next round, and without any plywood?

They ended up competing without the arm, employing an offensive strategy of knocking other teams' balls off the racks and relying on Augusto, their "human" player, to score hits for them, doing quite well in the process.

The energy was palpable. The driving beat of the bass in the loud music, and the adrenalin rush of competition kept things at a continuous fever pitch. Dancing to the ever-present music while competing was *de rigueur*—and all this after many sleepless nights spent designing and building the robots.

Professor Flowers' friendly, hands-on approach endeared him to the young contestants. Students from all over the country hugged and thanked him, asked for his autograph or had their picture taken with him. For his part, Professor Flowers felt "a wonderful, anxious high. I was in the zone. It's a delight to see the stories unfolding. Being creative is like being in love. It's one of the few fundamental sources of satisfaction, creating something. There is a magic about people building things, like a birthing process. It opens people up."

Gary Tooker, chairman of Motorola, last month flew directly from the National Innovation Summit at MIT to a FIRST regional competition near Chicago. At that event, he said, "I just left a very important meeting hosted by Chuck Vest, president of MIT, and sponsored by the Council on Competitiveness in which the entire group agreed that the critical issue for our country is fixing the talent pool. What you people are doing here is exactly what needs to be done all over the country."

Photos by Donna Coveney



FIRST founder Dean Kamen (left) shares a laugh with Professor Woodie Flowers, the event's master of ceremonies, as they wait for the competition to begin. The two have made "gracious professionalism" the hallmark of this competition. Teams cheer each others' efforts and even share materials in the event of crisis. "Societies get the best of what they celebrate, and FIRST is an effort to celebrate the right stuff. The hero/heroine structure supports rewarding the right things," Professor Flowers said.

Scientists investigate X-ray burst from possible black hole

(continued from page 1)

unprecedented sensitivity to study a black hole for many months, and see things that had not been seen before," said Professor Lewin, who has been studying sources of X-rays for more than 30 years. "That's not going to happen because the outburst lasted only a few days. We expected this transient to behave decently like its predecessors. Instead, its behavior is very unusual."

NEUTRON STAR?

There is little doubt that J0421+560 is a star in the constellation Camelopardalis, the Giraffe. CI Cam for short, the star is about 10 degrees northeast of the easily visible Capella, one of the brightest stars in the sky. The companion of CI Cam, from which the X-rays originate, must be either a neutron star or a black hole.

"It became clear that the X-ray intensity was going back down almost as fast as it had risen," said Ron Remillard, a principal research scientist in the Center for Space Research who played a major role in making the All Sky Monitor (ASM) on the RXTE work. "No X-ray transient had ever shown us such a rapid rise and fast decay, so we knew that we were on to something special."

"It had several characteristics of previous black holes, except it faded away in days instead of weeks or even months," said Richard Rothschild of the University of California at San Diego, who was in charge of building one of three instruments on board the RXTE that is sensitive to very high-energy X-rays. Did something happen to shut J0421+560 down prematurely, or was it inherently different? Figuring that out, he said, "is the task before us."

It's hard to speculate at this time whether it is a black hole, Professor Lewin said. "There is some strong evidence in favor, but none is conclusive. We cannot be sure until the mass of the compact object in this binary system has been measured, and that may take

years."

Nevertheless, J0421+560 is the first possible new black hole detected by the RXTE since its launch in December 1995, when, for the first time, scientists gained almost complete coverage of X-ray sources in the sky. RXTE is named for Bruno B. Rossi, an MIT pioneer in the field of X-ray astronomy.

"RXTE has a very large area detector that will allow us to look with high precision at how the X-ray flux may vary at very high frequencies up to thousands of oscillations a second," Professor Lewin said.

Despite its unusual behavior so far, he holds out hope that there may be a new burst of X-rays within a few weeks. If not, there may be something even more interesting afoot.

"Things you don't understand are exciting," he said. "This kind of science is like a dark room in which you are trying to find a door knob. I cannot guarantee that anything completely new will come out of all this. We are stepping on unexplored terrain. In this business, you always want to expand your horizons and uncover new territory."

SEARCHING THE SKY

From the time that the first X-ray transient was detected in April 1967, scientists' search for these ephemeral X-rays was like a search for a needle in a haystack.

Detection of X-rays was limited to five-minute rocket flights. In October 1967, Professor Lewin was the first to catch an X-ray source, although not a transient one, varying before his eyes during a seven-hour balloon observation from Australia. "Now, 40 years later, no one can conceive of X-ray sources that aren't variable, but transient outbursts in which a new source suddenly appears are quite rare," he said.

In an X-ray binary system, two stars revolve around each other. One is a "normal" star like our sun, burning nuclear fuel. In a storm of X-rays and temperatures reaching millions of degrees, it transfers matter to its compact companion, which can be either a neu-

tron star or a black hole.

Matter in the form of hydrogen and helium plasma moves from the donor star to its compact companion, a process known as accretion. Plasma from the donor star forms what is called an accretion disk—a pancake-like structure that pours a spiraling avalanche of matter onto the compact star.

This mass transfer, as it is called, generates a huge outpouring of X-rays. The matter reaches velocities close to that of the speed of light and produces unimaginable amounts of energy. "If

you threw a marshmallow onto a neutron star, the energy released on impact would be similar to that of the atom bomb dropped on Hiroshima," Professor Lewin said.

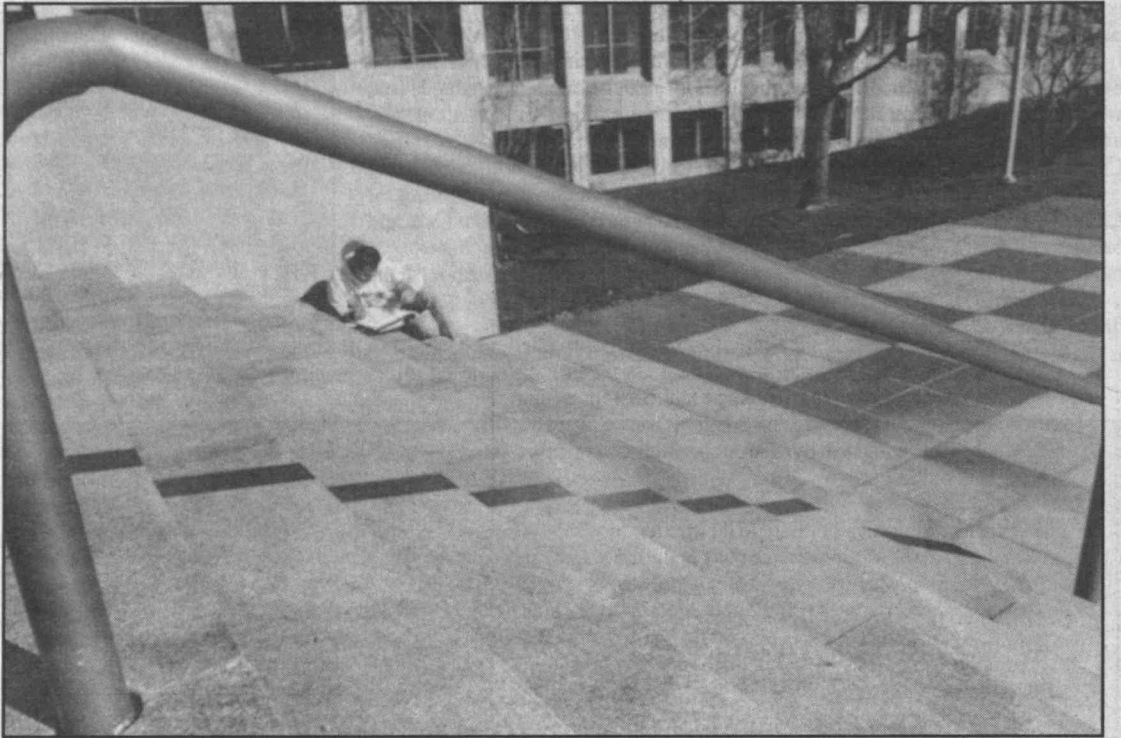
In the case of the transient X-ray sources, when the mass transfer falls below a certain level, the source shuts itself off and the X-ray emission ceases. Another avalanche—with its signature of strong X-ray emission—may not occur for another 50 years.

According to Jeff McClintock of Harvard University's Center for Astro-

physics, it usually takes weeks to months for an accretion disc to "rain out" all its matter onto the compact object. Professor Lewin surmises that in this case, the compact object may instead have been smothered by accretion from CI Cam.

"Maybe it's gone off the air in X-rays, so to speak, because it's been choked to death by accretion. If that is the case, it may become a bright X-ray source again in a few weeks," he said. "We're keeping our fingers crossed."

Step by step



Taking advantage of the beautiful weather to study is Gianni Armani, a second-year graduate student at the Sloan School. Photo by Donna Coveney

Campus alcohol dialogue continues

(continued from page 1)

mid-February. While Campus Police had not issued any citations as of yesterday, this system has raised questions about whether students would be reluctant to call Campus Police for emergency treatment or transportation during an alcohol crisis if they were subject to citations and sanctions.

The Dean's Office will now widen the dialogue by consulting with students and other groups about this and other issues relating to the development of a workable alcohol policy for the campus. "It's time to return to a much broader-gauged, community-wide discussion," Dean Williams said.

ORIENTATION AND RESIDENCE SELECTION

During various meetings of the faculty as well as during Family Weekend in the fall, many expressed reservations about housing freshmen off-campus or requiring them to make hasty housing decisions, sometimes without adequate information.

These issues were discussed by the Advisory Group on Orientation and Residence 1998, chaired by Professor J. Kim Vandiver, which concluded that requiring all freshmen to reside on campus in the fall was unfeasible, but that all first-year students who want to live on campus should be accommodated. The group made a number of recommendations to place less emphasis on residence selection during the orientation period and more on introducing students to academic life and the community.

At the March faculty meeting, Dean for Undergraduate Curriculum Kip Hodges described a set of changes to orientation that follow up on these recommendations, which emphasize stronger faculty engagement with students both during the orientation period and as advisors.

Responding to pleas from students and parents for more time to study residential options, incoming freshmen will receive information about resi-

dences earlier than in previous years—at the beginning of May—with draft copies of the residence guide available for April campus visits.

The guide will contain a reply card on which the student may check off the fraternities or independent living groups which he or she would like to have contact them over the summer. Only those groups will be permitted to contact the student during that period.

In addition to placing more emphasis on academics and community building, the orientation period will have lifestyle counseling that includes alcohol education events planned by the Working Group on Prevention of Binge Drinking and the Medical Department.

President Vest concludes his letter to parents with these words: "All of these activities are aimed at providing the tools, framework and context for the kind of problem-solving and leadership for which MIT is known. I welcome your reflections and observations, and your active participation, in this process."

WEB SITES

Additional information may be obtained on the alcohol web site at <<http://web.mit.edu/president/ace>> listed under "resources" on the MIT

home page. Another web page, <<http://web.mit.edu/newsoffice/nr/1997/krueger.html>>, listed under "News Releases" on the News Office home page, is an archive of news releases and MIT Tech Talk articles on these topics.

Report details prevalence of campus drinking

A 1995 Medical Department survey of 606 students showed less drinking at MIT than at other colleges, with 30 percent saying they abstained altogether (compared to 13 percent nationwide).

While the average number of drinks was 2.4 weekly (4.4 nationally), 23 percent said they had indulged in binge drinking during the previous two weeks (the national average is 44 percent). Thirty percent said they felt peer pressure to drink during the previous month and 10 percent said they held a drink at parties to fit in socially.

Gathering data on source of X-ray was a global effort

Gathering data on the source of a burst of X-rays required the work of many people and much machinery.

The All-Sky Monitor, which keeps an eye on most of the sky all the time, was built at MIT under the direction of Professor Hale Bradt of physics. Another instrument on board the RXTE, the Proportional Counter Array, built at NASA's Goddard Space Flight Center (GSFC), has been used daily since April 1 to observe XTE J0421+560. Jean Swank of GSFC is in charge of the RXTE satellite.

The presence of strong x-ray emission also was detected with the orbiting Compton Gamma Ray Observatory. William Paciesas of the University of Alabama at Huntsville and Gerald Fishman of NASA's Marshall Space Flight Center reported that they started detecting X-rays from this transient on March 31.

Y. Ueda of the Institute of Space and Aeronautical Science and his Japanese collaborators observed the source with the high-energy-resolution Japanese observatory ASCA on April 3 and 4. They detected an iron line in the spectrum of XTE J0421+560 that indi-

cates that the X-rays are the emissions of hot gas. The PCA sees the iron line as well, but the higher energy resolution of ASCA better fixes the nature of the emission.

The Italian X-ray observatory BeppoSAX also observed CI Cam at about the same time as ASCA. Those researchers, too, observed the all-important iron line.

Ground-based observations made by several groups using optical and radio telescopes noticed as early as April 2-3 that CI Cam was the likely origin of the X-ray transmission.

Robert Hjellming of the National Radio Astronomy Observatory and his collaborator A. Mioduszewski, using the Very Large Array in Socorro, NM, observed strong radio emission from CI Cam. The VLA consists of 27 radiotelescopes coordinated to operate as one giant radiotelescope. It was seen in the movie *Contact*.

Mark Wagner of Ohio State University and Sumner Starrfield of Arizona State University discovered that CI Cam had brightened substantially and found evidence in their optical spectra, taken with the Perkins 1.8m telescope, that CI Cam and XTE J0421+560 are almost certainly the same object.

Further support for this came on April 4 when Drs. Hjellming and Mioduszewski noticed that the radio emission from CI Cam was highly variable. The clincher came on April 5 when they observed twin radio jets emerging from CI Cam. The velocities of these jets were at least 15 percent of the speed of light. Similar jets had been observed in two previous black hole transients.

It's a fact

Institute Professor Emeritus Paul A. Samuelson was the second person and first American to win the Nobel Prize in economics in 1970. Institute Professor Emeritus Franco Modigliani received the award in 1985 and Institute Professor Robert M. Solow won it in 1987.

Do you have news or information you'd like to share with the MIT community or outside readers?

The MIT News Office staff can work with you to produce Tech Talk stories and press releases on such things as:

- Research advances (upcoming papers, clinical trials, etc.)
- New programs
- Noteworthy events or milestones

Contact the News Office at x3-2700 or <newsoffice@mit.edu>. Also see our Web page with links to our various publications at <<http://web.mit.edu/newsoffice/www/>>.

Alter recounts his Himalayan boyhood

■ By Mary Haller
Office of the Arts

Growing up in the Himalayas in the 1960s and early '70s, Stephen Alter's world was one of distant snowy summits and soaking monsoon rains, buffalo carts hauling sugar cane and wallahs peddling chickens and charcoal. As a young boy, he swung on the vines of banyan trees and hunted for barking deer, kept antelope and bamboo beetles as pets and spoke a mixture of Hindi and English.

Mr. Alter's anecdotes, memories and descriptions from that time and place are captured in his memoir, *All the Way to Heaven: An American Boyhood in the Himalayas*, from which he will read on Thursday, April 16 at 8pm in Bartos Theater (Building E15). Published in February by Henry Holt, the book recounts his experiences growing up in India as the son and grandson of American missionaries.

Mr. Alter, writer-in-residence in the Program in Writing and Humanistic Studies since 1995, is the author of four novels, all of which are set in India and address the dilemmas of characters straddling different cultures, as he himself has done for much of his life.



Alter

He began writing *All the Way to Heaven* just over two years ago at the urging of his editor, who, says Mr. Alter, "was intrigued by my background... memoirs were [also] very much in vogue at the time."

A self-proclaimed "private person by nature," Mr. Alter initially resisted the idea of writing a memoir, but once he started work on the book, he found that "it was much like writing a novel except that there wasn't the pretense of fiction to hide behind." The other difference, he said, was that while writing the memoir, "I always knew the outcome of the story, whereas in fiction the ending is never decided in my mind until I get there—and sometimes not even then."

It was the writing process itself, said Mr. Alter, that helped him tap into his childhood memories. "Often it was a matter of association—one recollection leading on to another." His research also took him back to his home town of Mussoorie in the summer of 1996 on a travel grant arranged by Professor Alan Lightman, then head of the Program in Writing and Humanistic Studies.

It is clear, however, from Mr. Alter's wistful and detailed descriptions of the rivers, foothills, flora and fauna of Mussoorie that it is the physical environment of his Himalayan homeland that lingers most in his memory. "What I still miss the most are the mountains and forests," he said. "More than anything it is the landscape that draws me back."

"An Evening with Stephen Alter" is presented as part of MIT's 1997-1998 Writers Series, sponsored by the Program in Writing and Humanistic Studies. For more information, call x3-7894.

String-along



The Lydian String Quartet (shown here), with special guest MIT Professor Marcus Thompson on viola, will perform a free concert of Haydn, Schubert and Sessions on Sunday, April 26 at 4pm in Kresge Auditorium.

Photo by Susan Wilson

Arts News

■ A new work by music lecturer **Elena Ruehr** will receive its premiere by acclaimed baritone Stephen Salters on Friday, April 17 at Jordan Hall as part of the BankBoston Young Artists Series. "Lullabies and Spring Songs" is a song cycle for baritone and piano with text by Langston Hughes. For more information, call 482-6661.

■ The Orquesta Sinfonica del Estado de Mexico (considered one of the best orchestras in Mexico) has included **Jose Luis Elizondo's** *Estampas Mexicanas* ("Mexican Snapshots") in two upcoming concerts on April 22 and April 24 in Toluca, Mexico. Carlos Prieto Jr., son of the world-renowned cellist who graduated from MIT in 1959, will conduct the orchestra. Mr. Elizondo, who graduated from MIT in 1995 with a double major in electrical engineering and music, wrote *Estampas Mexicanas* as an assignment in a composition class with Professor **Peter Child** and the work was premiered by the MIT Symphony in December 1995.

■ Intrigued by the new setup of the **Lewis Music Library**? Want to be sure your students understand how to use the facility? Tours, lasting from five minutes to over an hour, are available on request to individuals or groups. Contact Peter Munstedt (x3-5636) to arrange a time.

Symposium examines music and innovation

■ By Lynn Heinemann
Office of the Arts

A panel of scholars, musicians and historians will discuss "Technology, Innovation and the Musical Imagination" at the eighth annual J. Herbert Hollomon Memorial Symposium presented by the Technology and Culture Forum on Wednesday, April 15 at 3:30pm in Wong Auditorium (E51, Tang Center).

Over the past 300 years, technical innovations and technological developments have profoundly influenced Western music composition and performance techniques. These changes range from the 18th-century invention of the pianoforte (which allowed musicians to experiment with loud and soft and a range of dynamics not available on the harpsichord) to 20th-century digital sound synthesis.



Schuller

Pulitzer-prize winning composer, author and conductor Gunther Schuller; Darcy Kuronen, curator of the Historical Musical Instrument Collection at Boston's Museum of Fine Arts; and Professor Barry Vercoe of the Media Laboratory and founder of the Electronic Music Studio will examine how composers have used fundamental improvements in musical instruments as springboards for com-

positional development and, more recently, how they have used electronic means to change the Western musical landscape. Professor Peter Child, head of the music and theater arts section, will moderate. Following the presentations, there will be questions and discussion.

The symposium is named for Dr. Hollomon, who held leadership positions in academe, industry and the federal government until his death in 1985 at the age of 66. An MIT alumnus, he received the SB in physics (1940) and the ScD in metallurgy (1946). During his career, he was president of the University of Oklahoma (1968-70), assistant secretary of commerce for science and technology (1962-67) and head of GE's General Engineering Laboratory (1960-67).

In 1970, Dr. Hollomon returned to MIT, where he founded the Center for Policy Alternatives, which identified major sociotechnical issues and the policies and practices surrounding them. In 1985 the center became part of the Center for Technology, Policy and Industrial Development.

Dr. Hollomon and his wife Nancy dreamed of hosting a conference on technology and the arts, said Patricia-Maria Weinmann, assistant coordinator of the Technology and Culture Seminar. "This year's Hollomon Memorial Symposium speaks profoundly to the unity Herb lived as an engineer and a man of the arts," she said.

For more information, see the web site at <<http://web.mit.edu/tac/www/home.html>>.

Institute Arts

For more arts-related information call the 24-hour hotline at 253-ARTS or consult the World Wide Web at <<http://web.mit.edu/arts>>.

* Open to public
** Open to MIT community only

April 15-May 3

MUSIC

Chapel Concerts*—April 16: Arden Quartet. Beethoven's Quartet Opus 59, #1. April 23: Sounds of a Royal Flute: 18th-Century Music from the Dresden & Berlin Courts for Flute & Harpsichord. Mary Oleskiewicz, baroque traverse flute; David Schulenberg, harpsichord. Works of Quantz, Bach & Graun. April 30: Glorienne Collver-Jacobson, sr secretary, Chem. Eng. Brazilian guitar music by Paulo Bellinati & Garoto. Noon, Chapel, x3-2906.

Advance Music Performance*—April 27: Ja Hyun Shin '99. Beethoven, Brahms & Kreisler. 5pm, Killian Hall, x3-2826.

Technology, Innovation & the Musical Imagination*—April 15. Gunther Schuller, Prof. Barry Vercoe, Darcy Kuronen, Prof. Peter Child, moderator. 8th Annual J. Herbert Hollomon Memorial Symposium. 3:30pm, Wong Aud. x3-0108.

MIT Chamber Chorus*—April 17. William Cutter, conductor. William Byrd's Mass in F Minor for Four Voices with original psalm settings & intros by MIT student composers; Samuel Barber's *Reincarnations*; Brahms' *Lieblieder Waltzes*, Op. 52. 12noon, Killian Hall, x3-2826.

Funk Music Festival*—April 24. Spring Concert 1998, featuring Maceo Parker, Fishbone, and Five Fingers of Funk. \$8 in advance at The Source, \$10 at the door, open to college ID or MIT ID only. 8pm, Johnson Athletics Ctr. x3-2501 <spring@mit.edu>.

MIT/Wellesley Toons Spring Concert*—April 25. Coed a cappella singing group comprised of MIT & Wellesley students. 7pm, Rm 6-120. Info: 283-4682 or <toons-request@mit.edu>.

Cross Products Concert*—April 25. MIT's Christian a cappella group. 7pm, Rm 10-250. Info: <corinn@mit.edu>.

Mark Harvey & the Aardvark Jazz Orchestra*—April 25. Retrospective of original compositions by Music Lecturer Mark Harvey and the premiere of a new composition for jazz orchestra. 8pm, Kresge Aud. x3-3210.

Lydian String Quartet*—April 26. Featuring Prof. Marcus Thompson, viola. Haydn's Quartet in E-flat Major, Op. 20 No. 1; Schubert's Quartet in A minor, Op. 29; Sessions' Quintet for Two Violins, Two Violas & Cello. 4pm, Kresge Aud. x3-2906.

MIT Concert Choir & Symphony Orchestra*—May 1. William Cutter, director. Carl Orff's *Carmina Burana*; Mozart's Sinfonia Concertante in E-Flat Major. Kay Ann Chen '98, violin; Jennifer Gruczo '98, viola. \$5. 8pm, Kresge Aud. x3-3210.

MIT Concert Band Spring Concert*—May 2. John Corley, dir. Premieres of Rosey Meikuei Lee's *The Emperor's Garden*, John Bavicchi's *Fusions* & Edward J. Madden's *The Book of Kalls*. Also Vittorio Giannini's *Praeludium* & Allegro & Gustav Holst's *Moorish March*. 8pm, Kresge Aud. x3-3210 or <<http://web.mit.edu/bavicchi/www/>>.

Two-Piano Concert*—May 3. 1pm, Kresge Aud. x3-2906.

Guest Artist Concert: Jad Azkoul, Guitar*—May 3. Villa-Lobos' Five Preludes, Piazzolla's *Four Seasons* & works of Coeck & Albeniz. Co-sponsored by the Boston Classical Guitar Society. 4pm, Killian Hall. x3-2906.

Live Jazz at Muddy Charles Pub*—Wednesdays. The Pat Battstone Quartet. 8:30-10:30pm, Rm 50-110. x3-4012.

MIT Guild of Bell Ringers*—Mondays, 6:30pm, 2nd floor balcony of Lobby 7. x3-3573.

THEATER

The Mystery of Edwin Drood*—April 16-18. Musical Theatre Guild's audience participa-

tory mystery. Tickets: \$9, \$8 and \$6. 8pm, Kresge Little Theater. x3-6294 or <<http://www.mit.edu/activities/mtg/>>.

The Pirates of Penzance*—April 17-19, April 23-25. MIT Gilbert & Sullivan Players' production. \$6-9. 8pm (except 2pm on April 19), Sala de Puerto Rico. x3-0190 or <gsp-tickets@mit.edu> or <<http://www.mit.edu/activities/gsp/>>.

The Illusion*—April 23-25, April 30-May 2. Dramashop's production of play by Pierre Cornielle adapted by Tony Kushner, dir. by Prof. Janet Sosenberg. \$8, \$6 students. 8pm, Kresge Little Theater. x3-2908 or <<http://www.mit.edu:8001/activities/dramashop/dramashop-home.html>>.

"Haemophilia & Non-Parietal Disorders of Pulmonary Endio-magno-cardiogram-matical Dissolution"—April 25. Roadkill Buffet, MIT's improv comedy troupe. 8pm, Rm 66-110. Info: <ckb@mit.edu> or <<http://www.mit.edu:8001/afs/athena/activity/r/roadkill/www/home.html>>.

Shakespeare Ensemble Scene Night: "A Lighter Side of Life"—April 30-May 2. Scenes from Shakespeare & modern playwrights. 8pm, Walker 201. x3-2903 or <<http://www.mit.edu:8001/activities/ensemble/home.html>>.

Sherlock Holmes and the Hands of Othello*—April 30-May 2, May 8-9. Black Theatre Guild production of play by Alexander Simmons dir. by Marshall Hughes. 8pm, Rm 35-225. <mkdowe2@mit.edu> or x5-7527.

FILM/VIDEO

Regarde Les hommes tomber*—April 16. Jacques Audiard's 1996 film. (In French w/ subtitles). 7:30pm, Rm 10-250. x3-9777.

New Asian Film Mini-Series*—April 22: *Fun, Bar, Karaoke* (Thailand, 1997)—7pm; *The Red Door* (India, 1997)—9pm. April 23: *12 Storeys* (Singapore, 1997)—7pm; *A Single Spark* (Korea, 1996)—9pm. Sponsored by International Science and Technology Initiative, Film & Media Studies, the Lecture Series

Committee and the Committee on Race Relations. 7pm/9pm, Rm 10-250. x3-3599.

Office Killer*—April 29. Film by Cindy Sherman (1997) presented in conjunction with *Mirror Images...* at the List Visual Arts Ctr. 2pm, Rm 10-250. x3-4400.

Avant-Garde Shorts & Independent Visions by Women Filmmakers*—May 1. Films & videos from 1928 to contemporary, by Germaine Dulac, Maya Deren, Shirley Clarke, Shu Lea Chang & others. Presented in conjunction with *Mirror Images...* 7pm, Bartos Theater. x3-4400.

READINGS

Sci Fi Readings*—April 15. Nancy Kress & Michael A. Burstein. Sponsored by the Communications Forum and Film and Media Studies with a grant from John and Mary Markle Foundations. 7-10pm, Rm 6-120. x3-3599 or <<http://media-in-transition.mit.edu>>.

Evening with Stephen Alter*—April 16. Writers Series presents the MIT Writer in Residence. 8pm, Bartos Aud. x3-9469.

Poetry@MIT*—April 23. Readings by Ann Lauterbach & Joel Sloman, senior secretary, EAPS. 8pm, Killian Hall. April 30: Reading by French poet Pierre Martory, author of *The Landscape Is Behind The Door*. In French and English. 8pm, Rm 14E-304. Sponsored by Program in Writing and Humanistic Studies and Literature faculty. x3-7894 or <<http://web.mit.edu/humanistic/www/poetsery.htm>>.

Reading by Jennifer Ackerman*—April 23. Writer specializing in natural history and the biological sciences, author of *Notes from the Shore*. 4:30pm, Rm 56-114. x3-7894.

EXHIBITS

List Visual Arts Center (E15)*: Mirror Images: Women, Surrealism and Self-Representation. Self-representations by three generations of women Surrealist or Surrealist-influenced artists from 1928-1996. **Exhibi-**

tion Walk-Through*—April 18. 2pm. "Mirror Images: Women Represent Themselves" —April 25. Symposium. 9:30am-4pm, Bartos Theater. To reserve a box lunch, call Barbra Pine, x3-4400. Show runs through June 28. Hours: Tues-Thurs & weekends noon-6pm; Fri 12-8pm; closed holidays. x3-4680.

MIT Museum* (N52): Piranesi in Perspective: Designing the Icons of an Age. Examination of Giovanni Battista Piranesi's (1720-1778) career as an etcher, archaeologist & as a promoter of Rome extraordinaire. Through June 14. **Walking Tour***—April 25. *Piranesi's Influence on Monuments and Memorials: A Walking Tour of Mount Auburn Cemetery*. Cosponsored by the Friends of Mount Auburn Cemetery. 10am. Call x8-9106 to register. **Ongoing Exhibits.** 265 Mass Ave. Tues-Fri 10-5, Weekends 12-5. x3-4444.

Wolk Gallery: Reflections: Drawings and Projects by Wellington Reiter. Companion exhibition to *Piranesi in Perspective*. Through July 7. Rm 7-338 x8-9106.

Hart Nautical Gallery—Ships for Victory: American Shipbuilding's Finest Hour. Permanent Exhibition of MIT Museum's Ship Models. Ongoing. Daily 9am-8pm. x3-5942.

The Dean's Gallery—Yasuko: Recent Paintings. Through April 23. Rm E52-466. Weekdays 9am-5pm, x3-9455 or <<http://web.mit.edu/deans-gallery/www/>>.

Compton Gallery—MIT Master of Architecture Theses 1997/1998. April 22-May 22. Compton Gallery (Rm 10-150). Weekdays 9am-5pm. x3-7779.

Rotch Visual Collections—Ghadames: The City of Shades. Exhibition on a small historic town in the Sahara Desert. Through May 20. Rm 7-304 x3-2955.

Women's Studies. Permanent exhibition of archival photographs documenting the role of women at MIT over the decades. Rm 14E-316. x3-8844.

Doc Edgerton Strobe Alley. Photographs, instruments and memorabilia and hands-on experiments. Bldg 4, 4th floor. x3-4629.

Prof. Langer of MIT and Rabinow win Lemelson awards

(continued from page 1) while advancing numerous industries." "It gives me great satisfaction to know that the research that my laboratory has done has led to improvements in people's lives, and has given hope to patients in cases where there had been very little hope before," Professor Langer said. "Inventions can and have helped people in major ways and have changed the world. A lot of times conventional wisdom would dictate that your idea, or your invention, is not possible. It is important to realize that there is very little that is truly impossible."

A LIFETIME OF DISCOVERY

Years after receiving a Gilbert chemistry set as a boy, Professor Langer is still committed to learning and discovering in chemistry. The only active member of all three US National Academies—sciences, engineering and medicine—Professor Langer's groundbreaking research in polymers dispelled the belief that only some sizes of molecules could be slowly delivered. His discoveries led to the first approaches to the slow release of ionic drugs, peptides and other large molecules such as proteins and DNA.

As a biomedical engineer whose major focus is biomaterials, Professor Langer specializes in controlled drug delivery and tissue engineering. His groundbreaking research in the development of new systems for controlled delivery of pharmaceuticals, specifically his work with polymers, has led to a variety of novel drug delivery systems, including a treatment for brain cancer developed with Dr. Henry Brem of Johns Hopkins University Medical School.

This is the first FDA-approved treatment for brain cancer in 20 years and the first polymer-based treatment to deliver chemotherapy directly to the tumor site.

A pioneer in the field of tissue engi-

neering, Professor Langer discovered, with surgeon Jay Vacanti, that synthetic polymers could be seeded with mammalian cells to produce replacement tissue or organs. These discoveries formed a basis for creating new tissues such as artificial skin for burn victims, or cartilage and other tissue for patients suffering from tissue loss or organ failure. Tissue loss and organ failure cost the nation more than \$500 billion in health care costs in 1997.

"Professor Langer's breadth of activities are quite impressive. He has taken his own basic scientific work and created an incredible range of practical applications, such as artificial skin, bone and cartilage, and implantable drug delivery systems, from which society will clearly benefit," said Dr. William M. Cummings, manager of international fuels issues for Texaco and one of the reviewers of this year's prize nominations.

Professor Langer's research has been applied in areas including vaccines, diagnostics, innovative waste disposal technologies, novel therapeutics and tissue repair. In 1997, sales of advanced drug delivery systems in the United States were approximately \$14 billion.

Professor Langer earned the BS (with distinction) in chemical engineering from Cornell University in 1970 and the ScD in chemical engineering from MIT in 1974. He has been teaching and doing research at MIT since 1977.

In the mid-1970s, Professor Langer began his research into polymers. His numerous breakthroughs have earned him more than 60 national and international awards and honors. He is the only engineer to receive the Gairdner Foundation International Award (49 previous winners subsequently won a Nobel Prize) for discoveries that led to the development of slow drug-release systems, as well as the William Walker Award from the American Institute of Chemical Engineers and the Wiley

Medal from the US Food and Drug Administration.

INVENTIONS FOR DAILY LIFE

A prolific inventor, Mr. Rabinow's range of achievements include ordnance, sound reproduction, photography, computer technology, mechanical devices, optical products, electronic systems, horology (clocks and watches), mail sorters, reading machines and automobile devices.

His leading inventions are the automatic letter-sorting machine used by the US Postal Service, the automatic regulation of clocks and watches (formerly used in all American automobiles made from 1954-74), the magnetic particle clutch used in cars and airplanes, card punches and card sorting machines, and the straight-line phonograph, manufactured by Harmon Kardon Corp., Sony and Bang & Olufsen, among others.

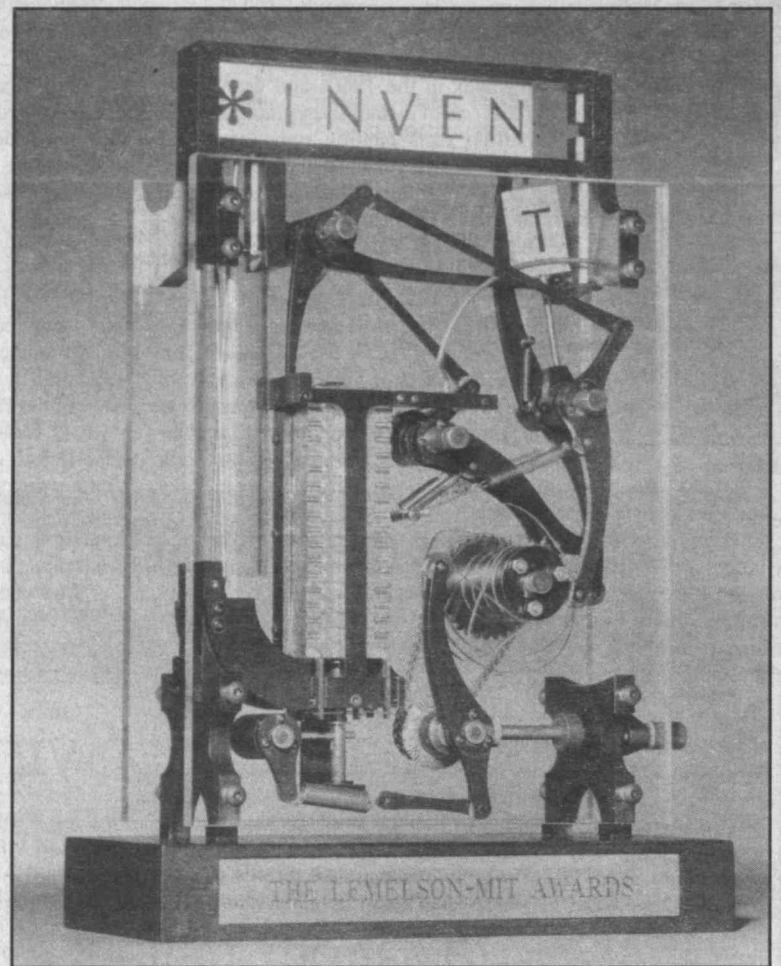
Born in 1910 in Kharkov, Russia, Mr. Rabinow's lifelong interest in inventing was inspired by machinery in his father's shoe factory and stimulated by the literary works of Jules Verne. He and his family emigrated to China and later to Brooklyn, NY, in 1921. He earned a BS in engineering in 1933 and a graduate degree in electrical engineering in 1934 from City College of New York.

An inventor since he was eight, Mr. Rabinow applied for his first patent in 1948 and his most recent patent in the spring of 1998.

In 1938, Mr. Rabinow began his career at the National Institute of Standards and Technology (NIST), then known as the National Bureau of Standards. He left in 1954 to create the Rabinow Engineering Co., which performed technical and engineering consulting services for many industrial organizations and the federal government. The company was later acquired by Control Data Corp., where he served as vice president.

In 1968, he established the RABCO Co. to manufacture his straight-line phonographs. Mr. Rabinow rejoined the NIST in 1972 and served as the chief research engineer of the National Engineering Laboratory until his retirement in 1989, though he still lectures and works as a NIST consultant.

Models of his inventions will be displayed at a new museum at the Na-



Inventors who receive Lemelson-MIT Awards each April will receive a trophy that's an invention in its own right—a 14-inch kinetic sculpture by MIT artist-in-residence Arthur Ganson that spells out "Invention and Innovation" via a hand crank.

tional Institute of Standards and Technology. Other models are housed at the Smithsonian Institution's National Museum of American History in Washington, DC.

"I invent because it is fun and I enjoy the challenge," Mr. Rabinow said. "Invention is an art form and should be supported as such. It's most important for young people to find the work they love, and inventors love what they do. As a nation, we should encourage invention by motivating potential inventors with programs such as the Lemelson-MIT Awards."

"Professor Langer's and Mr. Rabinow's achievements have transformed and enriched our daily lives, while serving as an inspiration to young

inventors," said Dorothy Lemelson, co-founder of the Lemelson Foundation. "Their contributions in invention and in the businesses that have benefited from them exemplify the ideals of the Lemelson Foundation and the Lemelson-MIT Awards Program."

The late independent inventor, Jerome H. Lemelson (1923-97), and his wife Dorothy established the Lemelson-MIT Awards Program at MIT in 1994 to promote positive role models for young people and for all aspiring inventors.

The program is administered by MIT, which leads the nation in number of patents awarded to a single university, on behalf of the Lemelson National Program.

Awards & Honors

■ **Alexander V. Mamishev**, a graduate student in electrical engineering and computer science, has been awarded an \$18,000 Link Foundation Energy Fellowship for 1998-99. Mr. Mamishev, a PhD candidate, works in the Laboratory for Electromagnetic and Electronic Systems and the High Voltage Research Laboratory. His thesis research concerns sensor design, fabrication, parameter estimation algorithms, and applications of interdigital frequency wave number dielectrometry. Potential applications for his work include measurement of porosity, state of cure, and presence of contaminants and flaws in materials; electrochemical parameters in

electrical double layers; and detection of plastic and metallic land mines.

■ **JoAnne Yates**, associate professor of management communication and information studies at the Sloan School, won the biennial Harold F. Williamson Medal awarded in March by the Business History Conference. Yates's contributions to business history include *Control Through Communication: The Rise of System in American Management* (Johns Hopkins University Press) as well as writings on contemporary electronic technology. She shares the prize for mid-career achievement with Steve Tolliday of the University of Leeds.

Family Resource Center moves offices

The MIT Family Resource Center will hold an open house on Thursday, April 23 from 4-5:30pm in Rm 16-151 to celebrate the Center's move to its new location.

The new space features private offices, a reception area and a conference room, allowing the Center to offer better access to its resources and more work/family services for the MIT community.

The open house is open to all members of the MIT community and their families. In acknowledgment of "Take

Our Daughters to Work Day" on April 23, the staff extends a special welcome to children visiting MIT with family members for the day. Participants are also invited to bring a photograph of their family to add to the Center's new bulletin board celebrating families in the MIT community. Light refreshments will be provided.

For further information, including directions to the new location, contact the Family Resource Center at x3-1592 or <frc@mit.edu>.

Disney hack on MIT home page draws appreciative e-mail

(continued from page 1)

—Walt Disney R&D; also an alumnus

Your article was adorable about Disney acquiring MIT. As a Disney stockholder and the fact that the stock had done particularly well lately, I at first almost believed it! Darn—thought my ship had come in. Thanks again for the neat April Fool's! —University of Texas

Subject: Three Little Pigs Center for Real Estate

Using increased funding expected from the sale of MIT, we announce the planned construction of a state-of-the-art brick facility to house the 3-LP Center on its new Florida campus. In addition to a classroom equipped with a wide screen and surround sound, the facility will have the latest security system designed particularly to combat marauding animals (ex. Canis lupus) and high winds characteristic of the area. For further information on these threats and security system design, see Little Golden Books. —mit.edu

Nice April Fool's gag. At WPI, we're doing one too, but it's restricted to users on campus [now archived at <http://www.wpi.edu/April>]. —Worcester Polytechnic Institute webmaster

God, I love hackers. —Prof. Samuel Jay Keyser

When do I start packing? —mit.edu

Good to see you folks have a sense of humor. Congratulations on being acquired by Disney. I want to know how Harvard can get in on this deal! —harvard.edu

Reading this delightful offering makes me wish I still worked at MIT, and not Harvard! —harvard.edu

Very good fun. A friend, who is coming to MIT for an interview was doing his "research" about the university. He e-mailed and sent the link. Such a riot. You are having fun, I can tell. —collegeboard.org

Don't you just hate it when your new employer gets bought out and decides to move out of state? At least the weather is nice, and everyone is always smiling. (Not to mention the omnipresent, soothing background music and "natural" bird sounds.) Bet you couldn't get that at Tufts! —analog.com

Thanks for making my staid existence at UCLA even more painful. Disney to acquire MIT, indeed! Y'all rock. —ucla.edu

I am so proud to be an alum of a school with such a sense of humor! Thanks! It really makes my day wonderfully cheerful! You'll be surprised how often we alumni/ae check our alma mater's home page. —alumna at Visto Corp.

I want to make sure you have my current address so I can receive the tuition reimbursement. —alumnus at mathworks.com

Distinctly inventive! Loved the home/welcome page. Congratulations. —Univ. of East Anglia

Glad to hear you guys are coming aboard. Maybe you guys can get our air conditioning/heating system to work properly. —disney.com

I'm surprised at all the attention that this deal has received. Disney's been purchasing MIT grads for years (both directly from the Institute and through various distributors and resellers). The announcement just solidifies an existing vendor/client relationship. —disney.com

Very mice spoof. —retg.com

I thought the Disney hack was perfect, just as the Oscar hack was well done... a reminder that I work at one of the finest institutions in the world, [where] people are clever as well as smart! —mit.edu

Help! I've fallen down laughing and I can't get up! But the more I think about, The Disney Institute of Technology sounds really cool. Maybe I hurt my head falling down. Thanks for the great April Fool's joke. —ix.netcom.com

Oh what a tangled web you weave
On April first when you deceive
Your 'cross-the-Charley-River neighbor
Who will "stay put" to teach and labor.
Suggest we do that MIT
(If it's all that it's cracked to be)
Instead, with Mickey flag unfurled,
ITSELF acquire the Disney world
And move it HERE, then spread the word:
How Disney was gobbled by King of Nerd!
—harvard.edu

Good show! As a parent, I am especially pleased about the tuition refund! What a great way to start April! —outside MIT

I think that I will never see
A Mickey Mouse at MIT,
But what will doubtless cheaper be:
A teleported MIT.
—outside MIT