

Iraq attack likely, CIS experts say

■ By Sarah H. Wright
News Office

Three panelists on a Center for International Studies discussion titled "War With Iraq: Pros and Cons" on Monday agreed on two points:

—A U.S. attack on Iraq is a terrible prospect.

—It is likely to become a reality.

They arrived at the point of advocating U.S. aggression by different routes, and they directed the audience to different views along the way. None expressed confidence in the Bush administration's foreign or domestic preparedness policies.

Professor Stephen W. Van Evera of political science, associate director of the Center for International Studies (CIS), served as moderator and a panelist for the two-hour discussion in Wong Auditorium. The other speakers were Kenneth M. Pollack, senior fellow and

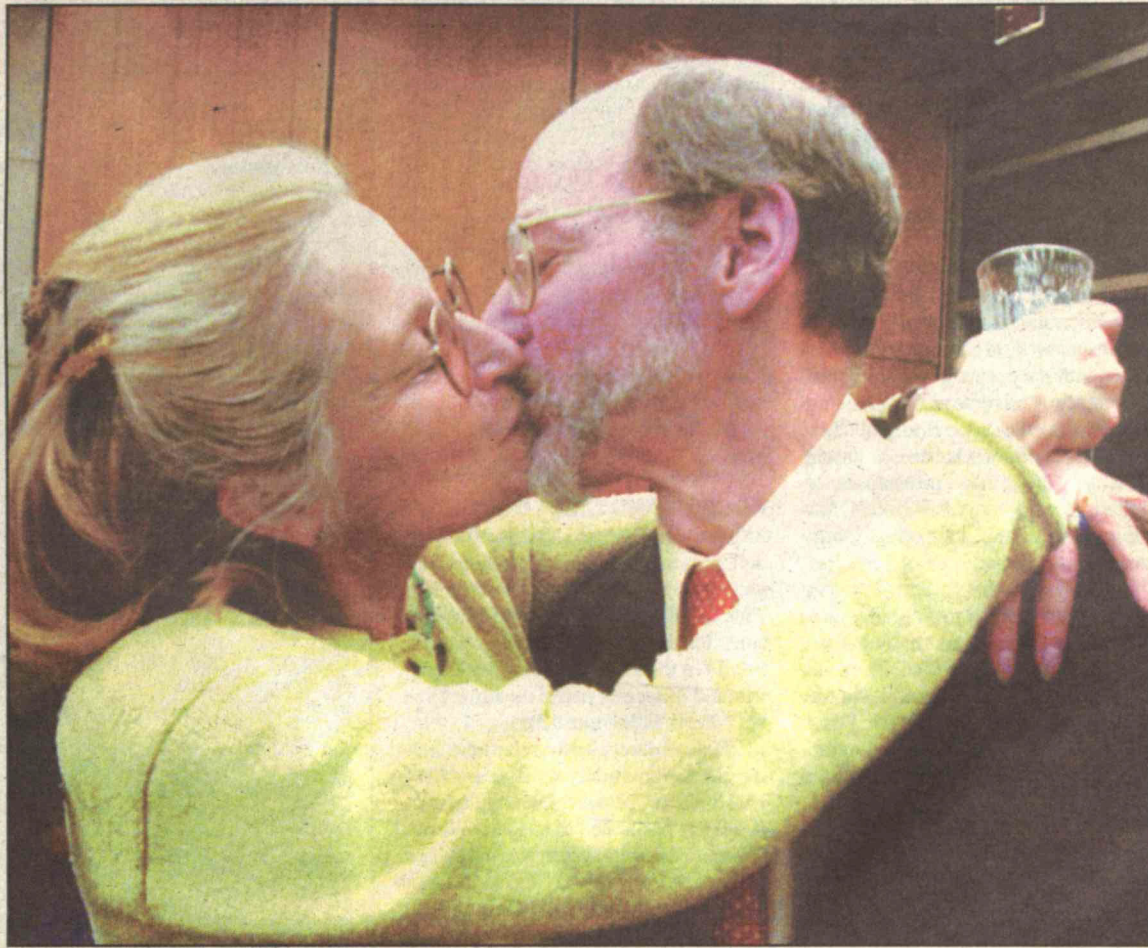
research director of the Brookings Institution's Saban Center for Middle East Policy and a former graduate student of Van Evera, and Owen Cote Jr., associate director of the CIS Security Studies Program.

The trio also agreed on the failure thus far of strategies for containment of Iraq (by economic sanctions and United Nations weapons inspections); for deterrence (by threats of retaliation); and for covert action to remove Saddam Hussein from power by anyone.

Pollack, who spent 12 years working with the CIA and is a "former poster boy for containment," said he now advocates using overwhelming force, including massive ground troops, to invade Iraq, remove Saddam and reconstruct the country along stable and democratic lines.

To illustrate, Pollack focused on Saddam's grisly treatment of his own people; his military and personal im-

(continued on page 4)



After his lecture on Friday, newly minted Nobel laureate Robert Horvitz gets a kiss from his wife, Martha Constantine-Paton, also a professor in biology at MIT.

Photo by Donna Coveney

Uncle Sam wants you— for cybersecurity duty

■ By Denise Brehm
News Office

National cybersecurity chief Richard Clarke (S.M. 1979) made it clear at an MIT panel discussion on Oct. 16 that the federal government plans to rely primarily on market forces and the cooperation of citizens to secure the nation's cyberspace infrastructure.

The meeting in Tang Hall was one stop on Clarke's road tour of the Northeast to get feedback on the draft of the National Strategy to Secure Cyberspace document.

(See <http://www.securecyberspace.gov> for the complete draft.)

Clarke told the audience of mostly men from the software industry and the information technology and security sectors that this may be the first time any national strategy has been developed with so much input from citizens, nongovernmental organizations and corporations. Anticipating the difficulty of regulating a system not owned by the federal government, Clarke said the process of developing the strategy was "designed to create a consensus" so that

(continued on page 8)

New Nobel laureate Horvitz explains why we should care about cell death

■ By Deborah Halber
News Office

In H. Robert Horvitz's first MIT lecture as a Nobel laureate, he told a standing-room-only crowd on Friday afternoon that tadpoles lose their tails and pigeons' feet become unwebbed through the same process that is his claim to fame: programmed cell death. In addition to being a normal part of development for humans, programmed cell death gone awry may be implicated in diseases such as cancer and Alzheimer's disease.

Horvitz—the David H. Koch Professor of Cancer Biology, an investigator for the Howard Hughes Medical Institute and for the McGovern Institute for Brain Research at MIT, and a member of the MIT Center for Cancer Research—received the Nobel Prize Oct. 7 for discovering and characterizing the genes controlling cell death in the

nematode *Caenorhabditis elegans*.

In the same lecture hall where as an MIT undergraduate he had taken "Introduction to Electrical Engineering" with Amar Bose of Bose stereo-speaker fame, Horvitz stood at the podium before the hundreds of students, faculty and staff members packing the seats and aisles of Room 10-250 and explained why we should care about dying cells.

GENES OF CELL DEATH

"We've known for many years that cells die. What is notable is that in many cases when cells die, it's not because they've been damaged beyond life, but because they've enacted an endogenous process of cell suicide," he said.

From the time that the fertilized egg first divides and continues to divide, creating in humans millions upon millions of cells, the cells take on different characteristics

(continued on page 6)

Employee vacation and bereavement policies improved

■ By Janet Snover
Executive Vice President's Office

MIT's vacation and bereavement leave policies for the administrative, sponsored research and support staffs are being improved starting Nov. 1.

Employees affected by the new policies announced by Vice President for Human Resources Laura Avakian will receive a letter and brochure with more information via interdepartmental mail this week. The extent to which the policies will apply to employees covered by union contracts will be determined in negotiations with each of the unions.

Significant improvements in the vacation policy will equalize the rate at which vacation days are earned across employment categories and will increase the amount of vacation time for some employees. Under MIT's old policy, employees in different categories did not accrue vacation time at the same rates.

Under the new policy, administrative, sponsored research staff and support staff who are eligible for vacation will earn 15 vacation days in their first year. After one year, these employees will earn 20 vacation days per year. (For part-time employees, the benefit is prorated based upon percentage of effort or number of hours worked in a week.)

At their 10-year anniversary and every five years after that, employees will receive an additional fifth week vacation credit. (Support staff had already received this benefit beginning after

Vacations at a glance

Starting Nov. 1, support, administrative and sponsored research staff will receive:

- 15 days in first year
- 20 days each year after
- Additional five days at 10th anniversary and every five years after that
- One-time proportional credit at next anniversary for employees in transitional years
- Maximum accrual of 40 days (plus five days of the additional vacation credit)
- 40-day maximum payout upon separation, plus up to five days of the additional week vacation credit

15 years of service, but now it will begin after 10 years of service and also will apply to administrative and sponsored research staff.) For employees who already have passed their 10-year anniversary, there will be a one-time "transition credit" on their next anniversary date. Details, including a chart with the years of service and corresponding transition credit, are included in the policy brochure being sent to eligible employees.

The new bereavement leave policy is intended to create a more flexible and contemporary set of guidelines and also to recognize the changing definition of family. The new policy provides up to five days of paid leave if an immediate or extended family member dies. It also broadens the definition of family to include the family of domestic partners, stepfamilies and other family relationships.

The old funeral leave policy provided paid leave for three days if an immediate family member died and one day for other close relatives.

These changes are the result of a comprehensive review of paid leave policies at the Institute that was undertaken for several reasons. There had not been an overall review of paid leave policies since the mid-1980s. Also, the HR-Payroll Project is working to implement additional modules of the SAP information

(continued on page 6)

The annual benefits open enrollment period starts on Oct. 31. See story on page 6.

Campus changes have improved morale, Benedict says

■ By Sarah H. Wright
News Office

The two new residence halls and the Zesiger Sports and Fitness Center have made a "palpable difference" in the quality of students and faculty lives alike, Dean for Student Life Larry Benedict said at the Oct. 16 faculty meeting.

Faculty members also heard an update from the Committee on Access and Disclosure of Scientific Information, proposals for two new graduate degrees in Engineering Systems, and a resolution on the death of Rudiger W. Dornbusch, the Ford International Professor of Economics.

Speaking about orientation and the beginning of the new school year, Benedict noted that all freshmen were accommodated on campus for the first time "with nary a peep or complaint." Changes in Orientation and housing-choice procedures produced a "very high degree of contentedness" among students. These new procedures included giving students "more information earlier and a successful summer lottery," he said.

Changes in the Stratton Student Center, including a new lounge area and relocated game room, and major changes in dining vendors were making a positive difference in the quality of student life, Benedict said. Eliminating overcrowding in the undergraduate halls has been another source of high morale.

"FSILG rush was done very differently this year because of the fact that all freshmen are living on campus. To date they have recruited 236 [students], which is short of last year's 330; we have some work to do with them this year to get those numbers up," Benedict said.

Faculty and students benefited from the absence of freshman rush that took place in past years, he said. "Students are already asking to move rush to Labor Day next year. But it worked not having rush right before classes start. Faculty said students seemed much more awake and ready to get to work this year."

Benedict also praised the Senior Segue program, in which MIT seniors

could choose to live in a graduate residence, as a solid example of community building. "It's a win-win. Seniors who are tired of undergrad life but not quite ready to move on bring a deep knowledge of MIT to graduate students new to the Institute," he said.

Dean for Undergraduate Education Robert Redwine echoed Benedict's sentiment on the benefits of alleviating crowding in housing units. "This has had important educational as well as morale-building effects," he said.

Redwine also commented on changes in grading, communication-intensive courses, and advising and mentoring at MIT.

"In general, we do a good job with advising and mentoring in the first year, but like most institutions, we need to do a better job beyond the first year. Another question we will be addressing is, 'Are we as a community taking full advantage of the remarkable diversity in our student population?'" he said.

ACCESS AND DISCLOSURE

Institute Professor Sheila E. Widnall presented the main findings and recommendations from the report by the Committee on Access and Disclosure. The complete text of this report, titled "In the Public Interest," was distributed to faculty at the meeting. (See MIT Tech Talk, June 12).

Widnall described the report as a "tremendous opportunity to state publicly MIT's values about research. Through it, MIT is positioned as a leader. We are committed to public service and to our nation's security needs."

The initial finding of the committee was that "retaining an open research environment with free flow of research results and information on the MIT campus is the best way for MIT to fulfill its public service responsibility."

Its initial recommendation, therefore, was that "no classified research should be carried out on campus; that no student, graduate or undergraduate, should be required to have a security clearance to perform thesis research; and that no thesis research should be carried out in areas requiring access to classified materials."

Widnall, describing agreements with research sponsors who want early results as a "slippery slope," warned that "the more restrictions we accept, the more we'll get."

ENGINEERING SYSTEMS

Professor of Civil Engineering Daniel Roos, associate dean of engineering for engineering systems, and

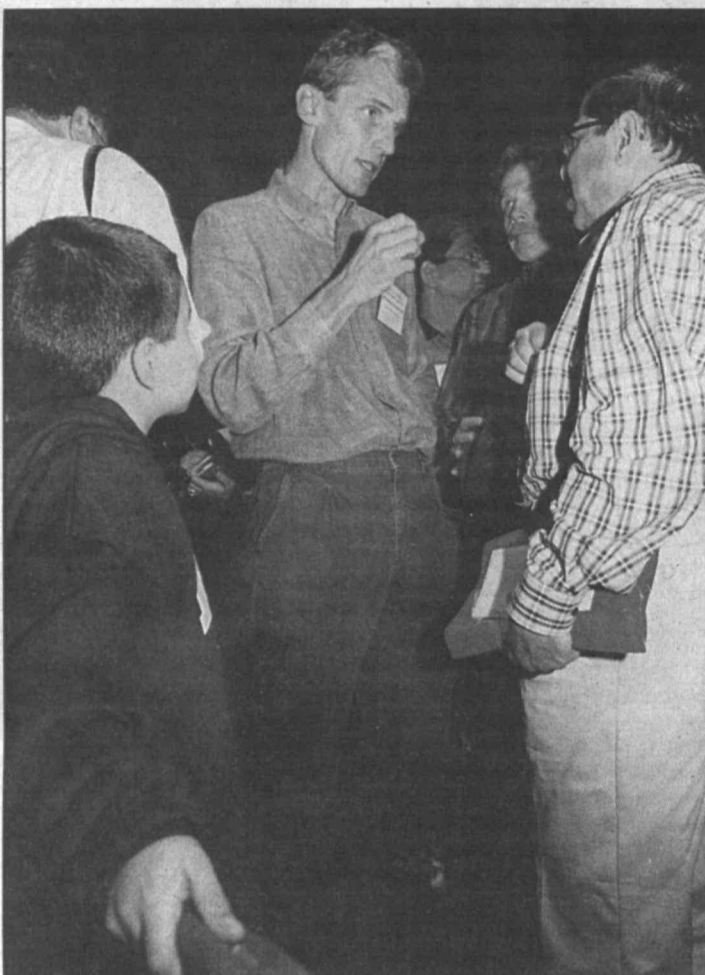
Professor Daniel E. Hastings, director of the Technology and Policy Program, presented proposals for establishing S.M. and Ph.D. degree programs in engineering systems.

DORNBUSCH

President Charles Vest led the faculty in a moment of silence in memory of Professor Dornbusch, who died

on July 25. Olivier Blanchard, head of the Department of Economics, read some comments on Professor Dornbusch's achievements and personality. Dornbusch will be remembered for his "vitality, wit and deep personal warmth," Blanchard said.

Family discussion



Professor of Physics Wolfgang Ketterle was mobbed by audience members of all ages after his speech at the Nobel laureate luncheon at the start of Family Weekend on Friday, Oct. 18. People sought his autograph or asked questions about his talk on "The Coldest Matter in the Universe." Photo by Laura Wulf

Writing contest seeks entries

Students are invited to enter a competition for the Benjamin Siegel Prize for the best-written work on issues in science, technology and society. The contest is open to all MIT undergraduates and graduate students.

The prize was established by family and friends of the late Benjamin Siegel (S.B. 1938, Ph.D.), a pioneer in the development of modern electron microscopy and professor of applied and engineering physics at Cornell University. Throughout his life, Siegel had an abiding interest in the history and philosophy of science, technology and education.

Entries should include one copy of a single-authored work of no more than 50 pages, written during the 2001-02 academic year. They should be sent to the Siegel Prize Committee, administered by the Program in Science, Technology and Society, Room E51-185. The deadline is Nov. 8. Anyone with questions should call 253-3452 or e-mail stsprogram@mit.edu.

MIT TECH TALK (USPS 002157)

October 23, 2002
Volume 47, Number 9

Publisher
KENNETH D. CAMPBELL

Editor
ALICE C. WAUGH

Associate Editor
DENISE BREHM

Photojournalist
DONNA COVENEY

News Office

Director: Kenneth D. Campbell; Associate Director: Robert J. Sales; Assistant Directors: Donna Coveney, Elizabeth A. Thomson, Alice C. Waugh; Senior Communications Officer: Patricia Richards; Senior Writer: Sarah H. Wright; Science Writer: Deborah Halber; Writer and Associate Editor of Tech Talk: Denise Brehm; Operations and Financial Administrator: Myles Crowley; Web Developer and Editor: Lisa Damtoft; Administrative Secretary: Mary Anne Hansen; Senior Office Assistant: Patricia Foley; Senior Editorial Assistant: Darren Clarke.

The arts page is produced by the Office of the Arts, Room E15-205, (617) 253-4003. Director of Arts Communication: Mary Haller; Administrative Staff Assistant: Lynn Heinemann.

News Office e-mail:
news@mit.edu

News Office URL:
<http://web.mit.edu/newsoffice/www/>

Office of the Arts URL:
<http://web.mit.edu/arts>

Tech Talk is published weekly except for most Monday-holiday weeks by the News Office, Room 11-400, Massachusetts Institute of Technology, 77 Massachusetts Avenue, Cambridge, Massachusetts 02139-4307. Telephone: (617) 253-2700.

Postmaster: Send address changes to Mail Services, Building WW15, Massachusetts Institute of Technology, 77 Massachusetts Avenue, Cambridge, Massachusetts 02139-4307. Subscribers may call (617) 252-1550 or send e-mail to mailsvc@mit.edu.

Tech Talk is distributed free to faculty and staff offices and residence halls. It is also available free in the News Office and the Information Center.

Domestic mail subscriptions are \$25 per year, non-refundable. Checks should be made payable to MIT and mailed to Business Manager, Room 11-400, MIT, 77 Massachusetts Avenue, Cambridge, MA 02139-4307.

Periodical postage paid at Boston, MA. Permission is granted to excerpt or reprint any material originated in Tech Talk. Selected articles that originated here are also available on line (see web URL above).



Printed on
Recycled Paper

Student Notices

* Open to public
** Open to MIT community only

INSTRUCTIONS: Listings for Student Notices should be submitted using the form at <http://web.mit.edu/newsoffice/tt/calform.html>. If you have questions, please contact ttcalendar@mit.edu or 253-1683.

October 23 - November 3

ANNOUNCEMENTS

Career Services and Preprofessional Advising Recruitment Presentations**—Oct 23: BD, 6pm, Rm 4-145. Lincoln Lab, 6pm, Rm 4-163. Raytheon, 6pm, Rm 4-149. United Technologies, 6pm, Rm 4-159. Oct 24: Appian Corp, 6pm, Rm 4-145. Applied Materials, 6pm, Rm 4-163. AQR Capital Management, 5:30pm, Rm 5-134. Lexecon Inc, 6pm, Rm 4-153. Oct 28: VMware Inc, 6:30pm, Rm 4-159. Oct 29: National Instruments, 6pm, Rm 4-159.

Luce Scholars Program**—The Center for International Studies announces a November 18 deadline for applications to the Luce Scholars Program which places young scholars in 10-month internships throughout Asia. Seniors, grad students, recent alumni and junior faculty are eligible to apply. Applications may be picked up at CIS Rm E38-656. More info: Carolyn Makinson at 253-9861 or Marsha Bolton at 258-8552.

RELIGIOUS ACTIVITIES

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

Baptist Campus Ministry**—Monthly events: First Sunday, 6pm, food followed by Christian discussion, Westgate Lounge, Bldg W85 bsmnt. Weekly: Mondays, 1:30pm, sm group Bible study, Westgate Lounge. Thursdays, 1-3pm, free intl student English classes, Bldg W11 board rm. Thursday, 7pm, BSF Bible study/worship, contact bgoza@mit.edu.

Chaplain: Michael Dean (W11-029), Campus Minister: Bryan Goza. More info: 253-2328 or mdean@mit.edu.

Campus Crusade for Christ**—Wkly mtg: Tuesdays, 8pm, PDR 1 & 2, Student Ctr. More info: 225-6229 or amalwitz@mit.edu.

Chi Alpha Christian Fellowship**—Wkly worship, Bible teaching, discussion. Fridays, 7:30-9pm, W11-080. More info: 253-2327, cacf@mit.edu or <http://www.mit.edu/activities/xa/main.html>.

Communitas-Life Together**—Protestant worship, Sundays, 11am. Sponsored by Amer Baptist Church, United Church of Christ, United Methodist Church, Presbyterian Church. Chaplain John Wuestneck, 252-1780 or chaplain@mit.edu.

Graduate Christian Fellowship**—Wkly mtgs Fridays, 6pm. Also wkly Bible studies, prayer and volleyball. More info: <http://web.mit.edu/mitgcf> or mit-gcf-info@mit.edu.

Lincoln Lab Bible Study*—Wednesdays, noon-12:30pm, Group 73 conference rm (D-382). More info: Sharon Frigon, 181-7730 or frigon@ll.mit.edu.

Lutheran-Episcopal Ministry at MIT*—Worship, Wednesdays, 5:10pm, followed by dinner and program, Bldg W11 dining rm. Mondays, 5:30-7pm, Bible study and pizza, Bldg W11 bsmnt. More info: 253-0108.

Meditation and Discourse on the Bhagavad Gita*—Fridays, 4:30pm, MIT Chapel. MIT chaplain Swami Tyagananda, monk of the Ramakrishna Mission of India. Sponsored by the MIT Vedanta Society. More info: 617-661-2011 or mehta@cvtel.com.

MIT Hillel**—Daily Orthodox services, Sun-Fri, 7:30am and 7:45am and each afternoon. Kosher dinners, Mon-Thurs, 6-7:30pm. Sundays, 11am, volunteer group at local soup kitchen. Mondays, 6pm, Jewish philosophy class. Tuesdays, 5pm, Jewish holidays class.

Tuesdays, 6:45 pm, Tanya Class. Wednesdays, 5pm, advanced Talmud class. Thursdays, noon, weekly Torah class. Fridays, 6pm, Shabbat evening services (Conservative, Orthodox and Reform). Fridays, 7pm, Shabbat dinner. Saturdays, 9am, Shabbat services (Orthodox). Saturdays, 12:30pm, Shabbat lunch. More info: 253-2982 or web.mit.edu/hillel.

MIT Muslim Students Association*—Five daily prayers, Bldg W11. Also, Friday congregation 1:10-1:45pm, Rm W11-110. Daily Iftars during Ramadan. More info: msaac@mit.edu.

MIT Orthodox Christian Fellowship**—MIT Wednesdays at 5:30pm in West Lounge 2nd flr of Student Ctr, discussion meeting followed by Chapel Vespers. More info: orthodox-acl@mit.edu.

Protestant Eucharist/Holy Communion*—Wednesdays, 5:10pm in Chapel. Sponsored by the Lutheran-Episcopal Ministry at MIT. More info: Lutheran Chaplain, 253-2325 or jkiefner@mit.edu or Episcopal Chaplain, 253-2983 or mcCreath@mit.edu.

Tech Catholic Community**—Sunday Masses at 9:30am, 1pm and 5pm. Weekday Masses Tuesdays and Fridays at 12:05pm when classes are in session. MIT Chapel. More info: 253-2981 or catholic@mit.edu.

United Christian Fellowship (UCF)**—Lrg group mtgs, Fridays, 7:15pm, Kresge Rehearsal Rm B. Wkly dorm-based Bible studies on and off campus. More info: mitucf-request@mit.edu or <http://web.mit.edu/ucf/www>.

STUDENT JOBS

For other job listings and more information about the following listings, go to the Student Employment Office, Rm 11-120 or <http://web.mit.edu/seo>. The MIT Student Employment Office functions much like the classified section of a local newspaper, and does not screen potential employers or employees.

On-Campus, Non-Technical. Staff assistant needed at the Aga Khan Visual Archives, Rotch Visual Collections. Duties include processing, organizing and indexing of slides. Knowledge of Word/Excel required. Flexible schedule: Mon-Fri, 9am-5pm at \$10/hr. Contact Ahmed Nabal, 253-6209 or annabal@mit.edu.

On-Campus, Technical. Seeking students to work on circuit design projects. We are interested in having you apply your intellect, creativity and skill to create a dynamite product. Pay depends on experience. Contact Steve Seltzer, 1126 Indian Pipe Lane, Zionsville, IN 46077 or 978-590-7358.

Off-Campus, Technical. Looking for a programmer with experience with PHP, SQL, and Oracle databases (Linux) to work for a fast-growing medical database company. 10-16 hrs/wk at \$15-\$20/hr depending on experience. Contact Paulo Andre, 617-233-6854 or patandre@mit.edu.

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

Community Service. Cambridge Public Schools Science Partnership has exciting opportunities to lead science support programs for Cambridge K-12 science classrooms. 6-10pm, Mon-Fri at \$10/hr. Contact Jill Soucy in the MIT Public Service Center (W20-547).

Community Service. Several paid community service positions through the non-profit Prevention Now! Group Leader: \$12.50-14/hr. Science Instructor (ages 5-13): \$13-\$15/hr. Art Instructor (5-13): \$12.50-\$14/hr. Computer Instructor (5-13): \$13-\$16/hr. Assistant Coordinator: \$14-\$17/hr. 2:30-5:30pm, Mon-Fri. Contact Henry Haroian, 617-650-2982.

Community Service. World Teach needs a creative/independent webmaster proficient in Dreamweaver and HTML. 10-12hrs/wk during normal business hrs at \$9/hr for undergrads, \$12/hr for graduates. Contact Harriet Wong, hiwong@worldteach.org or 617-495-5527.

Sloan looks to the future at 50th-anniversary celebration

More than 1,000 alumni and friends returned to the MIT Sloan School of Management Oct. 10-12 to celebrate the school's 50th anniversary and ponder the future of management.

Speeches and panel discussions focused on the need for greater corporate responsibility and the importance of understanding and adapting to rapid changes in technology.

President Charles Vest and Richard Schmalensee, the John C. Head III Dean of Sloan, both underscored Sloan's pivotal role in shaping the field of management and developing management tools now deemed essential by businesses worldwide. U.N. Secretary General Kofi Annan, a 1972 MIT Sloan Fellow, delivered the keynote address in Kresge Auditorium.

The event was as much a serious look at management's future as a celebration for Sloan alumni. Speakers included General Motors chair and CEO G. Richard Wagoner Jr., Boeing chairman and CEO Phil Condit, and Hewlett-Packard chair and CEO Carly Fiorina, a 1989 MIT Sloan Fellow.

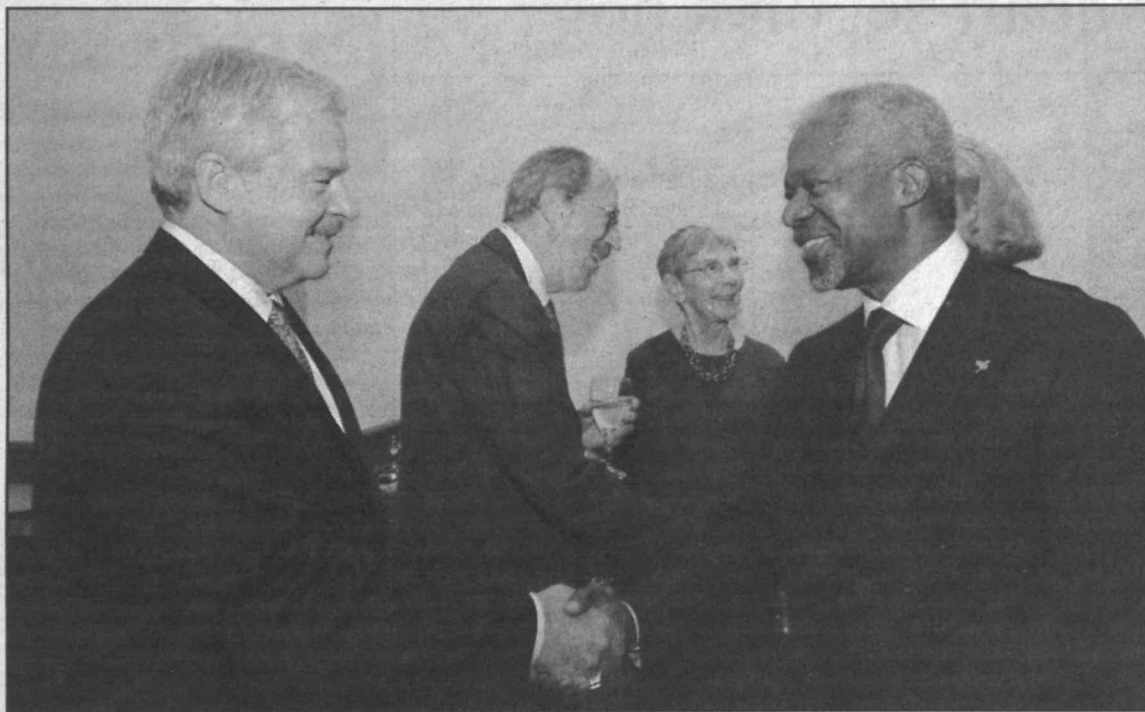
To see a webcast of the event, go to http://mitsloan.mit.edu/50th/event_videos.php.

GLOBAL RESPONSIBILITY

Annan reflected on his close association with Sloan and highlighted the importance of corporate responsibility to the global community.

"Over the long run, human well-being can be dramatically advanced by well-functioning markets," said Annan, "but markets themselves cannot be sustained if they do not ensure human well-being."

At the heart of his message was an appeal for corporations to fulfill their



Sloan dean Richard Schmalensee (left) welcomes U.N. Secretary-General Kofi Annan (S.F. 1972) to a reception on Oct. 10.
Photo by L. Barry Hetherington

obligations to the global community. The issue is at the forefront of his agenda at the United Nations.

In an age of interdependence, Annan said progress is possible only if people and nations have confidence that global markets and the international system in general are responding to their needs.

He highlighted the United Nations' Global Compact, which he proposed in 1999 as a way to help companies develop and promote global, values-based management and which he said is now gaining momentum.

"The Compact has become more

than a call to action," said Annan. "Today, it involves not only businesses but also labor federations and nongovernmental organizations. It has promoted the importance of universal values and encouraged investors to look harder at opportunities in the least developed countries, particularly in Africa."

VALUES-BASED MANAGEMENT

Fiorina said values-based management is vital to solve the crisis in public confidence triggered by recent corporate ethics breaches.

"If we are truly embarking on a new age of reform ... leadership is

not going to come from government or oversight organizations," she said. "True leadership must come from corporate America itself."

Fiorina said values-based management has helped sustain Hewlett-Packard, and she urged executives to embrace new corporate governance regulations as a return to fundamental values.

"The important thing is to understand that good corporate governance is not something that is being done to us. It is not something being foisted on us. The values we are being asked to live by today are the same values

we used to build the strongest economy on earth. The values we are being asked to live by today are the same fundamental values we know we must act upon every day to build effective teams and companies—open doors and open access and open dialogue in the boardroom and on the shop floor, equity, consistency, alignment," she said.

GM, a sponsor of the event, provided an array of classic cars and concept cars from the 1950s and today. On display outside Kresge Auditorium, the cars drew crowds of celebration attendees and others from the MIT community.

CELEBRATING INNOVATION

The event culminated a yearlong celebration of Sloan's 50-year history of innovation and leadership in management theory and practice.

Though its roots date back to 1914 with the creation of Course XV, MIT Sloan was officially opened in 1952. It was funded and inspired by alumnus Alfred P. Sloan Jr., who saw the opportunity to apply MIT's rigorous approach to research to the problems of industry.

As Sloan had hoped, Sloan School faculty and alumni over the past 50 years have had a central role in shaping global business practices. In many ways, said Dean Schmalensee in welcoming attendees, the celebration marked the fulfillment of Sloan's vision.

"When MIT established the Sloan School in 1952, it charged Sloan with an ambitious mission: to change the way management is done," he said. "Looking back over these past 50 years, we've done a very good job of living up to that ambition."

Techies need to teach

■ By Phil Primack
Special to MIT Tech Talk

Princeton University professor Brian Kernighan is on a mission to educate nontechnical people about the basic workings and issues of computers.

"It's important that people in science and technology be prepared to explain this field to people from a different background," Kernighan told 200 MIT students, faculty and others on Oct. 10 for the latest in the Laboratory of Computer Science Dertouzos Lecture Series. "And it's important that [nontechnical] people be able to think and reason about technological systems. If I at least know how something works, I can begin to reason about what does and doesn't make sense."

Mixing his serious message with humor, anecdotes and a kind of technology Trivial Pursuit—Windows XP has 38 million lines of programming, for example—Kernighan described his Princeton course, "What Should an Educated Person Know about Computers" which he has taught for four years. The class, which draws about 45 students majoring in politics, English and history, features what Kernighan called "a triad of important stuff"—hardware (what's inside a computer and how it works), software (how we tell computers how to do things) and communications (the web and the Internet).

Kernighan, who spent 30 years in the Computing Science Research Center at Bell Laboratories and is the co-author of several computer science books, includes a historic context in his teaching.

Citing Moore's Law, he noted that "computing power doubles every 18 months and has done so for 30 years." He continued: "You get twice as much bang for your buck every couple of years. My microwave oven today has more computing power than the computer in my office two years ago ... But at the same time, some things haven't changed.

Fundamentally, all a computer does is follow very simple instructions. But boy, does it do it fast."

Kernighan uses examples such as Napster and the Anna Kournikova virus as well as hands-on activities and other methods to pique the interest of nontechnical students. He showed his MIT audience how he takes apart a 1.44 MB floppy disc and asks his Princeton students to estimate the number of bits per square inch. "Everyone here can probably figure that in a couple of minutes," Kernighan said, allowing a pause for laughter to build as people in the crowd mentally struggled for the right equation.

He used another example, in which he asks students to estimate the weight of a nine-foot cast-iron cannon on the Princeton campus, to demonstrate why Princeton now requires all students to fulfill a quantitative reasoning (QR) requirement. Students often "hate" QR classes, he said, but such teaching is essential to encourage "numeracy," which Kernighan described as being able to view quantitative information critically.

Similarly, Kernighan said students can only appreciate the complexities and challenges of computer science through direct, hands-on learning. "You cannot really understand software without having tried to write a program," he said. "There are always bugs in programs. It's hard to get everything right all the time. And it's very hard to make software easy for people to use."

Kernighan doesn't expect his students to switch majors and become computer scientists, but he does want them to leave his class better informed. "I want them to be skeptical about technology, but not to have knee-jerk reactions that say technology is bad ... It's important for us who are technical in some way to convey what we do to others, because many of those people may end up making decisions that affect us."

Presidents of the National Academies urge current secrecy rules for anti-terror research

The presidents of the National Academy of Sciences, the National Academy of Engineering and the Institute of Medicine said Friday the scientific community should work closely with federal agencies to research ways to combat new national security threats. They urged the government to refrain from creating vague categories of "sensitive but unclassified" information that "inevitably" stifles scientific creativity and weakens national security.

The statement on "Science and Security in an Age of Terrorism"—by Bruce Alberts, William Wulf and Harvey Fineberg, the presidents of the National Academy of Sciences, the National Academy of Engineering and the Institute of Medicine, respectively—was the latest action by scientists concerned that government actions could damage the science needed to combat terrorism.

The presidents of the academies said, "Restrictions are clearly needed to safeguard strategic secrets; but openness also is needed to accelerate the progress of technical knowledge and enhance the nation's understanding of potential threats.

"A successful balance between these two needs—security and openness—demands clarity in the distinctions between classified and unclassified research.

"We believe it to be essential that these distinctions not include poorly defined categories of 'sensitive but unclassified' information that do not provide precise guidance on what information should be restricted from public access.

"They said the federal government should affirm and maintain the gen-

eral principle of National Security Decision Directive 189, issued in 1985: "No restrictions may be placed upon the conduct or reporting of federally funded fundamental research that has not received national security classification, except as provided in appli-

cable U.S. statutes."

More than 100 members of the MIT faculty have been elected to the academies. Election is considered one of the highest U.S. honors that can be accorded a scientist, engineer or health professional.

University leaders oppose creating vague new level of secrecy in scientific research

■ By Kenneth D. Campbell
News Office

University leaders have criticized government proposals designed to establish a vague new level of secrecy in scientific research. They told a Congressional committee that labeling some university research as "sensitive" but not "classified" could be counterproductive to development of new scientific discoveries and economic growth.

Rep. Sherwood Boehlert, R-N.Y., chair of the House Science Committee, opened the Oct. 10 hearing on "Conducting Research During the War on Terrorism: Balancing Openness and Security" with a strong statement supporting the open university system.

Boehlert also asked the witnesses, "Is sensitive but unclassified research legitimate?" All four witnesses, including White House science advisor John Marburger, said no.

Institute Professor Sheila Widnall, a former secretary of the Air Force, told the House Science Committee that establishing "sensitive research as a halfway house of restriction is doomed to failure."

M.R.C. Greenwood, the chancellor of the University of California at Santa Cruz and a former associate director of the White House Office of Science and Technology Policy, and Ronald Atlas, president of the Amer-

ican Society for Microbiology and dean of the graduate school of the University of Louisville, agreed.

Widnall noted that the physical science and engineering community "has 50 years of experience dealing with the relationship between basic research and its national security applications. There is a well-developed institutional framework within government agencies for considering and carrying out the management of these issues. Members of the scientific community are active participants in providing scientific advice to these government agencies in carrying out this mission and in evaluating the quality of the scientific work carried out in this environment ...

"In contrast, the biological and health science community has little history to guide them through the current debates," Widnall said.

Widnall said the excellence of science requires openness as well as the criticism and peer evaluation of research scientists and engineers.

"Cut off from such criticism and challenge, science deteriorates; subject to political rather than scientific judgments, it produces fads, junk science and wishful thinking. Our strong belief is that students must be educated in this open environment to insure the highest quality of their educational experience," she said.

< Fast. Reliable. Accurate. >

For the latest news at MIT

web.mit.edu/news

Got your heart set on a hog?

The 2003 Harley Davidson Softail Standard will be the center of attention at the annual Transportation Fair on McDermott Court on Thursday, Oct. 31.

For \$20, you can buy a raffle ticket with a chance to win the motorcycle with features including hidden rear suspension, raked FX fork, laced wheels, a 150-mm beefed up rear tire, and a counterbalanced 88B twin-cam engine. The MIT Federal Credit Union will sell 2,500 chances. Proceeds will go to Children's Hospital. The drawing will be held when the final chance is sold or on Dec. 15, whichever comes first.

"It seemed like an awesome way to raise money," said the credit union's chief marketing officer, Kimberly Shooter, who recently bought five chances on a Jeep Liberty in a raffle held by the Credit Unions of Massachusetts. "A Jeep wouldn't fit in our lobby. But a motorcycle was perfect." Potential raffle buyers may peruse the Harley and purchase tickets at Room E19-437. (Shooter didn't win the Jeep, and "as an employee, I'm not eligible to buy chances on the motorcycle," she said.)

This is the credit union's most ambitious fund-raising project. In the past, members have raised money for Children's Hospital by selling cookbooks, teddy bears, T-shirts and trinkets.

The Transportation Fair will run from 9 a.m. to 2 p.m. Other features include tips and minor tune-ups by mechanics from Farina's Bicycle Shop in Watertown, as well as information and displays by organizations including Zipcar, the EZ-Ride and Tech Shuttle services, MIT Saferide and the City of Cam-



Kimberly Shooter, chief marketing officer for the MIT Federal Credit Union, tries out the Harley-Davidson motorcycle to be raffled.

Photo by Donna Coveney

bridge. The MIT solar-electric vehicle and gas-powered vehicles from Ford and Keyspan will be on display.

The fair is sponsored by the MIT

Police, the Office of Parking and Transportation, and the Charles River Transportation Management Association.

Iraq attack is likely, experts say at forum

(continued from page 1)

prudence, contrasted with leaders of North Korea or Iran; and his 25-year record of "reckless, aggressive serial miscalculations" including his attacks on the Kurds in 1974, his invasion of Kuwait leading to the Gulf War in 1991 and his provocation of Operation Desert Fox in 1998.

Since Saddam's development of biological and chemical weapons of mass destruction is already documented, and his lust to develop nuclear weaponry is well known, a swift and terrible invasion of Iraq makes sense, Pollack declared.

However, such an invasion "would be no cakewalk," he added. "It could be a nasty fight," requiring a multinational coalition and effective easing of Arab-Israeli tensions. Pollack's new book, "The Threatening Storm: The Case for Invading Iraq" (Random House), details his argument fully.

Characterizing Saddam as a "Stalin-style killer, a human rights monster and a narcissist surrounded by sycophants," Van Evera zeroed in on the ongoing menace of Al Qaeda and other U.S. priorities. He urged that any military action against Iraq be considered in the light of American preparedness for terrorism at home.

"Are we prepared to deal with weapons of mass destruction used on the U.S.? I'm a big proponent of homeland security. Are we prepared to improve homeland security before attacking something on the outside? Is this the right time? And is the Bush administration the right team?" he asked.

Van Evera, like Pollack and Cote, criticized the Bush administration's foreign policy for overall "poor judgment." He cited the administration's failure to address pressing and ominous problems such as "loose nukes" in Russia, instability in Afghanistan and Pakistan, un-

remitting Arab-Israeli violence and the need for intelligence reform at home.

Cote criticized the Bush administration's hurry-up approach to invading Iraq, which partly arises, Cote said, from the "deeply pernicious concept" of lumping all weapons of mass destruction together.

"If this war is to get rid of chemical and biological weapons, the timing doesn't matter, since they've had these things a long time. If it's a preventive war to keep Iraq from getting nuclear weapons, we've got a big window," said Cote, noting that it takes both money and time to obtain fissile materials and build factories for nuclear weapon development.

American efforts, Cote said, could be far more effective if concentrated on "going to the source of fissile material—Russia—and securing those stockpiles. Also, it's just hubris that says our nuclear stockpiles are secure," he said.

The CIS will sponsor a panel titled "A U.S. Invasion and Occupation of Iraq: Concerns and Scenarios" at noon on Monday, Oct. 28 in Wong Auditorium. For information, call Laurie Scheffler at 253-3121.

Halloween party on Sunday

MIT Medical is holding its Annual children's Halloween party on Sunday, Oct. 27 from 2 to 3:30 p.m. in the Building E23/E25 atrium. There will be puppet shows at 2:20 and 2:50, arts and crafts, games, music, refreshments, balloons and more. The entire MIT community is invited, and people are encouraged to come in costume.

Institute Calendar

* Open to public
** Open to MIT community only

(For arts-related listings, see page 7.)

INSTRUCTIONS: Seminars & Lectures must be submitted to the online Events Calendar at <http://events.mit.edu>. If you have questions about using that calendar, see the online help page, contact the I/S Computing Help Desk (Mac: 253-1101, PC: 253-1102) or e-mail computing-help@mit.edu.

Listings for Community Calendar should be submitted to the News Office using the form at <http://web.mit.edu/newsoffice/tt/calform.html>. If you have questions, please contact ttcalendar@mit.edu or 253-1683.

Events must be MIT sponsored and take place on the MIT campus or at an MIT affiliate (Draper Labs, Lincoln Laboratory, etc.).

Next deadline for all types of listings is noon Friday, October 25, covering events from Wednesday, October 30 through Sunday, November 10.

October 23 - 30

SEMINARS & LECTURES

WEDNESDAY, OCTOBER 23

Slab-Coupled Semiconductor Lasers with Large Mode*—Joseph Donnelly, Lincoln Lab. Sponsored by Optics. 11am-noon. Grier Rm B (34-401B). More info: 253-8504 or ippen@mit.edu.

Cluster Algebras and Poisson Geometry*—Michael Shapiro, Michigan State Univ. Combinatorics Seminar. 4:15-5:15pm. Rm 2-338. More info: 253-4390 or <http://www-math.mit.edu/~combin/oct02.html>.

Standardization of Public Housing Design*—Lawrence Vale, MIT. Sponsored by Dept of Urban Studies and Planning. 5-6:30pm. Rm 10-485. More info: 253-5115 or <http://dusp.mit.edu/standards/index.html>.

Understanding Intellectual Property Law*—7-9pm. Sponsored by Deshpande Ctr for Technological Innovation. Rm 4-270. More info: 253-0943 or <http://50k.mit.edu>.

THURSDAY, OCTOBER 24

Morgan Stanley Japan: 30 Years at the Forefront of Change**—Tom Pederson, Morgan Stanley. Sponsored by MIT Japan Program. 7am-9pm. Bldg E38, 7th flr conference rm. More info: 258-8208 or japanprogram@mit.edu.

Mentoring: Changing to Meet the Challenge*—Kate Kibbee. Sponsored by Working Group on Support Staff Issues. 12:15-1pm. Rm 1-236. More info: 253-0137 or bsmith@mit.edu.

Nonlinearity and Multifractality of Climate Change in the Past 420,000 Years*—Yosef Ashkenazy, MIT. Atmospheric Science Seminar. 4-5pm. Rm 54-915. More info: 253-1984 or <http://www.mit.edu/~donna/MASSseminars>.

It's Just a Little Blood: Indigenous Perspectives on DNA Testing*—Debra Harry. Sponsored by STS. 4:30-6:30pm. MIT Faculty Club. More info: 253-4062 or <http://www.mit.edu/sts>.

Meeting the Family Care Needs of the Health Care Workforce: Reflections on the 1199 Child Care*—Carol Joyner. Sponsored by MIT Workplace Ctr. 4:30-6pm. Rm E51-063. More info: 253-7996 or <http://web.mit.edu/workplacecenter>.

Journalism, Media and Human Rights*—5-7pm. Sponsored by Program on Human Rights and Justice. Audio-Visual Theater (7-431). More info: 253-7692 or <http://web.mit.edu/phrj>.

Structuring True Joint Ventures in Biotechnology*—Jeff Wiesen. Sponsored by MIT Entrepreneurship Ctr. 7-9pm. Rm E51-335. More info: noras@mit.edu or <http://web.mit.edu/BioStrategy>.

FRIDAY, OCTOBER 25

For Graduate Students: Effective Resumes and Cover Letters**—1:30-3:30pm. Sponsored by Office of Career Services and Preprofessional Advising. More info: 253-4733 or <http://mit.edu/career/www/gradworkshops.html>.

The Physics of Collisionless Magnetic

Reconnection*—Barrett Rogers, Dartmouth College. Sponsored by Plasma Science and Fusion Ctr. 4-5pm. Rm NW17-218. More info: 253-8101 or rivenberg@psfc.mit.edu.

The Loudest Muttering is Over: Documents from the Atlas Group Archive*—Walid Ra'ad, CUNY. Sponsored by History, Theory and Criticism of Architecture and Art. 5:30-7:30pm. Rm 3-133. More info: 258-8438 or http://architecture.mit.edu/disc_grp/htc-o/acts/forum.html.

A World Gone Ape: Japanese Youth Consumers' Fashion and the International Impact on Harajuku Cool*—W. David Marx. Sponsored by MIT Japan Program. 6pm. Bush Rm (10-105). More info: 258-8208 or japanprogram@mit.edu.

SATURDAY, OCTOBER 26

How The @#&!#\$ Did they Do That?—Gururaj "Desh" Deshpande, Sycamore Networks. Sponsored by MIT Enterprise Forum of Cambridge Inc. 7am-2pm. The Newton Marriott. More info: 253-8240 or <http://www.mitforumcambridge.org/fall02>.

MONDAY, OCTOBER 28

A US Invasion and Occupation of Iraq: Concerns and Scenarios*—Noon-1:30pm. Sponsored by Ctr for Intl Studies. Wong Aud (Tang Ctr). More info: 253-1965 or communications@mit.edu.

Geometrization of 3-manifolds*—Michael Anderson, SUNY Stony Brook. Differential Geometry Seminar. 4-5:30pm. Rm 2-143. More info: 253-4384 or http://www-math.mit.edu/~jefv/DG_Current.html.

Doing International Research After September 11*—HSSST graduate student panel. Sponsored by STS. 4-6pm. Rm E51-095. More info: 253-4062 or <http://www.mit.edu/sts>.

A Beautiful Mind: Genius, Madness, Reawakening*—Sylvia Nasar, Columbia Univ. Applied Mathematics Colloquium. 4:15-5:15pm. Rm 10-250. More info: 253-4989 or <http://www-math.mit.edu/amc/fall02>.

TUESDAY, OCTOBER 29

Japan's Economic Troubles from a European Perspective*—Moreno Bertoldi. Sponsored by MIT Japan Program. Noon-2pm. Bldg E38, 7th flr conference rm. More info: 252-1483 or japanprogram@mit.edu.

The Empty Set, the Singleton and the Ordered Pair*—Akihiro Kanamori. Sponsored by Dibner Institute. Noon-2pm. Rm E56-100. More info: 253-6989 or <http://www.dibinst.mit.edu>.

Climate Change, Ice Sheets and Anomalous Diffusion: A View from the Inside Out*—Alan Rempel, Yale Univ. Physical Mathematics Seminar. 2:30-3:30pm. Rm 2-338. More info: 253-4387 or bush@math.mit.edu.

Earthquake Rupture through Complex Fault Networks*—James Rice, Harvard Univ. Sponsored by Civil and Environmental Engineering. 3:30pm. Bechtel Lecture Hall (Rm 1-390). More info: 253-7101 or <http://web.mit.edu/civen/html/spotlight/ricelecturewebjg>.

Materials for Molecular Devices*—Cherie Kaga, IBM. MTL VLSI Seminar. 4-5pm. Rm 34-101. More info: 253-5264 or <http://www-mtl.mit.edu/mtlhome/index.html>.

Flows Over Time: Complexity, Approximation and Modeling*—Martin Skutella, MIT. Sponsored by Operations Research Ctr. 4:15-5:15pm. Rm E40-298. More info: 253-7412 or <http://web.mit.edu/orc/www>.

Novel Propulsion and Power Concepts for 21st Century Aviation*—Arun Sehra, NASA. Sponsored by Gas Turbine Lab, AeroAstro. 4:15-5:30pm. Rm 31-161. More info: 253-2481 or dragon@mit.edu.

Big Biotech: Pharmaceutical Research and Development in the Post-Genome Era*—Roger Perlmutter, Amgen. Sponsored by Office of Corporate Relations/ILP. 4:30-5:30pm. Wong Aud, Tang Ctr. More info: maupin@ilp.mit.edu or <http://ilp.mit.edu/ilp/Conferences/CTO.html>.

Judicial Activism and Inactivism During Riots in India*—Justice Ahmadi, Supreme Court of India. Sponsored by Program on Human Rights and Justice. 5-6:30pm.

Rm 6-120. More info: 258-7614 or <http://web.mit.edu/phrj>.

Heikkinen-Komonen Architects: Recent Works*—Markku Komonen. Sponsored by Dept of Architecture. 6:30pm. Rm 10-250. More info: 253-7791.

WEDNESDAY, OCTOBER 30

Dispersion-Cancelled Two-Photon Optical Coherence Tomography*—Bahaa Saleh, Boston Univ. Sponsored by Optics. 11am-noon. Grier Rm B (34-401B). More info: 253-8504 or ippen@mit.edu.

Optical Imaging of the Cerebral Metabolic Rate of Oxygen During Brain Activation*—David Boas, Martins Ctr. Sponsored by HST. Noon-1:30pm. Marlar Lounge (37-252). More info: 253-8753 or davek@ai.mit.edu.

Explaining Changes in Gene Expression Using Molecular Interaction Networks*—Trey Ideker, Whitehead Institute. Sponsored by HST. 4-6pm. Rm E25-119. More info: 258-8925 or <http://finsilico.mit.edu>.

Variational Methods in Computational Solid Mechanics*—Michael Ortiz, Caltech. Sponsored by AeroAstro and Singapore-MIT Alliance/HPCES. 4-5pm. Rm 4-237. More info: 258-5548 or jeans@mit.edu.

GKM Spaces and Graphs*—Victor Guillemin, MIT. Combinatorics Seminar. 4:15-5:15pm. Rm 2-338. More info: 253-4390 or <http://www-math.mit.edu/~combin/oct02.html>.

MIT in the Deep Sea: DeepArch's Archaeology Projects*—Brendan Foley. Sponsored by MIT Museum. 7pm. MIT Museum, 2nd flr. More info: <http://web.mit.edu/museum/programs/familyprograms.html>.

COMMUNITY CALENDAR

Spouses&partners@mit Weekly Meetings*—Oct 23: Volunteer opportunities. Oct 30: Halloween. Wednesdays, 3-5pm, W20-400, unless otherwise noted. More info: 253-1614 or <http://web.mit.edu/medical/spousesandpartners>.

What inspires you?



Cardboard boxes, ants, Lego bricks, bicycles, and video games inspired robotic ant inventor James

McLurkin. Many inventors say childhood play led to the skills they use to create inventive solutions. Come explore the playful side of invention and the inventive side of play at *Invention at Play*, a new interactive exhibition for all ages.

- Discover your creativity through hands-on activities, puzzles and experiments
- Learn about inventors and their processes
- See how play has changed over time



Who said play is just for kids?

Lemelson Center for the Study of Invention and Innovation

Smithsonian National Museum of American History

1400 Street and Constitution Avenue, NW Daily 10AM to 5:30PM 202-633-9700

www.si.edu/lemelson

This exhibition is made possible through the generous support of The Lemelson Foundation and the National Science Foundation.

Graduate student James McLurkin is featured on this diorama placed in two of Washington D.C.'s busiest Metro stations—Federal Center and Union Station—during September. It will be back again in December. Approximately 55,000 people come through each station daily.

Tiny ideas get big media play

■ By Denise Brehm
News Office

James McLurkin, ant farmer and creator of robotic ants and other small things in droves, is living large on a subway poster in Washington, D.C.

McLurkin, a graduate student who designs and builds swarms of tiny robots that work together, is one of the subjects of a Smithsonian Institution exhibit titled "Invention at Play." The subway poster, really a lighted diorama advertising the exhibit, features a photo of McLurkin with his ants and a childhood photo of him grinning inside a cardboard box. The traveling exhibit, sponsored by the Lemelson Center for the Study of Invention and Innovation, runs through Dec. 29 at the National Museum of American History.

"If you take the Metro to the museum, there's a big picture of me on the ad for this exhibit. When you go into the museum and turn right, they have a big picture of me holding a robot. And when you go to the back, they have a whole James presentation. It's all very surreal," said McLurkin, who has had a larger-than-usual share of publicity in his 30 years.

A 1995 MIT News Office story about his robotic ants generated loads of attention from local and national media, with stories appearing in *Design News*, *Science*, *Discover* and on the Discovery Channel, among other places. He will appear on "60 Minutes" later this year.

It's clear that people are interested in his big ideas, even though the ideas wind up as minuscule inventions.

"I've always liked really cute and small things, like Matchbox cars. As an undergrad I was really fascinated by building really tiny things," he said. His first robot measured less than a cubic inch. "Goliath could bump off walls and move toward light. It was built the way undergrad projects are: I started with a wheel and went to the shop and just kept going. I made lots of mistakes," said McLurkin, who has a peripatetic history of work and study.

He finished the work for his S.B. in electrical engineering in 1994, stayed at MIT another year to get a minor in mechanical engineering, worked next in the Artificial Intelligence Lab with Professor Rodney Brooks, director of the lab, then went to the University of California at Berkeley, where he earned an M.S. in electrical engineering before realizing he didn't want to be an electrical engineer. So McLurkin returned to Boston as lead research scientist at iRobot in Somerville, a spinoff from the AI Lab, where he designs and builds tiny swarm robots. He's now working on his S.M. and Ph.D. in computer science at MIT.

"For my master's thesis, I'm going to write up my 'stupid robot tricks' into a coherent piece, a collection of all the different things I've done with different robots," he said. "For my Ph.D., I'm going to get heavy into the theory of how you get a computer to take a group goal and deconstruct it into tasks for a swarm of small robots."

And what might you do with a swarm of tiny robots?

"Take, for example, exploring Mars. Eight years ago we sent one robot. Wouldn't it be great to send 50 to Mars?" said McLurkin. "One of the obvious things you want a bunch of little robots to do is spread out. But you don't want them to really spread out [too far] because they need to communicate. Essentially you want each little robot to be its own cell phone and its own tower."

"Say the big robot knows that a small robot found something cool. You want the big robot to tell the science-equipment robot to go to where the small robot is. How? Use the swarm as a map, like a trail of bread crumbs. Then they can cluster around the found thing, carry it home and so forth," said McLurkin, who at one time was working with a Harvard biologist to better understand living systems and borrowed an ant farm to study the ants.

"When you want to build a system that has thousands

of agents, it's very easy to get stumped. But through local communication you get an extraordinarily complicated network," he said.

TINY MOUNTAINEERS

The swarm robots McLurkin's currently working on are four and a half inches on a side, making them "125 times larger and immensely more powerful" than the ant robots of his undergraduate years, he said. The swarm robots are sophisticated enough to determine the position, range and bearing of their neighbors, and have other qualities of a top-notch mountaineer. Each has a 32-bit 40MHz processor with 3 MB of flash memory and 1 MB of RAM,

"Through local communication you get an extraordinarily complicated network."

—James McLurkin

bump sensors, light sensors, top-mounted status LEDs, a self-charger, a radio modem and a 1.1 watt audio system. They will eventually have food sensors, trail sensors and a camera, McLurkin said.

The young inventor credits his father for teaching him at an early age how to work with mechanical objects.

"Anything that was broken was taken apart and fixed. The image that objects were static things that can't be changed was shattered a long time ago," said McLurkin, who comes from Baldwin, N.Y.

His father, once a "full-time corporate American in telecommunications," is now working on small construction projects and "having a lot more fun," said McLurkin. "My father keeps asking me when I'm going to get a real job. But then I'd have a shirt with a collar and wear pants I'd have to get dry-cleaned, and write reports."

"Invention at Play" tells the stories of several inventors, including McLurkin and Akhil Madhani (Ph.D. 1997), who won the Lemelson Student Award when he was a graduate student in the AI Lab. According to the exhibit's web site, "it departs from traditional representations of inventors as extraordinary geniuses who are 'not like us,' to celebrate the creative skills and processes that are familiar and accessible to all people." The curious can go to the exhibition web site <http://www.si.edu/lemelson/centerpieces/iaip> to check out McLurkin's story there.

MIT RECYCLING



Did you know?

If you buy remanufactured toner cartridges, you'll conserve the equivalent of three quarts of oil per cartridge.

Environmental Programs
Task Force (EPTF)

be-green@mit.edu

Assets decline in '02, but long-term outlook is good, report says

■ By Sarah H. Wright
News Office

Steady support from MIT alumni and friends, new revenues from real estate and licensing, and an investment strategy focused on the long term have afforded the Institute "a relatively strong financial position" going into 2003, according to the 2002 Report of the Treasurer.

With \$7.1 billion of net assets, MIT has a "solid base on which to continue building for the future," wrote Treasurer Allan S. Bufferd and Executive Vice President John R. Curry in their summary of the report, which covers the fiscal year that ended June 30.

That \$7.1 billion represents a decrease of 9.8 percent from last year due to the decline in capital markets, the report states, describing these as "difficult economic times."

But the long-range view is hardly dim. Even with last year's losses, MIT's total invested assets have increased \$2.8 billion over the past five years as a result of gifts and investment appreciation. (Some copies of the report already distributed erroneously give that figure as \$2.1 billion.)

And the Campaign for MIT has cast its own bright light. By June 30, the campaign, a seven-year effort to raise \$1.5 billion, had recorded gifts and pledges of more than \$1.46 billion—more than 97 percent of its goal—in just over five years. It reached the goal in October. At its meeting on Oct. 4, the MIT Corporation extended the campaign's fundraising target to \$2 billion.

"This demonstrates a deep belief on the part of many individuals and foundations that what we do at MIT is really important," said President Charles M. Vest.

The Campaign for MIT has already had an impact across the Institute, providing funding for 64 endowed faculty chairs, 171 endowed and expendable graduate fellowships, and 223 endowed and expendable graduate fellowships. Fifty percent of alumni have participated so far.

Gifts and pledges increased 14 percent, from \$207.2 million in 2001 to \$236.6 million in 2002. Individuals continue as the largest source for new gifts, with support for research and education programs the largest component of new gifts and payments on pledges, the report noted.

RESEARCH REVENUES

Research revenues in departmental and interdepartmental laboratories increased 4.5 percent over last year, yielding \$419 million in 2002.

Research revenues at Lincoln Laboratory grew from approximately \$350 million to \$390 million, an increase of about 10 percent.

Industrial support of campus research remained comparable with fiscal 2001 at about \$91 million. Industrial sponsors as a group remained the largest source of sponsored funds at MIT, followed by the National Institutes of Health and the Department of Defense, according to the report.

The Institute's income from fees and services "grew substantially" in 2002. This growth in revenue was due to a \$32.7 million increase in income from the licensing of intellectual property, which resulted primarily from the recognition of future royalty payments over the next 10 years with an estimated present value of approximately \$23.5 million.

TUITION/FINANCIAL AID

With a slight increase in the number of students and with financial aid increasing \$14 million to \$144 million, net tuition revenue from undergraduate and graduate students de-

creased \$7 million to \$153.8 million. The net tuition revenue provided one-tenth of MIT's total operating expenses last year.

OPERATING EXPENSES

Operating expenses increased by \$143 million, or about 10 percent, to a total of \$1,536 million in 2002. The largest share of this was research spending, up almost \$70 million from last year.

Discretionary spending in schools and departments for sponsored non-research activity grew approximately \$32 million, up about 30 percent from last year. These costs arose from growth in salaries, employee benefits, student support, space changes and increased obligations to inventors in connection with license agreements.

CONSTRUCTION PROJECTS

Three large-scale and pivotal campus life projects were completed in 2002—Simmons Hall, the Zesiger Sports and Fitness Center, and the graduate residence at 70 Pacific St.

Construction of these new buildings—along with significant renovations, instruction and research facilities improvements, utilities upgrades and relocation and landscape projects—increased the book value of MIT's fixed assets by 33 percent to \$1.173 billion in 2002.

Other ongoing Institute construction projects include renovation of the Dreyfus Chemistry Building, and the new Ray and Maria Stata Center for Computer, Information, and Intelligence Sciences. Projects in the design development stage include an expansion of buildings housing the Sloan School and the School of Humanities, Arts and Social Sciences; and new facilities for the brain and cognitive sciences (the McGovern Institute for Brain Research, the Picower Center for Learning and Memory, and the Department of Brain and Cognitive Sciences).

"The Institute's construction program is a visible indication of our commitment and investment to keep MIT in the forefront of academic initiatives in education and research for the years to come," Bufferd and Curry wrote in their report.

These projects were partially funded through gifts. The balance was funded through the issuance of tax-exempt debt. The Institute issued almost \$260 million of additional debt, increasing outstanding debt by almost 48 percent to \$772 million. The Institute's publicly held debt continues to be rated triple A by both Moody's and Standard and Poor's, the report noted.

INVESTMENT PROFILE

"From the financial asset perspective, this past year was a difficult one, resulting primarily from the significant turmoil in financial markets the world over, especially in the equity area, the major allocation of the Institute's investment portfolio," the authors of the Treasurer's report commented.

On June 30, total investments at market value were \$6,476.5 million, a decrease of \$857.9 million, or almost 12 percent, from last year. This decrease compares with a decrease of \$277.9 million in the previous year, their report said.

OPERATIONS DEFINED

The Institute's operations include tuition, research revenues, unrestricted gifts and bequests for current use, fees and services, other programs, investment income, the portion of net investment gains distributed to funds under the Institute's total return investment policy, auxiliary revenues and operating expenditures.

Horvitz explains importance of cell-death research

(continued from page 1)

that allow them to become the different parts of the body—arm, liver, brain, etc. Programmed cell death is a necessary part of this process of development.

Cells also die in the course of various diseases. This aspect of the research is particularly alluring to drug companies, who hope to find a targeted approach to halting or accelerating cell death as needed. In diseases such as AIDS, neurodegenerative diseases and cerebral stroke, too many cells die in programmed cell death. In others, such as cancer, autoimmune disease and viral infections, there is too little cell death.

"To me, the interesting aspect of this is that there is a biology of cell death," Horvitz said. If programmed cell death was "a cell fate like any other cell fate, there ought to be genes that control that."

In Horvitz's lab at MIT, specific genes were identified that are responsible in part for programmed cell death. Without the genes they named *ced3* and *ced4*, cells do not die. These *C. elegans* genes, and others later identified in neighboring cells involved in helping the cell die, turned out to have counterparts in humans. These genes, which block or cause the process of cell death, are potential targets for intervention.

"In many of these disorders, cells may be poised on a knife edge and maybe we could push them one way or the other," Horvitz said.

Horvitz likes to say that this year's Nobel is really recognition for *C. elegans*.

In this little creature of only 959 cells, "you could see individual cells and follow a cell and its daughters and so on and so forth," he said. The worm's tiny size and

short reproductive cycle allowed the researchers to study many organisms in a small amount of time.

Although it was a leap of faith at the time to study roundworms, yeast and fruit flies in the quest for knowledge of human biology, it turns out that the molecular genetic pathway of processes such as programmed cell death in these organisms has similar counterparts in humans.

"If one looks at the major funding in molecular genetics in the last 10 years, what's really striking is that despite the diversity of organisms, we show that genes and gene pathways in worms, people, fruit flies and yeast cells are strikingly similar," Horvitz said.

He thanked his wife, MIT biology professor Martha Constantine-Paton, and others for turning out to hear him, as well as "first and foremost, my lab," and his MIT colleagues. He said that since he came to MIT as a student in 1964, "this has been a spectacularly supportive environment" and the help and friendship of his biology department colleagues "remains a force behind my scientific effort."

Horvitz shares the prize with Sydney Brenner of the Molecular Sciences Institute of Berkeley, Calif., who established the nematode as a model organism for experimentation, and John E. Sulston of the Wellcome Trust Sanger Institute of Cambridge, England, who mapped a detailed cell lineage in *C. elegans* that showed that specific cells undergo programmed cell death in the process of cell differentiation.

According to the Nobel committee, the three were recognized "for their discoveries concerning genetic regulation of organ development and programmed cell death."

Open enrollment starts on Oct. 31

The annual benefits open enrollment period will be held this year from Thursday, Oct. 31 through Thursday, Nov. 14.

Personal Enrollment Guides will be sent to all benefits-eligible employees through interdepartmental mail later this month. Early retirees under age 65 will receive guides through U.S. mail. The guide summarizes each eligible employee's current benefit coverage and gives instructions for making benefits elections. You do not need to do anything if you want to keep your current level of coverage for 2003, unless you want to maintain a Flexible Spending Account. Anyone who had a Flexible Spending Account in 2002 must re-enroll to have an account in 2003.

If you do not receive your enrollment guide by Nov. 1, e-mail benefits-www@mit.edu or call the campus Benefits Office at 253-0500. Lincoln Laboratory employees should contact the Lincoln Benefits Office at (781) 981-7055.

At a series of upcoming Benefits Fairs, representatives from each of the health plans, the dental plan and the life insurance plan will be available to answer questions. Benefits Office staff also will attend to answer any other benefits questions.

The schedule for the Benefits Fairs is as follows.

- **Campus**—Wednesday, Oct. 30, 10 a.m. to 2 p.m., 20 Chimneys (Stratton Student Center)

- **Haystack**—Tuesday, Oct. 29, 10 to 11 a.m., Conference Room A

- **Bates**—Tuesday, Oct. 29, 2 to 3 p.m., Cafeteria

- **Lincoln Lab**—Tuesday, Nov. 5, 11 a.m. to 4 p.m., Lincoln Lab Auditorium

Employees may make enrollment selections by phone, or online via the SAPWeb benefits self-service system, a secure web service that requires Netscape 4.7 or higher or Internet Ex-

plorer 5.5 with Service Pack 2. The phone-based system lets you listen to a review of your benefits and record benefits changes.

For more information on the 2003 open enrollment changes or benefit plans, see the Benefits Office web

page at <http://web.mit.edu/hr/benefits>. Anyone with questions should attend one of the scheduled Benefit Fairs. You may also e-mail questions to benefits-www@mit.edu, or call the Benefits Office on campus at 253-6151 or at Lincoln Lab at (781) 981-7055.

Vacation and bereavement policies see improvements

(continued from page 1)

system, and MIT's relevant policies and practices are being reviewed first, rather than simply building a new system around current procedures.

"The HR-Payroll Project is giving us an opportunity to review every practice and process that needs to be systematized," Avakian said. "And we're

"I'm pleased that our new policies for vacation time and bereavement leave are more generous, simpler and more uniform."

—President Vest

deliberately asking questions such as whether a policy is contemporary, consistent and still achieving its objectives. Many of our practices and policies are fine, but in the case of vacation and bereavement leave, surveys indicated that MIT was not as competitive as we would like it to be, so these changes are being made," she said.

"In today's world, time for renewal, reflection and family responsibilities is more important than ever, whatever roles we may play in the life of the Institute," President Charles M. Vest said. "I'm pleased that our new policies for vacation time and bereavement leave are more generous, simpler and more uniform."

Recommendations for the policy changes came from the Paid Leave Working Group, which was charged with reviewing MIT's policies and practices for paid leave and suggesting any improvements. MIT looked at the policies of comparable universities, such as the "Ivy-plus" schools, as well as Boston-area universities. In addition, the review included local for-profit companies, which also com-

pete with MIT for employees.

The recommendations were then reviewed by the Policy Advisory Group for the HR-Payroll Project, which includes representative community members. The next step was discussion and ultimately approval by the Academic Council.

To help prepare personnel administrators in the departments, labs and centers for implementing the new policies, human resources officers are meeting with them to discuss the policies and answer questions. Community members with questions have a number of sources of information: the brochure, the web site at <http://web.mit.edu/hr/policy/vacation>, two e-mail addresses (hrpolicies@mit.edu for campus and hrpolicies@ll.mit.edu for Lincoln), the personnel administrator in their area or their human resources officer.

In addition, employee question-and-answer sessions about the policies will be held on campus from noon to 1 p.m. on the following days: Thursday, Oct. 31 in Room W20-307, Thursday, Nov. 7 in Room 10-105 and Friday, Nov. 8 in Room E19-207. A session at Lincoln Laboratory is scheduled for 11 a.m. to noon on Nov. 7 in the Lincoln Lab Auditorium.

THE HR-PAYROLL PROJECT

The HR-Payroll Project is a multi-year initiative that will redesign MIT's relevant business processes and implement an integrated Human Resources and Payroll system. MIT's current standalone computer systems for Human Resources and Payroll can't provide the comprehensive information needed to plan and manage MIT's most important resource: its people. Making the best use of technology and simplifying existing business practices and policies will allow Human Resources and Payroll to focus energy on providing services that meet the needs of departments, labs, centers and employees while balancing the Institute's need to achieve simplicity and appropriate control through standardization of business practices. For more information, see <http://web.mit.edu/is/delivery/hrpayroll>.

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 resubmitted 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 ttads@mit.edu)
- Interdepartmental/walk-in address: Calendar Editor, Rm 11-400.

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

All extensions listed below are campus numbers unless otherwise specified.

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

Deadline is noon Friday before publication.

FOR SALE

Industrial paper towel dispenser, clear black plastic tube wall mount, \$40. Industrial toilet paper dispenser, lrg roll, clear black plastic wall mount, \$40. Betty, 781-438-2424 (eves).

8'x11' Nourmak rug. Serapi pattern in red, cream and navy, 2 yrs old, used only 1 yr. \$500/bst. mtyler@mit.edu.

Palm Pilot m100 handheld, brand new, black, purchased 7/1/02, \$65. StairMaster 4000PT exercise system, exc cond, \$1,150. Cheryl, 253-3092 or 978-276-0670.

2 quilted bedspreads, floral pattern, \$40/pair. Tan acrilan blanket, \$20. White Ikea kitchen/dining table w/2 chairs, \$100. Ryagarn latch hook rug kit, \$100. 781-862-1935.

Johnson Brothers, Chelsea Rose pattern service for 8, exc cond, \$200. 2 black round coffee tables, \$75. Black TV stand, \$50/bst. Carol Mullinax, 781-981-7750 or 978-535-3366 (eves).

VEHICLES

1985 Nissan Maxima. Mechanic's special, needs work, \$500/bst. mora@mit.edu or 617-285-8381 (after 9pm).

1987 VW Golf GL. Stndrd, 178k miles, runs well, reliable city car, \$800. 617-253-1625.

1987 Honda Accord LX. 4-dr, stndrd, tan, 145k miles, runs well, A/C, pwr drs/windows, all maintenance records, \$1,500. hrabchak@mit.edu or 617-945-0316.

1988 Oldsmobile Cutlass. 100k miles, A/C, CD, grt cond, gd city car, \$1,500/bst. laurenw@mit.edu or 253-2091.

1989 Plymouth Reliant. 4-dr, exc cond, extremely well maintained, service receipts/record book, 98k miles, \$1,100/bst. Pete, 253-7253.

1989 Honda Civic LX. 4-dr, dark blue, 5-spd, pwr windows/steering/brakes, A/C, AM/FM/CD w/Alpine spkrs, 48.5k miles, 1 owner, \$3,000. 253-0445.

1990 Mercedes Benz I190e. 100k miles, CD, sunroof, leather, exc cond. Must sell, \$4,900/bst. Bob, 617-452-2369 or 617-529-4157.

1991 Volvo 940SE Turbo Wagon. Dark red, auto, tan leather seats, A/C, CD, sunroof, 193k miles, vry clean, \$6,200. Marc, mbj@mit.edu or 253-8904.

1992 Toyota Previa LE. 1 owner, exc cond, maintenance record, 112k miles, must drive, won't last, \$5,495. 978-750-0586.

1994 Camaro. 58k miles, almost mint, \$5,500/bst. 617-389-6544.

1995 Geo Prizm. Vry reliable (Corolla twin), blue, manual, A/C, ABS, pwr steering/brakes, runs and looks grt, \$990. 978-443-5507.

1997 Jeep Cherokee Sport. Black, premium sound, alloy wheels, 117k miles, gd shape, \$8,000/bst. John, 781-545-1226 (leave msg).

1996 Saturn SW2 Wagon. Gd cond, economical, reliable, auto, remote start, A/C, pwr windows/locks, rear wipers, sound system, dark green,

83k miles, \$4,500/bst. 617-244-7045.

1997 Cadillac Deville Concourse. Black, 58k miles, CD carousel, high-end stereo, traction cntrl, new tires. Must see and drive, \$15,000/bst. 258-5823 or tjan@mit.edu.

1999 VW Beetle GL. Blue, 25k miles, exc cond, pwr steering, stndrd, 5-spd, A/C, CD, \$11,495. Karl, khall@mit.edu or 617-876-4757.

2000 Mercury Sable V6. 4-dr sedan, loaded, all pwr, leather, moonroof, keyless entry/security, ABS, alloy rims, 33k miles, \$12,500. Patty, pattys@mit.edu or 258-6744.

HOUSING

Belmont: Quiet, comfortable furn rm in lovely hse on Belmont Hill. Off-strt prkg, breakfast privs, prvt entrance/terrace. Long/short stays, overnight accomodations too. 617-484-6833.

Somerville: 3 rm furn apt, 1st flr, no pets. \$1,000/mo incl utils. 617-625-6078.

Stratton Mnt, VT: Ski hse, 5BR, 2b, fireplace, seasonal or holiday/part-seasonal. knopp@mit.edu or 253-8437.

Freeport, Bahamas: Spring vacation rental, March 22-29, 2BR, 2b, sleeps 6, htd pool, A/C, cable, cntrl loc nr shopping/beach/casino, \$550. Linda, alger@draper.com or 781-749-0892.

Somerville: 6rm, 2BR, lr, dr, new paint/windows, gd loc, nr T/bus (10min walk to Orange line). \$1,250/mo + utils. Yama, 617-666-4764 or 617-290-6878.

Cambridge: 1BR loft, beautifully furn, roof deck, vry private/quiet, 10min walk to MIT. Avail 11/1, \$1,300/mo. John, 781-729-7225 or johnnatale@aol.com.

Lexington: Music prof's contemporary hse for rent spring semester 2003. 3BR, 3b, Steinway piano, heated indoor pool, spacious grounds, convenient to Rte 128. 781-862-9462.

Cambridge: Walk to MIT/Harvard, furn rm, kitchen/laundry, modern, supplies, Internet, phone costs shared. Avail now, \$735/mo incl utils. 617-625-9839 or sokolovska@mac.com.

Want to quit?



tobacco treatment class

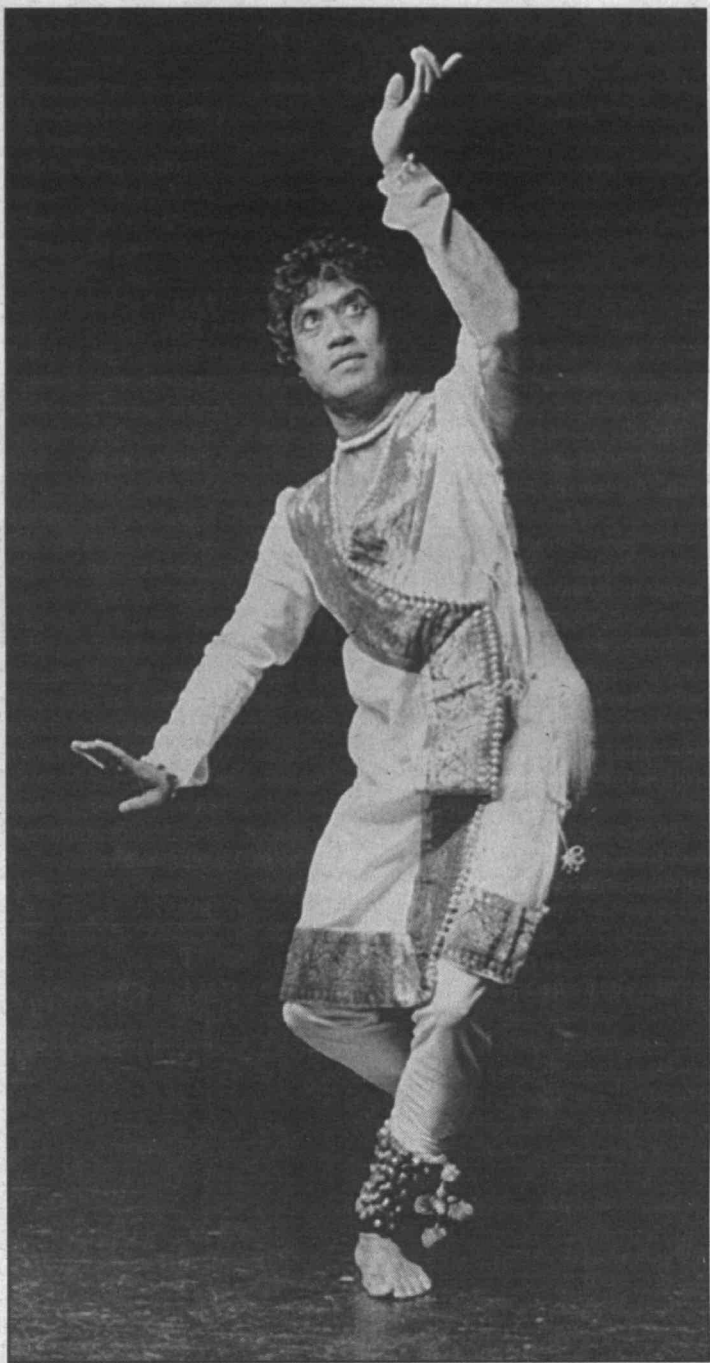
6 thursdays
12-1pm
begins oct 31
MIT, E25

\$85 (\$70 MIT Health Plan members, students, and retirees)

for more information or to sign up
E23-205, 617/ 253-1316



Kathak master class



Kathak Master Chitresh Das will present a lecture demonstration of the North Indian classical dance form on Thursday, Oct. 24 at 7:30 p.m. in Killian Hall. Kathak combines intricate footwork, dynamic technique, refined gestures, elegant stances, swift spins and rhythmic intensity with both subtle and dramatic facial expressions.

Subscribe to the arts e-mail list

The Office of the Arts has a listserv for:

- MIT-related arts announcements and postings
- free (and discounted) ticket offers
- information on special MIT arts events.

This list can only be used by subscribers. To subscribe, go to <http://imap.media.mit.edu/mailman/listinfo/arts-announce>. Everyone is welcome.

Council for the Arts to present awards to Burrows and Brody

Vinie Burrows, described by theater critic Clive Barnes of The New York Post as "one of the reigning divas of the black theater," will receive the 2002 Eugene McDermott Award from the Council for the Arts at MIT at its 30th annual meeting this week, which will focus on theater.

Born in Harlem, Burrows began her career as a child actor on radio. While still a teenager, she made her Broadway debut with Helen Hayes in "Wisteria Trees." She has performed on and off Broadway and in television and films in dramas ranging from classical Greek plays and Shakespeare to television's "Days of Our Lives." She received a B.A. in pre-law and a master's degree in theater arts from New York University.

Undaunted by the dearth of quality stage roles for black performers, Burrows has created eight one-woman shows which she performs around the world. She is also a practicing 'griot,' having learned the African art of narrative storytelling while collecting traditional folk tales on her many trips there.

While Burrows has always used

theater to advocate peace, justice and reconciliation, she has expanded her political and social effectiveness as the permanent representative for the Women's International Democratic Federation, a nongovernmental organization of the United Nations.

Actors Equity gave Burrows its Paul Robeson Award, and the National Black Theatre Festival designated her a "Living Legend."

The McDermott Award, presented annually since 1974 in honor of Eugene McDermott, an MIT benefactor in education and the

arts, is given to an artist of the highest caliber in a given arts discipline. In conjunction with the award, Burrows will return to the MIT campus at a later date for a brief residency.

BURROWS

Brody, the award, named for Gyorgy Kepes (1906-2002), founder of MIT's Center for Advanced Visual Studies, is given to a member of the MIT community whose creative work reflects the vision and values of Kepes, who was celebrated for his work exploring the relationship between art and science, and art and the environment.

Brody's plays, which have won numerous awards, have had productions and staged readings throughout the country. In a unique convergence of Council for the Arts at MIT award winners, Brody has directed Vinie Burrows in her one-woman show, "Sister! Sister!" He has also directed the world premieres of two operas, T.J. Anderson's "Soldier Boy, Soldier" and Ken Guilmartin's "The Marriage of Heaven and Hell," as well as numerous MIT student productions. He is author of two novels.

The Council for the Arts at MIT is a volunteer organization of MIT alumni and friends founded in 1972 to foster the visual, literary and performing arts at the Institute, providing support for many performances, exhibitions, arts facilities and co-curricular programs at MIT.



BURROWS

Brody receives the Kepes Prize. The Kepes Prize will be presented to Associate Provost for the Arts Alan

BRODY RECEIVES KEPES PRIZE
The Kepes Prize will be presented to Associate Provost for the Arts Alan

Art loan program wins grant

The MIT-based Museum Loan Network has announced the premiere performances of its new partnership with the American Composers Forum and the renewal of a grant from the John S. and James L. Knight Foundation.

Created in 1995 to promote and facilitate the long-term borrowing and lending of art objects among museums, the Museum Loan Network (MLN) has been administered by the MIT Office of the Arts since its inception. MIT was chosen as host, in part because of the Institute's long-standing commitment to the creative arts, as well as its expertise in the computing technology necessary to set up and maintain the program's database of more than 8,000 objects that serves as a shared permanent collection for museums nationwide.

Playing matchmaker, the MLN connects museums—those that need objects and those that have them—facilitating and funding the long-term loans to 191 institutions in 48 states.

Now, in a new collaboration with the American Composers Forum, the MLN is also matching composers with museums. "Museums, Composers and Communities" brings new music and the creative energy of composers di-

rectly into museums and their communities as composers are commissioned to create original pieces of work inspired by the museum installations.

The first three of six works commissioned through the 2001 pilot program will be premiered this fall, at the Mobile Museum of Art in Mobile, Ala., the Spencer Museum of Art in Lawrence, Kans., and the Western Heritage Center in Billings, Mont.

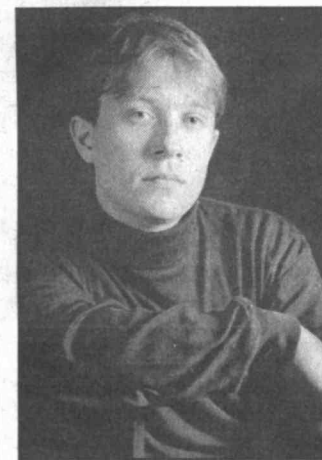
FOUNDATION GRANT

The John S. and James L. Knight Foundation has awarded the MLN \$2.75 million to continue its operations. The foundation has supported the MLN with more than \$6 million in grants since the program's creation.

"The enthusiastic participation of the museum community has confirmed the need and value of the MLN program. It is a pleasure to be able to continue support of this outstanding venture," said Hodding Carter III, president and CEO of the Knight Foundation. Established in 1950, the foundation promotes excellence in journalism worldwide and invests in the vitality of 26 U.S. communities.

More information on the MLN is available at <http://loanet.mit.edu>.

MITSO guest



Guest conductor Ludovic Morlot, called a "young conductor of talent" by the Boston Globe's Richard Dyer, will conduct the MIT Symphony Orchestra in a program of Bruch, Dallapiccola and Beethoven on Friday, Oct. 25 at 8 p.m. in Kresge Auditorium. Graduate student Amanda Wang will be the soloist for Bruch's "Concerto for Violin No. 1." Admission is \$3 at the door.

Institute Arts

- * Open to public
- ** Open to MIT community only

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

INSTRUCTIONS: To submit an item to the Arts Calendar, please contact the Office of the Arts at heine@media.mit.edu or 253-4003.

MUSIC

MIT Chapel Concert*—Oct 24: Renaissance. Italian Renaissance chamber music, dance music and improvisations with John Tyson et al. Oct 31: Alexey Shabalin, violin. Noon. Chapel. More info: 253-2906.

MIT Women's Chorale Rehearsals**—Open to all women in the MIT community. New members welcome until Oct 24. 7:45-9:30pm. Emma Rogers Rm (10-340). More info: 253-1614 or <http://web.mit.edu/womensleague/womenschorale>.

MIT Symphony Orchestra*—Oct 25. Dante Anzolini, music director. Frederick Harris, acting music director. Ludovic Morlot, guest conductor. Music by Bruch, Dallapiccola, Beethoven. \$3 at door. 8pm. Kresge Aud. More info: 253-2826.

Piano and Clarinet Recital: Kinan Azmeh, clarinet and Rami Khalife, piano*—Nov 1.

Works by Bartok, Brahms, Poulenc and Khalife. Sponsored by the Aga Khan Program for Islamic Architecture. 6pm. Killian Hall. More info: 253-1400 or <http://web.mit.edu/akpia/www/AKPsite/concert.html>.

DANCE

Lecture Demonstration by Chitresh Das, Kathak Master*—Oct 24. A classical dance from North India, Kathak combines intricate footwork, dynamic technique, rhythmic intensity with subtle and dramatic facial expression. 7:30pm. Killian Hall. More info: alpana@mit.edu or <http://web.mit.edu/bnaatyam/www/kathaklecDEM02.html>.

Kathak Dance*—Oct 27. Chitresh Das and the Chitresh Das Dance Company with Swapnamoy Banerjee, sarod and Kousic Sen, tabla. \$20, \$16 members, \$12 students (avail at door). 4pm. Paine Hall (Harvard Univ). 258-7971 or <http://web.mit.edu/mta/mithas>.

READINGS

"Pleasures of Poetry" Seminar**—Oct 23. Discussion of Jane Kenyon's "Evening at a Country Inn" and "Things" led by Steven Cramer. Poems avail from the Literature Office (14N-407). Noon-1pm. Rm 14N-304. More info: <http://web.mit.edu/lit/www/pop.html>.

FILM/VIDEO

Films by Kasi Lemmons*—Nov 1: "Eve's Bayou" at 7:30pm. "Caveman's Valentine" at 10:30pm. Rm 10-250. Nov 2: "Eve's Bayou" at 7:30pm. "Caveman's Valentine" at 10:30pm. Rm 26-100. Nov 3: "Eve's Bayou" at 10pm. Rm 26-100. More info: 253-8089.

EXHIBITS

List Visual Arts Ctr (E15)*—"After the Beginning and Before the End." Over 220 examples of so-called "Instruction Drawings," in a variety of forms, such as working drawings, installation instructions, musical scores, sketches, visual or textual memoranda, fabrication notes and work records. "Videos by Latvian Artists." Viesturs Kairis and Ilmars Blumbergs' "Magic Flute"; Laila Pakalnin's "Papagena." Both shows through Jan 5. List Visual Arts Center (20 Ames St.). Tues-Thurs and wknds noon-6pm; Fri noon-8pm; closed holidays. More info: 253-4680 or <http://web.mit.edu/lvac/www>. **Gallery Talks.** Wednesdays at noon and Sundays at 2pm.

MIT Museum (N52)*—"Perils of the Sea." Exhibition and accompanying lecture series exploring historic shipwrecks and disasters at sea. Through Nov 3. Oct 27: **Family Adventures in Science and Technology**

Sunday: Laser Day. See projects including light "sculptures," holograms and a variety of other applications. Free with Museum admission. 2-4pm. MIT Museum. More info: 452-2827 or fastsci@mit.edu. **Oct 30: "MIT in the Deep Sea: DeepArch's Archaeology Projects."** Illustrated lecture by Brendan Foley. \$7 adults, \$4 srs/students/MIT community, free for current MIT students w/valid ID. Pre-registration recommended. 7pm. MIT Museum. More info: 253-5927. **Ongoing:** "Mind and Hand: The Making of MIT Scientists and Engineers"; "Robots and Beyond"; "Exploring Artificial Intelligence at MIT"; "Gestural Engineering: The Sculpture of Arthur Ganson"; "Holography: The Light Fantastic"; "Flashes of Inspiration: The Work of Doc Edgerton"; "Thinkapalooza." \$5 adults, \$2 students/srs/children 5-18, free w/MIT ID. 265 Mass Ave. Tues-Fri 10am-5pm, Sat-Sun noon-5pm. More info: 253-4444 or <http://web.mit.edu/museum>.

Compton Gallery*—"From Page to Stage: A Theatrical Process." A look into the process by which directors and designers collaborate to put a play onto the stage. Through Jan 6. Compton Gallery (10-150). Wkdays 9:30am-5pm. More info: 253-4444 or <http://web.mit.edu/museum/exhibitions/comptongallery.html>.

The Dean's Gallery*—"K. Levni Sinanoglu: Searches for an Imaginary Kingdom." Mixed media works. Through Nov 1. The Dean's Gallery, Sloan School of Management (E52-466). Wkdays 9am-5pm. More

info: 253-9455 or <http://mitsloan.mit.edu/deansgallery>.

Artists Behind the Desk Exhibition. The women and men who keep the MIT machine humming show their creative side through a variety of media including photography, works on paper, fabric, and sculpture. Through Nov 15. Mon-Thurs 9am-8pm, Fri 9am-6pm. Roich Library (7-238). More info: 253-1712 or <http://web.mit.edu/abd>.

Institute Archives and Special Collections*—"Fire insurance policy, 1866-1867, on MIT's first building on Boylston Street in Boston." Hallway exhibit case across from Rm 14N-118. More info: 253-5136 or <http://libraries.mit.edu/archives/about/project.html>.

OTHER

Architecture Lecture*—Oct 29. "Heikkinen-Komonen Architects: Recent Works," by Markku Komonen, architect, Helsinki. 6:30pm. Rm 10-250. More info: 253-7791.

"hyperCollision"*—Oct 31-Nov 4. ATat (Arts & Technology At Tech) celebrates technology and art. Through Nov 4. Nov 1: Reception. 5-8pm. Tues-Fri 10am-5pm, Sat-Sun noon-5pm. \$5, \$2 non-MIT students/srs/children 5-18, free w/MIT ID. MIT Museum. More info: 253-4444 or at-officers@mit.edu.

Feds won't impose regulations to boost cyberspace security

(continued from page 1) when the national strategy is finalized, people will buy into it.

"This is not a paper exercise. We are seriously soliciting dialogue," he said.

"We are running a big risk if we assume that we have big vulnerabilities in our IT [information technology] networks and the only thing that's ever going to happen is the low-level attacks—denial-of-service attacks and worms—that we've seen to date. I think personally that is a stupid attitude. Somebody, some day is going to hurt us and hurt our economy if we don't start dealing with those vulnerabilities," said Clarke.

Several audience members questioned the advisability of relying on software vendors voluntarily to make their products secure and asking consumers who can't even program their VCRs to download patches to prevent hackers from getting into home computers.

"We don't see regulation as the main way of achieving IT security," said Clarke, who was appointed Special Advisor to the President for Cyberspace Security in October 2001. The role of government is to "provide information, to do research and development, to fund it, to raise awareness and to stimulate education, but not to get into everyone's network and tell them how to do it. Instead we think it's everybody's responsibility." He said the national strategy calls for everyone "to identify the vulnerabilities in their part of cyberspace and then develop a program to mitigate those vulnerabilities."

He plans to have the government work with software vendors to encourage them to "ship it secure with every box" and to empower organizations like the Internet Engineering Task Force

(the standards body for the Internet) to work the problems of securing the mechanisms of the Internet, he said.

MIT's network manager Jeff Schiller, director of the Internet Engineering Task Force, moderated the discussion, which was introduced by President Charles M. Vest. Panelists besides Clarke were Gary Beach, publisher of CIO and CSO magazines, and John Grossman, assistant attorney general and chief of the corruption, fraud and computer crime division for Massachusetts.

In opening remarks, Vest said that network security has been a priority at MIT since the first days of the Internet. He outlined some of MIT's most notable contributions to the field, including the development of the Kerberos cryptographic authentication sys-

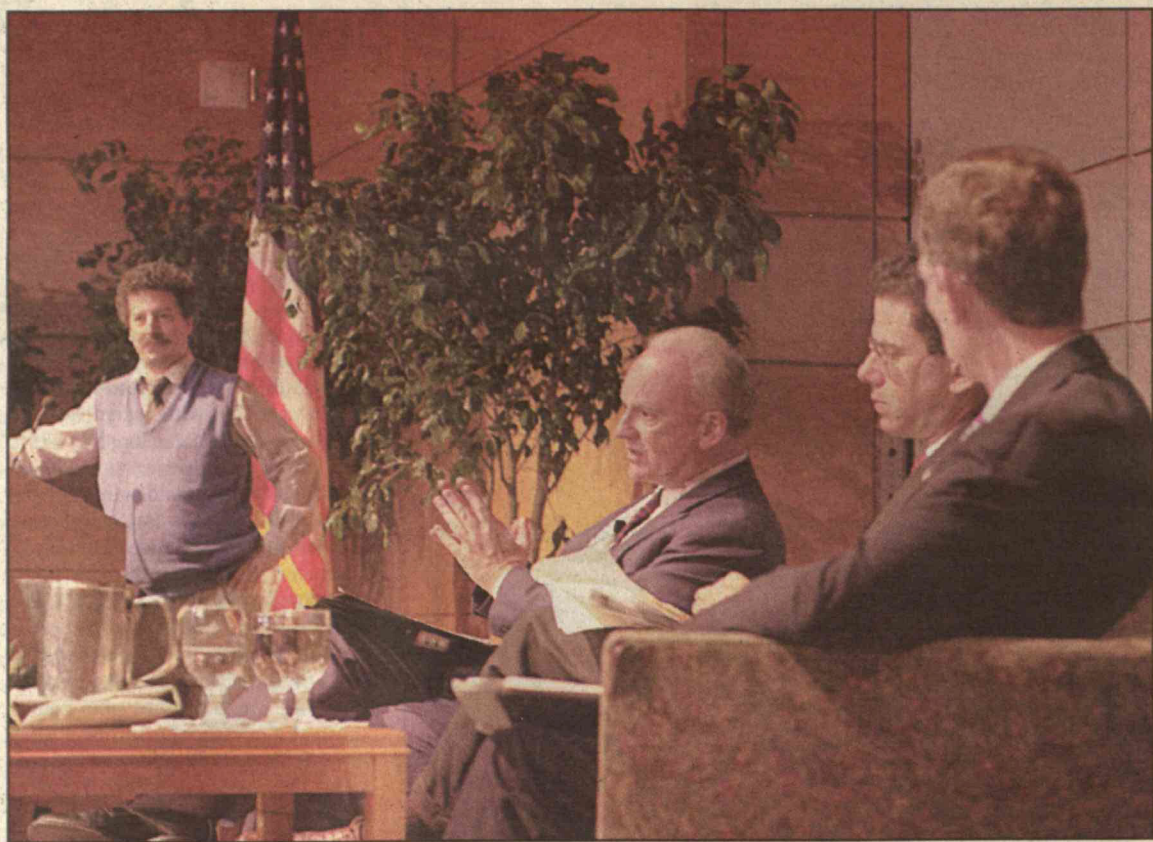
"We don't see regulation as the main way of achieving IT security."

—Richard Clarke

tem in 1986, which is today incorporated in both Microsoft and Apple operating systems. "We recognize an institutional responsibility to assist in combating terrorism at levels ranging from the study of its root causes through the development of technical countermeasures and strategies for protection," Vest said.

Schiller described "the great myth ... in people's heads."

"They believe when they design systems that no one's ever going to attack them," he said. The great lie, according to Schiller, is that people



Offering their views of cybersecurity at last week's town hall meeting were (left to right) Jeff Schiller of MIT, national cybersecurity chief Richard Clarke, John Grossman and Gary Beach. Photo by Donna Coveney

develop technology thinking it will never be used on the Internet.

Schiller said after the meeting that he generally agrees with Clarke's strategy.

"This is the first step. Let's see if [Clarke] can make progress in this way," said Schilling. "If it doesn't work, then we have to think about regulating the software industry in general. But one shouldn't do that without at least trying."

Hastings to be nominated to NSB

President George W. Bush announced last Thursday he will nominate Professor of Engineering Systems Daniel Hastings and seven others to serve on the National Science Board, the 20-person board of directors of the National Science Foundation.

Hastings is associate director of the Engineering Systems Division and director of the Technology and Policy Program. From 1997-99, he served as the Air Force chief scientist, and was honored with the Air Force Distinguished Civilian Award in 1997 and 1999.

MIT physicists had close ties with laureate Giacconi

■ By Deborah Halber
News Office

Riccardo Giacconi, a founding father of X-ray astronomy and co-recipient of the 2002 Nobel Prize in physics, had personal connections with many MIT X-ray astronomers in the 1960s and '70s, most notably his mentor, MIT's Bruno Rossi (1905-1993).

Giacconi, president of Associated Universities, Inc., and a research professor at Johns Hopkins University, shared the award earlier this month "for pioneering contributions to astrophysics, which have led to the discovery of cosmic X-ray sources."

Giacconi used X-ray detectors launched on a sounding rocket to discover the first cosmic X-ray source in 1962, finding that the universe contains a background radiation of X-rays. He was joined in this epochal discovery by MIT's Bruno Rossi, a pioneer in cosmic ray studies and later in X-ray astronomy and interplanetary plasmas. It was Rossi who first suggested that the search for celestial X-rays be carried out.

The Royal Swedish Academy of Sciences, in a background paper on the Nobel award, cited Herbert Friedman of the U.S. Naval Research Laboratory, Giacconi and Rossi as pioneers in X-ray astronomy, which they said began in 1949 with Friedman's discovery of X-rays from the sun.

"The most important leading persons through the first three decades of X-ray astronomy were, independently, Friedman and Giacconi. Also Rossi played a very important role, not the least as a senior colleague and mentor for Giacconi. These three persons contributed crucially to the development of methods and instrumentation, but also to the application of these methods to scientific work, leading to a very rich host of important discoveries," the Academy paper said.

"In a pioneering paper, Giacconi and Rossi (1960) discussed the possibilities of constructing imaging X-ray telescopes, inspired by earlier work on X-ray microscope design," the academy said.

In 1965, Giacconi obtained the first picture of the sun with an X-ray telescope that focused X-rays by means of grazing-incidence imaging optics. This proved that X-ray astronomy could photograph the sky just as do optical and radio astronomers do.

This event occurred after Giacconi started working in 1959 for American Science and Engineering Corp. (AS&E), a private research firm in Cambridge that was located on the site of MIT's current medical center. Although Giacconi did not have any formal connection to MIT, AS&E was founded in part by Martin Annis, a former Ph.D. student of Rossi. Rossi was chairman of the board and chief science adviser to the company.

"Our relations with Giacconi and his groups at AS&E and Harvard were extensive, intensive and rich while he was in Cambridge," said Hale Bradt, professor emeritus of physics at MIT. "It was no accident that he accomplished what he did. He was extremely talented, smart, decisive when necessary and able to see the big picture scientifically. He could be very persuasive and also very persistent in getting the resources from NASA that were needed to make successful his satellite programs."

To investigate cosmic X-ray radiation, which is absorbed by the Earth's atmosphere, you need instruments high in the atmosphere or in space. George W. Clark, professor emeritus of physics, and Minoru Oda, a Japanese scientist then at MIT, collaborated in subsequent AS&E

rocket flights with Giacconi and his colleagues. One flight, in which Bradt participated, located the X-ray source called Sco X-1 with sufficient precision for it to be identified optically. This made possible ground-based studies by optical astronomers of these then mysterious sources.

MIT'S PROGRAM

Within a few years, MIT developed its own program of X-ray astronomy under Clark. He was joined in a high-altitude balloon program by physics professor Walter Lewin and, later, senior research scientist George Ricker. A sounding rocket program was begun in 1966 under Bradt and physics professor Saul Rappaport. The group was later joined by physics professor Claude R. Canizares. Under Clark's leadership,

the group flew an experiment on the Orbiting Solar Observatory 7, which was launched in 1971.

In 1970, Giacconi's group launched the first satellite, named Uhuru, dedicated totally to X-ray astronomy. This allowed continuous observations of X-ray sources rather than the brief studies possible from rockets and balloons. This was a major step forward in X-ray astronomy's observational capability.

With the Uhuru observatory, several hundred X-ray sources were discovered. The observations demonstrated conclusively that X-ray sources can be binary star systems with a very compact object such as a neutron star, or a black hole in orbit with a more normal star, which transfers matter onto the compact object. As the matter falls towards the compact object, it gains a very high speed that drives its temperature up to millions of degrees. At such high temperatures, X-rays are emitted.

The MIT group in 1975 flew a follow-up satellite called Small Astronomy Satellite, again under Clark's leadership. It made its own important discoveries, in particular in experiments carried out by Lewin on the newly discovered phenomenon of X-ray bursts. MIT physics professor Paul C. Joss showed that these are thermonuclear explosions of the matter that has accumulated on the surface of a neutron star in a binary system.

Giacconi worked at the Smithsonian Astrophysical Observatory during the 1970s and was a professor in Harvard's astronomy department and associate director at the Harvard-Smithsonian Center for Astrophysics (CfA).

In 1977, the High-Energy Astronomy Observatory mission was launched. It carried two MIT experiments, one led by Lewin in collaboration with the University of San Diego and the other by Bradt in collaboration with Herbert Gursky of Giacconi's group. "The two groups [Smithsonian Astrophysical Observatory and MIT] worked as one; institutional affiliations were unimportant," Bradt said. Both experiments yielded additional valuable results.

Giacconi's dream of launching a large focusing X-ray telescope to study celestial X-ray sources came to fruition in 1978 with the launch of the Einstein satellite. The Einstein Observatory was the first fully imaging space-based X-ray telescope used for celestial (nonsolar) astronomy.

One of the Einstein instruments was the Focal Plane Crystal Spectrometer, developed in the MIT Center for Space Research under the direction of Canizares and Clark. This spectrometer made the first high-resolution measurements of cosmic sources.

Giacconi and colleagues submitted a proposal to NASA to initiate the study and design of an even larger X-ray telescope. After Giacconi left to become the first director of the Space Telescope Science Institute, the CfA group under the leadership of MIT Ph.D. graduate Harvey Tananbaum carried forward the program, culminating in the launch in 1999 of the Chandra X-ray Observatory, which is still operating.

MIT provided half the scientific instrumentation for Chandra and works with CfA to operate the mission, one provided by Ricker and the other by Canizares, now MIT's associate provost. "I met Riccardo the very first day I came to MIT, and he has remained the giant in the field since the beginning," said Canizares. "He has an outstanding combination of talents: as a visionary scientist, in instrumentation, in management of large projects and as an inspirational leader."

At present, MIT has two other X-ray astronomy experiments in space: one on the Rossi X-ray Timing Explorer under Alan Levine, principal research scientist, and the High Energy Transient Explorer under Ricker. The CfA and MIT groups look forward to more powerful X-ray missions in the future.

"MIT X-ray astronomers have had a close and mutually beneficial relationship with AS&E during Giacconi's time there and ever since with the Harvard X-ray group," Clark said.

Giacconi shared the 2002 Nobel in physics with Raymond Davis Jr. of the University of Pennsylvania and Masatoshi Koshihara of the University of Tokyo for their work in neutrino astrophysics.

"Our relations with Giacconi and his groups at AS&E and Harvard were extensive, intensive and rich while he was in Cambridge."

—Professor Emeritus Hale Bradt