

FSILGs scramble to find resident advisors for fall

■ By Robert J. Sales
News Office

More than two-thirds of entering freshmen had expressed housing preferences by noon Monday either by phone or by filling out cards enclosed in the residence guide, allaying fears that many fraternities would not have sufficient time to recruit candidates for vacant units.

When early returns on the cards were sparse, a telephone campaign was mounted and a flurry of responses was

received in the past two weeks. Orientation starts August 26, with rush scheduled for Saturday, Aug. 29. Before then, fraternities, sororities and independent living groups (FSILGs) are barred from contacting freshmen who have not specifically expressed an interest in them.

FSILGs are also considering candidates' applications for the position of resident graduate advisor. All ILGs will be required to have one in the fall. The policy was announced two weeks (continued on page 8)

Kyoto Protocol gets 'I' grade for 'incomplete'

■ By Judith V. Stitt
Joint Program on the Science and Policy of Global Change

Three MIT professors who authored a report card on the Kyoto Protocol on Climate Change in the July-August issue of *Foreign Affairs* essentially assigned the protocol a grade of "I"—for "incomplete."

"The main point is that key long-term climate issues have not been addressed," explained Professor Henry D. Jacoby of the Sloan School of Management (co-author of the article titled "Kyoto's Unfinished Business," with Professors Ronald G. Prinn of the Department of Earth, Atmospheric and Planetary Sciences and Richard Schmalensee of Sloan) in a recent interview.

"We've gotten all tied up in dealing with short-term targets and timetables for a long-term issue that potentially poses severe risks. The problem is not so much that long-term issues were ignored completely in Kyoto—the city in Japan where an international climate agreement was signed December 11,

1997, concluding two years of intense negotiations—but that the final text has a short-term emphasis that will cause people to lose sight of the bigger picture.

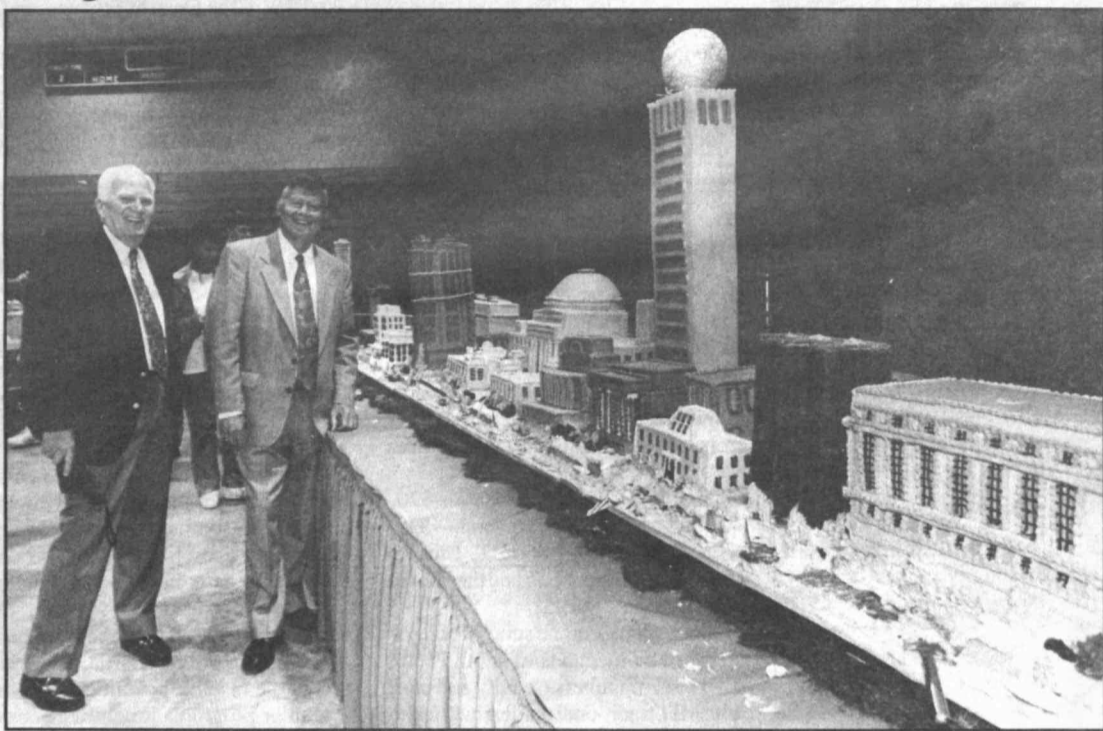
"Worse, the likely failure of nations to meet what are unrealistic short-term targets and timetables—and possible attempts to paper over the failure with creative accounting—could discredit the whole international process, and with it, chances for future collective action, should the problem turn out to be very serious."

The *Foreign Affairs* article argues that negotiators at Kyoto may have made it harder, not easier, to meet the long-term challenge of climate change. In support of this concern, the article includes a short, easy-to-read "primer" on the science and economics of global warming to increase readers' general understanding of some of the complex issues and uncertainties involved.

The authors then urge reasonable caution: "It would be irresponsible to ignore [the risk of significant global warming], just as it would be irrespon-

(continued on page 12)

Icing on the cake



Senior vice president William R. Dickson (center), who retired on June 30, and Frank Lawton, retired project manager for the biology building, survey the enormous cake and styrofoam replica of MIT (26 feet long, 3 feet wide) made especially for Mr. Dickson's June 12 retirement party by George Montilio's Bakery in Quincy. More photos can be found on page 9. Photo by Donna Coveney

Researchers locate WRN protein implicated in premature aging

■ By Sarah H. Wright
News Office

MIT biologists have advanced their research into mechanisms of human aging by determining the subcellular home of WRN, the protein defective in Werner syndrome, a disease which causes symptoms of premature aging.

Absence of or defects in the WRN protein have been shown to cause accelerated aging in human cells. People with Werner syndrome suffer cataracts, osteoporosis, diabetes and cancer at an early age. They succumb to cardiovascular disease or cancer in their forties or fifties.

The WRN gene product is located

in the nucleolus, a dense body within the nucleus of a cell. A defective nucleolus may relate to the symptoms of Werner's individuals, according to Professor Leonard Guarente of the Department of Biology.

The research was reported in the June 9 Proceedings of the National Academy of Sciences. The authors are Robert A. Marciniak, David Lombard, F. Bradley Johnson and Professor Guarente.

By unequivocally locating the WRN protein in the nucleolus, the researchers have moved one step closer to their goal of understanding and perhaps one day intervening in the normal aging process for people.

"This phase of research is a step-

ping-stone. The most exciting possibility is to discover, very specifically, how the nucleolus changes in humans and especially to identify what changes with age. Then we can start to think about ways to slow it down," Professor Guarente said.

A related and significant advance in the same research revealed the subcellular localization of the mouse homologue, or version of WRN (mWRN).

"In contrast to human WRN protein, mWRN protein is present diffusely throughout the nucleus," the authors wrote. "Understanding the function of WRN in these organisms of vastly differing lifespan may yield new insights into the mechanisms of lifespan

(continued on page 12)

Professor shipwrecked in Pacific is rescued by boat carrying MIT employee

■ By Denise Brehm
News Office

An MIT professor who drifted in a dinghy after his boat capsized in the Pacific Ocean was rescued by a boat carrying another MIT employee who just happened to be cruising the same waters around the Galapagos Islands that day. Professor Thomas Sheridan and Dr. Peter Reich, chief of psychiatry at MIT Medical, met for the first time when the vacationing physician saw an emergency flare set off by the shipwrecked professor.



Sheridan

Said Professor Sheridan, who was one of 19 survivors of the June 10 accident, "My advice to people is to learn how to swim. It can come in handy. All the survivors were reasonably good swimmers."

The sun had just set when the calamity occurred. The air was mild and a light breeze blew. Professor Sheridan and his wife, Rachel, were on the deck of the *Moby Dick*—a small cruise boat carrying them from one Pacific island to another—when their adventurous vacation turned into a nightmare.

Although the weather was calm, large swells rocked the 70-foot boat from side to side, sometimes pushing it

over at a pretty good pitch, then righting it, then tilting it to the other side. Dr. Sheridan, a semiretired professor of engineering and applied psychology in the Departments of Aeronautics and Astronautics and Mechanical Engineering, said he and the other 14 passengers weren't alarmed, since the night was tranquil.

"At one point, the boat went to its limit and sort of hesitated there," said Professor Sheridan, who stood at the bow of the boat at the time. "We all thought it would right itself."

But the boat capsized, took on water, and sank into the Pacific.

While the crew members cut loose lifesaving equipment, those passengers not tossed into the sea struggled to escape the sinking vessel.

"One woman was sick in her room, but managed to swim up the stairs and get out. Some were trapped by furniture. One went through a [broken] window," said Professor

Reich

Sheridan. "Several people said later they had no idea how they got out."

ADRIFT AT SEA

Tom and Rachel Sheridan were thrown into the sea, where they found themselves sucked under the boat, (continued on page 7)

Costa answers questions on human resources project

■ By Janet Snover
Community Involvement Team

The *Classification and Compensation project* began last month under the direction of Nora Costa, MIT's manager of compensation in the Personnel Office. The project will build on recommendations from the Human Resource Practices Development (HRPD) team, which were researched and prepared at the request of Joan F. Rice, vice president for human resources.

This question-and-answer interview with Ms. Costa focuses on why the *Classification and Compensation project* is necessary, its goals, what will be included, who is involved, and how and when the work will be done.

What are the primary reasons we need to change our current system?

The current classification and compensation system for administrative staff is about 25 years old and needs to be updated. As at other large employers, the ways in which people do their work at MIT and the skills required

have changed dramatically since 1974. It makes sense for MIT to adjust systems that no longer adequately support other changes that have been made in how we operate. Also, the modernization is needed to help us compete successfully for talented, qualified employees in many more marketplaces than we did in the past.

The HRPD team conducted extensive research into the community's perceptions of the current system. Feedback received in focus groups and administrative department meetings indicated that many employees believe that the current classification structure did not fully value the variety of skills and contributions made by the administrative staff, and that we needed to expand the "tools" available to management to reward and provide incentives for people. The redesign of the current system will address the issues raised by the community.

(continued on page 5)



Building 20 occupants relocated around MIT

With the recent relocation to Walker Memorial of the Office of Special Community Services (which includes the MITAC and Quarter Century Club offices), Building 20 is finally vacant. Following are the offices and programs that were partially or completely housed there, and their new locations.

Anthropology—Building 16
 Biotechnology Process Engineering Center—Building 16
 Cambridge Partnership—Building E60
 Center for Advanced Visual Studies—Building N52
 Center for Environmental Health Sciences—Building 16
 Center for Materials Research in Archeology and Ethnology—Building 16
 Committee on the Writing Requirement—Building 16
 Concourse—Building 16
 Earth, Atmospheric and Planetary Sciences—Building N9
 Educational Opportunities Program—Building N52
 Environmental Medical Service—Building 16
 Francis Bitter Magnet Lab—Building NW14
 Health Sciences and Technology—Buildings 16, E25

The Institute for Learning and Teaching—Building E60
 Integrated Studies Program—Building 16
 Laboratory for Advanced Technology in the Humanities—Building 16
 Laboratory for Nuclear Science—Building 24
 Laboratory for Nuclear Science machine shop—Building 38
 Language Learning and Resource Center—Building 16
 Laser Interferometer Gravitational-Wave Observatory—Building NW17
 Linguistics and Philosophy—Building E39
 MIT Electronics Research Society—Building N52
 MIT Press—Building NE25
 Music—Building NW14
 Office of the Dean of Students and Undergraduate Education—Buildings 5, 7, N52, 50
 Research Laboratory for Electronics—Building 36
 ROTC—Building W59
 Systems Design Management—Building 33
 Tech Model Railroad Club—Building N52

Old bicycles to be removed

If you own an old bicycle and have left it secured to an MIT bike rack for some time, Campus Police asks that you remove it. Bikes that appear abandoned will be red-tagged for removal from July 13-22.

If your bike has been tagged but you want to keep it call Sgt. Cheryl deJong Vossmer or Officer Thomas Hennessy at x3-2996.

When the removal process begins on July 13, a heavy-duty torch will be used to cut the locks, a process that could damage bikes parked nearby. If you need to secure your bike at a rack, please try not to park it next to a tagged bike from July 13-22. Campus Police and Physical Plant will not be responsible for any damage to bikes or locks.

This clean-up project helps keep space free for cyclists to park and lock their bikes, and it also helps Campus Police monitor the bike racks and reduce thefts.

Athletic cards on sale; lessons offered

MIT athletic cards are now on sale in DuPont Athletic Center Monday-Friday from 7am-7pm. The cards allow use of MIT's athletic facilities from July 1, 1998-June 30, 1999. Prices are as follows.

- MIT and Wellesley students—\$20
 - Family members of students—\$30
 - Faculty and staff at MIT, Lincoln Laboratory, Draper Lab and the Whitehead Institute—\$125
 - Family members and spousal equivalents of faculty and staff—\$185
 - MITFIT members (faculty and staff with MIT traditional or Flexible Health Plan discounts)—\$105
 - MITFIT family members and spousal equivalents—\$165
 - Alumni/ae—\$250
 - Alumni/ae family members—\$340
- Spouses, spousal equivalents and siblings must show proof of relation to an MIT faculty or staff member (birth certificate, driver's license or passport). Children under 16½ must be accompanied by parent or guardian.

Athletic cards are also available on a monthly (\$35) and weekly (\$25) basis. Cards for attendees of conferences held

at MIT are \$20 (good for the duration of the conference). Lockers for faculty and staff are \$20, or \$10 for students.

TENNIS LESSONS

The Tennis Camps at Harvard and MIT began on June 8 and will run through the summer season, offering group instruction for tennis players of all ages. The camp has been a successful program at Harvard for the past eight years, and this year an instructional program is being offered at MIT for members of the Institute community.

Junior programs for children from ages 5-16 are being offered at all levels for either full-day or half-day sessions. Adult instruction is available at a variety of times, including mini-camps in the evenings and on weekends.

The camps are directed by MIT men's tennis coach Jeff Hamilton and Harvard coaches Dave Fish and Gordon Graham. Mr. Hamilton, who has been coach at MIT since 1987, is a two-time Constitution Athletic Conference Coach of the Year.

Mr. Fish, who has taken the Harvard program to national prominence, has

been head coach of the Harvard men's team since 1976. Mr. Graham is the Harvard women's coach and has 20 years of NCAA Division I coaching experience. The teaching staff includes many top-level college coaches and varsity players.

The Tennis Camps at Harvard and MIT are open to all members of the MIT and Harvard communities. Those affiliated with MIT are eligible for discounted fees. For more information, call (617) 783-2400.

SCUBA, ROWING

The Physical Education Department is again offering instruction in scuba diving as part of its summer activity program. A few spaces remain for Advanced Dive classes to be held August 15-16 and August 22-23. Call the Physical Education Office at x3-4291 for details.

MIT community members may obtain a sculling card and borrow sculls to row on the Charles River anytime the Pierce Boathouse is open (Monday-Friday, 6am-7pm). A sculling instructor is on duty from 6-9am on Mondays and Wednesdays, and 4-7pm on Tuesdays and Thursdays.

Prospective scullers must take an introductory orientation lesson and pass a swimming test at the Alumni Pool (swimming 100 yards and treading water for 10 minutes). The Physical Education Department is offering more advanced rowing instruction throughout the summer; call x3-4291 for details.

Errata

■ In a June 3 MIT Tech Talk article about Tim Berners-Lee winning a MacArthur grant, the list of other past MIT recipients inadvertently omitted the name of Richard Stallman, a research affiliate at the Artificial Intelligence Laboratory.

■ In a caption for a photo of Boston Pops conductor Keith Lockhart in the June 10 issue, the developer of the "Conductor's Jacket" he wore during Tech Night at Pops was misidentified. The jacket was developed by Media Lab doctoral candidate Teresa Marrin. Jennifer Healey and several undergraduates developed the sensors that provided the feedback on Mr. Lockhart's gestures.

■ In a June 10 article headlined "Hundreds of students savor newly minted PhDs at ceremony," the degree year and current title of Lynda Jordan, an MIT PhD recipient in chemistry, were misidentified. She received her PhD in 1985 and is an associate professor of chemistry at North Carolina A&T State University.

It's a fact

Elmo/MIT, a five-and-a-half-foot bronze sculpture by Dimitri Hadzi commissioned in 1963, initiated an extensive public art collection at MIT that now includes outdoor installations of works by Henry Moore, Louise Nevelson, Alexander Calder and Pablo Picasso, among others.

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

Contact the News Office at x3-2700 or send e-mail to <newsoffice@mit.edu>. Also see our Web page at <<http://web.mit.edu/newsoffice/www>>.

Student Notices

* Open to public
 ** Open to MIT community only

July 15-August 16

RELIGIOUS ACTIVITIES

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

Taize Prayers*—Fridays, noon-12:30pm in W11, the Board Room. All invited. Sponsored by students from the Protestant Ministry at MIT, Tech Catholics and the Lutheran-Episcopal Ministry. Taize Prayers, coming from the Taize community in France, are a form of Christian meditation based on singing and silence.

Eucharist/Holy Communion*—Wednesdays,

5:10pm throughout the summer. W11, Main Dining Room. Sponsored by the Lutheran-Episcopal Ministry at MIT.

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

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

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

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

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

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

Communitas-Life Together**—Protestant Worship Sunday at 11am. Sponsored by:

American Baptist Church, United Church of Christ, United Methodist Church, Presbyterian Church (USA). Chaplain John Wuestneck, x2-1780 or <chaplain@mit.edu>.

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

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

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

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

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

Crimewatch

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

July 2: Walker: suspicious activity. Bldg. E25: malicious damage to card reader. Vassar Street and Mass. Avenue: non-affiliated, intoxicated female provided assistance. Bldg. E19: tool bag reported stolen later discovered misplaced. Bldg. 13: toxic gas alarm, no cause found. 33 Mass. Avenue: bike secure with "U" lock stolen, no known value. Sigma Kappa: credit cards stolen.

July 3: Bldg. WW15: abandoned vehicle towed.

July 4: Bldg. E23: suspicious person. Bldg. E53: sometime between May and July bike stolen, \$150. Bldg. 56: credit cards stolen. East Campus: items thrown from window at pedestrians struck and injured same.

July 5: Kappa Sigma: Assist other police department in looking for missing person. 500 Memorial Drive: noise complaint, all quiet.

July 6: Westgate: bicycle stolen, \$40. Amherst Street: minor motor vehicle accident, one operator taken into custody for an outstanding warrant. Bldg. 7: male arrested for trespassing.

July 7: Student Center turnaround: minor motor vehicle accident. Bldg. E55: check on well being of a child. Bldg. NW30: male taken into custody on an outstanding warrant.

July 8: 199 Bay State Road: SafeRide driver harassed by group of youths. Beta Theta Pi: credit cards stolen.

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Printed on Recycled Paper

Evidence of global warming seen on Neptune's largest moon

■ By Deborah Halber
News Office

We're not the only ones experiencing global warming. An MIT researcher has reported that observations obtained by NASA's Hubble Space Telescope and ground-based instruments reveal that Neptune's largest moon, Triton, seems to have heated up significantly since the Voyager space probe visited it in 1989. The warming trend is causing part of Triton's surface of frozen nitrogen to turn into gas, thus making its thin atmosphere denser.

While no one is likely to plan a summer vacation on Triton, the report in the June 25 issue of the journal *Nature* by Professor James L. Elliot and his colleagues from MIT, Lowell Observatory and Williams College says that the moon is approaching an unusually warm summer season that only happens once every few hundred years. Professor Elliot and his colleagues believe that Triton's warming trend could be driven by seasonal changes in the absorption of solar energy by its polar ice caps.

"At least since 1989, Triton has been undergoing a period of global warming. Percentage-wise, it's a very large increase," said Dr. Elliot, professor of earth, atmospheric and planetary sciences and director of the Wallace Astrophysical Observatory. The 5 percent increase on the absolute temperature scale from about -392°F to about -389°F would be like the Earth experiencing a jump of about 22° F.

Triton is a simpler subject than Earth for studying the causes and effects of global warming. "It's generally true around the solar system that when we try to understand a problem as complex as global warming—one in which we can't control the variables—the more extreme cases we have to study, the more we can become sure of certain factors," Professor Elliot said. "With Triton, we can clearly see the changes because of its simple, thin atmosphere."

The moon is approaching an extreme southern summer, a season that occurs every few hundred years. During this special time, the moon's southern hemisphere receives more direct sunlight. The equivalent on Earth would be having the sun directly overhead at noon north of

Lake Superior during a northern summer.

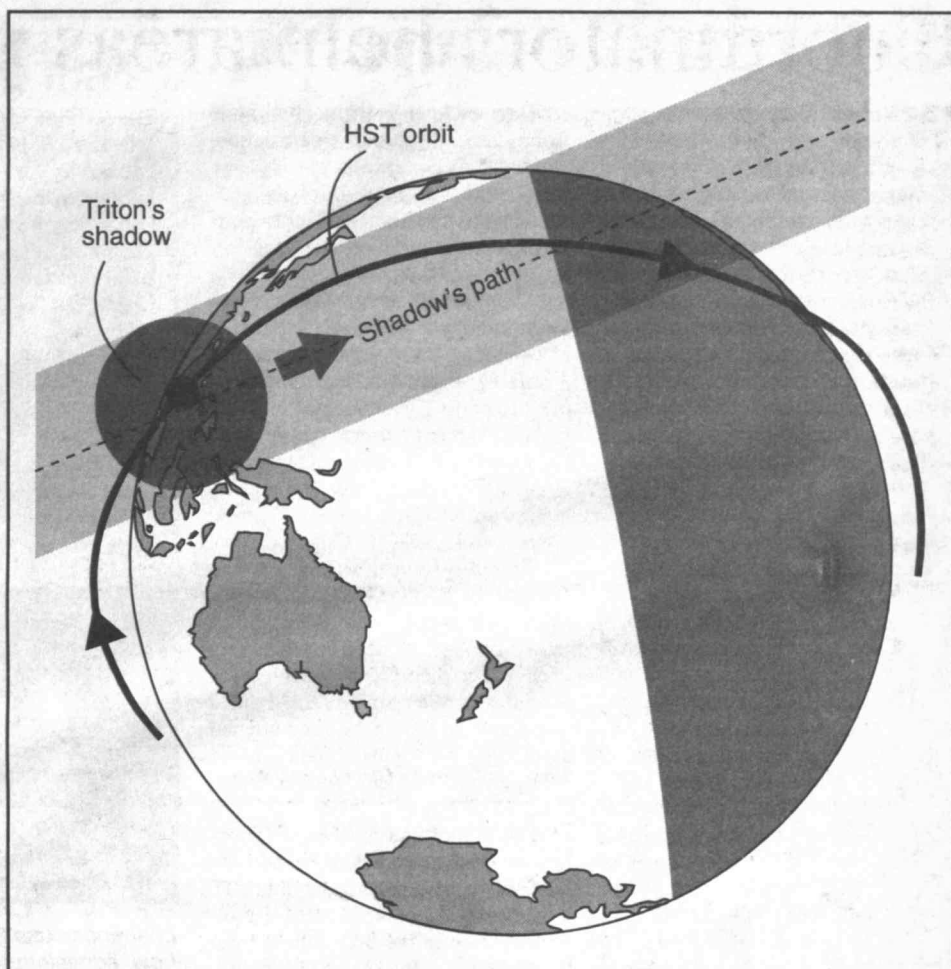
Professor Elliot and his colleagues believe Triton's temperature has increased because of indications that the pressure of the atmosphere has increased. Because of the unusually strong correlation between Triton's surface ice temperature and its atmospheric pressure, he said scientists can infer a temperature increase of 3°F over nine years based on its recent increase in surface vapor pressure. Any ice on Triton that warms up a little results in a big increase in atmospheric pressure as the vaporized gas joins the atmosphere.

Scientists used one of the Hubble telescope's three Fine Guidance Sensors in November 1997 to measure Triton's atmospheric pressure when the moon passed in front of a star. Two of Hubble's guidance sensors are normally used to keep the telescope pointed at a celestial target by monitoring the brightness of guide stars. The third can serve as a scientific instrument.

In this case, the guidance sensor measured a star's gradual decrease in brightness as Triton passed in front of it. The starlight got dimmer as it traveled through Triton's thicker atmosphere and then got cut off completely by the moon's total occultation of the star. This filtering of starlight through an atmosphere is similar to what happens during a sunset. As the sun dips toward the horizon, its light dims because it is traveling through denser air and because the sun's disk gets "squashed."

By detecting that Triton's atmosphere had thickened, astronomers were able to deduce that the temperature of the ice on Triton's surface has increased. "This pressure increase implies a temperature increase," Professor Elliot wrote. "At this rate, the atmosphere has at least doubled in bulk since the time of the Voyager encounter." Like the Earth, Triton's atmosphere is composed mostly of molecular nitrogen, but its surface pressure is much less than that of the Earth—about the same as that 45 miles high in the Earth's atmosphere.

In their *Nature* paper, Professor Elliot and his colleagues list two other possible explanations for Triton's warmer weather. Because the frost pattern on Triton's surface may have changed over the years, it may be absorbing a little more of the sun's warmth. Or changes in reflectivity of



Analyses of Triton's shadow helped determine the Triton warming trend. This graphic shows the orbit of the Hubble Space Telescope, Triton's shadow and its path. The black dot indicates the point in the HST orbit where the telescope was closest to the center of Triton's shadow.
Graphic: Lisa Damtoft, MIT. Source: James Elliot, MIT

Triton's ice may have caused it to absorb more heat. "When you're so cold, global warming is a welcome trend," he said.

About the same size and density as Pluto, Triton—one of Neptune's eight moons—is 30 times as far from the sun as the Earth. It is very cold and windy, with winds close to the speed of sound, and has a mixed terrain of icy regions and bare spots. Triton is a bit smaller than our moon, but its gravity is able to keep an atmosphere from completely escaping because it is so cold. Its composition is believed to be similar to a comet's, although it is much larger than a comet. Triton was captured into a reverse orbit by Neptune's

strong gravitational pull.

Other astronomers who participated in this investigation are research scientist Heidi B. Hammel and technical assistants Michael J. Person and Stephen W. McDonald, all of MIT; Otto G. Franz, Lawrence H. Wasserman, John A. Stansberry, John R. Spencer, Edward W. Dunham, Catherine B. Olkin and Mark W. Buie of Lowell Observatory; and Jay M. Pasachoff, Bryce A. Babcock and Timothy H. McConnochie of Williams College.

This work is supported in part by NASA, the National Science Foundation and the National Geographic Society.

Paper focuses on chemicals' image

■ By Elizabeth A. Thomson
News Office

A 10-year-old program developed by the chemical industry to improve its public image and environmental performance is not working, in part because it sets no performance standards and otherwise makes no promises, according to an MIT researcher who presented a paper on the program at the MIT Forum on Chemicals and Society in June.

John R. Ehrenfeld, director of the MIT Technology, Business and Environment Program (TBE), emphasized, however, that the industry program is still an important development. In his talk, he gave suggestions for how the program could be strengthened.

Later, a community activist who lives near seven chemical companies, a representative from the Chemical Manufacturers Association (CMA), and an EPA administrator responded to the paper in a panel discussion. One outcome: Richard Doyle of the CMA invited Dr. Ehrenfeld to share the proceedings of the session with the 16 CEOs who are currently reviewing the program in question.

"The chemical industry rates very low in measures of public perceptions, down there with the tobacco industry," said Dr. Ehrenfeld, co-author of the paper with TBE's Jennifer H. Nash. Enter the Responsible Care program, a set of principles and practices developed by the industry to address its poor public image and improve environmental performance.

But Responsible Care isn't working. "Even the industry recognizes that little has [changed]," said Dr. Ehrenfeld. Reasons for its ineffectiveness include the great variability in how companies have implemented the program. "The public will go to the bottom. It will look

at those [companies] that are doing the least and generalize to the industry as a whole," Dr. Ehrenfeld said.

To make Responsible Care more effective, he and Dr. Nash came up with a number of suggestions. These include setting performance standards for the industry and giving the public direct information about the results of proposed actions. "I think it's very hard for the public to see what Responsible Care does," Dr. Ehrenfeld said.

He also noted that socially appropriate decisions about chemicals cannot rely on facts alone. Both Florence T. Robinson, an activist with the North Baton Rouge Environmental Association, and Daniel Fiorino, director of the EPA's Emerging Strategies Division, agreed.

"The future of environmental protection in this country and elsewhere lies more in social, cooperative, and conceptual areas than it does in science," Dr. Fiorino said. Said Mrs. Robinson: "It is unfortunate that the CMA tends not to acknowledge this."

Mrs. Robinson also said that public perception is based on performance, noting that "the poor performance of industry is duly reported by people like [me], and we have very, very big mouths... If you want to silence us, you've got to be good. You've got to do your job right."

Both Drs. Ehrenfeld and Fiorino stressed that, for all its problems, Responsible Care is an important development in industry. That's because, among other things, it comes from the industry itself, it enlists the industry in the reinforcement of good practices, and it builds in measures for getting feedback from the public, said Dr. Fiorino.

For example, the team responsible for reviewing companies' implementation of Responsible Care includes technical experts as well as representatives from the public. Last year CMA identi-

fied 32 companies "who appeared to be struggling [with Responsible Care]," Dr. Doyle said. CMA tried to help them, and although a few left the association, "we saw monumental changes in others."

Dr. Doyle also noted that Responsible Care, which began in Canada, has spread to 40 nations around the world. "Is it perfect? No," he said. "But we feel it's a step in the right direction."

The Forum on Chemicals and Society featured sessions on the roots of public concerns about chemicals and sharing responsibility for chemical testing in addition to that on Responsible Care. Each session included a paper presented on the topic, stakeholder responses to the paper (a panel discussion), and afternoon workshops to develop recommendations related to each topic.

Vander Sande is interim dean

For the second time in three years, Associate Dean John B. Vander Sande will serve as acting dean of the School of Engineering while a search committee seeks a permanent successor for Dean Robert A. Brown.



Vander Sande

The appointment of Professor Vander Sande is effective August 1, when Dean Brown becomes provost, succeeding Professor Joel Moses. Professor Vander Sande served as interim dean in 1995 when Profes-

sor Moses became provost. Professor Brown, who came to MIT in 1980, has been dean since January 1996. He was head of the Department of Chemical Engineering from 1988-96.

Professor Vander Sande, a 1966 graduate of Stevens Institute of Technology, earned the PhD from Northwestern University in 1970 and was a Fulbright Scholar at Oxford University before joining the MIT faculty in 1971. He was named associate professor in 1975 and full professor in 1981. He has been the Cecil and Ida Green Distinguished Professor of Materials Science and Engineering since 1991. Professor Vander Sande became associate dean of engineering in 1992.

Dresselhaus honored by WSTI

Institute Professor Mildred S. Dresselhaus was one of five women inducted into the Women in Science and Technology International (WSTI) Hall of Fame in June.

"These women do a very good job at what they do, and they have been very encouraging to other women in the science and technology community," said Sheryl Root, a WSTI board member.

Professor Dresselhaus is a leading researcher of carbon-related materials at MIT. She has co-written three books on carbon science and done extensive research on fullerenes—compounds assembled from carbon atoms in structures resembling geodesic domes—and on fullerene-related carbon nanotubes.

"These days, women have the concept that they can do things just as well

as men," Professor Dresselhaus told the San Jose Mercury News. "I think that [attitude] is something we didn't have 30 years ago."

The other inductees are Dr. Anita Borg, a computer scientist at Xerox Corp.'s Palo Alto Research Center who developed and patented a method for making memory systems faster while working at Digital Equipment Corp. in the 1980s; Gertrude B. Elion, scientist emerita at Glaxo Wellcome Inc., co-recipient of the 1988 Nobel Prize in medicine; Julie Spicer England, a vice president at Texas Instruments who is co-holder of six patents related to infrared process technology; and Dr. Elinor F. Helin, principal investigator for the Near Earth Asteroid Tracking Program (NEAT), which has discovered a significant number of near-earth

objects for the Jet Propulsion Laboratory.

The premiere award for women in science and technology worldwide, the WSTI Hall of Fame was launched in 1996 to recognize, honor and promote outstanding contributions women make to the scientific and technological communities and to society.

Looking for past articles?

Find current and archived MIT Tech Talk articles as well as current calendar and job listings. Go to <<http://web.mit.edu/newsoffice/tt>>.

Coordinators help areas prepare for SAP rollout

■ By Robert Murray
Management Reporting Project

Four school and area coordinators are playing an important role this summer in helping MIT offices prepare for the next steps in the rollout of SAP, MIT's new financial system.

Toby Levi, administrative officer of the List Visual Arts Center, worked with School of Science coordinator Brian Tavares in June. "Dealing with Brian was quite refreshing," said Ms. Levi. "He came in with no assumptions about what we knew about SAP, and was ready to explain everything in detail. We showed him how we need to track our expenses, and then Brian explained how we could accomplish that in SAP... It's good to know that even with a small department like ours, SAP can fit our needs."

Last year, the Management Reporting Project team and the assistant deans proposed the appointment of resource and liaison people—a team of individuals who understand the business activities in the Institute's departments, labs and centers (DLCs), and who could work with DLCs to complete the transition to SAP. They felt that the successful implementation of SAP required that the Management Reporting team and the users understand their common objectives.

"Realizing that administrators are faced with the challenge of maintaining their normal workflow while implementing a new financial system, we saw the need for people who could help them understand what SAP can do, how to best navigate through the system and produce reports, and how to rethink the work they do in an effort to streamline current methods," said Sheila Kanode, assistant dean for finance and personnel in the School of Engineering. "We went out to look for people who understood the daily administrative challenges facing the DLCs—and thought it very important that this understanding be based on direct DLC experience."

TEAM MEMBERS

A search committee selected Rob-

ert Davine, Jennifer Kratochwill and Brian Tavares to be the new school coordinators. Because they need to represent both the interests of the academic areas and Management Reporting, the three coordinators report jointly to Assistant Provost for Administration Doreen Morris and Management Reporting Project Director Katherine Cochrane.

Ms. Cochrane designated Management Reporting team member Shirley Picardi to serve as an area coordinator. Dr. Picardi works in the same manner as the school coordinators, but focuses instead on the offices in the student and nonacademic areas.

Efforts are under way to fill two additional school/area coordinator positions. Interested candidates with at least five years of MIT experience, a keen understanding of the business activities of one or more DLCs, and a basic understanding of fundamental accounting principles should contact MIT personnel officer Jennifer Walsh at x3-4275.

The school and area coordinators have an intimate knowledge of how the DLCs do their business. Longtime MIT staff member Robert Davine, for instance, came to the SAP rollout from the Center for International Studies, where he was the administrative officer. In 1996, he served on the research management implementation team.

"As a former AO, I know how departments operate, and this knowledge is essential to assist administrators in setting up their departments for requisitioning," said Mr. Davine. He is currently the coordinator for the School of Humanities and Social Science, the School of Architecture and Planning, and the areas under the vice president for research.

"After working on several reengineering efforts, I thought it would be exciting to work directly on the rollout of SAP," Ms. Kratochwill said. She is the former fiscal officer for the Laboratory for Computer Science and now serves as the coordinator for the School of Engineering. She has participated on



Learning to use SAP at the List Visual Arts Center with the help of coordinator Brian Tavares (center) are Toby Levi, administrative officer (left) and Barbra Pine, senior office assistant (right). Photo by Donna Coveney

Management Reporting's departmental procurement implementation team, internal provider team and requisition testing team.

Mr. Tavares has been at MIT for 10 years, first as the fiscal officer in the Department of Materials Science and Engineering, and most recently as a member of the internal audit staff. In

"I'm impressed by how much SAP knowledge is already in place."

—Jennifer Kratochwill

early 1995, he served on the original Management Reporting team, which developed the management reporting vision that the Institute later adopted. In the summer of 1996, he was a member of the financial management implementation team.

"I wanted to take an active role in the changes going on at the Institute," he said. "This is a great chance for me to learn how the departments can best conduct their business with SAP today, and see what additional capabilities will be available to them in the future." Mr. Tavares is assisting the departments in the School of Science and the areas reporting to the provost.

Dr. Picardi could serve as a cross-functional team all by herself. Among the positions that she has held over the past 28 years at MIT are graduate student, Industrial Liaison Officer, secretary of the Alumni Association, bursar, and most recently, director of I/T Competency in Information Systems. In the spring of 1994, she was a member of the original core reengineering team that assessed and recommended to senior administration which Institute processes could most benefit from reengineering efforts.

SUMMER WORK

This summer, the coordinators are helping administrative and fiscal officers design an optimal financial structure and a requisition approval structure for their areas. The key tool for this work is a spreadsheet (often large) showing all the "cost objects" (general, fund and research accounts) that are currently assigned to the department.

In SAP, cost objects are grouped into "funds centers," which are used to control budgeting and spending. The bulk of the setup work involves assigning meaningful groups of funds centers to "spending groups," based on common requisitioners and/or approvers.

Rather than requiring each requisitioner to have approval for each cost object, requisitioners can be given authority to spend or commit funds on a funds center—or on an entire spending group. By eliminating the need to grant requisitioning authority for each new cost object, maintenance of the approval structure is much easier. Funds center authority automatically covers new cost objects as they are added to a funds center.

"My approach is to provide data about a department's accounts and users, and help them understand SAP and their options for a new financial structure," explained Dr. Picardi. "I then gather enough information to hand off to the authorization setup team so they can begin their configuration work. I might end up contacting each area four times over the summer to get the structure just right. It's an iterative process."

KEEP IT SIMPLE

Dr. Picardi is urging her contacts to keep it simple. "SAP is a robust product that is used in all kinds of organizations. You can configure it to be as complicated as you want, but maintenance down the road could be onerous. A simple structure is easier to set up

and to maintain."

The coordinators are now working in high gear. They expect to visit every department, lab, center and administrative office by mid-August. Following the end of the current rollout, they will continue to work with their assigned areas to refine and enhance the basic implementation.

"I'm impressed by how much SAP knowledge is already in place," said Ms. Kratochwill. "Many of the people I meet with have already mastered the new terminology and have given some thought to how they would like to structure their areas."

Mr. Davine is finding that the departments he visits are ready to move forward—with varying degrees of enthusiasm. "I thought I might encounter a lot of anxiety," he said. "This new system does ask people to change some of the ways that they work. However, the Institute is committed to SAP, and people want to get on with the changes."

The school and area coordinators welcome suggestions from the MIT community on how they can best help departments, labs and centers prepare for the rollout of SAP. The full coordinator team can be contacted via e-mail at <mr-sac@mit.edu>.

Institute Calendar

* Open to public
** Open to MIT community only

Tech Talk Calendar and Student Notices are on-line at <<http://web.mit.edu/newsoffice/tt/listings>>.

Next deadline for listings: Noon Friday, August 7. Covers events from Wednesday, August 12 through Sunday, August 30. Listings for the Institute Calendar and Student Notices should be submitted using the web form at <<http://web.mit.edu/newsoffice/tt/calform>>. Questions can be e-mailed to <ttcalendar@mit.edu> or call x3-2704. Early submissions encouraged.

July 15-August 16

SEMINARS & LECTURES

TUESDAY, JULY 21

Concept of a Nuclear Plant Based on the Fusion Reaction of Protons with Ions of Boron*—Dr. Alessandro Ruggiero, Brookhaven National Laboratory. Sponsored by Plasma Science and Fusion Center Seminar Series. 4 pm, Rm NW17-218. More info: x3-8101 <rivenberg@psfc.mit.edu>.

COMMUNITY CALENDAR

Electronic Swapfest*—Buy, sell or swap computer software, hardware, radio parts. Buyers \$4 (\$3 with MIT ID), Sellers \$10. 9am-2pm, third Sunday of each month, all summer long, rain or shine. Albany and Main Streets. Free parking. Sponsored by WIMX, the MIT Electronics Research Society.

Wives Group**—A support network sponsored by MIT Medical for partners and spouses of students, staff and faculty. Meetings held every Wednesday. More info: Jennifer at x3-1614 or <<http://web.mit.edu/medical/wivesgroup>>.

International Dancing. Sunday nights in the Sala, all summer. 7:30-11pm. Early teaching at 7:30pm, regular teaching at 8pm, request dancing begins at 9:15pm. More info: <richards@theory.lcs.mit.edu>.

MITAC

The MIT Activities Office (MITAC) serves the cultural and recreational needs of the MIT community (including MIT's retirement community). Two locations: (1) Walker Memorial Rm 005, 9:30am-3:30pm, Wednesday-Friday (2) Room LLA-218, x6130, Lincoln Lab, 1:15-4pm, Thursday and Friday only. More info: x3-7990 or <julieh@mit.edu>. MITAC accepts only cash or a personal check made payable to MIT. MIT IDs must be presented.

Riverside Amusement Park (Agawam, MA)**—One day park pass good any day through October. Tickets: \$16 (reg. \$24.99/height 36" and above; under 36" free).

Six Flags Great Adventure (New Jersey only)**—Early bird one-day pass into 125-acre theme park and 350-acre drive-through Safari, through October. Tickets: \$27 (reg. \$40).

Water Country (Portsmouth, NH)**—One-day park pass good any day. Tickets: \$19 (reg \$24.95); \$16.95 at the gate for children under 4 feet tall; age 2 and under get in free.

Trapp Family Lodge Weekend (Stowe, VT)**—Sun., Nov. 8 thru Wed., Nov. 11. Tickets: \$215 pp double for two nights (Sun. and Mon. evening) and \$315 pp double for three nights (Sun., Mon., and Tues. evening).

Museum Passes**—Children's Museum, \$4 (reg \$6-7). Museum of Science, \$4 (reg \$7-\$9). NE Aquarium, \$5.50 (reg. \$5.50 and \$11).

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

We will be closed for vacation August 3-14
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Costa talks about job classification and compensation system

(continued from page 1)

How are jobs classified currently?

The current classification system assigns points based on entry qualifications, job content, required knowledge, responsibilities, impact and working conditions. The points then map to one of 42 salary ranges. After the job is scored by the personnel officer supporting the department, a committee reviews the assignment of the salary range, checking for a correlation between that job and other positions within the same salary range.

What are the goals of this project?

We have developed seven major goals that are aggressive yet attainable through this redesign process. They include the following:

- To produce a system that is easy to understand, access and use;
- To enable managers and supervisors to creatively compensate and reward their most effective employees;
- To provide a mechanism to recognize special market conditions and "hot" skills;
- To expand MIT's use of salary information gathered from the external marketplace;
- To eliminate reclassifications that are unrelated to bona fide changes in duties and responsibilities;
- To introduce the use of variable pay to recognize the varied and special needs of the Institute's departments, laboratories and centers; and
- To provide efficiencies in salary administration through the use of new technology.

How will you go about doing the work?

In addition to a core group of personnel staff, we have assembled review and advisory groups comprised of representatives from a wide cross-section of departments and schools to guide us in our efforts. Including a broad spectrum of advisors will ensure that the priorities, issues and values of all areas are heard and considered in our work. In addition, we have retained the services of an outside compensation consulting firm, the Wilson Group of Concord, MA. The Wilson Group are experts in compensation and reward systems and will help to ensure our new system is sound, durable, and completed in our projected time frame.

(See accompanying article for the names of the core team and the project advisors.)

Costa

Will you look at the "marketplace" in terms of what other organizations pay for particular skills?

Yes, it is one of our main project goals to expand our use of external market data. MIT has many different marketplaces for administrative staff—other universities, as well as for-profit and not-for-profit organizations at local, regional, and national levels.

Will every administrative staff position on campus be subject to reclassification and possible change in salary as a result?

All 924 jobs will be fit into the new pay structure. It's unlikely that this work will result in salary changes for individuals. It will be important to identify and create a plan to address any significant equity issues that we may discover in comparing salaries internally to other jobs and to our competitive markets.

If salary increases are indicated for a particular job or family of jobs, it will likely occur over a period of time, and will depend on MIT's overall financial situation. If through our comparisons we see that a job or family of jobs is

paid high compared to market, then we will make recommendations on how to address this situation.

One way to deal with salaries above market would be to freeze the base pay for the job(s) in question, and replace a base-pay review increase with a lump-sum payment. This would serve to reward the employee for work well done in the review period, establish a maximum salary amount that MIT is willing to pay for a particular kind of work or job, and allow the market to "catch up" without continually escalating salaries above market. Actual salary decreases for good performers are rare in any organization, and would seem counter-cultural for MIT.

The project may have several beneficial outcomes unrelated to salary, such as producing an accurate and up-to-date job description, a documentation of skills and competencies, and a sense of what's required to develop one's career at the Institute. It will also provide managers with better guidelines for coaching and rewarding staff members.

Will MIT continue to provide merit increases for administrative staff on an annual basis?

Yes. The project will not affect the review cycles of any payroll category, so I expect administrative staff reviews to continue, with salary changes effective July 1.

How will community members get information about the Classification and Compensation project, and will they be able to provide input?

We'll be communicating with the MIT community periodically as the project progresses. Over the next year, look for updates in MIT Tech Talk, on the Personnel Office's web page at <<http://web.mit.edu/personnel/www/>>, and in open-session group meetings. I encourage individuals who want to provide input to speak with the project advisor for their area.

When do you expect to finish reclassifying the administrative staff, and how might this work affect other payroll categories?

The project we've undertaken is large and complex. We have mapped out a plan and intend to communicate the final products sometime in mid-1999, and as I mentioned earlier, with plenty of updates along the way.

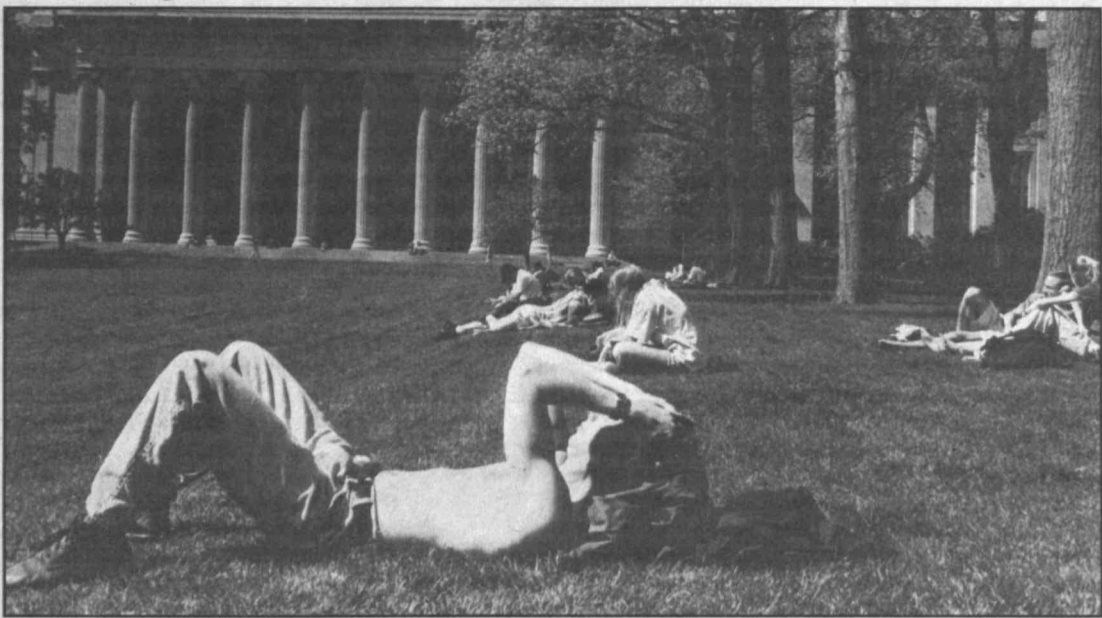
Our work on the administrative staff classification and compensation structure will not have any immediate effects on other payroll categories. Feedback from the community has informed us about some very specific limitations of the current system for administrative staff, and we've received a set of recommendations from the HRPD team on how improvements can be made. This project work represents action on the specific issues that were brought to light.

Although we have no specific plans to redesign other payroll categories at this time, I'm confident that we will develop better practices and identify some processing efficiencies that may be applicable to other payroll categories, such as a simplified tool to update job descriptions, the identification of competencies needed for success at the Institute, and technological improvements to the annual review process.

How will this project and the HRPD team's work on competencies fit together?

Members of the HRPD team are on the design group for the Classification and Compensation project, specifically to help us incorporate their research into the redesign. We're working closely together to take advantage of all the knowledge that has been and is being developed in the competency area at MIT. The projects are mutually supportive.

Courting the sun



Urban studies and planning senior David Honig takes a sun break on Killian Court.

Photo by Donna Coveney

Human Resources work progresses; report summaries to be placed on Web

■ By Deanna Sokolowski
HRPD

Three of the six teams involved in redesigning MIT's human resources practices are well on their way to finishing their work by late this fall. Three others have already presented their final recommendations to the Reengineering Steering Committee, and one of those reports is now available on the web.

As each team within the Human Resources Practices Design/Development Project (HRPD) issues its report, a summary will be placed on the web at <<http://web.mit.edu/reeng/www/hrpd/>>, and a copy of the complete report will be available at the checkout desk of Barker Engineering Library. The report of the Recognition and Rewards Project Team, completed in May, is already accessible. Within the next few weeks, reports from the Orientation Project Team and the Training Policies and Administration Project Team will be issued.



The three other HRPD teams (see below) are planning to complete their work in the late fall. Their reports, as well as that of the HRPD Core Team, will be presented to the Steering Committee before January 31, 1999, when the HRPD project will be concluded. Neither final approval nor funding for implementation of any recommendations has occurred yet.

ROLES AND COMPETENCIES

The Generic Roles and Competencies Team has been charged with researching and testing the hypothesis that competency-based human resource practices would provide a basis for successful hiring decisions and thoughtful transfer processes.

Since last October, team members have been working to develop generic roles (scopes of duties and responsibilities related to similar jobs) and define the competencies (predictors of performance success) that support these roles. As part of their work, they have helped build competency models for several generic roles in the School of Engineering, Physical Plant and Student Services. This information has been synthesized and a "competency

reference dictionary" specific to MIT is being developed.

The team has also worked to develop a group of competency practitioners at MIT. A number of staff members, including personnel officers and performance consultants, are learning how to integrate competencies into hiring and career development practices.

In the final phase of their work, team members will pilot competency assessment and development in the School of Engineering headquarters. They are also planning focus groups in Institute areas that have implemented competency-based practices and collecting benchmarking data from external organizations.

Their final recommendations for the development and adoption of competency-based practices will be accompanied by tools and methodologies for continued implementation. The team will also identify critical integration points with other HRPD project teams to create a system of practices designed to support the needs of the Institute, make hiring more efficient, support and encourage career development and pathing, and give recognition to employees.

Charged with building on the existing performance appraisal process, the Performance Management Team has focused not only on the actual performance appraisal process, but also on the planning/goal-setting and coaching/communication processes that should occur throughout the year.

After completing a review of data compiled through an extensive information gathering process both within the MIT campus community and from external benchmarking sites, the Performance Management Team has defined the next phase of its work. As part of the recommendations being developed, team members will detail a performance appraisal process with greater emphasis on coaching, goal setting and planning.

The team will also make revisions to MIT's performance appraisal form, and will support their final recommendations with suggested training initiatives in performance appraisals, planning and goal-setting, coaching and effective management practices.

The final report being prepared by the HRPD Core Team will include a recommended implementation plan for the continuing evolution of competency-based human resources practices after the HRPD team disbands in early 1999.

An August retreat with managers from Personnel is being planned to consider the implications of the recommendations being developed and to formulate a proposal for long-term implementation. In preparation for the retreat, the HRPD team has held a series of information/idea sessions for Personnel staff to solicit input on the proposed recommendations.

HRPD project core team members and advisors

CORE PROJECT

DESIGN TEAM MEMBERS FROM PERSONNEL

Patricia Brady, HRPD team leader
Nora Costa, manager of compensation
Dineen Doucette, administrative assistant
Kenneth Hewitt, senior personnel officer
Alyce Johnson, personnel officer
Robert Lewis, director of personnel for employee relations
Judy Raymond, compensation system specialist
Joan Rice, vice president for human resources

PROJECT ADVISORS

Ramona Allen, personnel administrator, Biology
Sharon Bridburg, special assistant to the dean for personnel administration, Office of the Dean of Students and Undergraduate Education
James Bruce, vice president for Information Systems
Allan Bufferd, deputy treasurer, Treasurer's Office
Allison Dolan, director, I/T staff development and resource management, Information Systems
Carol Fleishauer, associate director for collection services, Libraries
Genevieve Hammond, personnel and operations administrator,

Alumni/ae Association
William Hecht, executive vice president, Alumni Association
Annette Jacobs, executive director, Medical Department
Bonny Kellermann, recording secretary, Treasurer's Office
Nancy Kelly, administrative officer, President's Office
Doreen Morris, assistant provost for administration, Provost's Office
Beth Ogar, director of finance and administration, Resource Development
Charlene Placido, assistant dean for research, Provost's Office
Donna Savicki, assistant dean for administration, School of Engineering
Charles Shaw, Institute auditor, Audit Division
Vicky Sirianni, director, Physical Plant
Barbara Stowe, vice president for Resource Development
Glenn Strehle, vice president and treasurer
Rosalind Williams, dean of students and undergraduate education
Kathryn Willmore, secretary of the Corporation, director of Public Relations Services and executive assistant to the president
Ann Wolpert, director of Libraries
Sally Wright, manager of outpatient administrative services, Medical Department

High school teachers come to MIT as students

■ By Denise Brehm
News Office

Kids recently sprung from classrooms for the summer might be tickled to learn that a few of their teachers lost no time in grabbing their vacated seats. A select group of middle school and high school science and math teachers became students themselves, spending an intensive week at MIT and taking in knowledge in the best MIT fashion: "like drinking water from a fire hose."

Fifty-one teachers from 17 states as well as Lebanon and Saudi Arabia attended the Science and Engineering Program for Middle and High School Teachers, an educational program founded 10 years ago by Professor Ronald M. Latanision of materials science and engineering. This year, the program featured lectures by 26

MIT professors and researchers who explained and often demonstrated some of the latest cutting-edge research. The daily dose of eight hours of presentations ran the gamut from basic math, physics and biology to advanced applications such as aircraft engines and genetic engineering.

The goal of the June 21-27 course was to emphasize the connection between the basic science taught in public schools and the way engineers apply that science to advanced technology. Professor Latanision, director of the program, said it was established to provide educators with a different perspective on the subjects they teach.

"We're all part of the same educational continuum," he said. "High school students today are our students tomorrow, and ultimately, they represent the future of the educated population."

Once they complete the week-long MIT program, participants are granted membership in the New England Science Teachers (NEST) organization, the goal of which is to enhance scientific, mathematical and technological literacy. NEST offers follow-up workshops for its members, as well as participation in Scientists-On-Line, providing NEST teachers and their students electronic access to MIT faculty via the Internet.

"The smorgasbord of topics presented in one week at MIT has provided me with a nutshell perspective of current research in science and technology and its potential impact on society," said Beverly Lee, a physics teacher from Leagus City, TX, and a 1996 participant. "Thanks for the brain food."

Writers from the MIT News Office attended some of the presentations. Their synopses of just a few of those lectures appear below.

Lewin shows properties of sound

Can you see sound? Visiting science teachers did when Professor of Physics Walter Lewin presented some of the fundamentals of sound and music in "A Feast of Sounds."

This was no conventional feast tempting the senses of taste and smell, but it did make good use of both sight and sound, and touched a good many eardrums. Professor Lewin used compelling visual demonstrations of frequency and resonance to explain sound waves, then showed the potentially destructive effects of resonance by shattering a wine glass with a loud, even tone no opera singer would envy.

Sound is a pressure wave that compresses and decompresses the air to make a vibration, he explained—a disturbance that propagates similarly to the way unrest moves through a queue of people when one begins elbowing and shoving the next. When that pressure wave reaches your ear, "the eardrum begins to vibrate at the same frequency, and your brain tells you something," he said.

A person whose hearing is excellent hears sound in the 20-20,000 Hz range. (A hertz is one oscillation per



second.) As that person ages, he or she may lose the ability to hear frequencies above 5,000-10,000 Hz.

For perspective, Professor Lewin explained that the lowest key of a piano vibrates at 27 Hz; the highest, at 4,000; and the Middle A, at 440 Hz. "Certain combinations of frequencies are very pleasing to us," he said. In other words, they're music to our ears.

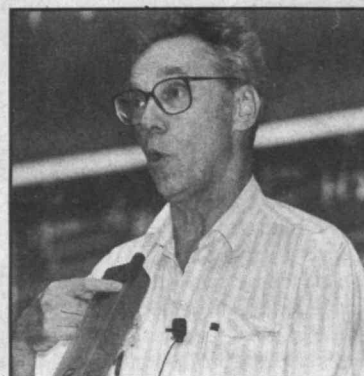
To demonstrate harmonics, he used a rubber hose clamped at one end and attached at the other to a mechanical device that moved it up and down while keeping the two ends relatively stable. With the hose stretched in front of a black velvet backdrop, he shone a strobe light on it to arrest movement and cap-

ture the hose in several frequencies of oscillation, including the first, second and third harmonics.

Professor Lewin described how musicians manipulate various musical instruments to produce sound. And on an overhead screen, he provided spectral analyses of live musical performances by students on the violin, saxophone and the French horn.

RESONANCE WRECKAGE

The most dramatic demonstration dealt with the destructive potential of resonance, which can occur, for instance, when wind or sound excites an object and causes it to vibrate at a very special frequency to which it is extremely sen-



Professor Walter Lewin used several noise-making devices to create "A Feast of Sounds" in his talk to teachers.

Photos by Donna Coveney

sitive. He showed a video of the infamous bridge in Tacoma, WA, that began swinging in the breeze, achieved resonance due to the wind and then, when the wind increased, was snapped in two by the torsional forces produced by the oscillations.

In the classroom, Professor Lewin demonstrated the impact of resonance on a smaller scale. He first rubbed a moistened finger around the rim of a wineglass to find the tone, or frequency, that is the resonance frequency of that glass. Then, using an electronic device to reproduce the tone at high volume, he shattered the vessel with sound waves.

Denise Brehm

Robots gather data in deep sea

Underwater robots developed at MIT are helping scientists probe mysteries of the ocean from its influence on climate change to one of its denizens: the giant squid.

About 30 science teachers heard about these and other applications of autonomous underwater vehicles (AUVs) in a talk by James Bellingham, director of MIT Sea Grant's AUV Lab. At the same session, one of the roughly five-foot-long AUVs was the focus of a "show and tell" by Robert Grieve, field operations manager for the lab's fleet of five robots.

Recent expeditions include last year's search for the giant squid (which the scientists didn't find), and a trip to the Labrador Sea to study ocean circulation. The latter involved tests of a new underwater docking system for the robots that will allow the scientists to leave them for extended periods of time to collect data. "We're still developing this. It will be another five years or so before the system will be routinely used," said Dr. Bellingham.

"The ocean is important to understanding climate," he said. Dr. Bellingham explained how AUVs are the "sensing tip" of a complicated network of computers the scientists are developing to help determine the impact of the ocean on climate change. The data the robots collect will be used in computer models for climate change.

Elizabeth Thomson

Scientists ask: was it once an RNA world?

For scientists, the question isn't just how life began. The real question might be: How many times did life begin?

In the early years of Earth's existence, there were so many cataclysmic events like meteor impacts that the oceans would repeatedly boil away and nascent life forms would be wiped out. So the fact that life seems to have started 3.5 billion years ago—rela-

tively soon after the planet was formed—indicates that life may have started several times before it had enough time to evolve. Meanwhile, the chances of having the right components fall together in the right configuration seem unbelievably small.

David Bartel, assistant professor of biology, explained to visiting teachers that biologists have wrestled with a chicken-and-egg problem. What was around first: protein, the building blocks of living matter, or nucleic acid, the building blocks of genetic material?

RNA, formed on a DNA template, plays a crucial role in protein synthesis and enables genetic material to replicate itself.

Although there's no question that it's now a protein world, was it an RNA world way back when? "It's the

molecular biologist's dream—and the chemist's nightmare—that we can deduce that RNA played more of a role than it does today," Professor Bartel said.

To answer questions like these, he and his colleagues are engineering a ribosome to carry out slow, simple reactions in the hope that it will provide clues to whether and how RNA nucleotides can join to another piece of RNA to form different sequences and increase its length. A ribosome is a small cell component in very simple organisms where the sequence of amino acids in a polypeptide chain is specified.

"We're having a lot of fun seeing what RNA can do," Professor Bartel said. "We're using the same techniques that exist in nature to find out about this ultimate evolutionary experiment."

Deborah Halber

Medical talk



Associate Professor Jacqueline C. Yanch of nuclear engineering and Whitaker College of Health Sciences and Technology spoke to teachers on "Radiation Science and Technology in Medicine." She pioneered a technique called boron neutron capture synovectomy for treating arthritis.

Photo by Donna Coveney

Honeycomb structures studied

What do potato chips, cork and plastic foams have in common? All are highly porous materials with a honeycomb-like cellular structure.

Such materials were the subject of Professor Lorna Gibson's talk during MIT's annual Science and Engineering Program for Middle and High School Teachers. "My research focuses on the mechanical behavior of these materials," explained Dr. Gibson, the Matoula S. Salapatras Professor of Materials Science and Engineering. To that end, she develops mathematical models of cellular materials to predict, among other things, how their cell walls deform under pressure and how they fail.

The models have a number of applications. For example, they can be used to identify the best foam to use inside "sandwich" structures such as skis and the flooring panels in airplanes, and in safety devices such as helmets.

Professor Gibson and colleagues are also working to understand changes in density and strength of

trabecular bone, the foam-like material at the ends of long bones and in vertebrae. "People with osteoporosis have increased risk of hip and vertebral fractures which result from a reduction in the mass of trabecular bone in these areas," she explained.

Her work also has applications in tissue engineering. For example, Professor Ioannis Yannas of mechanical engineering and materials science and engineering has developed an "artificial skin" for burn victims and others in which skin cells implanted onto a porous polymer scaffold grow into a new tissue.

"The scaffold looks an awful lot like the foam materials I've been talking about," Professor Gibson said. As a result, "we're looking at the contractile forces the [skin] cells apply to the scaffold to understand how the scaffold mediates healing and why it doesn't cause as much scar tissue" as an untreated area.

Elizabeth Thomson

Rogers calls for math skills

Although MIT students are good at math, there are ways they can be better, Professor of Mathematics Hartley Rogers Jr. told a gathering of science and math teachers at MIT last month.

He would like to see students who are better able to visualize in three dimensions. This skill is needed for multivariable calculus, he said.

Professor Rogers also wants to see students well-versed in logical arguments. "Teach them to reason," he said he hears from other departments that rely on those skills.

And finally, he said students should understand before they get to college that geometry is a model for how physical phenomena work, but it doesn't precisely reflect the real world. "If you're looking for counterparts of lines, circles and planes in the real world," you won't find them, he said. "Euclidean geometry is a different world, created by the human mind to understand what's true and not true."

He would like to see geometry taught in a way that emphasizes its three-dimensional nature, such as thinking about the relationships of planes, lines and points and picturing configurations of lines and planes in space.

On the other hand, he said today's math students are better prepared in fields such as probability than they were in the past.

Deborah Halber

Professor adrift in Pacific Ocean is helped by MIT employee

(continued from page 1)

trying to surface for air.

"We were bouncing along under the boat. We didn't know which way to swim. Fortunately it was moving pretty fast and passed over us," he said.

The Sheridans were lucky to find one another as soon as they resurfaced. They were also lucky to grab hold of a life raft, one of those cut free by the crew before the vessel sank. For about half an hour the couple clung to that lightweight raft, drifting on the dark sea. The water was warm, so hypothermia wasn't a fear, but the swells were so large they couldn't see around them.

At last they came across a dinghy with half a dozen other people in it, some crew from the sunken boat and some passengers. The Sheridans joined the group in the small boat. Later, several crew members on an inflatable raft tied up to the dinghy.

"The amazing thing is that people were pretty cool," Professor Sheridan said. "We'd all been together [on the cruise] for three days and the group had bonded pretty well. There was no hysteria." In fact, he said the Ecuadorian crew later remarked on the hardness of this group of vacationing Americans, thrust into a disaster situation without warning.

Aboard the dinghy was a woman with a serious head wound. The top of her scalp had been sliced off, probably by the boat's propeller as it swept over her in the water. She lost a lot of blood but survived without brain injury. A New Hampshire man's arm was cut by the propeller in the same way. He had no idea where his wife was or whether she had survived, but he was a pharmacist and kept busy giving first aid to the injured woman.

"We were in good shape at this point. We probably could have lasted all night," said Professor Sheridan.

Fortunately, they didn't have to.

The inflatable raft was equipped with a few emergency flares, which he helped set off when they spotted the lights of another boat in the distance. "A couple fizzled; some worked," he said. About half an hour after lighting the flares, they saw the lights of the other boat again. They appeared to be flashing.

"That's when we knew that they knew we were there," said Professor Sheridan. "It was an incredible experience to see those flashing lights. It looked like it was turning, going back and forth. We deduced that it was looking for—and hopefully picking up—other people along the way, which it was."

It took nearly an hour for the boat to reach the dinghy.

DRAMATIC RESCUE

Dr. Peter Reich, chief of psychiatry at MIT Medical, happened to be standing at the bow end of the upper deck of a different boat plying those same waters in the Pacific. The seas were rough and he found that by holding onto the rail and keeping his eyes fixed on the horizon, he could enjoy the rollercoaster without getting seasick.

"The boat was tipping rather dramatically. It was kind of fun, although I had some concern about the height of the waves," said Dr. Reich. He and his wife, daughter, son-in-law, and his wife's sister and her husband were exploring the Galápagos Islands on a trip very similar to the Sheridans', but run by a different tour group. They had seen the *Moby Dick*, a boat similar in size to theirs, as it left Isla Española earlier that day.

"It was about 7pm. The sun sets early in the Galápagos because it's near the equator. I saw up ahead of us this bright red light. I didn't know what it was, but the crew member at the wheel knew it was a distress signal," said Dr. Reich.

They traveled several miles to reach the site where the *Moby Dick* had capsized. As they approached, Dr. Reich and the others saw debris in the water. They also saw a floating light, a sign to the crew that a boat had gone down.

"When a boat sinks, there's apparently a radio that floats off the top of the boat up to the water's surface, broad-

casting a Mayday and flashing a light. That signal was relayed by satellite and later picked up in Panama. We saw the light in the water.

"We were looking, searching. We heard cries for help, and with a flashlight beam saw the faces of people in a tippy little raft. Through a rather difficult maneuver, we managed to get alongside them without capsizing their raft," Dr. Reich said. By then, they had also located the dinghy containing the Sheridans, as well as the inflatable raft attached to it.

"We now had 19 people to rescue. It was very difficult in those high seas. One of our sailors leapt into the water with a ring and swam to them and one by one took them up. He climbed up the boat's tailgate and passed them up to us in the cabin, where we wrapped some of them in blankets and gave them water and food—whatever they needed. My daughter is a pediatrician and she cared for the injured. Most were just badly shaken up.

"Of course there were lots of seasick people. The boat was tossing and tipping because the captain was holding it broadside to the waves so as not to capsize the dinghy. But this made it very rough. As you walked around the cabin, you could be thrown about and I was afraid there would be secondary injuries. It was pretty chaotic."

When all the survivors had been brought on board, it became obvious that some were missing. "They were in good spirits because they had been saved. But then, not everyone had been, and we had to deal with the emotional crisis," said Dr. Reich, who added that there were happy moments as well. "Two people had a reunion in the cabin. A woman who had already been rescued saw her husband climb up the back of the boat. She very emotionally cried out for joy."

"Eventually, because of the injured people, we were given clearance to leave the area. Ordinarily in this situation a boat would have to stay and search for other survivors," he said. Another boat, whose crew was making an IMAX film about the Galápagos Islands, arrived to continue the search.

Looking back on the rescue, Dr. Reich said that when he first saw the debris he hadn't fully understood the implications. "Then we were busy rescuing people," he said. It was later, when he realized some people had not survived, that "it became distressing and horrifying. I thought 'Oh my God, that boat looks almost like ours. Maybe we could have capsized.'"

Dr. Reich also noted the remarkable composure of the people involved. "I was really impressed by Tom Sheridan's ability to stay calm and deal with this thing. I was impressed with all the survivors. They were not in shock—not in any state—when they came on board."

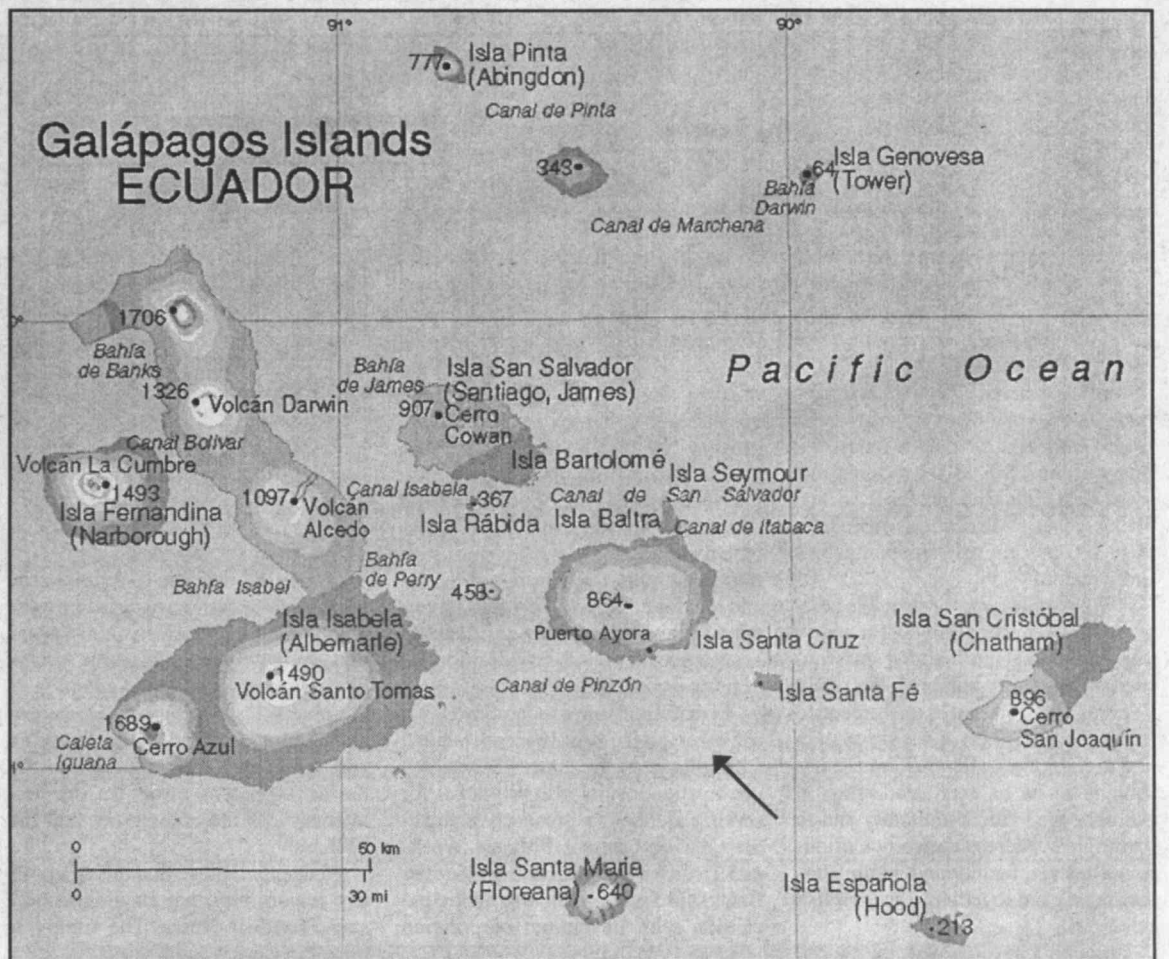
Although the two MIT employees had never met before, it didn't take long for Professor Sheridan and Dr. Reich to realize the MIT connection. "Somebody mentioned MIT and I said I worked there, and we started talking. I saw that Tom was okay except for a cut over his right eye. I asked if it needed attention, but he said it was minor," said Dr. Reich.

The group finally arrived at Isla Santa Cruz, their original destination, at about 2am, where they received medical care and lodging in the town of Puerto Ayora.

EXPLORING EVOLUTION

The disaster occurred on the third day of a week-long cruise planned by Elderhostel, a Boston-based organization that offers educational tours for people age 55 or older. The *Moby Dick*, a converted fishing boat, had left the small island of Isla Española that afternoon on a course for Isla Santa Cruz. The boat carried seven crew members, a guide/interpreter and 15 American tourists.

The trip was to be an exploration of the Galápagos Islands—located about 600 miles off the Ecuadorian coast—and their unusual species of flora and fauna, some of which exist nowhere else in the world. Charles Darwin made



The *Moby Dick* was sailing from Isla Española to Isla Santa Cruz when it capsized on June 10, killing four passengers and leaving 19 people adrift in the ocean for several hours. Survivors, including Professor Thomas Sheridan of mechanical engineering and aero/astronautics, were taken to the town of Puerto Ayora on Isla Santa Cruz. The arrow indicates the approximate location of the accident.

his study of finch beaks in this group of about 15 volcanic islands, eventually leading him to formulate the theory of evolution he explained in *The Origin of Species* but which is popularly known to many as "survival of the fittest."

While the Sheridans were forced to prove their mettle just to survive the trip, travel to the Galápagos isn't usually so demanding. Paul Barrett, who retired as director of MIT's Physical Plant in 1990, and his wife took an Elderhostel trip to the Islands in January 1996. He describes it as "a great trip" with no heavy seas, and plenty of time exploring the islands.

"The weather was very good. We'd spend every night on the boat and stop on the islands during the day. The crew would troll off the back of the boat and catch fish, which we'd have for dinner. We did a lot of snorkeling and swam with the young sea lions," he said, and went on to describe some of the unusual wildlife.

"The blue-footed boobies are quite odd-looking, and perfectly tame. When you walk on the islands, you have to stay on the trails for conservation reasons. Several times there was a blue-footed booby on the trail—you know, just sitting on its nest. We'd have to go around it because it wouldn't move. All the animals were very tame. We saw iguanas, very large tortoises that are a hundred years old and little penguins."

NOT WHAT THEY HAD HOPED

While the Sheridans' experience would fit neatly into any 'explorers and adventurers' category, it didn't allow them to see as much of the islands as they had hoped. Professor Sheridan said they saw boobies—grayish seabirds with bright blue or red feet—and lounging sea lions on Isla Española the morning of the accident. But he hopes to see more of the Islands another time, possibly even by the same route.

"After an accident like this, you almost have to feel that you're safer," he said. A disaster like the *Moby Dick* accident isn't likely to happen twice in the same way.

"The crew of our boat, the crew of the rescue boat, the travel agency, the Elderhostel people were all just absolutely super—professional, caring and every good thing you can say. Of the 11 survivors, not one—I don't think—has a grudge against any of the people involved."

Oddly enough, it wasn't the first time Tom and Rachel Sheridan had capsized in a boat. Professor Sheridan



The Galápagos Islands are about 600 miles west of Ecuador.

said the first time he took his wife sailing, during their engagement, he capsized the small boat deliberately, "because for some reason I thought she ought to have that experience."

Four of the *Moby Dick*'s passengers did not survive; only two of their bodies were recovered. One of the dead, the oldest of the travelers, was a man who, according to another of the survivors, chose to let go of a ring buoy to help ensure the survival of others clinging to the same lifesaving device. His wife, whom he had been unable to locate in the water, also died.

The woman with the head injury lost her husband; his body was not recovered.

Professor Sheridan said that despite the severity of her injury, the wounded woman made it to a gathering of the survivors held on their last night in the islands. "The bonding between people in these circumstances is incredible," he said. At that gathering, the injured woman, who is not Jewish, offered a toast to her deceased husband, who was.

"L'chaim," she said in Hebrew. "To life."

Edgerton Center offers girls' program; application deadline is July 20

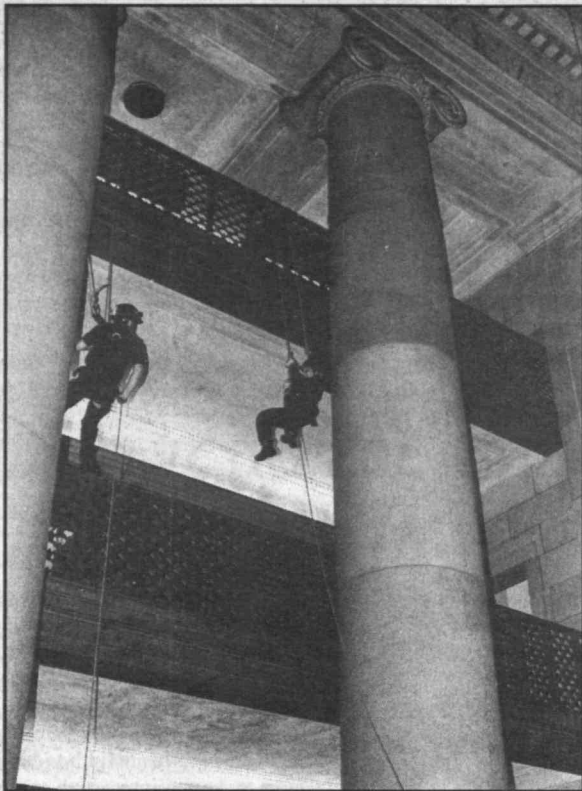
The Edgerton Center invites applications for its summer program called "You Go, Girl!" that will focus on science and career development activities for girls in the greater Boston area who will be entering ninth grade this fall.

Each day of the program, which will run from August 17-20, will begin with a hands-on science activity, ranging from electronics and lasers to LEGO design. In the

afternoon, the girls will work on projects focusing on career planning, high school and college preparation, and personal development.

The cost for the program is a suggested materials donation of \$30. For more information and an application, contact Daniele Lantagne at the Edgerton Center at x3-4629. The application deadline is Monday, July 20.

Friends turn out for Dickson farewells



Photos by Donna Coveney

In photo at left, Director of Physical Plant Victoria V. Sirianni (right) rappels from the fourth floor of Lobby 7 with David Barber of Physical Plant to deliver (in style) two bound volumes of all the buildings and projects built during the tenure of departing senior vice president William R. Dickson. The volumes (which Mr. Dickson holds in center photo) were Physical Plant's retirement gift to Mr. Dickson and contained photos of buildings and stories about Mr. Dickson, told by his colleagues. In center photo, Mr. Dickson smiles after receiving the books from Ms. Sirianni (third from left) as Mr. Barber (second from left), administrative assistant Sharon Flanagan and others from Physical Plant gather to thank Mr. Dickson and give him their best wishes. In photo at right, Mr. Dickson enjoys the barbecue in his honor, attended by hundreds in the Johnson Athletics Center.

Retiree education fund announced at dinner

Fifty-five retiring faculty and staff were honored at a Faculty Club dinner on June 1, where President Charles M. Vest unveiled a retiree education fund named in honor of Senior Vice President William R. Dickson, an MIT alumnus and employee for 40 years.

The Quarter Century Club William R. Dickson Retiree Education Fund was established by the QCC with an initial \$100,000 Institute grant to assist retirees who are members of the QCC in pursuing educational goals after retirement from the Institute. Eligible retirees may apply for grants to reimburse them for tuition for courses or training below the graduate level.

This year's co-winners for MIT longevity are Professors William T. Peake of electrical engineering and computer science (EECS) and Walter E. Morrow, Jr., director of Lincoln Laboratory—both at the Institute for 47 years. The full list of retirees follows.

- Michael Athans, EECS, 37 years.
- Irving R. Baird, Jr., Lincoln Lab, 16 years.
- Robert D. Blake, Alumni Association, 29 years.
- Richard A. Bolt, Media Lab, 21 years.

- Paul R. Bragger, Housing, 18 years.
- Estelle M. Cashman, Community and Donor Relations, 10 years.
- George H. Chihoski, Plasma Science and Fusion Center, 27 years.
- Charles C. Counselman, III, Earth, Atmospheric and Planetary Sciences (EAPS), 33 years.
- Elizabeth B. Court, Harvard-MIT Division of Health Sciences and Technology, 13 years.
- Edward S. Darna, Music and Theater Arts, 34 years.
- John J. Deely, Lincoln Lab Group 11, 12 years.
- Ann F. Delaney, Lincoln Fiscal Office, 37 years.
- William R. Dickson, Senior Vice President, 40 years.
- John J. Donovan, Sloan School of Management, 31 years.
- William F. Downes, Alumni Association, 10 years.
- George R. Elder, Sr., Campus Police, 31 years.
- Edward M. Gaposchkin, Lincoln Lab Group 91, 15 years.
- Lee Grodzins, Physics, 39 years.
- Robert L. Haefner, Physical Plant, 24 years.
- Charles H. Helliwell Jr., Civil and Environmental Engineering, 20 years.



Professor of Linguistics and special assistant to the Provost Samuel J. Keyser is enjoying himself at the Faculty Club retirement dinner with Nancy Kelly, administrative officer for the President's Office. Photo by Donna Coveney

- Norman L. Iverson, Francis Bitter Magnet Lab, 34 years.
- Howard J. Kennett, Libraries, 22 years.
- Samuel Jay Keyser, Linguistics and Philosophy, 21 years.
- Milton R. Kirste, Lincoln Lab Group 11, 11 years.
- Richard V. Maietta, Physical Plant, 10 years.
- Walter B. Martell, Physical Plant, 13 years.
- Thomas L. McCorkle, MIT Press, 31 years.
- Jane S. McNabb, EAPS, 42 years.
- Charles C. Meagher, Physical Plant, 25 years.
- John E. Meyer, Nuclear Engineering, 23 years.
- Stephen N. Miller, Lincoln Lab Group 101, 11 years.
- George L. Moran, Physical Plant, 32 years.
- Robert J. Morrison, Office of Lab Supplies, 32 years.
- Walter E. Morrow, Jr., Lincoln Lab Director, 47 years.
- Cornelius J. Murphy, Physical Plant, 39 years.
- Anna M. Nagy, Lincoln Lab Group 10, 20 years.
- Robert J. Neal, Lincoln Lab, 23 years.
- Mae Nigohosian, Sloan School, 10 years.
- William T. Peake, EECS, 47 years.
- C. Ross Peatfield, Lincoln Lab HR, 36 years.
- William F. Pounds, Sloan School, 37 years.
- Robert P. Rafuse, Lincoln Lab, 39 years.
- David V. Ragone, Materials Science and Engineering, 11 years.
- Helen M. Raine, Aeronautics and Astronautics, 31 years.
- Paul H. Rouillard, Lincoln Lab Group 18, 11 years.
- Robert Samuel, Lab for Nuclear Science, 19 years.
- Beatriz Santos, Physical Plant, 19 years.
- Eugene D. Savoye, Lincoln Lab Group 87, 10 years.
- Paul R. Schimmel, Biology, 30 years.
- Polly L. Slade-McCurley, Sloan School, 17 years.
- Walter W. Stoll, Physical Plant, 30 years.
- Mildred P. Themelis, Lincoln Lab Group 72, 19 years.
- Irving W. Webber, Physical Plant, 43 years.
- Marjorie Wedlock, Resource Development, 19 years.
- Thonekeo Xayxanavethy, Industrial Liaison Program, 17 years.



James Coleman (far left), Helen Raine, who worked in the Department of Aeronautics and Astronautics for 31 years (second from left), and her husband Vernon Raine chat with Mrs. Rebecca Vest (far right) at the retirement dinner. Photo by Donna Coveney

QCC picnic set for August 18

The Quarter Century Club Summer Picnic will be held on Tuesday, August 18, at the Johnson Athletics Center ice rink from 4:30-7 pm. Free parking will be available in the West Garage and West Garage open annex. Invitations will be sent out to all QCC members in late July.

Web consortium issues guidelines for user accessibility

Furthering efforts to ensure that people with disabilities worldwide have access to the Web, the World Wide Web Consortium (W3C) has issued the second of three public working drafts of web accessibility guidelines.

W3C's Web Accessibility Initiative (WAI) developed the "WAI Accessibility Guidelines: User Agent" specification to improve usability for all who access the web. The guidelines focus on different aspects of browser design, particularly the user interface.

Released June 18, the guidelines are part of a series of WAI accessibility guidelines that together address page authoring (released in February 1998), browsers (the current release), and authoring tools (in development). W3C is run by MIT's Laboratory for Computer Science, the National Institute for Research in Computer Science and Control (INRIA) in France and Keio University in Japan.

"The WAI Accessibility Guidelines: User Agent specification will provide guidance to manufacturers of web browsers and multimedia players to ensure that people with disabilities can use their products,"

explained Judy Brewer, director of WAI's International Program Office.

The user agent guidelines offer guidance on presentation adjustability, orientation information, navigation and control, organization of accessibility features, and compatibility with a variety of technologies. In addition, the guidelines highlight key elements of HTML 4.0 and Cascading Style Sheets Level 2, where implementation in browsers is critical to ensure support for accessibility.

ANSWERING A CRITICAL NEED

The user agent working draft is the result of a collaborative effort between disability organizations, industry and research organizations involved in WAI.

"These guidelines, which we are developing in cooperation with browser manufacturers, will clarify priorities for browser design with regard to usability for people with disabilities. We welcome public feedback while this is in working-draft status," said Jon Gunderson, chair of the WAI User Agent Guidelines Working Group and coordinator of Assistive Communication and Information Technology at the University of Illinois at Urbana-Champaign.

"Blind or visually impaired people should be able to navigate the web as quickly and comfortably as our sighted colleagues do," said Scott Marshall, vice president of the American Foundation for the Blind. "The guidelines created by the User Agent working group represent a significant step forward toward the creation of more accessible web browsers and related applications."

The W3C's WAI Accessibility Guidelines are just one aspect of a multipart approach to improve the ac-

cessibility of the web, in partnership with organizations around the world. The WAI is addressing web accessibility through five primary areas of work: ensuring that the core technologies of the web support accessibility; developing guidelines for page authoring, user agents and authoring tools; developing evaluation and repair tools for accessibility; conducting education and outreach; and tracking research and development that can affect the future accessibility of the web.

The WAI International Program Office is sponsored by the National Science Foundation and the US Department of Education's National Institute on Disability and Rehabilitation Research; the European Commission's TIDE Programme, and W3C industry members including IBM/Lotus Development Corp., Microsoft Corp., NCR and Riverland Holding.

For more information on the Web Accessibility Initiative, see <<http://www.w3.org/WAI>>.

Multimedia presentations on web made easier with new W3C tool

Television-like multimedia presentations are coming to the World Wide Web thanks to a new tool developed by the World Wide Web Consortium (W3C) run by MIT's Laboratory for Computer Science (LCS), the National Institute for Research in Computer Science and Control (INRIA) in France and Keio University in Japan.

The Synchronized Multimedia In-

tegration Language (SMIL; pronounced "smile") specification, released as a W3C recommendation on June 15, represents cross-industry agreement on a wide range of features for putting multimedia presentations on the web.

Television programs such as newscasts use many multimedia components. In these programs, the display of image, text and animation elements needs to be synchronized.

The web is already a multimedia environment, but lacks a simple way to express synchronization over time—for example, "play audio file A in parallel with video file B" or "show image C after audio file A has finished playing." SMIL enables this type of information to be easily expressed, thus allowing TV-like content to be created on the web.

"Synchronized multimedia is becoming increasingly important on the web. The SMIL recommendation will enable much-needed interoperability in this area," said Tim Berners-Lee, W3C director, inventor of the World Wide Web and a principal research scientist at the LCS.

Of course, the web offers far more than just television. For example, a search engine can be used to find a particular SMIL presentation. As the web is inherently interactive, users can use links embedded into a SMIL presentation to obtain background information on a newscast, or to order a product described in a commercial. With SMIL, users can switch from "couch potato" mode into interactive mode with a simple mouse click.

MANY ADVANTAGES

Among its advantages, SMIL is easy to use. Today, few authors write synchronized multimedia presentations for the web because existing approaches require the use of an authoring tool or to learn programming. SMIL removes these roadblocks. It does not require learning a programming language and can be done using a simple text editor.

It also improves bandwidth efficiency. In a typical television news broadcast, large parts of the screen contain text, still images and graphical elements, with full-motion video occupying only a small part of the screen

real estate. SMIL reduces the bandwidth of TV-like content, eliminating the need to convert low-bandwidth media types such as text and images into high-bandwidth video.

"SMIL avoids having to swamp the Internet with high-bandwidth video if you want to create interactive multimedia content," said Dr. Berners-Lee.

The advanced multimedia capabilities offered by SMIL give authors full creative control without sacrificing accessibility for web users who have disabilities. In particular, SMIL introduces textual description of multimedia components, provides the capability to support captioning, and supports alternate media types.

"SMIL represents an important breakthrough for accessibility of multimedia," said Judy Brewer, director of W3C's Web Accessibility Initiative International Program Office.

The increasing need for multimedia content and presentation of documents in multiple languages is well met with SMIL. SMIL's internationalization features, including the ability to include multiple audio tracks in a variety of languages, make significant steps towards enabling the proper display of multilingual multimedia documents.

The SMIL 1.0 specification was written and developed by the W3C Synchronized Multimedia (SYMM) Working Group, a mix of experts from four divergent industries: CD-ROM, interactive television, web and audio/video streaming. The W3C SYMM Working Group is comprised of key industry players including Digital, Lucent/Bell Labs, Netscape, Philips, RealNetworks and The Productivity Works, as well as research and government organizations such as the Centre for Mathematics and Computer Science in the Netherlands and the National Institute of Standards and Technology.

A W3C recommendation indicates that a specification is stable, contributes to web interoperability, and has been reviewed by the W3C membership, who favor its adoption by the industry. Further information on SMIL can be found at <<http://www.w3.org/AudioVideo>>. For more information about the World Wide Web Consortium, see <<http://www.w3.org>>.

Robotic might

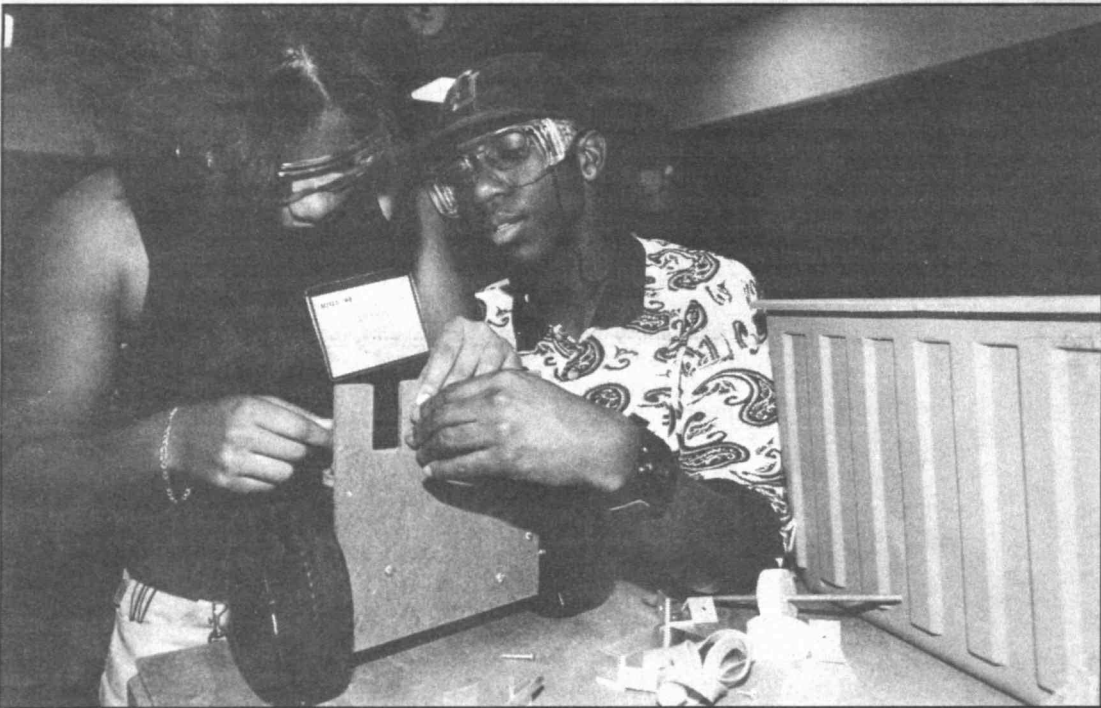
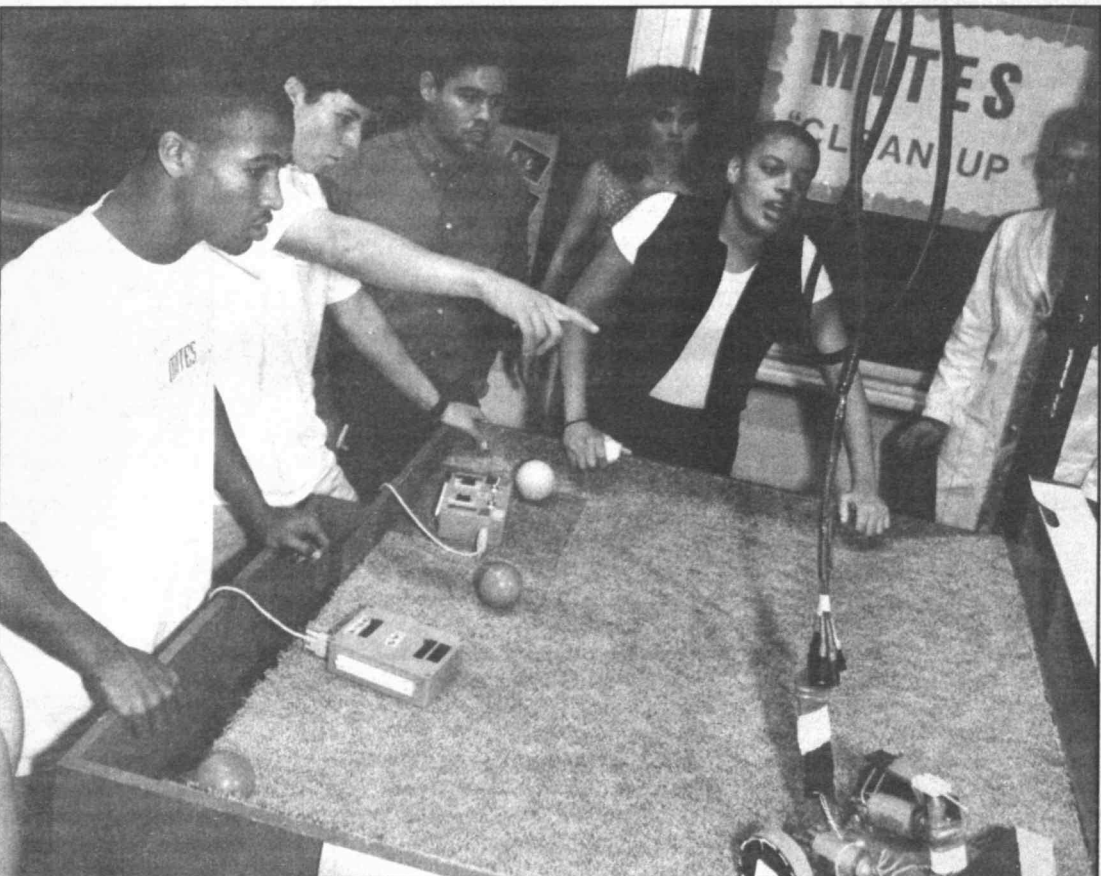


Photo by Donna Coveney



In "Clean Up Your Room," the annual MITES (Minority Introduction to Engineering and Science) robot competition, contestants had to build machines capable of collecting or pushing all the balls in their rooms into gutters or onto the other contestant's side. In top photo, Martine Remy of Long Island (left) and Bob Wayne Bell Jr. of Dallas build their robot before the July 10 contest. Watching the action in lower photo are (left to right) Eric Reid Jr. of Norfolk, VA; Gregory Edwards of Knoxville, TN; MITES resident counselor Jorge Rodriguez (SB '98); design instructor Diane Brancazio; Edgerton Center UROP student Valerie Pires (biology, '00), and judge Ben Polito (mechanical engineering, '99).

Photo by Graham Ramsay

Dickson areas temporarily reassigned as search continues

While MIT searches for a new executive vice president, President Charles M. Vest has named several other senior officers to take over Mr. Dickson's various areas of responsibility in the interim. Dr. Vest announced the arrangements in a June 26 memo to the Administrative and Faculty Councils.

Victoria Sirianni, director of Physical Plant, will have oversight of Insurance and Legal Affairs, the Planning Office, the President's House and the Safety Office as well as Physical Plant. Stephen Immerman, director of project development in the Office of the Senior Vice President, will be in charge of Audio-Visual Services, Campus Police, the Copy Technology Centers

and Endicott House.

The Purchasing Department will transfer to the Vice President for Finance, and the Publishing Services Bureau, which has had dual reporting lines, will continue to report to Kathryn Willmore (executive assistant to the president, director of Public Relations Services and secretary of the Corporation), who will consult with Mr. Immerman as necessary. A decision on the oversight of the Management Reporting Team will be made soon.

Vice President for Finance and Treasurer Glenn Strehle will convene regular meetings of all vice presidents, Ms. Willmore, Ms. Sirianni and Mr. Immerman.

Professor Emeritus Lele dead at 71

Professor Emeritus Padmakar P. Lele, a pioneer in the use of ultrasound to shrink tumors and measure heart damage, died June 11 at the University of California/San Diego Medical Center after a long illness. He was 71.

A native of India, Dr. Lele came to the United States in 1958 after receiving the BS and MD from the University of Bombay and the PhD from Oxford University. He was affiliated with Massachusetts General Hospital before joining the Harvard-MIT Division of Health Sciences and Technology and the Department of Mechanical Engineering in 1969 as a professor of experimental medicine. In addition to his research, Dr. Lele developed graduate courses in physics, technology, medical and industrial applications of ultrasound and microwaves.



Lele

He was a member of the board of governors of the American Institute of Ultrasound in Medicine (AIUM) and a fellow in the Acoustical Society of America. He was also a founding member of the American Hyperthermia Group and a charter member of the Bio-Electromagnetics Society. He served on the board of directors of the American Society for Clinical Hyperthermic Oncology and the European Society for Hyperthermic Oncology.

Dr. Lele was awarded the AIUM Joseph H. Holmes Pioneer Award in 1988. Upon retiring from MIT, he and his wife, Carla, moved to La Jolla, CA, and traveled extensively. Before Dr. Lele's retirement, they were longtime residents of Winchester, MA.

Besides his widow, Dr. Lele is survived by two sons, Martin and Malcolm of Westford, MA, and three brothers and a sister in India. Private services were held in San Diego and his remains were scattered at sea.

Semon E. Knudsen, member of Corporation, dies at 85

Semon E. "Bunkie" Knudsen (SB '36), a life member emeritus of the MIT Corporation since 1987, died on July 6 of congestive heart failure in Royal Oak, MI. He was 85.

Mr. Knudsen was the son of William S. Knudsen, who emigrated from Denmark at the age of 20 and eventually became president of General Motors from 1937-40. Semon Knudsen inherited his father's automotive interests; the elder Knudsen gave his son a car when Semon was 14. The car, however, was in hundreds of pieces; Semon had to assemble it to drive it, and he did.

Knudsen

After a year at Dartmouth College, Mr. Knudsen attended MIT, where he received the SB in general engineering in 1936. He joined GM in 1939, was

named general manager of Detroit Diesel Engine Division in 1955 and became a GM vice president and general manager of Pontiac a year later.

In 1963, he became general manager of Chevrolet, where he introduced "super sport" models and the famed 1963 Corvette. In 1965 he was made an executive vice president of GM and a member of the board of directors.

Mr. Knudsen left GM in 1968 to become president of Ford but gave way to Lee Iacocca 18 months later. He became chairman of White Motor Corp. in Cleveland and retired in 1980.

Mr. Knudsen was a member of the Society of Automotive Engineers and the American Society of Tool Engineers. He is survived by three daughters, Judith Christie and Lisa Flint of Birmingham, MI, and Kristina Gregg of Vancouver, WA; a son, K. Peter of Harbor Springs, MI; two sisters, Clara VanderKloot of Old Lyme, CT, and Martha McKenney of Bloomfield Hills; 12 grandchildren and 13 great-grandchildren.

Other obituaries

EDWARD BORGESS

Edward Borgess, 76, of New Bedford, a former administrative assistant at Lincoln Lab's Fiscal Office, died on May 9. He retired in 1983 after working at MIT/Lincoln Lab for 30 years. Names of survivors were unavailable.

W. F. CONSTANTINE

A funeral Mass was held on May 16 in St. Dorothy's Church in Wilmington, MA, for William F. Constantine, 76, of Palm Harbor, FL, who died on May 7. He was a former custodian at Lincoln Laboratory who was hired in 1962 and retired in 1978.

Mr. Constantine is survived by three sons, William F. Jr. of Waltham, Robert E. of Amesbury and Michael of Palm Harbor; a daughter, Patricia Spurr of Wilmington; three sisters, Ellen Sullivan of Maine, Joan Phillips of Bridgewater and June Hogan of Everett; 10 grandchildren and two great-grandchildren.

DORA B. JACKSON

Dora B. Jackson, 58, of Somerville, a senior secretary in the Department of Chemical Engineering at the time of her death, passed away on May 20. She had held her most recent position since 1997 but also worked at MIT from 1983-85 and

1992-95.

Ms. Jackson is survived by a son, Kif-Rob Dannecker of Riverdale, GA. Donations in her memory may be made to Oxfam, Amnesty International or the American Cancer Society.

AUSTIN P. MACNEIL

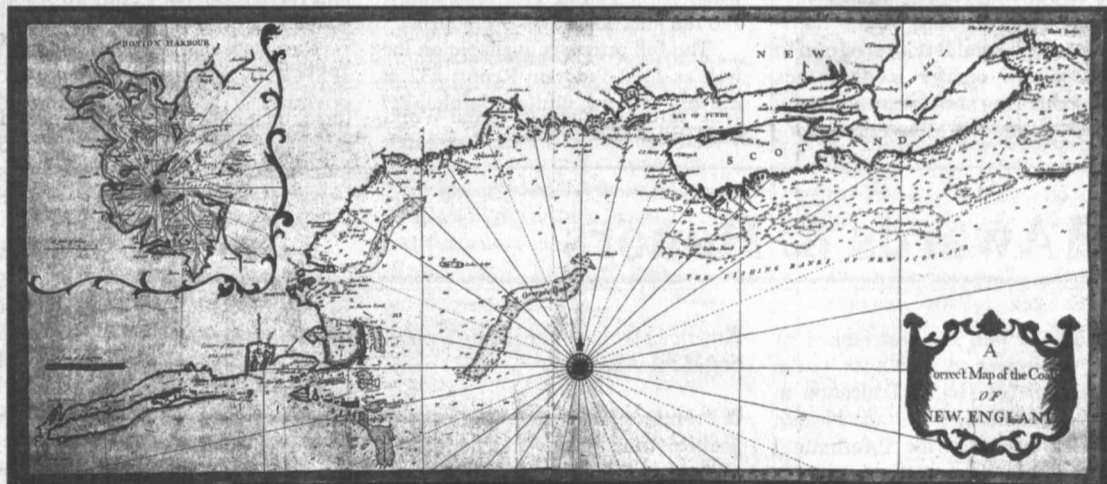
A funeral Mass was held in St. Mark's Church in Dorchester on May 19 for Austin P. MacNeil, 73, of Dorchester, who died on May 15. He was a former custodian with Physical Plant who retired in 1988 after 33 years at MIT.

Mr. MacNeil is survived by his wife, Margaret; a sister, Marjorie Dugas of Nova Scotia; three daughters, Carol Elliott of Halifax, MA, Angela O'Donnell of Norwell, MA, and Marie MacNeil of Weymouth, MA; a son, Mark of Casselberry, FL; and six grandchildren. He was buried in Cedar Grove Cemetery. Donations in his memory may be made to Hospice of Boston and Greater Brockton, 500 Belmont St., Suite 215, Brockton, MA 02401.

FELICIA H. MIKULA

Felicia H. Mikula, 86, of Sandwich, a former section head in the Controller's Accounting Office, died on May 9. She retired in 1977 after working at MIT for 24 years. Names of survivors were unavailable.

Map happy



Mapping Boston: Delineating the City and Its Region, an exhibition of maps from the Norman B. Leventhal ('38) Collection is on view at the Compton Gallery (Rm 10-150). The show, which traces the transformation of Boston and the New England coastline, runs through July 31. Gallery hours are weekdays 9-5pm.

MIT musicians create new chamber ensemble

To fill the void of musical events in the city at a time when many musicians move out to the music festivals for the summer, the newly formed Aurelius Ensemble will present two chamber music concerts in July and August in MIT's Killian Hall.

The ensemble's debut concert on Thursday, July 23 at 8pm is titled "Fun, Wit and Humor" and features performances of Tartini's *Devil's Trill*; Beethoven's *Clarinet Trio* (reduction of Septet); Roussel's *Trio* for flute, viola and cello; and Dohnanyi's *Sextet*. The second concert, "Unabashed Angst," will take place on Thursday, Aug. 27 at 8pm. Founded by and comprised of MIT-

affiliated musicians, the ensemble is named after Professor Marcus Aurelius Thompson, an internationally acclaimed violist and chamber music player, to honor his 25 years of musical contributions to MIT. Professor

Thompson, the Taylor Professor of Music since 1995 and professor of music since 1973, founded the MIT Chamber Music Society during his first year at the Institute and continues to promote and coach chamber music as head of the Society.

The concerts have been made possible through the support of MIT's Council for the Arts and the music and theatre arts section. For more information, call x3-2906.

Arts at MIT

Institute Arts

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

* Open to public
** Open to MIT community only

July 15-August 16

MUSIC

Aurelius Ensemble: Fun, Wit & Humor*—July 23. Grant Ho (G), violin; Dawn Perlner '01, violin; Annette Klein, viola; Jennifer Gruzca '98, viola; Michael Bonner, cello; Becky Baron, cello; Michael Horowitz (G), flute; Eran Egozy, clarinet; Asst Prof John Chapin, horn; Yukiko Ueno (G), piano; Elaine Chew (G), piano. Tartini's *Devil's Trill*; Beethoven's *Clarinet Trio* (reduction of Septet); Roussel's *Trio* for flute, viola and cello; Dohnanyi's *Sextet*. Ensemble's name honors Prof Marcus Aurelius Thompson for his commitment to MIT's chamber music program. 8pm, Killian Hall. More info: x3-2906.

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

MIT Guild of Bell Ringers*—Change ringing on hand bells. Beginners always welcome. Will also ring for occasions. Meets Mondays, 6:30pm, second floor balcony of

Lobby 7. Roberta Young, x3-3573, <rey@mit.edu>, or <<http://web.mit.edu/bellringers/www/>>.

THEATER

Urban Legends: An Evening of One-Act Plays*—Aug 13-15, Aug 20-22. MIT Community Players production of *Two Scenes* and *The Blue Hour* by David Mamet (directed by Jim Carroll); *Hot Line* by Elaine May (directed by Marc Miller); *The Unexpurgated Memoirs of Bernard Mergendeiler* by Jules Feiffer (directed by Ken Stern); *Definitely Eric Geddis* by Michael Snelgrove (directed by Ronni Marshak); *Hidden Agendas* by Terence McNally (directed by Jim Carroll). 8pm, Rm 35-225. Info: x3-2530 or <<http://web.mit.edu/mitcp/>>.

EXHIBITS

MIT Museum* (N52): Ongoing Exhibits. *Geological Engineering: The Sculpture of Arthur Ganson*; *LightForest: The Holographic Rainforest*; *Holography: Artists and Inventors*; *MIT Hall of Hacks*; *Light Sculptures by Bill Parker*; *Math-in-3D: Geometric Sculptures by Morton C. Bradley, Jr.*; *MathSpace*. 265 Mass Ave. Tues-Fri 10-5, Weekends 12-5. x3-4444.

Hart Nautical Gallery—Ships for Victory: American Shipbuilding's Finest Hour.

Shipbuilding production during World War II. *Ship Models: The Evolution of Ship Design*. Ongoing. Daily 9am-8pm. x3-5942.

The Dean's Gallery—Moving Through Reality: Photocollage by Amy Ragus. Exhibition runs through Aug 28. The Dean's Gallery, Sloan School of Management, E52-466. Weekdays 9-5pm. Info: x3-9455 or <<http://web.mit.edu/deans-gallery/www/>>.

Compton Gallery—Mapping Boston: Delineating the City and Its Region. Exhibition of maps from the Norman B. Leventhal ('38) Collection traces the transformation of Boston and the New England coastline. Through July 31. Compton Gallery (Rm 10-150). Weekdays 9-5. x3-4444.

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

Strobe Alley—Never Stop Learning: The Life and Legacy of Harold Edgerton. Photographs, instruments and memorabilia documenting the life of Harold Edgerton, inventor of the strobe light. Bldg 4, 4th floor. x3-4629.

OTHER

Applications for Wiesner Student Art Gallery** All students welcome to apply to put up an exhibit. x3-7019.

LVAC's Kline leaves for Bowdoin museum post

After nearly 20 years at the helm of one of the nation's liveliest contemporary art programs, Katy Kline is stepping down as director of the List Visual Arts Center to become director of the Bowdoin College Museum of Art in Brunswick, ME.



Ms. Kline, an art historian, author and scholar, starts her new job at Bowdoin in mid-October. She will remain at MIT for the opening of the fall shows: *About the House*, an exhibit of large-scale woodcuts by German printmaker Matthias Mansen, and *Recital*, an installation by San Francisco artist Lewis DeSoto.

Ms. Kline has served as director of the List Center since 1986, previously serving as curator (1979-83) and coordinator of special projects

(1983-86). She has a graduate degree in art history jointly from Oberlin College and the New York University Institute of Fine Arts and has published extensively on modern and contemporary art. In 1995, she was awarded MIT's Gyorgy Kepes Fellowship Prize for excellence in the creative arts.

"Katy has turned the List into one of the preeminent venues for contemporary exhibitions and installations," said Associate Provost for the Arts Alan Brody. "She has a remarkable eye for the real thing, whether established or just emerging and the generosity to support every artist whose work she believes in," he said.

Professor Brody has put together a search committee made up of both MIT and non-MIT representatives, with the goal of naming a replacement by fall 1999. "The List's exhibition schedule is pretty well set for 1998-99 and the staff works so well as an ensemble that they will be able to work with guest curators throughout this year," he said.

Key protein located, may have implications for premature aging

(continued from page 1)
determination."

The average person lives 80 years; the average mouse, two years. Mice more often die of cancer than old age, so the role of mWRN in their brief lives offers rich possibilities for comparative study.

PREVIOUS RESEARCH

The most recently reported research evolved from just over a year of intensive publishing and more than seven years' work in the Guarente lab at MIT and other Boston-area facilities.

Professor Guarente recalled the "very MIT-style" beginning of his lab's groundbreaking research.

"I was discussing areas for research with graduate students, looking for the ones that were known to be hard, maybe impossible," he said. "Aging was the area those students chose. I gave them a year to work on it. We didn't get anywhere then, but at the end of the year, we were so fascinated, we just kept going."

After four or five years, the first group accomplished their goals, Professor Guarente said. "Now, a new generation is carrying the ball."

The PNAS article is the fourth to be published on Guarente's work in just over a year. Together, the articles describe the steps leading from discoveries about aging and death in yeast cells to localization of WRN protein in humans and in mice.

In May 1997, an article published in *Cell* demonstrated that certain yeast genes determine the life span in yeast and showed that those same yeast genes promote cell longevity by moving from one cell structure to another (from the telomeres to the nucleolus).

The nucleolus, of course, would later be recognized as the site where the clock of cell mortality visibly goes tick-tock.

In August 1997, an article in *Science* written by Dr. David Sinclair and Professor Guarente identified the crucial role of another specific yeast gene, SGS1, in determining the life span of yeast cells. SGS1 corresponds structurally to the human gene, WRN. The MIT biologists discovered that experimental mutation of SGS1 produced symptoms of aging in yeast cells. The main symptoms noted by the researchers were fragmentation and enlargement of the nucleolus.

"In a striking parallel to Werner syndrome in humans, the sgs1 mutation shortens yeast lifespan by approximately 60 percent," the biologists wrote in the PNAS article, summarizing the earlier work.

The research published last August suggested "the nucleolus may be the Achilles' heel as cells get old. We think fragmentation of the nucleolus is a cause of aging," Professor Guarente commented at the time.

Four months later, in *Cell* (December 26, 1997), co-authors Drs. Sinclair and Guarente reported they had identified the mechanism of enlargement and fragmentation—in short, the mechanism of aging itself—in yeast cells.

FROM YEAST TO HUMAN CELLS

The new research "links us back to humans. The major point is that the human protein WRN is localized in the nucleolus. So, for people with Werner syndrome, the problem may lie in the nucleolus," said Professor Guarente.

"Now, the question is, what specific defect in the nucleolus might result in the disease of rapid aging?" he said.

In addition to localizing the WRN protein in normal cell lines, the researchers showed that the marked concentration of WRN persisted in the nucleolus in a variety of normal and cancerous human cells. Thus, the presence of other diseases did not disrupt WRN protein from its appointed rounds.

Once the scientists knew where WRN protein was localized, they again needed to explore what it did. This type of research progresses more like a sailboat tacking into the wind than like a train: the biologists must move patiently and creatively, back and forth across species, to get results.

Yeast cells continue to provide a simpler version of the molecular events occurring within human cells, Professor Guarente said. But the mirror that yeast provides for human cells may err by oversimplifying, too.

"Now we have to ask, is the structural change in human cells analogous to what happens in yeast? In yeast, there is only one such protein (sgs1). In mammals, there are several," he said.

To expand their research and to bridge the gap between the revelatory but simple one-protein yeast cell and the vastly more complex human, the biologists next looked for something a little higher up—but not too high up—on the food chain, Professor Guarente said.

They chose the mouse, which displays an intriguingly different localization for mWRN, the mouse equivalent of human WRN protein. What's more, since mice don't seem to age but instead often die of cancer, this difference promises more discoveries, the PNAS article stated.

To gain the most from the difference between mice and men, the researchers first established a link beyond mortality between the two species by finding the mouse equivalent of the WRN gene.

Next, the biologists contrasted immunofluorescent images of WRN and mWRN with surprising and significant results. Images of WRN reveal its presence in the human nucleolus and not elsewhere in the nucleus. WRN appears as a dramatic spot of light, illuminating the nucleolus like a neon sign on a dark country road.

By contrast, mWRN is present diffusely throughout the entire nucleus, so its image in a mouse cell leaves an all-over powdery glow, like new snow.

Thus, the biologists wrote, "mWRN does not show nucleolar localization. It remains to be determined whether this apparent difference in subcellular localization implies a difference in the function of WRN in these two organisms."

The next steps for the biologists include creating and studying "knock-out mice"—mice without mWRN—to see if their lives are shortened, as Werner syndrome sufferers' are, by absent or defective WRN genes.

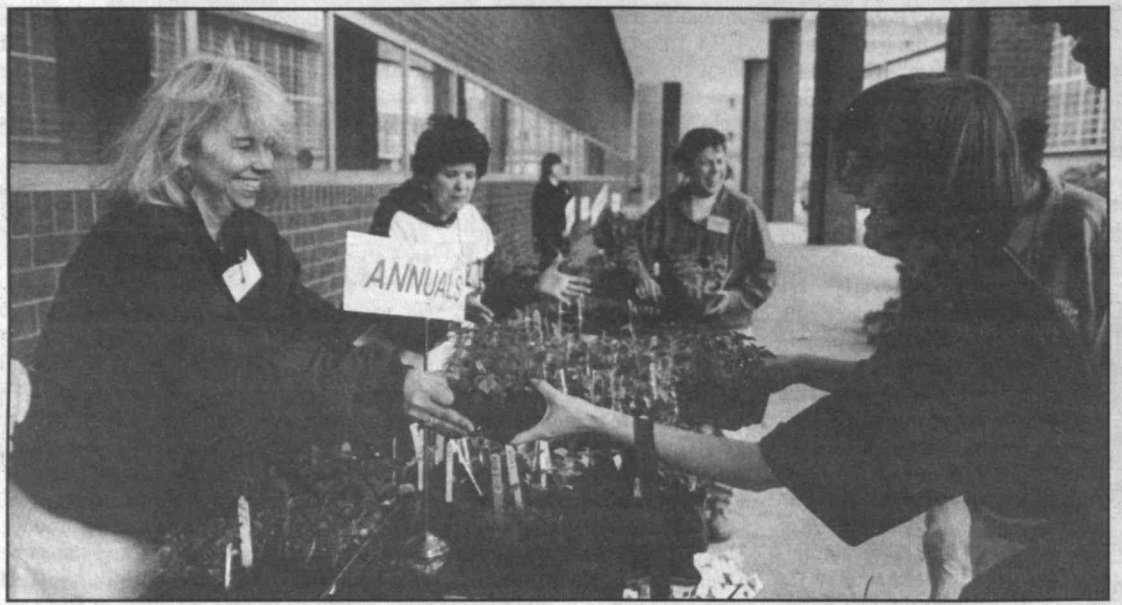
"Such cross-species analysis may aid in our understanding of the importance of nucleolar structure and function in mammalian aging and yield new insights into mechanisms of lifespan determination," the article said.

As for the knockout mice themselves, Professor Guarente added, there were "a few possibilities. We could get normal mice. We could get dead mice. Or, most interesting of all, we could get a mouse that's in between—a mouse with premature aging."

Implications for future research arising from the phase reported in the recent PNAS article include close study of yeast, mice, and human cells to clarify both nucleolar function and the role of WRN and its homologues in cell aging and death.

This work was supported by grants from the National Institutes of Health to Dr. Marciniak, Johnson and Guarente and a Medical Scientist Training Program Training Grant to David Lombard.

Annual perennial swap



Nancy Crosby, administrative assistant in the Office of the Dean for Students (far left), hands a plant to Carol Koskelowski (far right) at the annual plant swap on June 12. Also shown are Brenda Blais, senior secretary in DUSP (left center), and Sgt. Cheryl Dejong Vossmer, of Campus Police (right center).
Photo by Donna Coveney

Kyoto Protocol receives 'I' grade

(continued from page 1)
sible to do nothing when you smell smoke at home until and unless you see flames. It would also be irresponsible, of course, to call the fire department and hose down all your belongings at the slightest whiff of smoke."

The article emphasizes the importance of focusing on the "architectural framework" of what might become vitally important future collective action, stipulating three essential elements of such a framework:

- World-wide participation, including developing nations,
- A substantial R & D program to develop new energy technologies that could bring about deep emission reductions and still allow robust economic growth,

• International institutions capable of exploiting low-cost abatement and adapting to new scientific knowledge.

While the Foreign Affairs report card may not be one the negotiators proudly present to their parents, Dr. Jacoby notes how the "incomplete" grade can be made up: "This November at Buenos Aires [where the international discussions on global change will continue], an effort must be made to shift the focus to longer-range elements of wider participation, new technology, and flexible, adaptable mechanisms."

The full article is available on the web as Joint Program Report #32 at <<http://web.mit.edu/globalchange/www/rpt32.html>>.

Dr. Jacoby is the William F. Pounds Professor of Management and codirector of the Joint Program on the Science and Policy of Global Change (JPSPGC). Dr. Prinn is TEPCO Professor of Atmospheric Chemistry, codirector of the JPSPGC, director of the Center for Global Change Science, and head of the Department of Earth, Atmospheric and Planetary Sciences. Dr. Schmalensee is the Gordon Y. Billard Professor of Economics and Management, director of the Center for Energy and Environmental Policy Research, and acting dean of the Sloan School.

Research was funded through the JPSPGC by a supporting partnership of government organizations, international corporations, and foundations.

Awards & Honors

■ MIT's web site was ranked #1 among university web sites by the *Chronicle of Higher Education* in May. According to Suzana Lisanti, MIT's campus-wide information systems facilitator, the Institute's official web server at <<http://web.mit.edu>> was accessed 16,131,009 times by an estimated 1.9 million people that month. This includes requests for everything from the MIT home page to those for departments, offices and personal web pages. These "hits" came from 639,861 unique addresses. The schools whose sites were second and third for most visits in May were the University of Illinois at Urbana-Champaign and the University of Michigan. The *Chronicle's* story is on line at <<http://www.chronicle.com/free/98/06/98061701t.shtml>>.

■ Apollo Professor of Astronautics Laurence R. Young was awarded the 1998 Betty and David Koetser Memorial Prize by the Koetser Foundation for Brain Research in Zurich, Switzerland, on May 19. The award recognizes Professor Young's "fundamental contributions to the aerospace medical field, in particular to the study of vestibular functions and the mechanisms underlying visually-induced motion effects."

■ In March, Dr. Cynthia Stevens became the sixth woman to be inducted into the American Academy of Dental Science, the 100-member Academy founded by Oliver Wendell Holmes in 1867. Dr. Stevens, who holds DDS and MPH degrees, has been with MIT Medical's Dental Service since 1979. She is the second African-

American woman to become a member of the Academy.

■ Professor Krzysztof Wodiczko of architecture has won the fourth Hiroshima Art Prize from Hiroshima City, Japan. The prize, which is awarded every three years, is given to an artist whose work not only demonstrates high achievement in international contemporary art, but has also contributed to world peace. Professor Wodiczko was director of the Center for Advanced Visual Studies (CAVS) from 1995-96 and is now head of the Interrogative Design Group in CAVS.



Wodiczko

This fall, he will create a projection onto Bunker Hill Monument in Charlestown, as part of *Let Freedom Ring*, the inaugural exhibition of *ICA/Vita Brevis*, a public art installation by Boston's Institute of Contemporary Art. An exhibition of Wodiczko's work will be held at the Hiroshima City Museum of Art in 1999.

■ Earl Miller, assistant professor in the Department of Brain and Cognitive Sciences, has been named a winner in the 1998 John Merck Fund Scholars Program. He and two other recipients will receive \$240,000 over a four-year period. The program seeks "to encourage gifted young scientists to focus on the problems of the mentally handicapped and emotionally disturbed child," said the fund's chairman, Francis Hatch. Professor Miller was selected for his research on the neural basis of working memory and cognition.

■ David Epstein, professor emeritus in music and theater arts, has been named Senior Fellow in the Arts and Humanities by Philip S. Khoury, dean of the School of Humanities and Social Sciences. The announcement was made by Dean Khoury at a reception following Epstein's farewell performance with the MIT Symphony on March 14.

■ Jay W. Forrester, professor emeritus and senior lecturer at the Sloan School of Management, is the 1998 recipient of the Computerworld Smithsonian Program's Price Waterhouse Leadership Award for Lifetime Achievement. A record of Professor Forrester's life and career will join those of other information technology leaders in the permanent research collection on information technology at the Smithsonian's National Museum of American History.



Forrester

Professor Forrester invented random-access, coincident-current and magnetic-core computer memory. As one of the founders of MIT's Servomechanisms Laboratory, he designed feedback-control equipment for military guns and radar. He also headed design of the SAGE air defense system installed in North America. He is now supervising a group of undergraduates who are creating systems dynamics materials as a basis for much that is taught in kindergarten through high school.

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