MIT TECH TALK
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Ray and Maria Stata give $25 million to MIT

Gift is largest ever for Institute building project

■ By Kenneth D. Campbell
News Office

MIT today announced a $25 million donation by Ray and Maria Stata for the creation of a complex of buildings designed to foster interactions and innovations among MIT's faculty and students in computing, information science, artificial intelligence, and linguistics and philosophy.

The Executive Committee of the MIT Corporation has voted to honor the Statas by naming this complex of buildings for them. Theirs is the largest gift ever received by MIT for a building project.

"What is exciting is that we started simply with the idea of bringing all the laboratories, faculty and students together in a new building project," said Mr. Stata, a member of the Class of 1957 and founder and chairman of Analog Devices. "But this has evolved into a vision of an architectural design that will catalyze the interaction of students and faculty and stimulate invention and exchange of ideas across many disciplines.

"Even in this age of instant electronic communication, there is no substitute for the casual, creative personal contact that this new complex will facilitate."

A year ago, the Statas pledged $10 million toward this project, but as the concept and scope grew, so did their commitment—to $25 million.

President Charles M. Vest said, "This is an extraordinarily generous commitment from an alumnus who, as the long-time chairman of the Visiting Committee of the Department of Electrical Engineering and Computer Science, led the

(continued on page 4)

Ray and Maria Stata have donated $25 million to the Institute for a major building project.
Photo by Donna Coveney

O/R panel makes recommendations

Report suggests changes for orientation, residence choice

■ By Alice C. Waugh
News Office

In its final report released last Friday, the Advisory Group on Orientation and Residence 1998 detailed some suggestions for improving freshman orientation and housing selection, including avenues for more faculty/student interaction, a comprehensive guide to residences, and creation of a new Orientation Policy Committee.

The 12-member panel chaired by Professor of Ocean Engineering J. Kim Vandiver was charged by President Charles M. Vest with advising the administration on new ways of introducing students to the campus and holding residence selection for the Class of 2002. During their discussions, members considered survey results, a November 5 forum on freshman housing, and proposals by the President's Council of the Interfraternity Council (IFC).

The biggest obstacle to making improvements, the panel found, is "a fundamentally different point of view between the faculty and the students with respect to what is broken in the present system of introducing freshmen to campus," the report said.

"Many faculty believe the current residence system obstructs the academic orientation of new students to the university and leads to a singular loyalty to the living group at the expense of a lack of substantive intellectual connection to the academy... On the other hand, students widely believe that faculty put little effort into building relationships with students, and furthermore fail to understand that living groups provide the support network essential to students, beginning in the fall of the freshman year."

Consequently, any meaningful change will require a sincere effort by both faculty and students to agree on goals and work together. Faculty and administration members must strive to create "substantive orientation programming" and gain some first-hand familiarity with the residence system, while students must show commitment to put new programs in place and attending orientation activities, the report said.

On the idea of housing all freshmen on campus, "we concluded that this was not in MIT's best interest for the fall

(continued on page 8)

Fraternities disciplined in wake of alcohol incidents

■ By Robert J. Sales
News Office

One MIT fraternity has been suspended and another put on notice as a result of incidents involving alcohol abuse and reported underage drinking.

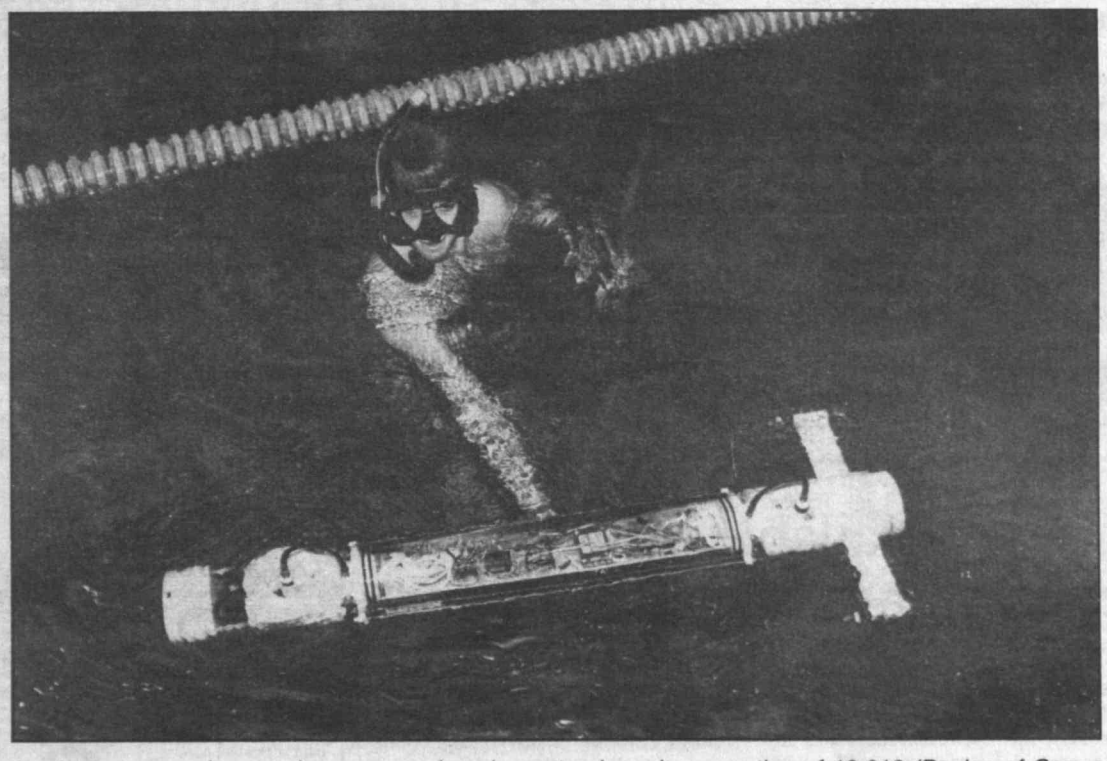
Both fraternities were notified of the actions by Neil Dorow, assistant dean for residence and campus activities.

Sigma Phi Epsilon was suspended from holding organized activities in its house at 518 Beacon St. in Boston and banned from having alcohol on the premises after a freshman was treated for alcohol intoxication last weekend. The student was taken from Baker House to the Medical Department in a Campus Police ambulance shortly after 3am Saturday.

The Dean's Office and Campus Police are investigating reports that the 18-year-old student was served alcohol at Sig Ep. If the reports are

(continued on page 5)

Pooling resources



Ian Ingram, a sophomore in ocean engineering, attends a class meeting of 13.018 (Design of Ocean Systems II), which happened to be held last week in the Alumni Pool for the purpose of testing the autonomous underwater vehicle Autolycus, *which he and his classmates designed. In 13.018, students draw on their knowledge from various engineering fields to build and test a complex marine system, generally either an autonomous underwater vehicle or an underwater robot. It is the second in a two-course senior design sequence in ocean engineering.*
Photo by Donna Coveney

Space tissue-engineering experiment is successful

■ By Elizabeth A. Thomson
News Office

Thanks in part to a diligent astronaut and several million bovine cartilage cells, MIT and NASA scientists have reported that the first tissue-engineering experiment in space was a resounding success. The work could lead to experiments with human tissues to determine why space is so hard on the body.

In the experiment, which ran for three months on Earth and then for an additional four months aboard the space station Mir or on Earth, the scientists grew viable cartilage tissue from bovine cartilage cells "seeded" on polymer scaffolds. Key to the work was a bioreactor that supplied the cells with nutrients and gases and removed wastes so they could regenerate a full tissue.

Among the scientists' findings: the tissues grown on Mir were smaller and mechanically weaker than those grown on Earth.

"The study was very complex, so it was a technical feat just to keep the cells alive," said Lisa E. Freed, a research scientist at the Harvard-MIT Division of Health Sciences and Technology. Dr. Freed is first author of a paper published in the December 9 Proceedings of the National Academy of Sciences (PNAS).

(continued on page 8)

IN BRIEF

SPECIAL SECTION

"A National Mission," a special report to the MIT community from the office of President Charles M. Vest, is inside this issue of MIT Tech Talk. It offers an overview of MIT's continuing efforts in Washington and nationwide to promote public understanding of—and support for—investments in university-based research and education.

BELL RINGING

MIT community members will be taking turns ringing a bell for the Salvation Army's Cambridge chapter in front of the 77 Massachusetts Ave. steps on Tuesday, Dec. 16 from 8:30am-5:30pm. Anyone who would like to be a bell-ringer may contact Matt Wolfe at x3-1988 or <mdwolfe@mit.edu>.

HOLIDAY CLOSING

The Institute will close at noon on Wednesday, Dec. 24 in addition to observing the official holidays on December 25 and 26. The last shuttle from MIT to Lincoln Laboratory on that day will leave campus at noon, while the last shuttle from Lincoln to MIT departs at 11am.

NO FACULTY MEETING

The faculty meeting scheduled for Wednesday, Dec. 17 has been canceled.

Student Notices

* Open to public
** Open to MIT community only
*** Open to members only

December 10-January 11

■ ANNOUNCEMENTS

Attention February Degree Candidates: If you have MIT administered student loans, you must have an exit interview before graduation. To schedule an appointment, call x3-4007 or e-mail <ewolcott@mit.edu>.

Attention International Scholars: If you plan to travel outside of the United States for the holidays, please stop at the International Scholars Office, Rm 4-105, at least 10 days before you leave. Please bring your passport and visa document (IAP-66 Form, I-797, I-20) with you when you come in to see us. Have a safe and pleasant trip.

***Technique 1998* Submission Deadline**—Dec 20.** MIT's year book is currently accepting poetry and anecdotal short story submissions from students and faculty. All entries should be typed, single-spaced for poetry and double-spaced for stories. Include your name, class year or position at MIT and e-mail/contact information. E-mail to <jackal1@mit.edu> or drop off hard copies to Technique office (Student Ctr Rm 451). Do not send original copies. Johnny Lee, Journal Editor, <grogospeak@mit.edu>.

■ RELIGIOUS ACTIVITIES

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

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

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

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

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

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

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

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

MIT Hillel—**Tuesdays: 12:15pm Hebrew Conversation Table in Walker Cafeteria; 5:30pm Beginning Hebrew Class; 6:30pm Intermediate Hebrew Class. Wednesdays: 7pm Haftorah Class. Thursdays: 12noon 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. Bible Studies, Tuesdays 5:30-6:30pm, Bldg W11. 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.

Special Events

MIT Hillel—Dec. 12:** "Nazi Looted Art," Jewish faculty/staff forum with Walter Robinson.

■ VOLUNTEERS

The MIT Public Service Center (Room W20-311, x3-0742) has compiled the following volunteer opportunities.

Magic Me of Boston is looking for an AmeriCorps staff member to help with coordination and oversight of programming to work full time for one year beginning either Jan. 5 or Sept. 1, 1998. Magic Me is a non-profit organization committed to engaging urban adolescents and isolated elders in long-term community service to teach other. Responsibilities for this position include direct service with elders and youth, logistical planning, curriculum development, and recruitment and supervision of volunteers. Volunteers receive a $8,340 stipend, a $4,725 education grant, and health insurance. To apply, call (617) 423-6633 or fax a resume and cover letter to (617) 422-0626.

Jewish Community Volunteer Programs needs volunteers to provide technical and professional help to their organization. They are looking for help in the following areas: web site design, PC usage, Windows 95, data management systems, networking, graphic design and mentoring of new Americans in colloquial language. Volunteers should commit to just a few hours a week and can work at home or on site, days or evenings, Monday through Friday. To lend a hand, contact Sandie Bernstein at (617) 558-6585 ext. 585.

Crimewatch

The following summary contains incidents reported to Campus Police November 21-30, but does not include medical shuttles, ambulance transfers, false alarms and general service calls.

Nov 21: *Sloan lot*: hit and run damage to vehicle. *Bldg. E15*: harassing e-mail.

Nov 22: *New House*: report of suspicious male, individual stopped and issued a trespass warning. *Mass. Avenue*: assist other police agency with two individuals involved in a fight.

Nov 23: *East Campus*: harassing phone calls. *Bldg. 10*: CD player accidently left behind was stolen, $120.

Nov 24: *New House*: noise complaint. *Student Ctr*: bike secured with a cable stolen, $450. *Bldg. 13*: cylinder bracket stolen, $160. *Bldg. 14*: vandalism. *Bldg. 20*: VCR stolen. *Bldg. W32*: male taken into custody on outstanding warrant. *Memorial Drive*: assist other police agency with the arrest of a male for indecent exposure. *Bldg. 42*: keys stolen.

Nov 25: *Bldg. E40*: report of a suspicious person. *DuPont Gym*: male arrested for trespassing. *Bldg. E15*: computer and amplifier stolen, $1,200.

Nov 26: *Bldg. 37*: bike secured with "U" locks stolen, $600. *Bldg. 35*: books stolen, $300. *Bldg. 20*: laptop computer stolen, $4,000. *Bldg. E25*: Think Pad computer stolen, $2,500. *Walker*: pager stolen from a vehicle.

Nov 27: *Bldg. 4*: printer stolen, $200.

Nov 28: *Bldg. 5*: microwave oven stolen, $270. *Westgate*: annoying phone calls. *Bldg. 20*: Think Pad computer and other items stolen, $2,500.

Nov 29: *Bldg. 3*: laptop stolen, $2,000; CD player and radio stolen, $220; report of a suspicious person.

Nov 30: *Bldg. 54*: computer and computer parts stolen, $9,000. *Alumni Pool:* suspicious person. *DuPont locker room*: wallet stolen, $20.

Proposal aims to improve dining

■ **By Denise Brehm**
News Office

MIT needs a comprehensive new dining program to improve the diversity, quality and value of its dining services and make food available when and where students need it most, according to the Dining Review Final Report released by the Food Services Working Group (FSWG) in November.

The report recommends increasing the seating capacity of campus dining facilities, especially during the day; reopening four residential dining halls; extending dining hours in the residential halls, but probably closing Lobdell Food Court for evening meals; and improving service and value through the creation of "managed competition" between two food services contractors on campus.

All these changes should be made as part of the overall goal of "strengthening the community-building, social, educational, nutritional and citizenship aspects of Institute dining," the report said. The FSWG also recommended the creation of an advisory board, local oversight groups and a central Office of Campus Dining to oversee all campus food providers.

"The proposal creates a system for the delivery of high-quality food and dining services to our community that incorporates the suggestions made to the Working Group during our review process. It will be comprehensive and will be guided by an educational mission and a set of objectives to reemphasize residential dining," said Phillip J. Walsh, director of the Campus Activities Complex, who served as chair of the FSWG.

The FSWG received input from an advisory board, a community involvement group, and more than a dozen other campus groups and individuals. It was formed in February 1996 by William Dickson, senior vice president for operations, and Rosalind Williams, dean of students and undergraduate education, both of whom will decide if the recommendations will be enacted. If they elect to go forward with the proposal, a transition plan would be implemented to develop the new administrative and support structures and restructure current contracted operations.

TWO DINING ZONES

Under the managed competition model, the area now covered by the primary contract would be split into two separate zones or operations managed by two contractors. The goal is to have the two new contractors in operation for the 1998-99 school year.

One contractor would serve the Student Center, all residence halls and the Sloan community, while the second would provide food in Walker Memorial and all other central campus eateries.

A campus-wide catering system would also be established, consisting of nine to 12 vendors which would provide three general levels of service and menu diversity. The other campus providers in the system would be able to compete for catering jobs as well.

Aramark is now the primary food contractor on campus, operating Lobdell Food Court, Networks, the Refresher Course, Walker Memorial, the Bio Cafe, the Faculty Club, Pritchett, the Building 4 coffee shop, MacGregor Convenience, MIT Catering and the residential dining facilities in Baker and Next Houses.

The food trucks near Building 20 operate on a space lease, and other facilities on campus are student-managed and operated: the 24-hour Coffeehouse in the Student Center (through the Campus Activities Center), the Lobby 7 donut stand, the Muddy Charles Pub and the Thirsty Ear Pub. A separate contractor, Daka, provides most campus vending, along with Coke and Pepsi. MIT also leases space to LaVerde's Market and Toscanini's in the Student Center. All of these would come under the umbrella of the new dining system.

MORE RESIDENTIAL DINING

Other proposed changes include reopening four residential dining facilities in addition to those currently operating in Baker and Next Houses. McCormick Hall's dining hall and kitchen would be reopened for the 1998-99 school year. Kitchen facilities in Baker, Next and McCormick Houses would then provide catered meals in Ashdown, MacGregor and Burton-Conner until a full-service program in those houses was in place. Ashdown House dining hall would begin serving catered meals in 1998-99 and MacGregor and Burton-Conner the following year.

All other residential halls would be designated as personal cooking houses, and the Institute would make appropriate improvements to those facilities to encourage students to cook full and nutritional meals for themselves. A relationship with the new Star Market at University Park is being planned to make it easier for students to shop for food.

Several meal plans would be available to students living on campus, and the FSWG suggested that MIT explore the possibility of offering meal plans to students in independent living groups or off-campus apartments. Food truck operators would be required to join the campus dining system and follow its standards. The MIT Card would be more widely accepted, and kosher and vegetarian foods would be easier to find.

Obituaries

GEORGE H. BURR

George H. Burr, 95, of Edmonds, WA, a retired guard at Lincoln Laboratory, died on November 7. He was hired in 1955 and retired in 1968. Survivors include a nephew, Earle S. Miller of Edmonds.

GERTRUDE FOWLOW

Gertrude Fowlow, 85, of Newfoundland, Canada, a retired library assistant, died on October 15. She retired in 1974 after 12 years at MIT. Survivors include a niece, Marguerite Martin of Newfoundland.

SIDNEY NELSON

Sidney Nelson, 90, of Pinellas Park, FL, a retired guard at Lincoln Laboratory, died on October 16. He worked at Lincoln Lab from 1959-70.

THOMAS T. PUREKA

A service was held at the Annunciation of the Virgin Mary Greek Orthodox Church in Woburn on November 14 for Thomas T. Pureka, 89, of Woburn, a retired design drafter at Draper Laboratories, who died on November 11. An MIT alumnus (SB '31), he retired in 1973 after 21 years at Draper.

Mr. Pureka is survived by his wife, Lillian; a son, Paul of New Canaan, CT; a daughter, Elizabeth Rossettos of Winchester; four grandchildren and several nieces and nephews. He was buried in Wildwood Cemetery in Winchester.

JOHN ROCHE

A funeral Mass was held in St. Anthony's Church in Allston on November 20 for John Roche, 73, of Allston, a retired electrician with Physical Plant, who died on November 15. He retired in 1991 after 18 years at MIT.

Mr. Roche is survived by his wife, Elizabeth; two brothers, Francis of California and Joseph of Nevada; and a sister, Marie Marron of Longmeadow, MA.

DOROTHEA SCANLON

Dorothea Scanlon, 73, of Wollaston, a retired administrative staff member in the Laboratory for Computer Science, died on October 24. She retired in 1989 after 46 years at MIT.

ARTHUR SOUZA

A funeral Mass was said in St. Joseph's Church in Somerville on November 10 for Arthur Souza, 70, of Cambridge, a retired houseman in the Housing Office, who died on November 6. He worked at MIT for 24 years and retired in 1989.

Mr. Souza is survived by his wife, Lorraine; a daughter, Sharon Renault of Scarborough, ME; a brother, Frank of Pahrump, NV, and one grandchild. He was buried in Cambridge Cemetery. Donations in his memory may be made to the American Lung Association, P.O. Box 265, Burlington, MA 01803.

Grants available to study energy/environmental policy

International Energy and Environmental Policy research grants in amounts up to $25,000 are available for MIT faculty, researchers and advanced doctoral students working with faculty on relevant projects. The program is supported by the Japan Energy Endowment of the Center for International Studies.

Proposals for research seed funding, publications, and attending workshops and conferences will be considered for any aspect of international energy or environmental policy, including research on developing countries as well as advanced industrial countries.

The deadline for applications is Feb. 4, 1998. For details, contact Dr. William Keller, x3-9861, <bkeller@mit.edu>, or Laurie Scheffler, x3-3121, <lauries@mit.edu>.

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Roos is new associate dean in School of Engineering

Japan Steel Industry Professor Daniel Roos of civil and environmental engineering has been named to the new position of associate dean for engineering systems. In announcing the appointment, Dean Robert Brown of the School of Engineering said the position is part of the School's increased focus on interdisciplinary systems.

"The School of Engineering is placing growing emphasis on engineering research and educational programs that integrate traditional engineering expertise with management and social science," said Dean Brown. "We often think of these features as being present in large-scale open systems that arise in industry and society. The design of transportation systems and the integration of engineering product design with manufacturing and marketing are two examples of open systems at this interface.

Roos

"The position of the associate dean for engineering systems has been created to help add momentum and coordination to these initiatives in the School of Engineering and the Institute."

Professor Roos will take responsibility at the school level for several existing programs and research centers, as well as other programs to be created. Initially, he will oversee the Center for Innovation in Product Design; the Center for Technology, Policy and Industrial Development (CTPID); the Center for Transportation Studies; the Industrial Performance Center; the Leaders for Manufacturing Program; the Technology and Policy Program; and the System Design and Management Program.

"Dan Roos is a wonderful faculty member to launch this position," said Dean Brown. "He brings to it a tremendous amount of first-hand research and programmatic experience working at this interface."

Professor Roos has been director of the CTPID since 1982. He is also director of the International Motor Vehicle Program, the Technology Management and Policy Program, the Cooperative Mobility Research Program, and co-chair of the MIT Commission on Industrial Relationships.

He is special assistant to the provost and assists the provost and president in negotiations with potential major industrial partners. He was also actively involved in negotiating the new multimillion-dollar MIT/Ford partnership and now serves as associate director of that project.

Professor Roos was appointed to the MIT faculty in 1966 after receiving the SB, SM and PhD in civil engineering from MIT. He is a noted expert on urban transportation who received the 1994 Shingo Prize for Excellence in Manufacturing and the 1989 Frank M. Masters Transportation Engineering Award from the American Society of Civil Engineers.

"MIT has pioneered in developing interdisciplinary educational and research programs. This new position provides an opportunity to work with my colleagues in engineering, management and the social sciences in developing the next generation of interdisciplinary engineering systems," said Professor Roos.

He will be succeeded as CTPID director by Professor Joel Clark of materials science and engineering. Professor Clark served as acting director of the Center in 1993-94 and was formerly the Metcalfe Professor (1987-88) and the POSCO Professor of Materials Science (1988-93).

His research focuses on developing methods to analyze the competitive position of materials and processes in specific applications. In 1983 he founded the Materials Systems Laboratory. He received the BS and MS in engineering science from Florida State University, the ScD in materials science and engineering from MIT in 1972, and the SM from Sloan School in 1975. He has been a member of the MIT faculty since 1975.

Clark

Denise Brehm

Course looks at real-world influences on development of technology

■ **By Denise Brehm**
News Office

There's a slight shift occurring in the Course 6 educational paradigm. It's not really a revolution, but it could affect the evolution of some of the graduate students.

"The Structure of Engineering Revolutions," a course offered for the first time this fall, provides an integrated approach to engineering, one that considers the interplay between socio-political influences and technological developments. The course is listed jointly in the Program in Science, Technology, and Society (STS) and the Department of Electrical Engineering and Computer Science (Course 6 or EECS).

In true engineering fashion, Dr. David A. Mindell, an assistant professor in STS who is a historian of technology as well as an electrical engineer, designed the course to solve a specific problem.

"I asked Course 6 what kind of educational problems they were facing that an STS course might be able to address. They said they wanted to give the master's students a better idea of how engineering works in the real world, familiarize them with working in teams and improve their communications skills," said Professor Mindell.

The new course, STS.185/6.972, does all those things through readings in sociology and history of technology, class discussions and lectures, and group projects presented to an audience that includes experts who respond to—and sometimes challenge—the presenters. It is co-taught by Professor Mindell and Professor of Computer Science Charles Leiserson.

"The incoming students were naive with respect to real-world engineering. This course teaches them about the technical and nontechnical forces that contribute to design choices," said Professor Leiserson. "Developing the course with STS is a high priority of my department."

Engineering students may learn about black boxes early on, but many years can pass before they understand that their work takes place in a sort of conceptual box, the engineering equivalent of Thomas Kuhn's scientific paradigm.

The group projects encourage students to look at innovative electronic machines as artifacts of a particular time and place, rather than seeing them as naturally occurring developments in a linear history of technology.

Students choose a single technological artifact or a particularly innovative engineering firm and make it the subject of a thorough investigation. They try to recreate the social and political world of the historical engineers and metaphorically climb into the conceptual box with them—to see the process behind the engineering artifact from the designers' perspective.

SHOOTING FOR THE MOON

For instance, one group tackled the Apollo Guidance Computer (AGC) that was developed in the early 1960s by the MIT Instrumentation Laboratory (IL), the precursor of today's Draper Lab. By studying popular publications, news sources and the IL team's own AGC documentation, as well by interviewing key IL design engineers, they learned that AGC's conception was fraught with conflict.

Not only can political and social pressures be the primary impetus for technology development, but the tension among competing groups often influences design decisions. In turn, the artifacts' design can have major ramifications for future technology.

"The American people saw the Apollo program as the country's manifest destiny. The reality was that President Kennedy was desperately clutching at something to save face in a political arena where his country was losing," said Mohan Gurunathan, a graduate student in EECS, during his group's presentation on December 2. His teammates were fellow EECS graduate students Jennifer Kleiman, Matt Lau, Chris Rodarte and Keith Smith.

> *"Developing the course with STS is a high priority of my department."*
> ***—Prof. Charles Leiserson***

In their presentation, they described how the Cold War struggle for military power led to the desire for space supremacy and finally to the development of technology capable of achieving that national goal. The United States reacted quickly after Soviet cosmonaut Yuri Gagarin made the first manned orbit of Earth in 1961.

"Against the advice of his scientific advisors," Mr. Gurunathan said, "Kennedy declared that the United States would be the first to walk on the moon. The scientific objections were buried away in classified documents."

The students asserted that America's need for heroes greatly influenced the design of the Apollo Guidance Corp. computer, forcing the engineers to allow the astronauts more manual control over the guidance system than the engineers thought necessary.

"Tensions arose between the astronauts and the engineers. The engineers believed the computer was capable of recalibrating itself, but the project administrators wanted the astronauts to have control. So they were given the illusion of control," said Mr. Smith. The astronauts were responsible for adjusting the computer's location information. But the adjustments themselves were actually computer-assisted because the computer controlled the optics.

"It's debatable whether or not the AGC could have flown the entire mission without the need for external correction," he said.

Mr. Smith also discussed the decision process behind the inclusion of integrated circuitry in the AGC, which was then an "immature technology."

Donald MacKenzie of the University of Edinburgh, a sociologist of science and technology who is visiting at Harvard University, served as commentator for the AGC presentation. He noted that the decision to include integrated circuitry in AGC prompted long-term technological change. The resources put into developing that particular technology for such a high-profile project served as an endorsement for further development of integrated circuits.

Another group presentation followed the trajectory of the Thinking Machines company from its 1983 founding in the "AI paradigm" through a shift of focus to scientific computing in 1989 to bankruptcy in 1994. Other teams studied RSA Data Encryption, the development of spreadsheets, and magnetic core memory.

Professors Leiserson and Mindell were pleased with the students' progress over the term, "especially their ability to synthesize and make persuasive arguments and rigorously support them with evidence," said Professor Mindell.

Although it was experimental this fall, STS.185/6.972 will become a regular part of the Course 6 curriculum next year, offering students a way to broaden their engineering education.

"This represents a statement by MIT that the best engineers combine the highest technical abilities with a broad perspective and the ability to communicate," said Professor Mindell.

Two named to professorships

Assistant Professor Bevin P. Engelward of the Division of Toxicology has been named to the Samuel A. Goldblith Career Development Professorship for a three-year term. The chair, which is also held by Professor Bonnie Berger of mathematics, honors Dr. Goldblith, professor emeritus of food science and former vice president for resource development.

Professor Engelward came to MIT earlier this year after completing her doctoral studies and a year of postdoctoral training in the laboratory of Professor Leona Samson in the Department of Molecular Toxicology at the Harvard School of Public Health. She received her undergraduate degree from Yale University in 1988. Her current research interests are in the molecular basis of DNA-damage-induced loss of genetic information and mechanisms of DNA repair.

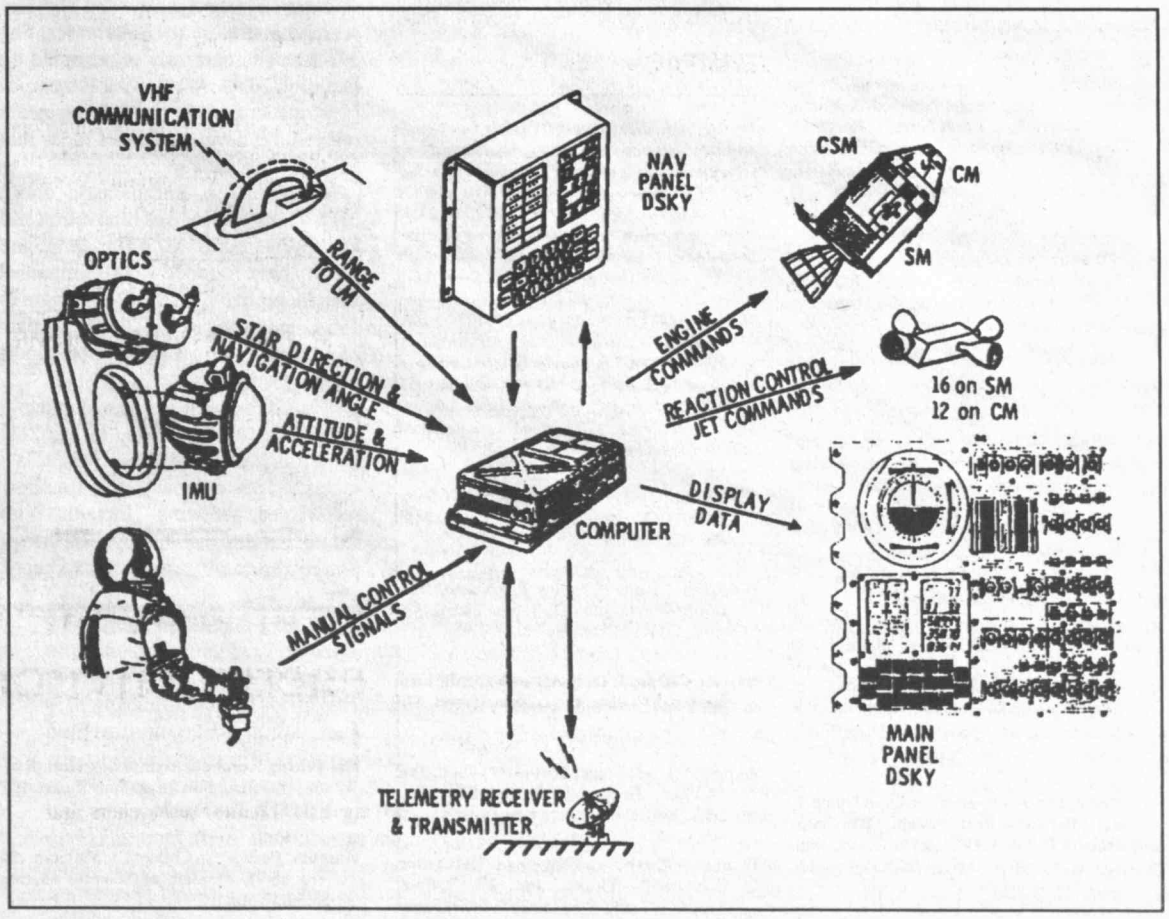
Engelward

Associate Professor Ann M. Pendleton-Jullian of architecture has been selected to be the inaugural holder of the Alfred Henry and Jean Morrison Hayes Career Development Professorship for a three-year term. The chair was established with a bequest from the Hayeses; Alfred Hayes received the SB in chemical engineering from MIT in 1929.

Pendleton-Jullian

Professor Pendleton-Jullian's principal fields of interest are architectural design and the theory and practice of architecture. Her work includes designing a house for the late Dr. Carl Sagan and his wife Ann Druyan. She has published work from her practice as well as numerous theoretical pieces, including *The Road That is Not a Road and the Open City: Ritoque, Chile* (both MIT Press).

Professor Pendleton-Jullian received the BArch degree from Cornell University's College of Architecure, Art and Planning in 1979 and the MArch degree from Princeton University in 1983. She was an assistant professor at Cornell from 1986-93, when she came to MIT.



This diagram, taken from the notebooks of one of the engineers who designed the Apollo Guidance Computer System in the early sixties, is an example of the historical documentation studies by students in STS.185/6.972.

Courtesy the Charles Stark Draper Laboratory

Institute Calendar

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

(For arts-related listings, see page 7)

December 10-January 11

■ SPECIAL INTEREST

Zero to $300 Million in Three Years: Philosophies for Fast-Track Entrepreneurship*—Jon Hirschtick, founder and CEO, Solidworks, Inc. MechE Distinguished Alumnus Event, Bechtel Lecture Hall Rm 1-390, **December 10,** 4pm.

■ SEMINARS & LECTURES

WEDNESDAY, DECEMBER 10

5th Biannual "My Favorite Ocean" Pageant*—Emceed by Prof. Paola Rizzoli, MIT. Sponsored by Physical Oceanography in the Dept. of Earth, Atmospheric, and Planetary Sciences, Noon, Rm 54-915. Info: x3-0251.

Zero to $300 Million in Three Years: Philosophies for Fast-Track Entrepreneurship*—Jon Hirschtick, Founder and CEO, Solidworks, Inc. MechE Distinguished Alumnus Event, Bechtel Lecture Hall Rm 1-390, 4pm.

Remarks on Viro's Combinatorial Construction of Smooth Real Projective Hypersurfaces*—Dr. Jesus Deloera, The Geometry Center. MIT Combinatorics Seminar, Rm 2-338, 4:15pm. Contact: x3-7775.

Toward Machines That Can Deny Their Maker*—Rosalind W. Picard, MIT. God and Computers: Minds, Machines, and Metaphysics, sponsored by the Artificial Intelligence Lab, 4:30pm, Rm 34-101.

Technology Adoption in Consumer Markets*—MIT Enterprise Forum 10/250 Case Presentation. Gregory Shlopak, chairman and CEO, CYRK, Inc. Followed by case profile of Reflective Technologies, Inc. (RTI), which was founded by four MIT graduate students. 6-9pm, Rm 10-250. $10 members, $15 non-members. Info: x3-8240.

THURSDAY, DECEMBER 11

The Cold Branch of the Thermohaline Circulation: Sensitivity to Parameterizations of Sub-Grid Scale Processes in an Idealized OGCM*—Dr. Alban Lazar, NASA/Goddard Space Flight Center. Sponsored by Physical Oceanography in the Dept. of Earth, Atmospheric, and Planetary Sciences, 2pm, Rm 54-915. Info: x3-0251.

TBA*—Paul Matsudaira, Whitehead Institute for Biomedical Research, MIT. Mechanics & Materials Seminar Series, Dept. of Mech. Eng., 4-5pm, Rm 5-234. Refreshments at 3:45pm. More info <l_m@mit.edu>.

The Physics and Chemistry of Hydrocarbon Emission*—Simone Hochgreb Department of Mechanical Engineering. Sloan Automotive/Reacting Gas Dynamics Laboratories, 4:15-5:15pm, Rm 31-161. Refreshments at 4pm.

FRIDAY, DECEMBER 12

Q-Calculus, Scaling, and Irreversibility*—Professor Ayse Erzan, Istanbul Technical University and Feza Gursey Research Institute for Basic Sciences. Chez Pierre Seminar, 4:15pm, Rm 12-132. Tea and cookies at 4pm. Info: <kbowring@mit.edu>.

Self-organized Carbonate Precipitation into Alkaline Media: Application to Precambrian Geochemistry*—Prof. Juan M. Garcia-Ruiz, University of Granada. EAPS Lecture Series, 4pm, Rm 54-915. Refreshments at 3:30pm in Ida Green Lounge.

TUESDAY, DECEMBER 16

The Mind and Its Place in Newtonian Nature*—W. Alan Gabbey, Barnard Colleg. Dibner Institute Lunchtime Colloquium, noon-2pm, Dibner Institute, Rm E56-100. If you plan to attend, contact <dibner@mit.edu> or x3-6989.

WEDNESDAY, DECEMBER 17

The Myth of US Management of the Latin American Long Peace*—David Mares, Professor of Political Science, University of California, San Diego. Security Studies Seminar, noon-1:30pm, E38-615. Info: x3-0133 or <llevine@mit.edu>.

The Geodynamo: Observations and Numerical Models*—Prof. Jeremy Bloxham, Harvard Univ. EAPS Lecture Series, 4pm, Rm 54-915. Refreshments at 3:30pm in Ida Green Lounge.

THURSDAY, DECEMBER 18

Characterization and Dynamics of Rough Interfaces*—Prof. Ayse Erzan, Istanbul Technical University and Feza Gursey Research Institute for Basic Sciences. Condensed Matter Theory Seminar, Sponsored by Condensed Matter Physics Group, 4:15pm, Rm 12-132.

FRIDAY, DECEMBER 19

Current Plasma Physics Issues in Electric Propulsion for Spacecraft*—Dr. Edgar Choueiri, Princeton Plasma Physics Laboratory. Plasma Science and Fusion Center Seminar Series, 4pm, Rm NW17-218. Refreshments at 3:45pm. Info: x3-8101.

■ COMMUNITY CALENDAR

MIT Pistol & Rifle Club, Basic Pistol Marksmanship Course*—Begins Jan. 15. Four nights: Jan. 15, 16, 22, 23 from 6-9pm. DuPont pistol range. Course covers safe handling, storage and use of firearms, as well as developing marksmanship skills to meet local police department requirements for pistol permits. Fee $75 MIT community, $100 non-MIT, $25 discount for students. $20 non-refundable deposit applied toward fee. Info/registration: Valerie Lowe, Draper x8-4769 or email: <vlowe@draper.com.>

Falun Gong Classes*—Falun Gong is an ancient method of self-improvement in body and mind, an advanced Qigong system of the Buddhas' School. Good for all ages. Everyone is welcome. No fees or donations. **Tuesdays**, 6:30-7:30pm, Rm. 1-134. Contact Leonard at x3-0720 or see <http://falun.mit.edu>.

Libraries' Booksale—**Hayden Library Basement, Building 14S. Thursday, **Dec. 11** 10am-3pm. Engineering, philosophy, and miscellaneous subjects. Free materials in every sale. Funds raised support the Library Preservation Fund. Gifts Office, x3-5693.

Working Group for Support Staff Issues*—Dec 11: Please join us for the regular meeting, noon-1:30pm, Rm 10-105 (Bush Room). Lunch is provided. Please RSVP to <eaj@mit.edu>. More info: Kate Schenck x3-5921 or Edward Jacobson x3-5030.

Wives Group—Dec. 10:** Safety at MIT and in Boston, Cheyl deJong Vossmer, Campus Police; 3:30pm W20-400. **Dec. 17:** Holiday Dessert Party, 3pm. Call x3-1614 for location. Ongoing weekly meetings.

Health Education Services Wednesday Workshops for Parents and Parents-to-Be—Dec 10:** Keeping Our Children Safe and Healthy. **Dec 17:** Providing a Safe and Secure Home. All workshops 12-1pm (except where noted), Rm E23-297, free, children welcome, no preregistration necessary, open to members of the MIT, Draper and Whitehead communities and to their families. More info: x3-1316.

MIT Women's League—Informal Needlework Group:** 10:30am-1:30pm, Rm 10-340 (Emma Rogers Room). Upcoming meetings: **Dec 17, Jan 7. Tai Chi Classes:** Tuesdays 5:15-6:30pm, Rm W31-225. Classes open to all levels. To register call x3-9436.

■ SENIOR FOCUS

Tai Chi—Jan 9-30:** Fridays 12:30-1:30pm, four sessions, $30. More info: x3-7910.

■ MITAC

*The MIT Activities Office (MITAC) is a non-profit employee service that serves the cultural and recreational needs of the MIT community (including MIT's retirement community), their families, and friends. Two locations: (1) Room 20A-023, 18 Vassar St, Cambridge, 9:30am-3:30pm, Monday, Wednesday, Thursday, and Friday (closed Tuesday and all Institute holidays); (2) Room LLA-218, x6130, Lincoln Lab., Lexington, 1:15-4pm, Thursday and Friday only. Call x3-7990 at 20A-023 or e-mail <julieh@mit.edu> for further information. MITAC accepts only cash or a personal check (with a valid MIT ID) made payable to MIT. (Include MIT ID#, room number, and extension on checks.) Credit cards not accepted. **MIT IDs must be presented.***

Yo-Yo Ma (Symphony Hall, Boston)—Sun., Jan. 11,** @ 3pm: ticket: $40 (reg. $45). Purchase by 12/12.

BlueMan Group (Charles Playhouse, Boston)—Fri., Jan. 23,** 10pm. Ticket: $37 (reg. $45). Purchase by 12/19.

Boston Classical Orchestra (Faneuil Hall, Boston)—Fri., Jan 2,** 8pm. Ticket: $14 (reg. $18).

Antigone (Lyric Stage, Boston)—Sat., Jan. 24,** 5pm. Ticket: $16.50 (reg. $24). Purchase by 1/8.

Bruins vs. Pittsburgh Penguins (FleetCenter, Boston)—Thurs., Jan. 29,** 7:30pm. Ticket: $27 (reg. $29) and each ticket comes with a $5 concession stand coupon good at any of the FleetCenter concession stands. Purchase by 12/12.

Chicago (Colonial Theatre, Boston)—Thurs., Feb. 12,** 8pm. Ticket: $60.50 (reg. $65). Purchase by 1/16.

The Peking Acrobats (Symphony Hall, Boston)—Sun., Feb. 15,** @ 3pm. Ticket: $31 (reg. $35). Purchase by 1/2.

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

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

■ SOCIAL ACTIVITIES

MIT Folkdance Club*—All Night Hora: Dec 24-25. MIT Folk Dance Club's annual Israeli dance marathon. Bring pot-luck dish to serve 6-8. 6pm-6am, Walker Gym. **Sundays: International Dancing** 7-11pm. **Tuesdays: Advanced Balkan Dancing,** regular teaching & requests, 7:30-11pm. **Wednesdays: Israeli Dancing** 7-11pm. MIT/Wellesley students free, $1 others. Call x3-folk or e-mail <fdc-request@mit.edu> or see <http://www.mit.edu:8001/activities/fdc/home.html> for locations.

■ LOOKING AHEAD

***Next deadline for listings:* 12 noon Friday, January 2.** Covers events from Wednesday, January 7 through Sunday, January 18. Listings for the Institute Calendar and Student Notices should be e-mailed to <ttcalendar@mit.edu>. Hard copy also accepted (send to Calendar Editor, Rm 5-111), but e-mail preferred.

Please use appropriate Calendar formatting. Faxes are not accepted. Early submissions encouraged.

Reading volumes

Mark Ryan, a senior in electrical engineering and computer science, studies in the Humanities Library.

Photo by Laura Wulf

Statas donate $25 million to Institute

(continued from page 1)

drive to integrate our computer science facilities into the core of the campus and fulfill a goal MIT has had for many years. The state-of-the-art facility we envision will facilitate learning, research and interaction within the department and across other disciplinary boundaries."

MIT expects to have a leading architect design the complex, which will have numerous common areas and small meeting places where teachers, researchers and students from many academic disciplines can informally meet and talk about the next breakthrough in their fields.

The buildings, totaling more than 300,000 square feet, will bring together teaching and research space for the Laboratory for Computer Science (LCS), the Artificial Intelligence (AI) Laboratory, the Laboratory for Information and Decision Systems, and the Department of Linguistics and Philosophy faculty who use sophisticated computational models to study language acquisition and processing. Provision also has been made for facilities for brain and cognitive sciences work.

The complex will be located on Vassar Street adjacent to the Sherman Fairchild Building, which houses the electrical engineering and computer science (EECS) faculty and the Research Laboratory for Electronics. The 2.8-acre site currently is occupied by Building 20, the World War II "temporary" structure where MIT engineers refined the development of radar that helped win that war.

Mr. Stata is enthusiastic about MIT's long tradition of innovation and entrepreneurship. MIT alumni/ae and faculty have founded 4,000 companies which employed 1.1 million people in 1994, according to "MIT: The Impact of Innovation," a BankBoston report released this year.

He co-founded his first company, Solid State Instruments, in 1962 in Cambridge with two former MIT classmates. "That company was founded, really, on a shoestring," he said. "With me not earning any money, Maria supported the family in the early years. Fortunately, we were able to sell that company, which provided the nest egg to start Analog Devices. Maria's been my partner in life and whatever success we have had, we earned together."

They have two grown children, Nicole and Raymie. Their son Raymie received the SB in EECS from MIT in 1991, the SM in 1992 and the ScD in 1995.

Mrs. Stata, a teacher who supported the household on her salary for the first couple of years of their marriage, commented, "I appreciate the fact that MIT provides an opportunity for students, like Ray, to reach their full potential regardless of their economic background. MIT means a lot to me now, as I have a husband and son who benefited greatly from their MIT education."

Mr. Stata said he always had it in his mind to start a company. "My dad was a small-town electrical contractor in Oxford, PA, so I saw what it was like to run your own show. It seems natural for MIT graduates to form companies. I believe that the connections students and teachers and researchers make in these new buildings will prompt them to become entrepreneurs, since there will be many inventions created here."

ORIGINS OF ANALOG DEVICES

In 1965, Mr. Stata co-founded Analog Devices with another MIT graduate, Matt Lorber, in Cambridge, and he has built the integrated circuit manufacturer into a company with more than 6,000 employees and $1.2 billion in sales. The company is now headquartered in Norwood. It recently added a manufacturing plant in Cambridge to manufacture micromachined sensors for automobile air bags on the site of the former Instrumentation Laboratory, where Mr. Stata did his master's thesis.

Mr. Stata, who received both master's and bachelor's degrees in electrical engineering from MIT, noted that tuition for most of MIT's history has covered only half of the cost of providing an MIT education. "If you compound the interest on the subsidy over a lifetime, that comes to quite a debt," he said. "Alumni should repay that debt, and go beyond, if possible, to assure that others get the same opportunity we had. MIT depends on alumni to sustain its excellence, and I hope other alumni follow my example and step up to the plate."

Mr. Stata has been a member of the Corporation since 1984 and a member of the Executive Committee since 1994. He has chaired the EECS Visiting Committee since 1985.

Provost Joel Moses noted that the Ray and Maria Stata Professorship was created in 1984, at a time when enrollments in EECS were at an all-time high. "The gift was a great boost to the morale of the department. This new and magnificent gift comes at a time when there is a large shift of enrollment to computer science within the department. It too provides a tremendous boost in morale," Dr. Moses said.

In addition to founding Analog, Mr. Stata is also a founder and chairman of the Center for Quality of Management, a group of Boston-area CEOs who learn from each other by sharing best practices and by developing and delivering training programs to help their companies become more competitive.

He was the first president of the Massachusetts High Technology Council, which he helped found in 1978. He is a member of the National Academy of Engineering and the American Academy of Arts and Sciences and a trustee of the Boston Symphony Orchestra.

Robert A. Brown, dean of engineering, said, "Computer science and information technology are at the heart of many of the most important developments in engineering. This project will lead to a facility with state-of-the-art laboratories and classrooms for faculty, staff and students involved in this revolution. Moreover, it will centralize those activities on campus, where they can have the biggest impact on students and faculty in related areas throughout the Institute."

The LCS and the AI Lab have operated in off-campus rented quarters at 545 Technology Square since the 1970s and now occupy almost an entire nine-story building.

Boston Harbor proving to be fertile farming site

■ By Andrea Cohen
MIT Sea Grant

Clifford Goudey has become something of an urban farmer, but don't look for him milking cows or tending cattle amidst the Hub's skyscrapers. The citified husbandry that's caught his eye is aquaculture, and he's now raising fish in Boston Harbor.

Why grow fish in Boston Harbor? "Because we can," said Goudey, director of MIT Sea Grant's Center for Fisheries Engineering. "It would have been preposterous 10 years ago, but the water quality has improved tremendously, and it's getting better."

To prove that point, Mr. Goudey started Aqualab, the first aquaculture project in Boston Harbor. Perched on a pier at the National Park Service's Charlestown Navy Yard, this compact, year-round research facility is helping to identify and solve critical problems restraining the growth of aquaculture in Boston Harbor and other coastal urban centers.

"We're trying to study the implications of growing finfish in the harbor, where there may be some trace contamination from pollution," Mr. Goudey explained. Having started out with cod fingerlings, he will be raising hearty, warm-water red drum this summer. The fish will then be examined for accumulation of metals or other contaminants. But he is optimistic about what those inspections will reveal. "Most of the lingering contamination in the harbor is in the sediments, not in the water column," he said. "The water quality here is among the highest for urban harbors."

Thus, the lab can serve as a model for larger-scale commercial ventures in the lucrative worldwide aquaculture industry valued at more than $30 billion. Although Aqualab's systems are small, they are as complex as those used in similar commercial systems. The facility is housed in a 20-by-8-foot cargo van and includes two recirculating systems, each with a 300-gallon tank for growing fish. The water is pumped into the tanks from the harbor, with approximately 10 percent of the water replaced daily. Water quality is maintained with a protein skinner, a floating bead filter and an ultraviolet sterilizer.

"Bacteria that grow on the beads break down the ammonia produced by fish into benign compounds, and these are removed in the water exchange process," said Mr. Goudey. The protein skimmer also removes fine particles from the water to improve clarity. The water is moved through this system and aerated by an airlift pump.

The project is also educational on a number of levels. Students from the Department of Ocean Engineering helped construct and install the lab, and they're gaining hands-on experience in maintaining the fish.

Public education at the site is also a key element to Aqualab. "There is a lot of misinformation about aquaculture," Mr. Goudey said. "In some respects, the bad rap is earned because there are some very irresponsible examples that have turned mangrove forests into environmental nightmares or polluted coastal embayments through poor husbandry practices." However, recirculating systems such as the one used at Aqualab provide growers with good control of water quality, and effluent can be treated before it is released back into the environment.

These points comprise part of Aqualab's interpretive introduction to aquaculture, which is on display for visitors to the Charlestown Navy Yard. As home to the *USS Constitution*, the site welcomes more than 2 million people each year.

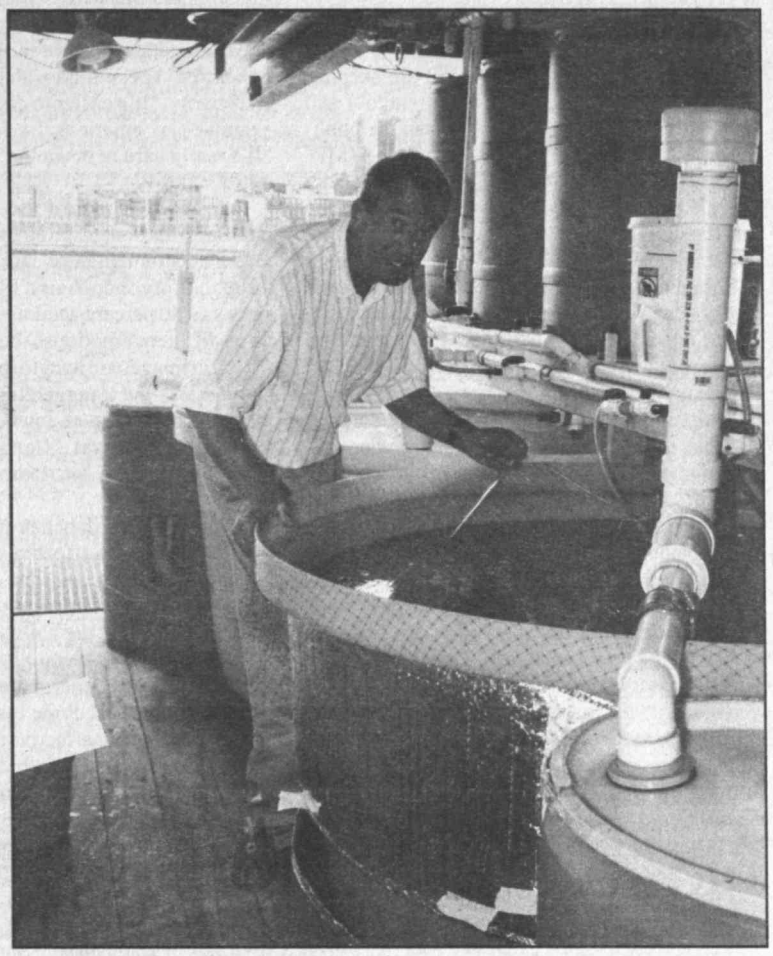
"Whenever we're down here, people are always coming by and asking questions," said Mr. Goudey. "They've been very supportive of both the aquaculture efforts and associated outreach activities we have held." Along with technical information, visitors also get a broader understanding of the potential economic gains from aquaculture in Boston Harbor and off the Massachusetts coast.

Across the harbor, Boston Mayor Thomas Menino has also shown interest in Mr. Goudey's efforts. "The Mayor's office has initiated work to try to bring aquaculture to Boston Harbor," said Mr. Goudey. He's now doing a study for the city to assess the feasibility of using Boston Harbor's Moon Island—once a sewage treatment site—as an aquaculture center. Discussions are also ongoing with Massport and other property owners about other possible sites for projects on the inner harbor.

Until then, Mr. Goudey will be busy raising fish at Aqualab, hoping to spark growth in the production of seafood. "I think there's a strong market for different kinds of high-quality products here, and the harbor makes perfect sense for this," he said. "Boston is one of many coastal cities that has a great harbor but also has a lot of underutilized waterfront industrial space."

Some of that space has already been converted to non-maritime and residential activity. According to Mr. Goudey, the time is ripe to devote some of that space to raising fish. "In the next 10 to 20 years, either aquaculture makes a stand and gets part of the waterfront, or it never will."

(This article originally appeared in Two If By Sea, *a joint publication of the MIT and Woods Hole Oceanographic Institution Sea Grant programs.)*



MIT Sea Grant fisheries engineer Cliff Goudey tends to a tank full of red drum at Aqualab, the first aquaculture project in Boston Harbor.
Photo by Leah McGavern

Discounts offered for Delta flights to NY

MIT will benefit from an agreement with Delta Air Lines that will result in discounted airline tickets for Institute-related business trips to New York on the Delta Shuttle. This discount is in addition to an agreement with American Airlines announced earlier (MIT Tech Talk, October 22).

The agreement between Delta Air Lines and MASCO (the Medical Academic Scientific Community Organization), a consortium including major Boston hospitals, Harvard University and MIT, is effective December 1, 1997 through December 31, 1999. It provides a significant discount on the Delta Shuttle between either Boston and New York or between New York and Washington, DC.

The discounted fares are available only when using American Express Travel (x3-7961) or Omni Travel (x3-9405). Those with questions may call the agencies directly.

Two fraternity houses cited for alleged alcohol infractions

(continued from page 1)

ated, the fraternity faces additional sanctions. The student and others involved also may face disciplinary action.

At the other fraternity, Theta Chi, the residents removed all alcohol from the house and declared the house to be substance free after a Boston University freshman claimed she was hospitalized for alcohol poisoning as a result of drinks consumed at the fraternity on November 14. The Boston Licensing Board cited the house, at 528 Beacon St. in Boston, for underage drinking on November 20 and will schedule a hearing for January.

MIT officials did not suspend Theta Chi because preliminary inquiries indicate the incident occurred in an individual's room and not at a scheduled house event. Mr. Dorow said any infraction of Theta Chi's voluntary ban or the presence of alcohol in the house "could result in the house's suspension."

Shortly before the Theta Chi incident came to light on Thanksgiving weekend, the Boston Licensing Board voted unanimously to revoke the dormitory license of Phi Gamma Delta for seven months, effective January 15.

Phi Gamma Delta has been suspended since September, when freshman pledge Scott Krueger fell into an alcohol-induced coma after allegedly drinking heavily at a social event at the house located at 28 The Fenway. Mr. Krueger died in Beth Israel Deaconess Hospital on September 29.

The license revocation means that the fraternity's 37 residents, 11 of whom are freshmen, must move by January 15.

Members of the fraternity who wish to live on campus should follow the normal procedures for housing and work through Phillip Bernard, program director of residential life.

"We would certainly expect to house all of the freshmen on campus and will do our best to house all those upperclassmen who wish to be on campus as well," said Dean for Student Life Margaret Bates. "Since the change is coming between semesters, we have more flexibility than we would normally have during a semester, and so we expect to be able to offer housing to all those students who wish to be on campus.

"In addition, we are trying to identify options that would allow those students who wish to live together to do so," Dean Bates said. "Whether that means rooming together, living in the same residence or some accommodation for larger numbers of students will depend both upon individual preferences and upon the options we are able to identify."

Dean Bates said MIT would assist upperclassmen who prefer to live off-campus find such accommodations.

The licensing board said the Malcolm Cotton Brown Corp., an alumni group that owns the house, would have to apply to restore its dormitory license when the suspension ends on August 15. If the license is restored, the board said, alcohol will be banned on the premises for two additional years. The Phi Gamma Delta national fraternity has voted to make all chapters substance-free by 2000.

In addition, the licensing board ordered MIT to report by June 1 its plans to supervise Phi Gamma Delta. The board also requested a report on the results of MIT's investigation into the events surrounding Mr. Krueger's death.

Meanwhile, the Interfraternity Council elected new officers last week. The new president is Duane Dreger of of Sigma Nu, a junior in mathematics. Other officers are: Margaret Tsai of Kappa Alpha Theta, a junior in chemical engineering, vice president for activities and organization; Bob Broderick of Zeta Psi, a junior in electrical engineering and computer science, vice president for internal affairs; sophomore Enid Choi of Kappa Alpha Theta, treasurer; and Lisa Tatterson of Alpha Chi Omega, a junior in biology, secretary.

Committee chairs are: Amir Mesarwi of Phi Delta Theta, a sophomore in chemical engineering, community relations; Katherine Hardacre of No. 6 Club, a junior in biology, judicial; Christopher Rezek of Alpha Delta Phi, a junior in linguistics and philosophy, public relations; and Hongsup Park of Phi Kappa Theta, a junior in biology, rush.

The National Interfraternity Conference (NIC) adopted a resolution at its annual meeting last week that encourages members to pursue alcohol-free facilities and pledges its support in such efforts. The NIC pledged to "actively seek the cooperation, support, staff involvement and resources commitment from institutions of higher learning in this effort."

On Sunday evening, 200 students attended a Campus-Wide Mixer, cosponsored by Alpha Phi and MedLINKS. The event combined snacks, "mocktails" (alcohol-free cocktails), an "Alcohol 101" lecture by Dr. William Kettyle, associate medical director, and a performance by UpFront, the theatrical arm of the MedLINKS program.

"It was a festive event where people could socialize without alcohol as well as get information about the effects of drinking. I hope there will be more events like this," said Tracy Desovich, student health educator.

Funding event was provided by the Medical Department and the Office of the Dean of Students and Undergraduate Education, as well as the Campus Activities Complex Program Board, LaVerde's and Health Education.

Guidelines given on alcohol at holiday events

As the holidays approach and many departments are planning parties and functions that may involve the use of alcoholic beverages, Vice President for Human Resources Joan Rice has issued guidelines and a reminder of MIT's policies on serving alcohol at such events.

MIT is now reviewing all Institute alcohol-use policies (described in section 9.3 of *Policies and Procedures*, available on the web at <http://web.mit.edu/policies>). In the meantime, the following policies pertaining to events apply:

- In academic and administrative areas, including labs and centers, the appropriate senior officer (a member of the Academic Council) must give written approval for *any* MIT event (on or off campus) where alcohol is served, based on a determination that the requirements below are understood and will be observed.
- No alcohol may be served at events where persons under age 21 will be present unless the sponsor has prior approval from the appropriate senior officer, again based on the requirements below.
- All events where alcohol will be served must be registered with the Office of Conference Services, Rm 7-111, x3-1703. (Student events must be registered through the Residence and Campus Activities section of the Dean's Office.)

Under the law, the sponsor or host of an event has the duty to take steps to control the dispensation of alcoholic beverages. The Institute could be held legally responsible if, for example, a driver who was served too many drinks at an MIT-sponsored event causes an accident.

Hosts of MIT events must take the following steps to control the dispensation of alcoholic beverages:

1. Issue written instructions to those dispensing or controlling the alcohol that it must not be served to persons under 21, or to intoxicated persons.

2. Ensure that at events which include underage attendees, anyone being served alcohol must show proof of age, using a driver's license or Massachusetts state liquor ID card.

3. Remain present or designate a responsible individual to remain present until the conclusion of the event.

4. Ensure that servers do not serve more than two drinks to any person at one time.

5. Make sure that any area where alcohol is served is attended at all times.

6. Limit the number of hours alcohol is served, and restrict hard liquor to certain hours or eliminate it entirely.

7. Have ample amounts of low-alcohol and nonalcoholic beverages, including coffee, available throughout the function.

8. Serve food whenever alcohol is served.

9. See that safe transportation is provided to any guest who appears to have overindulged in alcoholic beverages.

10. Document the measures implemented to conform to these requirements.

Picard lecture explores computers' affective potential

■ By Sarah H. Wright
News Office

Rosalind W. Picard welcomed both skeptics ("I was one myself a few years ago") and enthusiasts to a lecture that celebrated the publication of her book, *Affective Computing* (MIT Press) and challenged her audience to reconsider the role emotions play in our own lives and the role they might play in the "lives" of computers.

Dr. Picard, the NEC Development Professor of Computers and Communications and associate professor of media technology at the Media Laboratory, opened with a quick survey of research on emotions and their role in human decision-making. Studies reveal that too much emotion wreaks havoc on reasoning, but, surprisingly, too little emotion also take its toll, she said. Of computer scientists, she quipped, "We're not known as empathically savvy people. Yet empathy—reading and adapting behavior to affective cues—is critical."

Empathy is especially important, she noted, in teaching and learning. Three emotions—interest, distress, and pleasure—form a natural cycle associated with learning, and if a mentor can adapt his or her behavior when recognizing them, more effective interaction results.

Now that distance learning has become more commonplace, Professor Picard asked, can computers become mentors in this way? Further down the road, can computers become like affectively-clued-in house pets, figuratively purring or trotting in with the evening paper and a pair of cyber-slippers?

Professor Picard acknowledged that she was once a skeptic, but no longer. Some computers now have the ability to express and recognize affect or emotion, and she said her research at the Media Lab indicates these abilities could become more commonplace.

Computers have been made to recognize emotional states as revealed by facial expression, vocal intonation, posture and gestures. Computer-generated speech has also been modulated affectively. "It's easier to come up with negative examples of emotions," said Professor Picard. "It's really hard to make them sound joyful right now."

Less visible indicators of emotion such as pupillary dilation, respiratory changes, heart rate, pulse and temperature can all be recognized through skin conductivity. In fact, some research shows an 80 percent accuracy rate for identifying three different emotions, she said.

"Still images are hard to look at and recognize. Computers like exaggerated expressions, with the mouth going up or down, as in anger, disgust or surprise," she said. "Computers like someone speaking to them as if they're speaking to a foreigner."

Professor Picard then provided her criteria for judging whether an affectively equipped machine is actually a conscious one. She noted that the intuitive "feeling of knowing," the ability to regulate emotions, and the ability to utilize emotions as people do when planning activities to capitalize on good experiences, are all aspects of consciousness that still elude researchers.

Concerns about affective computers—including invasion of privacy, anthropomorphizing computers (leading, perhaps, to a computer-rights activism analogous to animal-rights activism) and the possibility that computers may learn to feign affect and "manipulate or deceive us"—were also raised.

Professor Picard closed her lecture with a summary of graduate students' works in progress, including wearable computers such as the Blood-Volume Pulse Earring, a galvanic skin response unit inside a shoe, and an affective camera pendant that gathers video continuously but saves only those images associated with states of high arousal.

Professor Rosalind Picard makes a point during her lecture on "Affective Computing."

Photo by Donna Coveney

Video footage of Confusion-Sensing Glasses which detect eyebrow-furrowing (intended for use in distance learning) offered both a view of the future and a note of Saturday Night Live-style humor. Questions following Professor Picard's talk sought more information on applications of her research and explored the implications of generalizing about human emotion.

Professor Picard is delivering another lecture, "Toward Machines That Can Deny Their Maker," this afternoon at 4:30pm in Rm 34-101. Hers is the final lecture in the fall series, "God and Computers: Minds, Machines, and Metaphysics," coordinated by Dr. Anne Foerst of the Artificial Intelligence Laboratory.

Pratt named as new director of career services office

Christopher Pratt, director of career services at Seton Hall University, will join MIT as the director of career services and preprofessional advising in January.

"Chris is an excellent manager, a born teacher and educator, and a warm and engaging human being," Dean of Students and Undergraduate Education Rosalind Williams said in announcing Dr. Pratt's appointment.

Pratt

Dr. Pratt was raised in Natick and received the BS from Northeastern University in 1970. He earned the MA from Bradley University in Peoria, IL, in 1977 and the EdD from Seton Hall in South Orange, NJ, in 1992.

"I look forward to meeting and working with the MIT students and faculty to help each other learn to be more effective in our changing world," said Dr. Pratt. "As for coming home, Gail Sheehy says that passages are very important in our lives, and I am looking forward to this one with great anticipation. Perhaps as TS Eliot said, '...and the end of our exploring will be to arrive where we started and know the place for the first time.'"

Dr. Pratt, who studied English, journalism and social psychology as an undergraduate and was president of his senior class at Northeastern, worked at his alma mater from 1970-73 in university relations and at the Cooperative Education Research Center.

He was director of the Center for Cooperative Education at Trenton State College in New Jersey from 1973-76 before becoming director of the Cooperative Education and Career Development Center at Bradley from 1976-79. He then returned to New Jersey to become the director of career services and head the Atlantic Cooperative Training Center at Seton Hall, where he also coached women's soccer from 1990-1993.

Dr. Pratt received the 1993 Cooperative Education Association Ralph W. Tyler Award for Outstanding and Distinguished Research, Procedures and Outcomes for Students in Cooperative Education at the 30th CEA Conference in Newport, RI. He has published more than 20 articles and conducted program consultations and evaluations of cooperative education and career services at nearly 100 institutions.

Safety tips offered

The Safety Office has issued guidelines for the use of holiday decorations in all Institute buildings.

Flammable decorations are prohibited under Massachusetts fire prevention regulations. Noncombustible decorations or those labeled as flameproof are permitted.

All Christmas trees and decorative boughs must be artificial, with an approved flame-retardant label. The use of open flames for candles, other lighting and decorative purposes is prohibited by the Cambridge Fire Department.

Only UL-approved lights rated for use on artificial trees are to be used. Larger tree lights normally used on natural trees generate enough heat to melt plastic and ignite decorations. Miniature or "twinkle" lights are preferred.

Classified Ads

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

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

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

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

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

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

Deadline is noon Friday before publication.

■ FOR SALE

NordicTrack Pro with electronics, cross-country exercise machine, $350 or bst. Dave, Linc x1024, eves 603-880-1866.

Westinghouse stackable w/d, almond color, grt cond, electric hook-up, hardly used, askg $800 or bst. Contact <straccom@mit.edu> or Diane at x3-1718.

Epson LQ-510 dot matrix printer incl stand, pin-feed paper, and 2 toner cartridges, $70; Nine West W's sz 9 black lace-up boot w/2" heels, new, $40. Nancy x8-8479 or <nwilliam@mit.edu>.

Classic 35mm SLR: Olympus OM-1 MD, plus 75-150mm zoom lens and Vivitar 285W zoom flash, $350. Hal, Linc x7448 or <hal@xn.ll.mit.edu>.

Apple Macintosh mouse, exc cond, $25; AppleTalk 8-pin network connector box and phone line, $5. Tyson, 787-2460, <tyson@mit.edu>.

Futon bed, Q-sz, incl cotton mattress & foldable wooden frame, $60. Call 617-629-7332 (eves).

Sears Lifestyle Power Rider, never used, exc cond, askg $75 or bst; 19" color TV (no remote), gd cond, askg $75 or bst. Anne x3-4142 or <acahill@mit.edu>.

Stroller, Century Travelite, semi reclines, canopy, basket, $35; Gerry chging table, pad, white, 38.5"h x 33.5"w x 20"d, 2 shelves, 1 drawer: $40. Deb x3-3372, 978-779-6860, <debsmall@mit.edu>.

Versatile solid-maple twin beds; set up separately or as bunk beds, $275, platforms incl but not mattresses. Call 617-491-3487 or <irwin@mit.edu>.

Treadmill: Alpine Walker, manual, used 1x, $50. Call 617-275-8384.

■ VEHICLES

1981 Buick Skylark Ltd, 87K, wh/black vinyl, 6-cyl, 23 mpg, auto, new batt/alt/a/c seal, 1 ownr, records avail, $1000. Contact: <rendino@ll.mit.edu>, 781-981-2021 (d), 617-782-3802.

1984 Pontiac Sunbird convertible, 125K, auto, good stereo, $600. Mike x3-5824.

1984 Chevy Caprice Classic, 100K miles, white, 2-dr, power everything, automatic transm, V6, runs grt, $1400. Bjorn DeBear, 225-7448, <debear@mit.edu>.

1985 Honda Accord LX, 4-dr, auto, a/c, pwr, grey, new alt/trs/exh pipe/muff, 145K, 1 ownr, doesn't lose oil, gd cond, nds some work to be perf, $1400. Steve, Draper x8-3374 or <scop@draper.com>.

1986 VW Golf, gray/black, 5-sp, 4-dr hatchbk, 135K, 25mpg, runs great, new exh, fuel pump & brakes, $1200 or bst. E-mail <kuraishi@mit.edu> or lv mssg at x5-1152.

1987 Merkur XR4Ti, 93K, red, auto, turbo, moonroof, new battery, belts, tires, runs grt, $3500. Mike, x3-5449 or <majors@psfc.mit.edu>.

1988 Mazda 626 LX, 5-dr, 5-sp, all power options, 128K, v gd cond, $2950. Call x3-1638 or 862-2467 (eves).

1990 Chrysler Le Baron convertible, V6 auto, 86K, driver-side air bag, gray-silver, security sys, $2500. Call x3-6658 or <lslerman@mit.edu>.

1993 Honda Civic Lx, 4-dr, auto, 4-sp, a/c, all power package, cc, 63K, exc cond, $7,400. Seong x3-3247, 781-647-7340, <jegarl@mit.edu>.

1993 Chevrolet Corsica LT, 37K, grt shape, ps, abs, pb, a/c, airbag, cloth int, $6250 or bst. Call 508-535-0270.

1994 Hyundai Excel hatchbk 3-dr, red, auto, a/c, ps, AM/FM/cass, extra rear spkrs, 26K, well-maint, exc cond, $4,800. Call x3-8594 or 782-0841 or <jklee@mit.edu>.

■ HOUSING

Arlington: lrg sunny 1BR apt avail Dec 1, located at 285 Mass Ave, 10 min to Alewife & 15 min to Porter Sq, rent $685, heat incl. Andrew, x3-7031 or 643-4239.

Arlington: beaut single family 3BR, deleaded, 2b, jacuzzi, hdwd, gar, landscaped yd, grt nbrhd w/ parks & playgrounds, easy commute, avail 1/1, $2000/mo. E-mail <goemans@math.mit.edu>.

Belmont: 3-4BR, Jan.-Dec 1998, $2,900/mo. Call 489-2028, <junekino@medial.mit.edu>.

Bethel, ME: luxury lakefrt condo, 15 min to Sunday Rvr ski area, downhill, x-c, ice skating, 2BR, fplc, mod ktchn, cable, slps 4-5, $1000/mo or $3800/season. Cheryl 252-1111 or 978-664-3646.

Cambridge, W: for sale by ownr, Colonial, quiet court, off-st prkg, nr Hvd Sq, Charles Rvr, 8 rms, 3BR, 2b, new ktchn, deck, thermo-windows, chimney, move-in cond, $498,000. Call 617-547-1983.

Concord, MA. 9-rm contemp ranch, nr LL, abutts GMNWR, bikepath, 2-car gar, child-safe cul-de-sac, Alcott Sch, non-smkg, no pets, refs, avail 12/15, $2500/mo. Linc x4892, <rogal@ll.mit.edu>.

Everett, 1BR w/study, living, dining, mod kitch & bath, off-st prkg, on T, pleasant nbrhd, no pets, non-smoker(s), avail 12/1, $650/mo, no utilities incl, 1st mo/sec dep. Trudy x3-4954.

Martha's Vineyard: miles of beaches & trails near this 4BR Chappaquiddick house, outdoor shower, w/d, TV, VCR, June-Sept, $600-800/wk. David, Linc x3863 or 603-679-8849.

N. Waltham: 3BR/2.5b apt, eat-in-ktchn, frig, d/d, a/c, h/hw incl, w/d hookups; no lead, cats OK, free bus to T, workout room, nice view; avail 1/1, $1400/mo. Call 781-899-0379 or <jdefig@mit.edu>.

Quechee, VT: 2BR house avail for rent, $250/wknd. Call x3-4478.

■ WANTED

Visiting Prof (family of 2) seeks studio or 1BR unit for rent 2/1-7/31/98. Contact <matsuoh@mail.utexas.edu>.

MIT Sr. Sec. looking for studio apt or independent situation in shared home handy to MBTA, friendly, quiet, non-smkr, for 12/15 or 1/1. Anne x3-6681.

One ticket wanted for Patriots vs Steelers game. Ben 244-4899.

Room to rent wanted near MIT or T stop, starting Jan 25, needed by Feb. Master's graduate to continue work on campus. Call x5-9663.

■ ROOMMATES

Belmont: Seeking roommate to shr 2BR apt, lrg LR, DR, small deck off ktchn, fplc, yr-rd sunroom, w/d, storage, prkg, on carline, hdwd flrs, nice woodwork, avail now. Call 617-489-8560.

Somerville: Room avail Jan 1 in 3-person apt, 10 min. walk to T, lrg, sunny, hdwd floors, w/d in bsmt, we are 2F grad students, sk non-smkr, $285/mo+. E-mail <vero@mit.edu> or <ckiddoo@mit.edu>.

South Boston: seeking prof and/or grad student to share huge apt, 1BR in 3BR apt, close to 4 bus lines, 1 mi from Red Line, storage, avail 1/1/98, $366.66+. Call 617-268-5363.

List fellowships awarded to two students for music projects

For the first time since its creation in 1992, the List Foundation Fellowships in the Arts for Students of Color have been awarded to students exploring musical pursuits.

Sumita Pennathur, a sophomore in aeronautics and astronautics, received a fellowship to study Karnatic music in the west, combining her passions for south Indian classical (Kar-natic) music and modern jazz. Isela Rodriguez, a junior in urban studies and planning, will use her fellowship to study Mexican mariachi vocal music for a project titled "Mexico Lindo: Canciones de Romance/Sweet Mexico: Songs of Romance."

Ms. Pennathur, who began studying Karnatic vocal music at age seven and Western music on the alto saxophone at 11, plans to take Karnatic vocal lessons in India and learn instrumental aspects of Karnatic music to combine those traditions with jazz.

Pennathur

"Since I am passionate about both, playing jazz without Karnatic or vice versa makes me feel like something is missing from the inner part of myself," she said. "I sometimes get the feelings of ecstasy and peace simultaneously... when I play certain improvised phrases on my saxophone. I feel as if I'm playing my soul through the instrument," she continued, adding that she also gets this feeling when listening to a very good Karnatic performance.

Arts at MIT

Ms. Rodriguez seeks to explore the rich romantic culture of her Mexican heritage through music. By learning the songs enjoyed by past generations of her family, she hopes to "grasp a portion of the past and embrace it as part of my future."

"Mariachi music is not a daily part of MIT life," she noted. "There is a passion for life and its components within the words sung by these performers. By joining their ranks, I'd be able to share this passion." Ms. Rodriguez likens the fellowship award to attaining a dream she'd always thought beyond reach. "It just goes to show that anything is possible," she said, commending the merits of "holding on to dreams and direction."

Rodriguez

Both award recipients plan MIT concerts to share their projects with the community.

Established in 1992 with support from the Albert A. List Foundation, the List Fellowship was created "to encourage a broad range of artistic endeavor and to further cultural investigation, affirmation and understanding through the arts by supporting students of color in their exploration of traditional and non-traditional art forms."

The fellowship awards up to $5,000 annually to two MIT students to support the yearlong pursuit of a project in the performing, visual or literary arts, including a mentorship program to work with established artists of color. Both recipients will work with local instructors as well as teachers in the respective indigenous regions—Ms. Pennathur in India and Ms. Rodriguez in Mexico.

Plasma center expands research

■ By Robert J. Sales
News Office

With a new name and a renewed sense of mission, the Plasma Science and Fusion Center (PSFC)—formerly the Plasma Fusion Center—is well positioned to take advantage of increased federal interest in energy research and development.

"The added word 'science' better reflects the diversity of research that is being carried out at the Center," said Professor of Physics Miklos Porkolab, director of the PSFC. "Our long-range plans call not only for a diversification in plasma science and related technology research, but also for focusing the emphasis on science in our fusion-oriented research activities, in accord with the recent shift in the US magnetic fusion program's near-term emphasis from a reactor development goal to a fusion science program with a strong concept improvement element. Our very long-term goal still remains the development of an environmentally attractive and commercially competitive energy source for mankind."

When Princeton University shut down its Tokamak Fusion Test Reactor earlier this year, MIT's Alcator C-Mod became the largest tokamak fusion experiment on the East Coast, rivaled in the United States only by the DIII-D in San Diego. Many of Princeton's scientists, experimental apparatus and graduate research projects have shifted to MIT.

The Department of Energy's Office of Fusion Energy Sciences redirected $2.3 million of funds for Princeton projects and personnel to MIT, as well as $1.1 million originally budgeted for the University of Texas. In addition, DOE funds for the Alcator project at MIT were boosted by $1 million to $12.5 million.

Two years ago, Congress cut $4.5 million from the Alcator program. As a result, more than a dozen key scientific and technical personnel were laid off, experimental run time was curtailed and major upgrades to the facility were postponed.

"If the fusion budget holds up next year, or better yet, increases as recommended by recent national advisory panels, the Alcator program is earmarked for further funding increases which we hope will enable us to achieve full experimental operations in fiscal 1999," said Professor Porkolab, who has more than 30 years of experience in his field.

"When we consider the presence of visiting professors, research scientists and students from other universities and laboratories, the PSFC is truly becoming a national center of excellence in plasma science and fusion research."

Reflecting the change in name, the PSFC has expanded its scientific research interests, sharing a five-year, $5 million DOE grant with Columbia University to construct a Levitated Dipole Experiment (LDX) at MIT's Nabisco Laboratory.

"Assuming favorable experimental results and progress in superconducting technology, this concept may lead to a more attractive and economical source of fusion power," said Professor Porkolab. "Meanwhile, we can contribute to a better understanding of space plasma physics."

While these activities were taking place, the President's Committee of Advisors on Science and Technology (PCAST) urged increased financial support for energy-related projects. In a September 30 report entitled "Federal Energy Research and Development for the Challenges of the 21st Century," PCAST said, "The inadequacy of current energy R&D is especially acute in relation to the challenge of responding prudently and cost-effectively to the risk of global climatic change from society's greenhouse-gas emissions, of which the most important is carbon dioxide from combustion of fossil fuels. Much of the new R&D needed to respond to this challenge would also be responsive to other challenges."

The PSFC is ready for the challenge, Professor Porkolab said. "Our program has always been scientifically oriented, but with a strong technology element. We are now intensifying our efforts to further develop the underlying science that will help us understand the physics of high-temperature plasmas. Ultimately, this effort should lead to a better fusion reactor concept."

Porkolab

The suggested amounts devoted to fusion would go from $230 million in fiscal 1998 to $250 million in 1999, and rise in steps to $328 million by 2003. Congress reduced the budget for fusion research from $369 million in 1995 to $225 million in 1997.

President Charles M. Vest served on a special PCAST panel that prepared the report on research and development. His deputy on that group was Jefferson Tester, the H.P. Meissner Professor of Chemical Engineering and director of the Energy Laboratory. President Vest and Institute Professor Mario Molina are both on PCAST.

The Columbia-MIT LDX will test a new concept for magnetic confinement of high-temperature plasma. The concept, first proposed by Osaka University's Professor Akira Hasegawa when he was an adjunct professor at Columbia, mimics Jupiter's magnetosphere, first observed by the Voyager spacecraft in 1979. The principal investigators for the LDX are Columbia Professor of Applied Physics Michael Mauel, an MIT graduate, and MIT senior research scientist Jay Kesner, a Columbia graduate.

"Plasma confinement in a dipole magnetic field as observed in planetary magnetospheres represents the only naturally occurring confinement of high-pressure plasmas [plasmas having pressures equal to the magnetic field pressure]," said Dr. Kesner. "It may prove to be ideal for application to advanced (neutron-free) fusion fuel cycles. This approach is new to magnetic fusion research and presents a fascinating new challenge to our understanding of plasma physics."

The experiment involves the magnetic levitation of a superconducting ring 1m in outer diameter that will float by means of supporting magnetic fields for hours in a large (4.5m diameter) vacuum chamber. The superconducting ring and its control system will be designed and installed by PSFC's Fusion Engineering and Technology Division, headed by Dr. Joseph Minervini.

After the Nabisco Lab structure is completed, Columbia scientists will join their MIT colleagues in carrying out the experimental program. "First we will bring Jupiter's plasma torus into the laboratory," said Professor Porkolab. "We'll do the sun later."

■ Arts News

■ Through Saturday, Dec. 20 at the Boston Center for the Arts, Boston's Theater Offensive is reviving its production of Theater Arts Assistant Professor **Brenda Cotto-Escalera**'s *Motherlands*, first staged in May 1996. Based on a story by Professor Cotto-Escalera (who also directs) and Noelia Ortiz Cortes (who also acts), *Motherlands* explores the relationships between a young Puerto Rican woman, her mother and her girlhood soulmate, using stylized poetry and traditional Puerto Rican music. The cast includes architecture senior **Lin-Ann Ching**. For more information, call 426-0320.

■ MIT Lecturer **Mark Harvey** and his Aardvark Jazz Orchestra will celebrate their 25th annual Christmas concert and the release of a Christmas CD—all to benefit Rosie's Place, a sanctuary for homeless women—on Sunday, Dec. 21 at 7:30pm in Old South Church (645 Boylston St., Boston). The ensemble's CD, "An Aardvark Christmas," includes vocal settings of Appalachian and African-American carols, an up-tempo treatment of "O Come, O Come Emanual," and a calypso-flavored "Virgin Mary Carol." The concert will feature guest vocalist Sheila Jordan and the premier of a new composition by Mr. Harvey. Tickets are $15 and $25. For more information, call 442-9322.

■ Associate Professor **Evan Ziporyn** earned high praise for the Boston Musica Viva's premiere of his *Dreams of a Dominant Culture*. "'Dreams' mystified as surely as it delighted (what a precise ethnological ear, what transformations) and mystified again (how many things are going on here anyway?). It joins the 'must hear again' list," wrote the Boston Globe's Richard Buell.

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**
*****-Open to members only**

December 10-January 11

■ MUSIC

Annual *Messiah*-Sing*—Dec 12. Conductor: Reed Woodhouse, senior lecturer in literature. Pianist: Ellen Polansky. Sponsored by the Lutheran-Episcopal Ministry at MIT. Refreshments served. 4-5:30pm, West Lounge, Stratton Student Ctr. x3-0108

MIT Women's Chorale Concert*—Dec 14. Works by Mozart, Bach, Mendelssohn, songs from Jean Berger's *A Child's Book of Beasts*, Czech carols & Hanukkah songs. Children, accompanied by adults, are welcome. Reception follows concert. 3pm, Killian Hall. Jennifer Recklet, x3-1614 or 666-3394

Live Jazz at Muddy Charles Pub*—Mondays. "Open rehearsals" by Moto Nakamura group. Every Monday, 8-10:30pm. x3-4012 or moto@rossby.mit.edu

MIT Guild of Bell Ringers* Change ringing on hand bells. Beginners always welcome. Will also ring for occasions. Meets Mondays, 6:30pm, 2nd floor balcony of Lobby 7. Roberta Young, x3-3573 or email rey@mit.edu or http://web.mit.edu/bellringers/www/ on the Web

■ THEATER

"Entrails Mauvais"*—Dec 13. Roadkill Buffet, MIT's improv comedy troupe. 8pm, 6-120. 816-4446 or email rkb@mit.edu or or http://www.mit.edu:8001/afs/athena/activity/r/roadkill/www/home.html

■ READINGS

Martini-In-Transit Poetry*—Dec 11. Adjunct prof & award-winning sci fi author Joe Haldeman reads from his first book of poetry, *Saul's Death and Other Poems* (1997). 7:30pm, Bartos Aud (E15). x3-6475

■ EXHIBITS

List Visual Arts Center (E15)*: *The Art of Detection: Surveillance in Society*. Video, photographic and installation work by contemporary artists, including Bill Beirne, Diller and Scofidio, Laura Kurgan, Richard Lowenberg, Steve Mann and Julia Scher addressing the role of institutional surveillance in the post Cold War era — its pervasiveness, our responses to it and the new and sometimes invisible forms of watching provided by the digital revolution. ***Recovering Lost Fictions: Caravaggio's "Musicians."*** A project by contemporary artists Joseph Grigely and Kathleen Gilje that explores the ways we authenticate, value and appreciate fine works of art, using the recently recovered Caravaggio painting, "The Musicians" as a case study. ***Both shows*** run through Dec 28. Hours: Tues-Thurs & Weekends 12-6pm; Fri 12-8pm; closed holidays. Curatorial Office Hours—Meet the curatorial staff for informal discussions and questions about art—Weds, 12:30-1:30pm. x3-4680

MIT Museum* (N52): *Unfolding Light: The Evolution of Ten Holographers*. Organized by guest curator Rene Paul Barilleaux, this show explores the work of holography's first generation of artists, juxtaposing selections by ten innovators from the Museum's permanent collection with recent works by these same artists. Through Feb 22. ***Ongoing*: *Gestural 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

Compton Gallery—*Drawing & Architecture: Two Projects by Michael McKinnell*. Exhibition of drawings of the Arrow International Corporate Headquarters in Reading, PA (1995) and Hauser Hall at Harvard Law School, Cambridge, MA (1994). Michael McKinnell, of Boston's Kallmann McKinnell & Wood Architects (KMW), is currently Prof. of the Practice of Architecture teaching a design studio at MIT. Dept of Architecture exhibition. Through Feb 6. Weekdays 10am-5:30pm, and special hours Dec 27-28 & Jan 3-4: 12-5pm. Closed Dec 20-26 and Dec 29-Jan 2. x3-7791

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

Wolk Gallery—*Allies and Morrison: Architects*. Models, relief models, line drawings and photographs of projects by the London-based firm which has built 22 projects in the past 12 years, having won numerous commissions through competitions. This past year, they have been unique in winning three Royal Institute of British Architects awards and being voted "Up and Coming Architectural Practice of the Year." Exhibition supported by the British Council. Wolk Gallery (Rm 7-338). Through Dec 15. Mon-Fri, 9-5pm or by appointment. x8-9106

The Dean's Gallery—*George Herman: Found Paintings*. Recent abstract paintings on wood. Through Jan 23. The Dean's Gallery, Sloan School of Management, E52-466. Weekdays 9-5pm. x3-9455 or <http://web.mit.edu/deans-gallery/www/>.

Rotch Visual Collections—*The Revival of Mamluk Style in Architecture*. Selected examples of secular and religious buildings from Egypt, Saudi Arabia, India and and Bosnia. Through Dec. 20. Rotch Visual Collections, Rm 7-304. x3-2955

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

***Doc Edgerton Strobe Alley*.** Photographs, instruments and memorabilia that document Harold Edgerton's invention of the strobe light. Also, several hands-on corridor experiments. Bldg 4, 4th floor corridor. x3-4629

■ OTHER

Pottery Sale*—Dec 10-11. Student Art Assn holiday ceramics sale. 9am-4:30pm, Lobby 10. x3-7019

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

Panel issues report on orientation, housing

(continued from page 1)

of 1998," the group said. Such a move would require finding approximately 360 additional beds, resulting in additional dormitory crowding and displacement of about 200 graduate students. Nevertheless, "the Institute should anticipate the possibility of a temporary jump in the demand for on-campus housing next fall."

The first step, the advisory group recommended, should be the appointment of an Orientation '98 Policy Committee composed of faculty, staff and students who would immediately begin planning orientation for next fall. Residence/orientation or R/O should be renamed simply Orientation, reflecting a greater emphasis on the orientation component, the report added.

Other proposals for providing a better introduction to MIT for incoming students included:

- Hold the most important orientation activities before rush.
- Expand on existing programs such as Core Blitz, Meet the Profs and lab tours and add new events such as workshops on issues such as diversity, alcohol awareness and harassment; a faculty panel; a presentation on counseling and support services; and events in multiple small-group settings such as Project MOYA, advising and temporary-residence assignment groups.
- Create more student/faculty interaction by having each freshman speak with faculty members during the summer; encouraging faculty-run experimental academic programs within living groups; starting a year-long program of faculty dinners; and holding panel discussions, early freshman-advisor meetings, and activities in temporary residences.
- Have more alumni/ae activities such as summer receptions in home towns of alumni/ae and students, or events with a panel of distinguished alumni/ae to discuss their experiences with freshmen.
- Change the academic "default setting" from an emphasis on early failure to early rewards. Offer better core subject advice, including sample classes.
- Create an Advising Center to centralize information and expertise to provide advisors and students with answers to the most commonly asked questions.
- Expand opportunities for freshmen to come early to campus with programs such as the existing Interphase, Freshman Leadership Program, etc.

In detailing ways to improve the residence selection process, the advisory group relied on principles that included early, objective and accessible residence information, and equitable and diverse housing choices for all students. Their suggestions included restricting unsolicited summer mailings and telephone calls to freshmen, and preparing a comprehensive guide to residences that incorporates objective information on demographics, academic performance, extracurricular activities and so forth.

This living-group guide—described by the IFC Presidents' Council and endorsed by the advisory group—would have four components:

—A fact sheet including house GPA, majors represented, cost per year, meals provided, length of pledge period, police incidents within the last three years (one-line summaries), names of faculty advisors and graduate resident tutors, and awards received.

—An objective entry written by Residence and Campus Activities staff covering participation in varsity/intramural athletics, campus organization officers, extracurricular activities represented, etc.

—A subjective entry submitted by recruitment chairs of all fraternities, sororities and independent living groups (FSILGs).

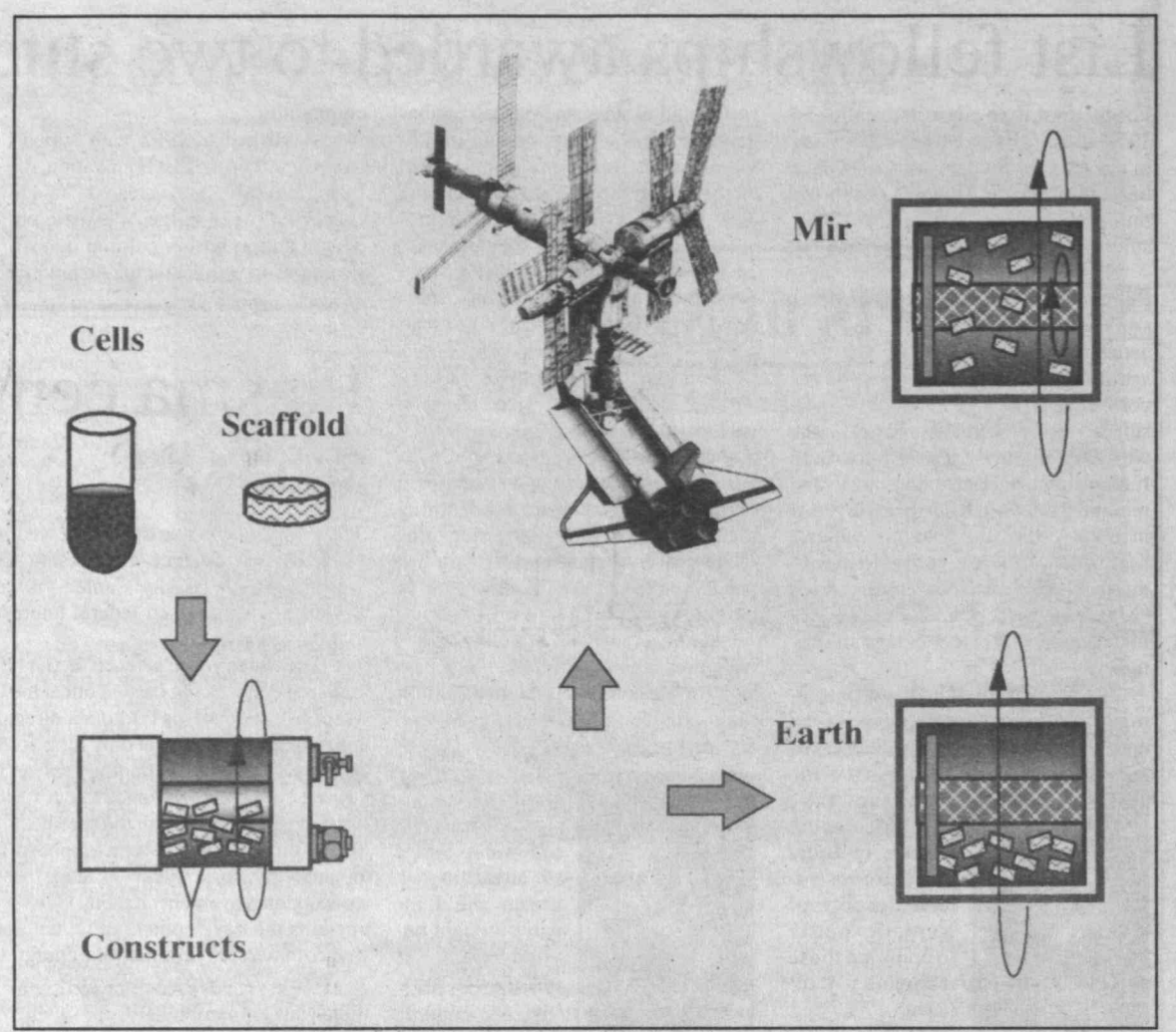
—FSILG members' parent contact information.

The report recommended other means of providing incoming students with information, such as putting residence information on the web (and giving freshmen Athena accounts as soon as possible), providing visitation opportunities (perhaps overnight) to living groups during the spring before freshmen arrive, and holding a "residence midway" similar to the Activities Midway. Members also suggested lengthening the time allotted for residence selection and having greater participation by dorms in rush activities.

Panel members endorsed the concept of a residence selection workshop proposed by the IFC Committee on R/O Proposals. The workshop, held before the start of residence selection each fall, would aim to explain the residence selection system (the schedule, bid process, and key questions to ask members of a living group), review residence selection rules and resources for taking questions or complaints, and inform freshmen of the options available to them after residence selection if they are unhappy with their choice.

Other suggestions included:

- Periodic reviews of "Institute-approved housing" status for all living groups, including dorms.
- A messaging system so parents can maintain contact with sons or daughters during orientation (e.g., voice mail, pagers or e-mail).
- A combination and expansion of the functions of R/O Central and Rush Central.
- More single-sex housing opportunities for women.



In the first tissue engineering experiment in space, cartilage cells were seeded onto polymer scaffolds and the resulting constructs were cultivated in rotating bioreactors on Earth and in space.

Illustration courtesy Proceedings of the National Academy of Sciences

Tissue engineering experiment flies

(continued from page 1)

"It demonstrates the feasibility of cultivating cells—and tissues—in space over relatively long periods of time," said Dr. Freed, who will also present the work at a seminar today at 5pm in Rm E25-117 and at the December 13 meeting of the American Society for Cell Biology. Previous space studies involving cells lasted only about 10 days and did not involve the growth of full tissues.

The work paves the way for controlled experiments with human tissues. Growing human bone and muscle in space, for example, could help scientists understand why these tissues are adversely affected by microgravity (for example, human bones can become brittle). "After more than 25 years in space, we still can't explain this," Dr. Freed said.

That knowledge, in turn, could lead to the development of effective countermeasures to prevent such effects. This would be important for the health of astronauts aboard space stations and for long-term voyages, such as missions to Mars.

The work will not, however, lead to the growth of replacement body parts in space. "That's always the first question we're asked," said Gordana Vunjak-Novakovic, a research scientist at the Whitaker College of Health Sciences and Technology. Contrary to popular belief, tissues do not appear to grow better in space than on Earth.

The new study corroborates this. For example, the tissues from space were smaller and mechanically inferior to those grown on Earth. "They had less of one matrix component that's thought to contribute most to cartilage stiffness," Dr. Vunjak-Novakovic said.

The scientists also observed that the two sets of cartilage had different overall shapes. The original polymer scaffolds used to support the cells as they grew and differentiated into tissue were disc-shaped. The cartilage constructs grown on Earth tended to retain this shape, while those grown in space became more spherical. (The scaffolds biodegrade over time, leaving the regenerated tissue.)

TECHNICAL CHALLENGES

Key to the success of the experiment, which was aboard Mir from September 16, 1996, through January 22, 1997, was astronaut John Blaha. Mr. Blaha ran certain procedures and otherwise cared for the growing tissues. For example, he took weekly samples of the fluid surrounding the cell-polymer constructs and measured parameters like pH and oxygen content. "Cell growth changes these parameters, so measuring them was a way of monitoring the experiment," Dr. Freed said.

The communications lag between space and Earth complicated the work. "If John had a question about some aspect of the experiment, he'd radio it down to Earth and there were limited windows when he could do that," Dr. Freed explained. Sometimes it took three days between query and answer. "Such a delay could have killed the cells [if something had been really wrong]," she said.

That particular situation never happened, but the experiment was still beset by technical hitches. "It was one thing after another. There was never a calm period over that four months," Dr. Freed said. For example, gas bubbles in the bioreactor vessel threatened the experiment.

FUTURE WORK

Thanks in part to the success of the experiment, the scientists were awarded a contract with Cambridge-based Payload Systems, Inc., to develop a more advanced cell-culture unit for the International Space Station.

The new system, which will be fully automated, will run up to 24 experiments concurrently and will be able to handle mammalian cells and tissues, plant cells and microorganisms. The system is also designed to determine how specific characteristics of the space environment affect cells and tissues.

Although the MIT/NASA team documented a variety of differences between the cartilage grown on Earth and in space, "we can't explain exactly what factors caused these effects," Dr. Freed said. "We need more experiments to help evaluate the individual contributions of different factors to determine the underlying mechanism behind the observed effects."

For example, one feature of the new system will allow scientists to subject experiments to gravity while they are in space. "That will allow us to decouple the effects of gravity on the growing tissues from everything else," Dr. Vunjak-Novakovic said.

Additional authors of the PNAS paper are Robert S. Langer, the Germeshausen Professor of Chemical and Biomedical Engineering; Ivan Martin, a postdoctoral associate at the Harvard-MIT Division of Health Sciences and Technology; and Neal R. Pellis, Biotechnology Program director at the NASA-Johnson Space Center.

Major funding for the work was from the NASA Microgravity Research Division, with additional support from Advanced Tissue Sciences.

Notes from the Lab

USING CHINA'S COAL IN CARS

Chinese policymakers face a bewildering array of options as they consider using their vast coal deposits to fuel vehicles. Coal can be used to produce gasoline, methanol or electricity. But each of those fuels has its advantages and disadvantages. MIT researchers and their Chinese and American collaborators have now estimated how shifting from petroleum to each coal-based fuel would change consumer costs, environmental impacts and energy efficiency.

Their life-cycle analyses included the complete history of each type of fuel and vehicle, from extraction of raw materials through production, use and disposal. As expected, changing to any of the coal-based fuels would reduce efficiency, increase carbon dioxide emissions and cost more. However, the added cost is a relatively small fraction of the total cost of owning a vehicle—except in the case of electricity, which is prohibitively expensive unless batteries improve dramatically. Effects on emissions other than carbon dioxide vary from fuel to fuel.

This type of comprehensive assessment represents a methodology that can also be used to compare technology options in other fields. MIT's part of the work, supported by the Ford Motor Co., was coordinated by Malcolm Weiss of the Energy Laboratory.

Nancy Stauffer, Energy Lab

This column features summaries of MIT research drawn from several sources. If you have an item to suggest, send it to Elizabeth Thomson, News Office assistant director for science and engineering news, Rm 5-111, or <thomson@mit.edu>.

Clothing drive, bake sale set

A clothing/food drive and a bake sale are in the works as part of MIT's annual United Way campaign.

This Friday, Dec. 12, the United Way Bake Sale will be held in Lobby 7 beginning at 11am and ending when all the food is sold. Containers for MIT's annual clothing drive, an adjunct to the United Way campaign, are now in place in nine locations on campus. This year, the drive is also accepting donations of nonperishable food.

Donations of all kinds of clean clothing and canned and prepackaged food will go to three Cambridge facilities—CASPAR, the Salvation Army and Shelter, Inc. Items may be dropped off in Lobby 7; the lobbies of Building E18/E19, Building E52 and Walker Memorial; the first floor of the Stratton Student Center; the Building E23/E25 atrium; Rm NE43-110; Rm NW16-204; and Rm 20A-023.

CASPAR is also seeking babies' and children's clothing and furniture. These items should not be left at any of the drop-off locations; call Peggy Carney at x3-4605 to arrange for a pickup. Anyone who would like to assist Physical Plant in collecting items from the drop-off locations or helping to deliver clothes to the shelters may contact William Wohlfarth at x3-1741.

As of Monday, Dec. 7, 801 MIT community members (including 39 Leadership Givers donating at least $1,000 apiece) have pledged $186,433 to the United Way of Massachusetts Bay. This puts the campaign at 59 percent of its $315,000 goal, which organizers hope to achieve by December 31.