September 6, 1989 Volume 34 Number 4

TECH ALK TECH TALK TECH TALK TECH TALK

Club reopens

The Faculty Club is scheduled to reopen in its renovated space for lunch Monday, Sept. 11, at 11:30am. The lobby area and main dining room have been refurbished while the Club was closed this summer. A grand reopening luncheon is planned for later this month—watch for the announcement.

New child care

Lincoln Laboratory's first Child Care Center for infants and toddlers will open September 25. The center will be located in the Minuteman Vocational Technical High School campus in Lexington. For information regarding enrollment, call Carol J. Stokes at 981-7028 at Lincoln.

Telling flyer

A flyer called "Tell Someone" will be mailed this week to everyone employed at MIT. The flyer is an informal reference guide with information about complaints, concerns, grievances and inquiries.

The publication was prepared by the Working Group on Support Staff Issues as a service to the community.

Planning ahead

Here are the dates for regular faculty meetings during the 1989-90 year: September 20, October 18, Novem-

ber 15, December 20, February 21, March 21, April 18, May 16.

Meetings are held in Rm 10-250 and start at 3:15pm. They usually conclude about 5pm.

Athena notes

Faculty and teaching assistants involved with courses using Project Athena are invited to an orientation and information session Monday, Sept. 11, in Rm 35-225.

There will be two sessions this year. The first, 6-7pm, will be a general introduction for individuals who have not yet used Athena in a course; the second, 7:30-8:30pm, will be a refresher for previous users, covering changes in the system and in procedures since last year.

Instructors who pay to use Athena as part of a course, whether for the development or delivery of courseware or for the storage and delivery of classrelated files, should return their Request for Project Athena Resources form to the Athena Faculty Liaison Office, Rm E40-343A, as soon as possible.

For more information, call Ann LaVin, x3-0115, or Naomi Schmidt, x3-0170, Athena faculty liaisons.

Blood drive

TCA is sponsoring a mini blood drive Thursday, Sept. 7, 1-7pm, and Friday, Sept. 8, 9am-3pm in the Sala de Puerto Rico. This drive comes at a time when regional blood supplies are low because of summer vacations, so donations are particularly appreciated. No appointments are necessary.

T shirt surprise delights Japanese PM

By ROBERT C. Di IORIO

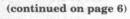
Staff Writer

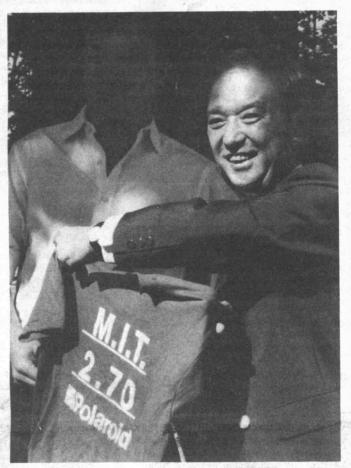
A 2.70 T shirt was the hit of a 20-minute visit to MIT Sunday morning, September 3, by Prime Minister Toshiki Kaifu of Japan who had dined the night before in Boston with President Paul E. Gray and other university presidents.

The T shirt, bearing the number 29, which has great significance to the Prime Minister, was presented to him during his short campus tour. Mr. Kaifu was elected to Japan's parliament when he was 29, an unusually young age, and he said then that within 29 years he would be prime minister.

This bit of numeric trivia became known to Professor Harry West of the Department of Mechanical Engineering, the current coordinator for 2.70, when he read it in the Japan Times on a visit to that country recently to judge a 2.70-like contest among 20 universities. The contest was arranged by a TV station which got the idea from coverage of MIT's 2.70 by the program Discover the World of Science, which is very popular in Japan.

Professor West had been informed of the Prime Minister's visit on Friday, September 1, by Terri Priest of the Information Center, who coordinated arrangements for the visit, which was to include a brief tour with a stop at the 2.70 display case in Building 3. On Saturday night, as Professor West put the finishing touches on a special four-page description of 2.70 that would be given to Mr. Kaifu, it occurred to him that one of the six $2.70\,\mathrm{T}$ shirts remaining from the 300 prepared for the last contest might be number 29. He dug through his supplies, and-stroke of luck-found number 29. He put it in the case a few minutes after midnight Sunday morning. At about 8am Sunday, just before Ms. Priest was to meet with Secret Service, Campus Police and Japanese officials, Professor West told her about the shirt and suggested that the student guides who would conduct the brief tour open the case and present the shirt to the Prime Minister. Ms. Priest successfully proposed





Prime Minister Kaifu displays his new T shirt to the press entourage in Killian Court. At left is Professor Harry West, coordinator of 2.70.

Mid-latitude ozone loss noted

Once again, ozone in the stratosphere has made scientific headlines. A team of four researchers, including MIT Professor R. Alan Plumb of Earth, Atmospheric and Planetary Sciences, has announced finding anomalously low ozone in the stratosphere over Australia and New Zealand. The group's work is reported in the July 27th issue of Nature.

The researchers theorize that ozonepoor air created over Antarctica travels as far as Australia and New Zealand before undergoing substantial mixing with ozonerich air from the tropics. Their conclusion: ozone is not actually destroyed in midlatitudes to bring about the stratospheric ozone deficit in that region.

Prior to this research, the 1987 Antarctic Ozone Expedition concluded that the depletion of Antarctic ozone in the [southern hemisphere] spring is due to photochemical destruction—occurring after a winter "preconditioning" phase in which chemical reactions take place on aerosol particles in clouds over the southern pole. After this finding, other researchers dis-

covered a late spring decline in mid-latitude ozone.

The question then arose whether the mid-latitude decline was caused by a local photochemical effect or did it occur through mixing with Antarctic ozone-depleted air.

(continued on page 6)

Langer elected to IOM

Professor Robert S. Langer, a leading researcher in pharmaceutical engineering, has been elected to the Institute of Medicine of the National Academy of Sciences. He is the first chemical engineer to be elected.

Dr. Langer, professor of chemical and biochemical engineering in the Department of Chemical Engineering, is widely known for his research in "controlled release technology" which has established that it is possible to use certain polymers to deliver a variety of medications.

New members are elected by present active members from among candidates chosen for major contributions to health and medicine or to related fields.

Parents are invited to return to campus

The Alumni Association is hoping parents visiting their sons and daughters on campus this week will return for the Family Weekend being planned for October 20-

Family Weekend will afford parents an opportunity to attend classes with their son or daughter, tour the campus and hear from Institute officials about services available for students. In addition, there will be a reception in Strobe Alley with Institute Professor Harold E. (Doc) Edgerton and Mrs. Edgerton presiding.

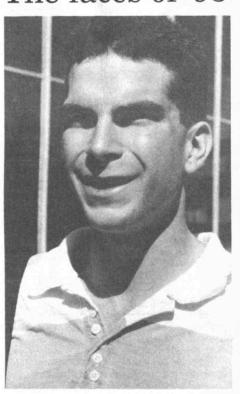
President Paul E. Gray will greet families at a program Saturday morning and introduce Institute Professor Emeritus Philip Morrison who will discuss his experiences as an astrophysicist. Later there will be a demonstration of devices built by students for the 2.70 contest.

On Saturday afternoon there will be an open house in academic departments and a panel discussion on student life by students. This will be followed by a party in Walker Memorial with music by Associate Provost Jay Keyser and his band.

Sunday will be an informal day offering families a chance to attend the Head of the Charles Regatta, visit Boston or enjoy the

All MIT parents will be receiving invitations and information and are urged to return the registration material as soon as possible. The weekend is being arranged by the Alumni Association's Parents Pro-

The faces of '93



Michael Todd Pedersen, 18, of Funk, Nebraska (population 500). Likely Major: Aeronautics and astronautics. Interests: Running, vocal music, science fiction, mostly Star Trek ("I'm a trekkie"). Naval ROTC.

"I'm from a farm where there are cornfields as far as the eye can see in every direction. The choice was between MIT and Caltech, but I like the east coast atmosphere better than the west coast. Also, the ROTC program's right on campus. It'll take a while to get adjusted to the city, but I'm an outgoing person."

(More faces of the class of 1993 may be seen on page 5.)

INSTITUTE **NOTICES**

- **-Open to MIT Community only
- ***-Open to members only

Announcements

Project Athena Orientation/Information session ** -- Mon, Sept 11, General Intro-6-7pm; Refresher for Previous Users (Changes in Systems and Procedures)-7:30-8:30pm, Rm 35-225. Info: Ann LaVin, x3-0115 or Naomi Schmidt, x3-0170.

Library Orientation Tours**-Barker Library - Engineering (10-500): Tues, Sept 12, 19, 26, 4pm; Thurs, Sept 7, 14, 21, 28, 10am. Dewey Library -Socical Sciences and Management (E53-100): Wed, Sept 6, 13, 20, 27, 3pm; Thurs, Sept 7, 14, 21, 28, 10am. Humanities Library (14S-200): Tues, Sept 12, 19, 26, 3pm; Wed, Sept 6, 13, 20, 27, 10am. Rotch Library-Art, Architecture & Urban Planning (7-238): Wed, Sept 6, 10am—SPURS, 4pm—Urban Studies & Planning; Thurs, Sept 7, 10am-Architecture, 1pm-Ctr for Real Estate Dev; Mon, Sept 11, 4pm-Architecture. Science Library (14S-139): Tues, Sept 12, 19, 26, 4pm; Thurs, Sept 7, 14, 21, 28, 10am. Music Branch Library (14E-109): Mon, Sept 18, 4pm or by appointment. Institute Archives and Special Collections (14N-118): Call x3-5136 to set up a tour. Tours available on request at: Aeronautics and Astronautics Branch Library (33-316); Lindgren Branch Library-Earth and Planetary Sciences (54-200); Schering-Plough-Neurosciences (E25-131).

September Degree Candidates Reminder—Post cards must be returned promptly to Rm E19-335 to indicate whether diplomas are to be mailed or called for in person, or whether attendance at Commencement is planned, Mon, June 4,

International Open House Volunteers Needed**-Medical Dept/Dean's Office Event, Wed, Sept 6, 9:30-5pm, Rm 10-105. Info: x3-1614.

International Open House**-Medical Dept/Dean's Office Event to welcome international students, staff, faculty and their families, Sept 6, 9:30-5pm, Rm 10-105. Evening with MIT Faculty-Wed Sept 6, 7:30-9pm, Rm 10-105. Chaired by Prof/Associate Provost Samuel J. Keyser, with Profs Charles L. Cooney, Isabelle de Courtivron, Alvin Drake, Frank E. Perkins and Frank Solomon.

 $\textbf{Hosts to International Students Program} \color{red} - \textbf{MIT Women's}$ League program to host foreign students coming to MIT for the first time. Provide a welcome, occasional hospitality and friendship. All financial and academic problems handled by specific MIT offices. Info/volunteer forms: Kate Baty, 861-6725 or Pam Daveta, x3-3656.

MIT Language Conversation Exchange**—Medical Dept program to assist members of the MIT community to practice a language with a native speaker. Applications accepted throughout the year. To exchange English or another language and be matched with someone with your interests, call the secretary of the Language Conversation Exchange, x3-

MIT Student Furniture Exchange**—MIT Women's League store, Tues/Th, 10am-2pm, 25 Windsor St (N52), x3-

Free Museum of Science Admission for MIT Students-With MIT student ID, provided by Mass Beta chapter of Tau Beta Pi, the National Engineering Honor Society. Reduced admission to special exhibits.

Arts Hotline-Recorded information on all art events at MIT may be obtained by dialing x3-ARTS. Material is updated every Monday morning.

Nightline**-a student-run campus hotline open every evening of the term, 7pm-7am. If you need information about anything or you just want to chat, give us a call. We're here to listen. x3-8800.

Club Notes

MIT Radio Society and UHF Repeater Association Monthly Ham Exams**—All classes, Novice to Extra, Sept 20, Oct 18, Nov 22, Dec 20, Rm 1-150. Reservations requested 2 days in advance. Contact Nick Altenbernd, 437-0320. Exam fee: \$4.50. Bring copy of current licence (if any), 2 forms of picture ID and completed form 610 available from FCC, Ouincy, MA, 770-0423.

MIT/DL Bridge Club*-Duplicate bridge, Tues, 6:30pm, Student Ctr Rm 407. ACBL masterpoints awarded; come with or without partner, newcomers always welcome. Handicap game, 3rd Tues every month. Info call Gary Schwartz, x8-2459 Draper, or Mark Dulcey, 247-2300. Admission for regular games: \$1/students, \$2/non-students.

MIT Student Bridge Club*-Duplicate games Mon, Thurs, Sat and Sun and teams following 7:30pm, usually at Student Ctr (see posters). Lessons, 7pm, if required. Refreshments. Info: Bo-Yin, x5-9865 dorm or David, x5-7522 dorm

MIT Go Club*-Meets every Wed, 5-7pm, Rm 24-612 (ESG Lounge). Info: John Cox, x3-7887 eves.

MIT Science Fiction Society*-The world's largest open collection of science fiction books and magazines is located in Student Ctr Rm 473. Meetings, Fri, 5:30pm. Info: x8Hunger Action Group**—Meets Tues, 7pm, Baker Master Suite Lounge. Volunteers at soup kitchens, Boston Food Bank; sponsors forums, films addressing hunger- and development-related issues. Contact Susmitha, x5-8528 dorm or Irene, x5-8492 dorm.

COCA (Committee on Central America)*—Meets at least once a month to plan activities relating to events in Central America. Info: Charlie Welch, 783-1668 eves/messages.

Club Latino at MIT**-Student organization to promote exchange of cultural backgrounds between members of the MIT Hispanic community and other MIT affiliates. Info: Miguel Velez, x3-5958 or e-mail latinos @athena.mit.edu.

Brazililan Student Association of MIT Elections***-Fri, Sept 15, 9am-4pm, Lobby 10.

MIT Outing Club*—Camping, cycling, climbing, canoe ing, cabins. Meets 1st Mon of month, 6pm, W20-461. Rental hours, M/Th, 5-6pm, W20-461. Also, see our bulletin board in "Infinite Corridor" next to Athena. Info: Dave Campbell, x5-9623 dorm.

MIT Soaring Association*—Weekend Soaring—Learn the exciting sport of soaring. We fly from the Mansfield airport every weekend and some holidays (weather permitting). Mansfield is 45 minutes south of Cambridge, off Rt 95. Student membership: \$175; typical flight: \$16. Contact: Cathy Keller, x0814 Linc or 327-3193 eves.

MIT Sport Parachute Club*-Learn to skydive: experienced jumpers go out every weekend; beginners, call for information on our first jump courses. AFF and Static-line.

MIT Nautical Association**—Sailing Pavilion on Charles River open every day, 9am-sunset. Sailing, windsurfing and coastal cruising. Free basic sailing classes, Wed, 5:15pm and Sat, 9am. Membership cards on sale at Cashier's Office: \$15 students, \$35 staff/faculty, \$45 alumni.

MIT Hobby Shop**-Complete supervised facilities for woodworking and metalworking, Rm W31-031, M-F, 10am-6pm; Wed, 10am-9pm. Fees: \$15/term students; \$25/term community. Info: x3-4343.

MIT Aikido Club**-Non-competitive martial discipline, meets M-F, 5:30pm, DuPont Exercise Rm. Beginners always welcome. Info: Mitch Hansberry, x8-1272.

MIT Wu Tang Martial Arts Club**-Learn Northern Chinese kung fu. Long fist and praying mantis styles, short sabre and sword. Meets T/Th, 8-10pm; Sat, 9am-12noon, Burton Dining Hall. Info: Matt Cordery and Paul Filmer, x3-

MIT Karatedo Doshinkan Club*-Classical noncompetitive Okinawan Karatedo, MWF, 5:30-7pm, meet outside Dupont (W31) by BBQ pits. Rain schedule: MWF, 4:30-6pm, W31-225 Dance Studio. Info: Jim, x3-0472.

MIT Tae Kwon Do Club*-Traditional Korean martial arts with emphasis on development of mind and body, Mon/Wed, 6:30-8pm, Burton Dining Hall; Fri, 6:30-8pm, T Club Lounge; Sun, 4-6pm, T Club Lounge.

Religious Activities

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

MIT Hillel*—Shabbat services and the Kosher Kitchen has resumed. Info: x3-2982.

Lutheran Ministry and Episcopal Ministry**-Weekly Service of Holy Communion-Wed, 5:10pm, MIT Chapel. Supper follows at 312 Memorial Drive. For further info, call

United Christian Fellowship**—Large group meetings. Join us for worshipful singing, prayer, sharing and Bible teaching, and small group Bible studies during the week in various dorms, Fri, 7pm, Student Ctr Mezzanine Lounge. Info: Tracy, x5-9688 dorm.

Graduate Christian Fellowship**-Come join other grad students, faculty and staff in learning about and growing in the Christian faith. Activities open to both Christians and those interested in learning more about Christianity. Info: Curt Bronkhorst, x3-4414 or Roz Picard, x3-7314.

MIT Islamic Society*-5 daily prayers in the prayer room (Ashdown House WD West basement). Friday prayer, 1:10-1:45pm, Student Ctr Rm 407. Islamic Studies Classes: English .7pm, Rm 1-132/134; Arabic, 8pm, Prayer Rm. Introduction to Islam Classes: 1st Thurs of each month, 8:30pm, Rm 1-134. Info: x8-9755.

Christian Science Organization at MIT*—Weekly Testimony meetings, Thurs, 7pm, MIT Chapel.

Lincoln Laboratory Noon Bible Studies*-Tues & Thurs, Kiln Brook III, Rm 239. Annie Lescard, x2899 Linc.

Morning Bible Studies**-Fri, 7:30-8:30am, L-217. Ed Bayliss, x3456 Linc.

Noon Bible Study*—Every Wed, Rm 1-132, bring lunch. Ralph Burgess, x3-8121. (Since 1965.)

MIT Bible Study Group*—The Economy of God, a look at God's eternal purpose to dispense Himself into man based on the revelation of the Bible, Fri, 8pm, Student Ctr Rm 407. Singing, prayer, Bible reading, fellowship.

MIT Campus Crusade for Christ*-Fridays, 7:17pm, Marlar Lounge, Rm E37-252, TGIF weekly meeting of MIT Campus Crusade for Christ. We "thank God it's Friday" every week with singing, biblical input, discussion and fun. Info: x5-9153 dorm.

Graduate Notices

Fannie & John Hertrz Foundation Graduate Fellowship, 1990-91. Financial support for outstanding students pursuing graduate studies in applied physical sciences. NOT for students in biological sciences or for those seeking professional degrees or PhD and professional degrees (i.e. joint PhD/MD programs). Provides cost-of-education allowance of \$8,000 and a stipend of \$15,000 (nine months) US citizenship or documented evidence of application for citizenship required. Applications available in the Dean of the Graduate School Office, Rm 3-138. Deadline: Nov 1, 1989.



A rendering of apartments MIT is building at Brookline and Pacific Streets, Cambridge.

MIT housing projects advance

Two projects that will add to Cambridge's stock of housing for people with low and moderate incomes are moving forward—one is the project known as University Park at MIT, the other is just nearby at Brookline and Pacific Streets.

At Brookline and Pacific Streets, MIT has begun construction of six two-bedroom apartments which will be leased to low- and moderate-income tenants referred by the Cambridge Housing Authority. Koetter & Kim are the architects and the FAR Group of Cambridge is the developer. Completion is scheduled for next summer.

At University Park, the historic F.A. Kennedy Steam Bakery building is already undergoing extensive renovations and is now known as the Kennedy Lofts Apartments. The 142 units there include 36 for low-income households and as many as 25 for households of moderate income, with the balance to be rented at market rates.

Forest City Development is developing the 27-acre University Park site on land owned by MIT. Besides office, research and other uses, the project will include 400 units of housing, of which 150 will be for people with low and moderate incomes.

International Notices

MIT-Japan Program. A unique opportunity for MIT science, technology and management students to spend a year in Japan working at a major Japanese company or laboratory. Students are trained in Japanese language and culture at the Program's expense before being placed in Japan. Placement is tailored to the student's background and experience. Travel to/from Japan and living expenses will be covered. For further information, call Patricia Gercik, x3-3142, Ctr for International Studies, MIT-Japan Program, Rm E38-754 Orientation meeting-Tues, Sept 12, 5-7pm, Student Ctr West Lounge. Prospective Program interns-meet with the Program Dirctor, staff and former interns; details and Program requirements explained. Info: Kathy Schaefer, x3-

Student Jobs

There are more job listings available at the Student Employment Office, Rm 5-119.

Special Note: The Student Employment Office has many "one time only" jobs. Many students find these jobs a good way to earn money fast.

On Campus: Non-Technical:

Circulation desk in Laboratory for Computer Science Reading Room. Must be reliable; able to deal with faculty, research staff, students, and visitors; familiarity with library procedures helpful, Hours: Mond-Fri, 5-8pm, Contact: Paul Mickevich, x3-5896 or Maria Sensale, x3-8820.

Assist with office help. Purchasing, maintenance of supply cabinets, filing, xeroxing, running errands, etc. 12 hrs/wk Salary: \$6.75/hr. Contact: Audrey Childs, 56-201, x3-7008.

General office work; 3 hrs/day, 5 days/wk. Salary: \$6.50/hr. Contact: Maria Ciampa, Thinking Machines, 245 1st Street,

Sleep technicians needed in research lab in Kenmore Square. Application of electrodes and monitoring patients. Hours: up to 20 hrs/wk. Salary: \$8/hr. Contact: Kelly Buckley, 247-

UROP

Welcome to all students, old and new. MIT and Wellesley undergraduates are invited to join with faculty members in pursuit of research projects of mutual fascination. Faculty supervisors wishing to have projects listed should send project descriptions to the UEO. Questions? Contact us, x3-7909, Rm 20B-141.

The 1989-90 UROP directory is available in the Undergraduate Education Office (UEO), 20B-141. Project listings and guidelines will be posted on the bulletin boards located in the infinite corridor and in the UEO/Proposals for fall UROP support will begin to be reviewed on Sept 12. For further information, read details on procedures in the participation section of the directory.

Computer Based Imaging of Human Coronary Atherosclerosis. This UROP involves examining the surface features of human hearts. Goals: to reliably distinguish features within coronary arterial structures and to locate and quantify areas of microvascular proliferation from normal arterial growth. Proficiency in C language and possible experience in developing X11 based software is required. Contact faculty supervisor: Dr. Elazer Edelman, HST, x3-3443 or page at 732-6987.

Composite Information Systems. UROPer needed for the design and development of composite information systems to facilitate timely access to multiple disparate databases and formulation of composite information for business executives. Literature survey and study for composite information systems will also be done. Must be a senior with computer science background; experience in software engineering and data bases preferred. Contact faculty supervisor: Prof Richard Wang, x3-0442.

Ultrasound Modulated Drug Delivery. Work available on the effect of ultrasound on the degradation and release of drugs from bioerodible polyanhydride polymers with the aim of developing an ultrasound modulated drug delivery device for the treatment of conditions such as diabetes. Goals: to determine the mechanisms by which ultrasound increases using a range of analytical techniques such as ultraviolet spectroscopy, scanning electron microscopy and differential scanning calorimetry. Faculty supervisor: Dr. Robert Langer. Contact: Dr. Antony D'Emanuele, E25-342, x3-3413.

TECH TALK (USPS 002157)



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Hynes named head of biology

Professor Richard O. Hynes, a distinguished biologist whose research focuses



on the molecular basis of cell adhesion, has been named to head the Department of Biology.

The appointment, effective July 1, was announced by Professor Gene M. Brown, dean of the School of Sci-

Dr. Hynes Professor Hynes succeeds Professor Maurice S. Fox, head of the department since 1985, who will return to teaching and research. Dean Brown said, "Professor Fox has served with distinction and dedication. His efforts for the past four years have been distinguished by his wise and thoughtful analyses of issues and problems. It is a comfort to me to know that he will continue to be available for advice when needed.

"Professor Hynes' leadership role in research and his concern for the educational programs of the department-as evidenced by his effectiveness as a teacher and willingness to participate in other activities of the Department-admirably qualify him for the position of head of the Biology Department. I look forward to working closely with Professor Hynes in his new position as the leader of the Department."

The new department head has been a member of the MIT faculty since coming here as an assistant professor in 1975. Prior to that he was a research fellow at

Joel Moses, widely recognized for the

development of MACSYMA, the largest

computer system for formula manipula-

tion, has been appointed the Dugald Caleb

ment was announced by Professor Jack L.

Kerrebrock, acting dean of the School of

The Dugald Caleb Jackson Professor-

ship, established in 1968, honors one of

MIT's foremost educators. Head of the

Department of Electrical Engineering from

1907 to 1935, Professor Jackson set the

tradition of the department and established

what has become a nationwide standard of

Previous holders of the Jackson Profes-

sorship were Gordon S. Brown, Institute

Professor Emeritus, and Professor Emeri-

tus Louis D. Smullin, who also headed the

department at one time. Dr. Brown was a

student of Jackson's and later became dean

of engineering. He was a pioneer in teach-

excellence in engineering education.

Dr. Moses

Engineering

Jackson Professor of

Computer Science and

will hold the professor-

ship as he returns to

teaching and research

in the Department of

Electrical Engineering

and Computer Sci-

ence, which he has

headed since 1981.

appoint-

(See related story.)

Professor Moses

Engineering.

Moses named to Jackson Chair

Electronics.

the Imperial Cancer Research Fund Laboratories, London, England. He became an associate professor at MIT in 1978 and became a full professor in 1983. He has been associate head of the department since

Professor Hynes and his colleagues have focused their cellular and molecular biological studies on a family of adhesive glycoproteins, fibronectins, which permit cell adhesion and migration, as well as on a family of cell surface receptors, integrins, which mediate the attachment of cells to fibronectins and other analogous proteins.

The attachments of cells to solid surfaces and to each other play vital roles in cell behavior during embryological development and in important physiological processes such as hemostasis, thrombosis, wound healing, and cancer. Dr. Hynes' lab, a recognized leader in this area of research, has discovered alterations in cell adhesion processes associated with malignant trans-

Professor Hynes, 44, who was born in Nairobi, Kenya, and is a citizen of the UK (US permanent resident), holds both his BA (1966) and MA (1970) degrees from Cambridge University, and a PhD from MIT that was awarded in 1971.

Professor Hynes was named a Howard Hughes Medical Institute Investigator in 1988. In 1982 he received a Guggenheim Fellowship to spend a year in London working on the development of the brain. He was a Harvey Lecturer in 1986, is a Fellow of the AAAS, and was recently elected to the Royal Society of London.

Professor Hynes has served on the NIH Cell Biology Study Section. He is currently an associate editor of Cell and a US editor of Development. He lives in Belmont with his wife Fleur and sons Hugh and Colin.

ing the theory and practice of feedback

control. Professor Smullin is a widely rec-

ognized authority on microwave tubes and

microwave electronics. He played a major

role in the development of MIT's Radiation

Laboratory and the Research Laboratory of

ulty since 1967, has made significant con-

tributions to both computer science and

computer engineering. As a computer sci-

entist, he is known for his work on the

theory of algebraic manipulation algorithms

in the areas of simplification and integra-

tion. As a computer systems engineer, Pro-

fessor Moses is best known for applying his

theoretical results to the development of

MACSYMA, a system that enables com-

puters to carry out exact differentiation

and integration of complex expressions as

well as symbolic solutions of equations. His

current interests include the study of or-

ganizational structures in computer sci-

came to the United States in 1954. He

received the BA (1962) and the MA (1963)

from Columbia University and the PhD

(1967) from MIT. He was appointed assis-

tant professor here in 1967, associate pro-

fessor in 1971 and professor in 1977. From

1974 to 1978 he was associate director of

the Laboratory for Computer Science. From

1978 to 1981 he was associate department

head for computer science and engineering.

A native of Israel, Professor Moses, 47,

ence, AI, and management.

Professor Moses, a member of the fac-

New team named in Course VI

MIT's largest academic unit-the Department of Electrical Engineering and Computer Science—has a new team at the

Professor Paul L. Penfield Jr., widely recognized as an expert in integrated circuit design automation, has been appointed head of the department, succeeding Professor Joel Moses, department head since 1981. Professor Jeffrey H. Shapiro has been named associate department head from electrical science and engineering, and Professor Fernando J. Corbató will continue as associate department head from computer science.

The appointments were announced by Jack L. Kerrebrock, acting dean of the School of Engineering and Richard Cockburn Maclaurin Professor of Aeronautics and Astronautics.

Acting Dean Kerrebrock also announced that Professor Moses will return to teaching and research as the Dugald Caleb Jackson Professor of Computer Science and engineering. (See related story.)

Professor Kerrebrock noted that Professor Moses and his two associate department heads have served their department, the School of Engineering and the Institute admirably for eight years, leading the department through a time of great stress because of high enrollments and substantial change in the educational and research programs. At the same time, he said, Professor Moses has been influential in the Institute's undergraduate educational renewal and is chairing the faculty committee on Lincoln Laboratory.

9 entering grads are NSF minority fellows

Nine MIT graduate students and three MIT graduates pursuing advanced degrees at other institutions this fall have received National Science Foundation Minority Graduate Fellowships.

The students are among 100 nationwide to receive the fellowships, which are awarded on the basis of "outstanding ability for graduate study in the sciences, mathematics and engineering." This year 797 students applied for the awards.

Each fellowship provides a stipend of \$12,300 per year for full-time graduate study. An annual cost-of-education allowance of \$6,000 is also provided to the university by NSF in lieu of all tuition and

This year's NSF minority fellows at MIT

Kim M. Coleman, economics. Scott E. Deering, materials science and engineering.

Carolyn E. Ford, biochemistry. David G. Fernandez, economics. Patricia D. Hatch, biochemistry. Augustin I. Ifarraguerri, bioengineer-

Antonio A. Pangan, mechanical engineering.

Michael G. Vale, inorganic chemistry. Jorge Vendrell, electrical engineering and computer science.

The following students received their undergraduate degrees from MIT this June and will pursue graduate studies at other institutions:

Raul J. Elias, linguistics at the University of Pennsylvania.

Donn H. McMahon, mechanical engineering at the University of California,

Salma I. Saeed, bioengineering at Johns Hopkins University.

Carol Martin joins coaching staff

Carol Martin has been appointed head coach of field hockey and women's lacrosse, MIT Director of Athletics Royce Flippin has announced.

A native of Newtonville, where she was a field hockey and cross country skiing standout at Newton North High School, Ms. Martin is a 1986 graduate of the College of Wooster in Ohio where she was a first-team field hockey All-American and the most valuable player of the North Coast Athletic Conference. She was also named to the All-Brine Defense Team in lacrosse during her collegiate career.

A year of coaching at Castleton State College earned Ms. Martin Coach-of-the-Year honors from the Mayflower Conference in 1987. Martin also coached lacrosse at the Vermont school. Additional coaching stops have been at the Putney School in

Putney, VT, and Concord-Carlisle (MA) High School.

Ms. Martin has attended the Olympic Development Camp for field hockey at Northeastern University, and is a member of the Boston Field Hockey Association with whom she travelled with the first team in 1988. She competed in the National Hockey Festival in 1986 as a member of the Northeast Region first team.

She has competed in several triathalons and also competes in mountain bicycle races. Her baccalaureate thesis was entitled "The Effects of Relaxation Training on Reducing Precompetitive Anxiety Levels in Male and Female Basketball Players." She has also done research into variables affecting home versus away performance of athletes.

Teaching workshop

The first joint Orientation Workshop for New Faculty and Teaching Staff will be held Thursday, Sept. 7, beginning at 9:30am in Huntington Hall (Rm 10-250).

The workshop was first offered to new teaching assistants six years ago, and to new faculty three years ago. They are helpful in acquainting new teachers to the resources available to them. This year's session will also hear from two seasoned faculty members on teaching

The workshop is jointly sponsored by the Office of the Provost, the Dean of the Graduate School and the Dean for Student Affairs.

Professor Richard B. Adler, who had been associate department head from electrical science and engineering since 1978, has been appointed codirector of the Microsystems Technology Laboratories (MTL), Professor Kerrebrock announced. Dr. Adler, who holds the title distinguished professor of electrical engineering and computer science, is noted for his work in semiconductor electronics, electromagnetic theory and circuit theory. The other codirector of the MTL is Professor Dimitri A. Antoniadis.

The appointments were effective September 1.

Professor Penfield's professional interests have included noise and thermodynamics, solid-state microwave circuits,

electrodynamics of moving media, circuit theory, computeraided design, APL language extensions, and integrated circuit manufacturing He joined MIT in

1960 as an assistant professor after earning his ScD here and became associate professor in 1964 and professor in 1969. He

Dr. Penfield served as associate department head for electrical science and engineering from 1974 to 1978.

Professor Penfield is a fellow of the IEEE and a former chairman of the Boston section. He is the author of five books and many articles in his various fields.

Professor Shapiro began his career at MIT as associate professor of electrical engineering in 1973 and

Dr. Shapiro

fessor in 1985. He received his PhD from MIT in 1970 and until 1973 was an assistant professor at Case Western University. His interests are in system optics, which includes the application of signal analysis and communications theory to optical propa-

was promoted to pro-

gation, communication and imaging. He is a senior member of the IEEE and a member of the Optical Society of America. He is an active professional consultant and the author of numerous articles in his field.

Professor Corbató has been associate head from computer science since 1983.



Dr. Corbató

For three years before that, he was director of computing and telecommunications resources at MIT and carried out an extensive review and assessment of MIT's computing capabilities and installations. Under his direction, the establishment of a campuswide computer network was begun.

Professor Corbató is widely known for his leading role in the 1960s in the development of the Compatible Time Sharing System (CTSS) that made it possible for more than one person to use a computer at the same time.

New Center begins

Five faculty members in the Department of Mechanical Engineering have established the Center for Information Driven Mechanical Systems (CIDMS) to explore ways in which machines can be made to perform better through integration with information and data acquisition, and processing and control systems.

The center serves to bridge mechanical engineering and computer science, focusing on design and control issues. Participating labs are the Intelligent Machines Laboratory, the Man-Machine Systems Laboratory, the Nonlinear Systems Laboratory and the Vehicle Dynamics Labora-

The founding faculty are Professors David N. Wormley (department head), Haruhiko Asada, Thomas B. Sheridan, Jean-Jacques E. Slotine and Harry West.

THE **INSTITUTE** CALENDAR

September 6 - September 17

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

Events of Special Interest

TCA Blood Drive*—American Red Cross Blood Services/ Technology Community Assn Drive, Thurs, Sept 7, 1-7pm; Fri, Sept 8, 9am-3pm, Student Ctr Sala de Puerto Rico. Info: x3-7911.

Seminars and Lectures

Freshmen are encouraged to attend departmental lectures and seminars. Even when these are highly technical they provide students one means to learn more about professional work in a department and field.

Friday, September 8

Fluid Modeling of the Plasma Edge Including Impurities*-Dr. Bas Braams, Princeton Plasma Physics Lab/ Courant Institute, Plasma Fusion Ctr Seminar, 4pm, Rm NW17-218.

Monday, September 11

Hydrodynamic Theory of Glancing Impact**-Dr. Itzchak Frankel, Dept of Aerospace Engineering, Technion University, Israel, Fluid Dynamics Seminar, 4-5pm,

Tuesday, September 12

Electrostatic Accelerator Free-Electron Laser*-Dr. A. Gover, Tel Aviv University, Plasma Fusion Ctr Seminar, 10am, Rm NW17-218

Relativistic Plasmas and Their Applications to AGN's and Black Holes*-Dr. Alan P. Lightman, MIT, Ctr for Space Research Astrophysics Colloquium, 4:15pm, Rm 37 252. Refreshments, 3:45pm.

Wednesday, September 13

Intercomparison and Testing of Tropical Ocean Models*-Dr. Claude Frankignoul, LODYC, University of Paris, Dept of Oceanography Sack Lunch Seminar, 4pm, Rm 54-425

Thursday, September 14

Manned Spacecraft: X-15 to the Space Station ** -- Myron Kayton, president, Kayton Engineering Co, Dept of Aeronautics and Astronautics Seminar, 4-6pm, Rm 9-150.

Quantum Coherence Effects in Small Disordered Conductors**-Prof Boris Altshuler, MIT/Leningrad Institute of Nuclear Physics, Physics Colloquium, 4:15pm, Rm 10-250. Refreshments served, 3:45pm, Rm 26-110.

Friday, September 15

Fischer-Tropsch Synthesis as a Way to Utilize Remote Natural Gas**-Dr. George Huff, Amoco Chemicals Corp, Chemical Engineering Seminar, 3:30pm, Rm 66-110.

A Laterally Extensive Geochemical Boundary in the Mesozoic Basalts of Southern Gondwanaland and Tectonic Implications**-Prof A.J. Erlank, University of Cape Town, Dept of Earth, Atmospheric, and Planetary Sciences Conoco Lecture, 4-5pm, Rm 54-915.

Community Meetings

Alcoholics Anonymous (AA)**-Meetings every Tues, 12-1pm; Thurs, 12-1pm, Rm E23-364. For info call Sarah, x3-4911.

Al-Anon** -- Meetings every Fri, noon-1pm, Health Education Conference Rm E23-297; every Tues, noon-1pm, Rm 1-246: and every Mon. 12-1pm. Lincoln Lab Bldg 1218. Family Support Ctr. The only requirement for membership is that there be a problem of alcoholism in a relative or friend. Call Sarah, x3-4911.

Alcohol Support Group**-Meetings every Wednesday, 7:30-9am, sponsored by MIT Social Work Service. For info call Sarah, x3-4911.

Co-Dependents Anonymous (CoDA)*-Meetings every Thurs, 6:30-8pm, Rm 66-144. Info: Sarah, x3-4911.

Narcotics Anonymous*-Meetings at MIT, every Mon, 1-2nm Rm E23-364 (MIT Medical Dept), Call 569-0021.

Overeaters Anonymous (OA)*-Meets Thurs, 1-2pm, Rm E23-364. On requirement for membership is the desire to stop eating compulsively. Info: Sarah, x3-4911.

MIT Faculty Club**-Closed for renovations, through

Office Workers Issues Group**-Women's Forum infor-

mal support staff meetings, Wed, 12:10-1pm, Rm 8-219. Bring your lunch; network or talk about office worker's

Women's Forum Talbot House Weekend**-Active members and friends invited, Sept 22-24, Talbot House, VT. Open program, time to relax, and get to know each other. Dorm-style lodging and meals, \$50/pp. Provide own transportation or car pool. Reservations due by Sept 15. Call Joan Doucette, x3-8246

MIT Women's Book Discussion Club**-Meets 1st & 3rd Thurs each month, 1-2pm, Rm 10-340. Sept selection, After the Second Set: Conversations with Simone de Beauvoir, by Alice Schwarzer, 1984. Bring lunch. Info: Ellie Bonsaint,

Working Mothers Support Group**-Meets every other Tuesday, 12-1:30pm (drop in any time), Rm 8-219. Next meetings: Sept 19 and Oct 3. An ongoing support group that meets to discuss parenting-related issues in a casual atmosphere. Info: Janette Hyde, x3-4290.

Women's Forum Steering Comittee Meeting**-Thurs, Sept 7, 12:10-1pm, Rm 8-219. All MIT women welcome; discussion of future programs and projects.

MIT Association for Women Postdocs**-Meeting to discuss plans for the year, Tues, Sept 19, 12noon, Rm 6-321. Lunch provided. Info: Patti, x3-1824.

Child Care Discussion for Expectant Parents**-Child Care Office Discussion led by Rae Goodell, coordinator, Parent Programs, Thurs, Sept 14, 12-1:30pm, Rm 4-144. MIT men and women expecting or planning their first child.

Tai Chi Class**—Women's League/Taoist Tai Chi Society of Massachusetts lessons of ancient meditative exercise which can relieve stress and improve concentration and perception. 10-week class through Nov 7, 5:10pm, Rm 10-340. Wear loose clothing. Info: Nancy Collins, x3-8381, John, x3-4434, or Pam, Women's League office, x3-3656.

Informal Embroidery Group*—MIT Women's League Group meets Sept 6 & 20, Oct 4 & 18, Nov 1 & 15, Dec 6, Jan 3 & 17, Feb 7 & 21, March 7 & 21, April 4 & 18, May 2 & 16, June 6, 10:30am-1:30pm, Rm 10-340.

Health Education

From Smoker to Non-Smoker*-Medical Dept Smoking Cessation 5-week program meets weekly starting Thurs, Sept 7, 12-1:30pm. Cost: \$30, \$25/MIT Health Plan members. Info/registration: x3-1316.

Nursing Mothers' Support Group**-Pregnant and breastfeeding women at MIT meet to gain confidence and share info and practical tips. First Tues of each month, 10am and third Weds of each month, 4pm, Rm E23-297. Babies welcome. Info: Connie Bean, x3-1316.

MITAC

MITAC, the MIT Activities Committee offers discount movie tickets for General Cinema (\$3.50) and Showcase (\$3.75). But stock up now, before the price increase. Tickets are good 7 days a week, any performance.

Tickets may be purchased at MITAC Office, Rm 20A-023 (x3-7990), 10am-3pm. Mon through Fri. Tickets are also sold in Lobbies 10 & E18 on Fridays, 12-1:15pm. Lincoln Lab will begin its Tues-Fri sales schedule in Rm A-263 from 1-2pm, Tues, Sept 12.

Check out our table of discounts for dining, musical and cultural events available to you through MITAC.

The 165th Topsfield Fair. Sept 30-Oct 9. America's oldest fair (founded in 1818). Tickets: \$3.50/pp (reg \$4/pp weekdays; \$5/pp weekends; children under 12 are free). Available in the MITAC office

Fiddler on the Roof. Wed, Oct 4, 7pm, Wang Ctr. Tickets \$26.50/ea (reg\$29)

Boston Classical Orchestra. Wed, Oct 4, 8pm, Faneuil Hall. Program includes Mozart's Eine Kleine Nachtmusik, K. 525; C. P. E. Bach's Concerto for Harpsichord and Strings in D Minor (Mark Kroll-soloist); Handel's Sonata No. 5 (Concertmaster Robert Brink, soloist); and Mendelssohn's Sinfonia No. 10. Tickets \$8/ea (reg \$12).

Fall Foliage Weekend on Lake Winnipesaukee. Oct 7-8. Escape includes: round-trip bus fare; I night's lodging at the Wolfboro Inn; an Oktoberfest evening (dinner/dancing) aboard the Mt. Washington cruise boat; gourmet continental breakfast; morning boat ride on the Judge Sewell; and Sunday brunch — all for only \$96/pp/dbl. occupancy (*or, \$71/pp/dbl. occupancy without the Oktoberfest evening). Bus leaves. West Garage 10am, Sat, Oct 7; returns om Sun Oct & Space is limited reservations must be made before Sept 15 in the MITAC office.

Ringling Brothers & Barnum & Bailey Circus. Fri, Oct 13, 7:30pm, Boston Garden, Tickets, \$10/ea (reg \$12.50).

Hal Holbrook in Mark Twain Tonight. Sat, Oct 14, 8pm, Opera House. Tickets \$25/ea (reg \$28); available in the MITAC office.

Philadelphia Weekend by Train. Oct 27-29. The weekend escape includes round-trip train fare; 2 nights' lodging in Independence Square; welcome dinner at the hotel; walking tour of the historic area and Society Hill, followed by lunch at the famous Dickens Pub; Sunday breakfast; transfers and more. Only \$249/pp/dbl occup. Reservations must be made by Sept 15 in the MITAC office, and space is limited.

Montreal Holiday Shopping Weekend. Nov 24-26. Bus leaves West Garage Fri, Nov 24, 7am; returns approx. 7pm, Sun, Nov 26. Cost: \$120/pp/dbl occup (inc round-trip bus fare & 2 nights' lodging at the Hotel Le Baccarat). Space is limited. Ticket sales for this event only begin Tues, Sept 12, 10am, in the MITAC office.

F.Y.I. I Don't miss the North Shore Music Theatre's production of My Fair Lady, Oct 5-28. And, receive \$5 off the box office price (for this or any other Broadway show at the NSMT) with the NSMT's Corporate Discount Card. (It's free) Available in the MITAC office. Call, or stop by, the MITAC office for more details.

F.Y.I. II Exotic Car Expo, Oct 6-8, Bayside Expo Center.

Discount coupons available in the MITAC office.

The City Books are Here. Only \$1 ea (reg \$7.50). Discount coupon books, from dining to health clubs to car washes and more. (Coupons valid through Oct 15, 1989.) And, look for the new City Books arriving in mid-Oct (with coupons valid through Feb 1, 1990).

Riverside Park Discount Coupons. Riverside Amuseument Park, Agawam, MA. Admission \$10.95 (reg \$14.95), or \$7.95/child under 48" height (reg \$10.95). Available in MITAC Office, valid through Oct 1.

The Steamship Authority Discount Coupons are Here. Offering reduced fares to Nantucket and Martha's Vineyard. With the discount coupon, round-trip fare to Martha's Vineyard is \$6/adult (reg \$7.50), \$3/child (reg \$3.80), and roundtrip fare to Nantucket is \$13.60/adult (reg \$17) and \$6.80/ child (reg \$8.50). Discount coupons are available in the

Council for the Arts Museum Passes. On campus, there are 10 passes employees may borrow for free admission to the Museum of Fine Arts. To check on availability, call the MIT Libraries, x3-5651. At Lincoln Lab, passes are available in the Lincoln Lab Library, Rm A-150.

PLEASE NOTE: Museum of Science tickets no longer available. Due to the recent revamping of the Museum of Science Corporate Discount Ticket Program, the \$1 discount tickets are no longer available.

Important! To avoid disappointment, purchase tickets and make reservations early as we are limited by ticket availability and transportation. All MITAC events and ticket purchases are non-refundable due to the non-profit nature of our

Social Activities

Bienvenidos a MIT**-Club Latino/Graduate Student Council welcome picnic for new and veteran students, Thurs, Sept 7, 4pm, BBQ area near Student Ctr.

MIT Islamic Society Open House*-Sat, Sept 9, 8-10pm. Student Ctr Mezzanine Lounge. Socialize and learn about the MIT Islamic Society.

Japanese Lunch Table**—Every Tues, 1pm, Walker Rm 220. Bring bag lunch and speak Japanese with native speakers. All levels welcome.

Theater

Little Shop of Horrors*-MIT Musical Theatre Guild pro duction, Sept 7-9, 8pm, Kresge Little Theatre. \$8, \$7 MIT faculty & staff, \$6 students & seniors, \$5 MIT student ID. Info: x3-6294. Mail order: PO Box 3, MIT Branch, Cambr-

Dance

MIT Dance Workshop First Meetings**—Composition/ Improvisation: Tues, Sept 12, 11-12:30pm, Walker 201; Intermediate Modern Technique, Tues, Sept 12, 5:30-7pm. Walker 201; Beginning Modern Technique, Wed, Sept 13, 3:30-5pm, Dupont Ctr, T-Club Lounge; Repertory/Improvisation, Thurs, Sept 14, 11-12:30pm, Walker 201. Come

MIT Ballroom Dance Club Workshops*-Sun, Sept 10: Swing I, 1-2pm, \$.50/member, \$.75/non-member; Merengue I & II, 2-3:30pm, \$.75/member, \$1/non-member; General Dancing, 3:30-4:30pm, free; Dance Exhibition, 4:30-5:30pm, free, Student Ctr Sala de Puerto Rico. No partner necessary. Info: x8-6554.

MIT Folk Dance Club*-weekly dancing-Sun, International Dancing, 7:30pm, Student Ctr Sala de Puerto Rico; Tues, Balkan and Western European Dancing, 7:30pm, Student Ctr Rm 407; Wed, Israeli Dancing, 7:30pm, Student Ctr Sala de Puerto Rico. Info: x3-3655.

Rhythmic Gymnastics Classes for Women**-MIT Women's League classes, Thurs, 12-1pm, Rm 10-340. Info: Helena, 596-2396 eves.

Yoga*—Ongoing classes in traditional Hatha and Iyengar style. Beginners: Mon, 5:10pm, Rm 10-340; Intermediate/ Advanced: Mon, 6:30pm, Rm 10-340. For information call Ei Turchinetz, 862-2613.

Exhibits

LIST VISUAL ARTS CTR

Student Loan Art Exhibition and Lottery. Prints, draw ings, and photographs displayed for distribution by lottery to full-time, registered MIT students for the 1989-90 academic year. Through Sept 21. Lottery: Sept 22. Remo Campopiano: In Residence. Creating a room-size installation, including among other elements, a coffee-table landscape inhabited by a colony of live ants. Through Nov 19. Still Performance: Rimma and Valery Gerlovin, Collaborative photographs by Soviet emigre artists which mix language and portraiture in the creation of poetic and paradoxical visual formlulas to explore philosophical questions. Catalogue available. Through Oct 8. Hours: Weekdays, 12-6pm, Weekends, 1-5pm. Closed holidays.

THE MIT MUSEUM

MIT Museum Bldg (N52)-Lahore: The City Within. The cultural, artistic, and architectural center of Pakistan explored through historical and modern photographs, maps, textiles, and paintings, with performances, films and lectures, Sept 17 through Dec 17. Math in 3D: Geometric Sculptures by Morton C. Bradley, Jr. Revolving sculptures based on mathematical formulae. Form and color relations lend these works a unique visual appeal, ongoing Holography: Types and Applications. Changing exhibit demonstrating the uses of this three-dimensional imaging medium. Works include scientific, medical, technical, and artistic imaging drawn from the work of the Spatial Imaging Group at MIT's Media Laboratory, ongoing. Light Sculptures by Bill Parker, MIT '74. Changeable, touchable plasma sculptures by the artist who developed this medium,

Boisjoly to speak September 18

Roger Boisjoly, who received the Scientific Freedom and Responsibility Award from the American Association for the Advancement of Science for his efforts to avert the Challenger disaster, will make a return visit to MIT this month.

When he spoke here in January 1987 he moved many here and catalyzed reflection on ethical issues in engineering and science on this campus. The video tape of that lecture has been used in many MIT classes over the last two years.

He will give a lecture, "Engineering Ethics: Making the Best of Difficult Situations," Monday, Sept. 18, at 4:30pm in Rm 10-250. This lecture is open to the MIT Community and there will be opportunity for audience discussion. This lecture is jointly sponsored by the Departments of Civil Engineering, Mechanical Engineering, Electrical Engineering, Chemical Engineering, Nuclear Engineering and Aeronautics and Astronautics in conjunction with the jointly offered subject Ethical Issues in the Work Life of Engineers and

On September 19 and 20 Mr. Boisjoly will visit the lecture and discussion sections of Ethical Issues in the Work Life of Engineers and Scientists to discuss the engineer's responsibility for safety.

ongoing. Hours: Tues-Fri 9am-5pm. MIT Museum closed to the public on Mondays; Open 12-4pm Sat-Sun.

Compton Gallery-Stopping Time. Photographs, instruments, memorabilia documenting Harold E. Edgerton's invention and use of the strobe light, Through Sept 15. Gallery hours: Weekdays 9am-5pm, closed Saturdays.

Hart Nautical Gallery

Ongoing exhibits: George Owen '94: Yacht Designer-Line drawings and half-models designed by one of the early professors of naval architecture at MIT. Half Models in Naval Architecture and Ship Building-Half-models, ship drawings and photographs illustrate how the half model has aided ship and yacht designers and builders.

Edgerton's Strobe Alley-Exhibits of high speed photography. Main corridor, 4th floor.

Corridor Exhibits: Building 1 & 5, 2nd floor: John Ripley Freeman Lobby, Building 4: Norbert Wiener, Karl Taylor Compton. Community Service Fund, Ellen Swallow Richards. Women at MIT. An overview of the admission of women at MIT. Five photographic panels with text documenting the circumstances that increased the number of women in the classroom since Ellen Swallow Richards. Building 6: Laboratory for Physical Chemistry.

OTHER EXHIBITS

Institute Archives and Special Collections-1887: The Founding of the Lawrence Experiment Station. Second in a series of three exhibits in commemoration of the Lawrence Experiment Station's 100th anniversary. Jerome C. Hunsaker, Father of Aeronautics at MIT. Chronicles his founding of aeronautics at the Institute; his design and construction of Navy airships and NC-4, the first airplane to cross the Atlantic, and his role in leading the Dept of Aeronautical Engineering from 1939-51. Happy 50th, Class of '39. Hall exhibit cases in 14N, 1st floor.

Wellesley Events

Jewett Arts Center*-Style and Science: Examining a Polykleitan Statue. A technical and stylistic analysis of the most important work of classical sculpture in the Wellesley College Museum collection. Through Oct 22. Giorgio Vasari's Holy Family: Master and Pupil in a Renaissance Workshop. Examination of a Renaissance masterlpiece reveals clues to the structure of the Renaissance workshop.

Style and Science*-Henry Lie, Gene Farrell and Maureen Ressell Neil, Ctr for Conservaton and Technical Studies, Harvard Art Museums, Wellesley College Museum Gallery Talk, Sept 14, 4:30pm, Jewett Main Gallery.

The Bread and Puppets Theater*—Outdoor performance, Fri, Sept 15, 4:30pm. Rain location: Sports Ctr Field House.

MIT Cable Listings-Submit announcement in writing to Rm 9-050. We prefer a day's warning, but faster action may be possible. Useful also for correcting errors, notifying about cancellations, and dealing with emergencies. If you have met the Tech Talk deadline, your announcement is automatically put on cable (except for exhibits and some multi-meetings programs).

We are now accepting requests via e-mail. Announce-ments are shown on MIT Cable channel 12; which is displayed on the receivers in Lobbies 7 and 10. Announcements should be of interest to the general MIT community. Classified ad type messages will not be accepted. Messages should include: date, title of event, speaker or sponsor, time and location. MIT Cable reserves the right to edit your message to fit the screen. Include your MIT phone number. E-mail your announcements to: tv-messages@telecom.mit.edu. Messages will usually be posted within 24 hours of their

Send notices for Wednesday, September 13 through Sunday, September 24 to Calendar Editor Rm 5-111, before 12noon Friday, September 8.

The faces of '93

They have come from all over America and the world-some 1,100 freshmen and transfer students, most of them new to MIT and the Boston area and almost all of them still teenagers. Their lives and careers stretch out ahead of them, but for the time being they must cope with finding their way in new surroundings. Tech Talk spoke to some of them as they arrived for R/O week, asking them about their interests and first impressions.



Lori R. Swenson, 18, of Salt Lake City, Utah. Likely major: Chemistry, with a music minor. Interests: Flute, singing (alto) and softball (pitcher).

"I love it. There's a lot more happening here than where I'm from. The only thing I don't like are the really humid daysthey're awful."



Oliver Hui Chow, 18, of Winnipeg, Manitoba, Canada. Likely major: Combination of management and engineering. Interests: Debating (ranked ninth in the world as a high school junior), public speaking, varsity basketball and volleyball.

"I like MIT because of its world-wide reputation. It's not the most beautiful campus in the world, but it's functional, which is what I expect from an engineering school. To me, a university is made up of people, and everybody I have met has been fabulous-helpful and friendly."



Anastasia Damianidou, 18, of Thessaloniki, Greece. Likely major: Undecided, but perhaps economics. Interests: All sports, especially volleyball and rowing.

"It's a wonderful place. I have so many things to do here. My sister, Katerina, is a graduate student in ocean engineering. She's told me so much about MIT.'



Raynard O. Hinds, 17, of Orlando, Fla. Likely major: Electrical engineering. Interests: Running, computers, reading.

"I like it here. It's a nice city and a good school with good facilities."



Huilin Lai, 19, of Singapore, a sophomore transfer student from the University of Pennsylvania. Likely Major: Chemical engineering. Interests: Piano, swimming, tennis, classical music, concerts, operas,

"I really like the environment herethe research environment and the UROP program. Here everything's very practical, even the buildings. Compared to the Ivy League campuses, it's a bit square, actually. But the dorm is very well furnished."



Garry Moorer, 16, of Pittsburgh, Pa. Likely major: Electrical engineering and computer science. Interests: Everything, having fun, volleyball and basketball.

"Boston reminds me of New York. It's more hectic than Pittsburgh. The campus is a city itself within a city. Pitt (the University of Pittsburgh) is spread out over a wide area."



Elizabeth Aria Landstrom, 17, of Union City, California, near San Francisco. Likely major: Undecided. Interests: Swimming, reading, gymnastics, journalism.

Boston doesn't seem all that different from San Francisco. It's pretty friendly. The campus is interesting; it's different to be around so many smart people."





R. Bruce Duncan, 18, of Virginia Beach, Va. Likely Major: Nuclear engineering, with a strong interest in creative writing. Interests: Science fiction, photography, music, stereo, laser light shows coordinated with music. Naval ROTC.

"It's weird but stimulating. Everyone here is interesting. There's a lot of personality here. People wander down the street and talk about particle physics, and that's



Safroadu Yeboah-Amankwah, 18, a native Ghanian who has been living and going to school in New Guinea, where his father, an MIT alumnus (SM and PhD in physics), is head of the physics department at the University of Papua. Likely Major: Electrical engineering. Interests: Photography, varsity soccer and reading.

"It's great here. I love it. The only thing I don't like, I suppose, is that it's so much in the city. The city has its advantages, of course, but I think seclusion is better for studying."



Jean Kim, 18, of Yorba Linda, California. Likely Major: Undecided. Interests: Most sports, especially volleyball, and art.

"It really seems very nice. It's a new atmosphere, but I went to school in Connecticut, so it's not too different."

CLASSIFIED

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 approximately 30 words) per issue and may not be repeated in successive issues. All must be accompanied by full name and extension. Persons who have no extensions or who wish to list only their home home telephones, must come in person to Rm 5-111 to present Institute identification. Ads using extensions may be sent via Institute mail. Ads are not accepted over the telephone.

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

Deadline is noon Friday before publication.

For Sale

9x6 burgundy carpet. \$60; Sansui dual voltage rcvr. \$95; Maxima hot tray, nvr usd, \$90; Smith-Corona elctrc typwrtr Coronet XL, \$90. Call 566-0922 ly mssg.

Penn cherry 4-postr dbl bed, tripl drssr/mirror, chst, \$500 firm. Pat, x8-3513 Draper or 324-7149.

Macintosh SE hard disc 20, xtnded keybrd, Imagewriter II prntr, \$2,500 for all. Chris, 623-7557, lv mssg.

Frame for futon, bed/couch, nw, sturdy constrctn, \$125. Call 497-6886.

Sears Best screen hse, 9x12', nw \$525, now \$125, inc I/O carpet. Bob, x8-2357 Draper.

Raleigh bikes, 26", 2W, 21" frames, 1M 19" frame, \$35, \$25 & \$20. Ralph/Jane, 1-508-685-2614.

Fuji 35mm auto focus, auto wind built-in flash cmra, rarely usd, \$100; Vivitar telephoto zoom lens, 70-230mm screw-in mt, \$100. Paula, x3-8376.

2 Goodyear whitewall radl tirs, P215/75/R15, almst nw, \$30 ea. Fran, x3-0424 or 933-8213.

Rolling Stones tix, 2 for 9/29, eithr for sale or xchange for another date. Victor, x8-5171 Whitehead

Cmptr games by Sierra for MsDOS compatbls: Space Quest 3, \$25; King's Quest 4 & Huntbook, \$28; Leisure Suit Larry 1, \$25; Leisure Suit Larry 2 & Hintbook, \$28. Oliver, x5-

IBM Selectric typwrtr, 12 pitch, nds repr, potentl collectible, \$50 or bst. Gloria, 595-8596 eves.

Yachting Magazine, 40+ years back issues, almst complete, bst offr. Prof Newman, x3-6809.

4 trs, steel-bltd P155/80R13 (drivn 17K), mtd on rstd-out 78 Horizon (drivn 90K0, may be gd for spare parts. Bob, 899-

Free to gd hm: treadl sewing mach. Mary, x3-8214.

Guitrs: Yamaha SE700SE, blck, twin-humbuckrs, awesome whammy/tuning sys, \$400; cheapo hack special, \$50; PA: TOA MX-106R 6-channl powrd mixr, \$400; Peavy 2420H spkr columns, \$250/pr. Mark, 868-0435.

Roller Blade skts, usd, fits szes 9.5-10.5, bought \$110, \$49. Ali, x3-3022 or 577-9671.

Furn: 2 armchrs, \$25 ea: 4 ktchn chrs & formica tbl top, \$50; 3-drwr bureau, \$25; 15 c.f chst frzr, \$99 or offrs. Call 729-2203 aftr 7pm.

Vehicles

'75 Ford Granada, a/c, Chapman lock, 63K, \$400. Dave, 229-6349 or 508-263-5396.

'78 Chevette, 62K, nw brks, alt, watr pump, shocks & timing belt, rstd pass floorbrd, \$500. Christian, x3-0727 or 876-

'82 Chevy Malibu classic, 4-dr sdn, auto, a/c, AM/FM, ps, pb, rear wndw defrst, V6, v dpndbl, \$2,095. Pat, x2981 Linc or 508-256-5180 eyes.

'83 Nissan Sentra wgn, bl, 55K, sgl ownr, mint cond, no rst, a/c, 5-spd, \$3,900; Honda Trac Olympic moped w/Kryptonite lock, only 300 mi, as new, \$550. Call 643-4276.

'86 Buick Century Ltd, auto, a/c, AM/FM/stereo, 51K, ps, pb, pw, velour int, exc cond, askg \$6,200 or bst rsnbl offr; '80 Dodge Colt, sunrf, nw exh, std tran, gd cond, askg \$625 or bst rsnbl offr. Angela, x8-1746 Draper

'88 Hyundai Excel, 2-dr htch, 4-spd, 4 cyl, AM/FM/cass stereo, exc cond, \$4,700. Call 484-3430.

'88 Conquest TSI (Chrysler), fully loaded, lthr int, 6 spkr stereo cass, wh, exc cond, well-maint, \$13,500. Paul, x3-4489 or 1965-0384.

Housing

Derry, NH, charming 2BR, 1-1/2b condex, oak cbnts, wdstv

T shirt surprise delights Japanese PM

(continued from page 1)

this to the Secret Service which, for security reasons, needs to know in advance all details of state visits and could have said no to the unscheduled presentation.

The shirt was given to the Prime Minister by students Anne Tuttle, a senior in political science, and Kathryn Sand, a sophomore in mechanical engineering, who conduct the regular tours offered daily by the MIT Information Center. When Ms. Tuttle unfolded the shirt and turned it around so the number 29 was visible, shouts of delight filled the corridor. Mrs. Kaifu insisted that photos be taken. A few minutes later, when the Prime Minister entered Killian Court to meet the dozens of Japanese photographers traveling with him, he held up the shirt and many more photos were taken.

The Prime Minister's party arrived at 77 Massachusetts Ave. at 9:30am. The travelling press was directed to Killian Court by another route. Mr. Kaifu was greeted as he got out of his car by Professor Satoru Masamune of the Department of Chemistry and Ms. Priest. He was introduced to the tour guides at the entrance to the Infinite Corridor. Assisting with the visit were David R. Martin, sophomore in mechanical engineering, and Gregory Gould, a senior in management. Winston Williams, a former MIT student, photographed the visit for the Information Center. The Prime Minister also saw the Athena Cluster in Building 11 and Doc Edgerton's "Stopping Time" exhibit at the Compton Gallery. The party left at

Biomagnetism anniversary noted

The 7th International Conference on Biomagnetism held at New York University, August 14-18, 1989, coincided with the 20th anniversary of a pioneering accomplishment at MIT: the use of a shielded room plus a new magnetic detector to produce the first high-quality recording of a magnetic signal from the human body.

From the mid-1960s, when MIT physicist Dr. David Cohen built the first magnetically shielded room to do experiments in biomagnetism, he has pioneered in the field. In December 1969 in his new shielded room at the Francis Bitter National Magnet Laboratory, Dr. Cohen and his colleagues recorded the magnetic field of the human heart for the first time using a superconducting quantum interference

Tracing ozone

(continued from page 1)

Professor Plumb and his colleagues say, "The extent to which the effect penetrates into mid-latitude is clouded by statistical uncertainty in trend analyses and by the difficulty of separating photochemical and dynamical effects on seasonal timescales."

Nonetheless, using data from balloonborne and Nimbus-7 satellite instruments that measured ozone, the research group identified in mid-December 1987 data a sudden decline in Australia and New Zealand stratospheric ozone concentration. The rapid plunge, they say, "rules out photochemical effects" to explain the mid-latitude depression. "Our conclusion is that transport of ozone-poor air from higher latitudes was the chief factor in producing the anomalously low total ozone observed over southern Australia and New Zealand," they write.

Professor Plumb's coauthors of the Nature paper include: Roger J. Atkinson of the Bureau of Meteorology, Melbourne, Australia, W. Andrew Matthews of the Physics and Engineering Laboratory, Lauder, Central Otago, New Zealand, and Paul A. Newman of the Universities Space Research Association, NASA/Goddard Space Flight Center.

-Eugene F. Mallove

hookup, fmly rm in bright wlk-out bmsnt, in quiet cul-de-sac on 3-1/4 acres, 1 hr to MIT, lease-back opt avlbl, \$110,900. John, x3-0831 or 603-437-6001.

SW NH, prime prop, historc twn, CT River Valley, hse inc 11 acres land, rare barn, ez walk ctr twn, shopping, restrctd devlpmnt. Linda, x3-4579.

Santa Fe, NM, 2BR condo, nwly purchased but not yet occupied, v rsnbl rates, daily/wkly, adobe styl, Kiva frplc, priv patios, prkg, avlbl to mid-Dec, 1989. Kate, x3-2445 or 354-6751.

Sweden, ME, 2BR log cabin, sleeps 5, ovrlooks lake, swimming, boating avlbl, \$350/wk off-seasn. Mark, x3-1505.

Westboro, 2BR condo, 930 s.f, w/w, a/c, fully appliancd, tennis, pool, rec area, prkg, grt locatn, conv to Rt 70, 495, 290, mrtg assumable, no pts, ownr offr \$2,000 @ closing, askg \$82,500 nego. Call x2935 Linc or 508-366-1732 aftr

Camb, shr 2BR mod apt on quiet st, 15 min wlk to MIT, quiet non-smkng rspnsbl person, \$600/mo+ utils. Call x3-7860 or

Watertown, 5 rm apt, frnt & back enclosed prchs, nice nbrhd, quiet st, \$850/mo, no pets. Jean, x8-5548 or 643-8946 eves.

Wanted

Chld care nded for 2 girls age 5 & 2, in our Camb hm, lite hsekeeping, M or T 11:30-2:30, W 4-8pm, Th 11:30-4:30pm, F11:30-6pm, mst drv (own car pref), non-smkr, refs. Call x3-5581 or 508-820-0184

Ride to NYC, will shr all xpnses, flex schedule so rides nded 1/bth ways, mid wk or wkends. Christine, x3-8238 or 547-

Asst swim instructr for 8 Sat AM parent/child classes thru fall @ MIT pool, Water Safety Cert necessary, exp w/chldm under 5 strongly pref, \$8.50/hr. Child Care Office, x3-1592.

device (SQUID). A report of their work appeared in the 1 April 1970 issue of Applied Physics Letters.

Recalling the early years of biomagnetism before he came to MIT in 1969. Dr. Cohen says, "Scientists then did not want to be bothered with weak magnetic fields, and especially by the strange idea that these could be produced by the human body!" It is a far different research environment today, says Dr. Cohen. "The reward of biomagnetism research is no longer the simple excitement of discovering the magnetic field of the brain and other organs. Instead, it is the satisfaction of seeing biomagnetism used in many areas of research as well as in clinical settings."

Among the landmark accomplishments in biomagnetism over the past two decades by researchers at MIT and the years in which they were reported:

-The first magnetocardiogram taken of the human heart with a SQUID (1970). This was done in collaboration with the developer of the first practical SQUID detector, Dr. James Zimmerman, then at the Ford Motor Company.

-The first magnetoencephalogram (MEG) of the human brain—including that of an epileptic patient-using a SQUID (1972). This was the beginning of neuromagnetism.

-The first measurement of the magnetic field of the lung, caused by ferromagnetic particles (1973). This was the beginning of pneumomagnetism.

—The first evoked magnetoencephalograms of the human brain (1975). This was the beginning of the evoked MEG.

Almost all work on biomagnetism today has its roots in the four research reports on

The Francis Bitter National Magnet Laboratory continues to engage in frontier work in biomagnetism. Researchers at the Laboratory, led by Dr. Cohen, principal investigator, presently are completing a study, sponsored by the National Institutes of Health, to compare the localizing ability of the magnetoencephalogram with the electroencephalogram.

This is being done in collaboration with physicians at Beth Israel Hospital. This is the first study of its kind, where the signal sources are electrodes of precisely known location already implanted in the brains of epileptic patients to locate the abnormal electrical discharge areas. The purpose is to test the claim that the MEG localizes the discharge sites much more accurately than does the EEG.

Memorial set for Ruth Ippen

An outdoor memorial service will be held at 10:30am Saturday, Sept. 9, for Ruth Ippen, 76, Belmont conservationist and community leader, who died of cancer Saturday, Aug. 26, at the MIT Infirmary.

The service will be at the Ruth Ippen Tree Walk, Claypit Pond, Concord Avenue and Underwood Street, Belmont. If it rains, the service will be in Payson Park Church,

Mrs. Ippen was the widow of the late Institute Professor Arthur T. Ippen of the Department of Civil Engineering, who died in 1974, and the mother of Professor Erich P. Ippen of the Department of Electrical Engineering and Computer Science.

Mrs. Ippen was an indefatigable champion of public green spaces and community landscaping. She was a founder of Belmont's Environmental Advisory Committee, the founder and first chair of the Shade Tree Committee, president of the Garden Club and chair of its Civic Planting Committee. She was instrumental in the drive to have Belmont named an official "Tree City, USA" in 1987 and 1988; she headed the campaign for the renovation of the MDC's Beaverbrook Reservation in Belmont, and she organized many community clean-up and tree-pruning projects over more than a quarter century. The Belmont Garden Club honored her in 1985 with the creation of a Community Planting Fund in her name, and the town of Belmont officially named the arboretum and footpath surrounding Claypit Pond the Ruth Ippen Tree Walk in April 1987.

Mrs. Ippen was born in York, Neb., received her BA from Kearney State College and began her high school teaching career in Kimball. In 1937 she moved to southern California where she continued to teach English, Latin and history. She earned her MS at the University of Southern California, took graduate studies in counseling and was a high school guidance counselor in Arcadia, Calif.

She moved to Belmont when she married Professor Ippen in 1955. She traveled extensively with him, visiting and later hosting hundreds of his professional associates, students and their families-an international network she maintained and nurtured until just before her death.

In addition to being an avid gardener, Mrs. Ippen had been a member of the McLean Hospital auxiliary since 1961, serving as president from 1977-79, and a member of the Institutional Review Board since 1975. At MIT, she was president of what is now the Women's League from 1967-69, and she volunteered in many of its endeavors. She was also a member of the World Affairs Council and the Mt. Auburn Auxiliary; she served on the corporations of both the Eunice Kennedy Shriver Center and the Fernald State School, and she was an active member of Belmont's Payson Park Church.

She leaves three children: Julie Calvert Hill of Los Angeles, Karin Ippen Ihler of College Station, Texas, and Erich P. Ippen of Belmont; and five grandchildren.

A Ruth Ippen Garden will be established at MIT. Contributions may be sent to the Ruth Ippen Memorial Fund, MIT Treasurer's Office, Rm 4-113.

Sherbs memorial

A memorial service will be held at 2pm Thursday, Sept. 7, at the MIT Chapel for Virginia L. Sherbs, who died August 24. Ms. Sherbs was administrative coordinator for the MIT commission on Industrial Productivity, which concluded its work with the publication in May of the report, Made in America. She was about to begin a new position with the Center for International Studies when she was stricken with can-

Leonard Earle

Leonard Earle, 77, of Malden, a retired guard at Lincoln Laboratory, died July 7. He worked at Lincoln from 1962 until his retirement in 1976.

He leaves two sons, Leonard Jr. of New York and Paul M. Earle of Harwich, and five grandchildren. Memorial contributions may be made to the Alzheimer's Disease and Related Disorders Association or to the Joslin Diabetes Center.

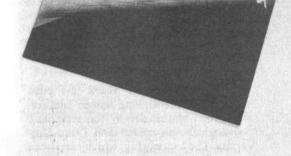
Soviets' POTOS

Images below, known as "Potos" created by collaborative artists Rimma Gerlovina and Valeriy Gerlovin, are part of the three exhibi-



Sign up for art foryourrooms

Three new exhibitions have opened at the List Visual Arts Center in the Wiesner Building, including one which enables students to sign up for art works for their rooms. The Student Loan Art Exhibition and Lottery opened yesterday and will be up until September 21.



Above, On Edge, an intaglio print, 22 x 30 inches, made in 1981 by Chilean artist Sergio Gonzales-Tornero, is part of the Student Loan Exhibition. More than 300 prints, drawings, and photographs are displayed for distribution by lottery to full time, registered MIT students for their dorm rooms, apartments, club offices and activities rooms during the 1989-90 academic year.

This collection features original signed graphics by leading contemporary artists, artist-designed posters, and photographs in an array of styles ranging from abstract geometry and expressionism to more representational works.

If you are interested, go to the List Center and sign up for your choice during Gallery Hours, weekdays 12-6, weekends 1-5. The lottery itself will take place on September 22 and the art works can be picked up later that day. For more information: 253-4400.

Arts Page Begins Again

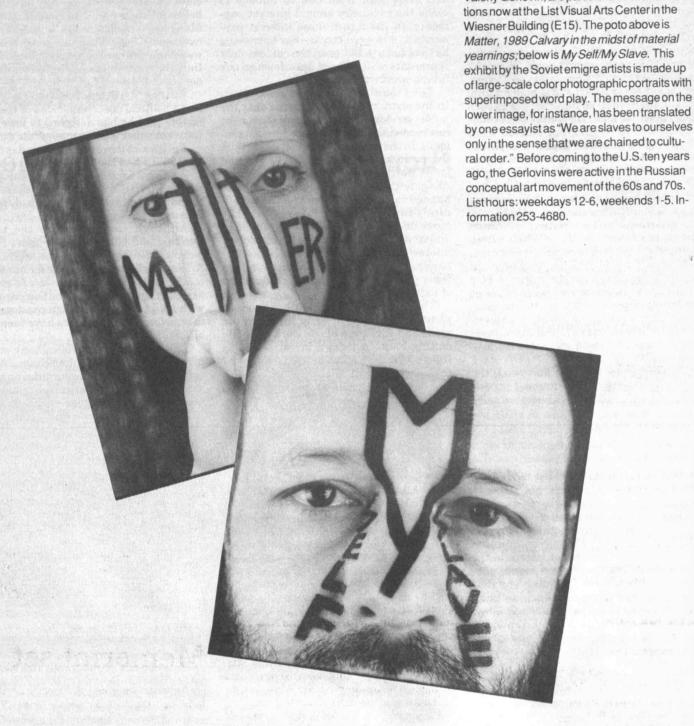
This first Arts Page of the 1989-90 academic year marks the beginning of the third year for this endeavor. The main goal is to keep a light shining on people and events in the world of MIT arts. Why? Because the arts - uniquely -need to be seen, heard, and experienced.

Events in the arts here have doubled in number in the last four years. A subsequent Tech Talk will tell about the arrival on of MIT's first associate provost for the arts, the new Office of the Arts, exhibitions at the MIT Museum's major galleries, and other arts

Students and others interested in the arts are invited to contribute to this page, which appears every week during the academic year, except in January. Write or drop-in to the new Office of the Arts in the Wiesner Building, E15-205. The telephone number is 253-4003. Visual material in the form of drawings, photographs, and two-dimensional images in any media will be considered for publication. The Arts Page closes one week in advance. on Wednesdays.

In the Summertime

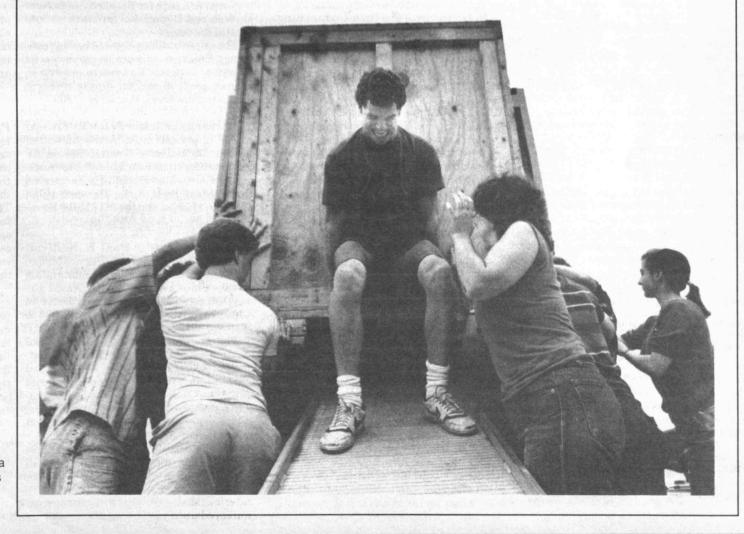
Kevin Cunningham'84 directed two short plays, by Samuel Beckett and Sam Shepard. at Boston's Lyric Stage this summer. These were presented by Ulysses Productions Ltd., a young theater company founded by members and alumni of MIT's Dramashop in the summer of 1988. —China Altman



THIS is theater

Students of the MIT Musical Theater Guild unload an 800-pound "plant" prop, the most astonishing visual feature of Little Shop of Horrors, playing its last weekend Sept. 7-9 in Kresge Little Theater. In the center of the action above is Rick Buellesbach '90, the "voice" of the human-eating plant at its Audrey II stage. Nearly 40 MIT students and four from

Wellesley College have worked together for this production, which has a six-person live orchestra. Prices are \$8 general, \$7 MIT Faculty and Staff, \$6 Students and Senior, \$5 MIT Students with ID. Information 253-6294. Photo by Barry Hetherington



Americans are embroiled in a Faustian bargain

By LESTER THUROW

Dean of the Sloan School of Management

Suppose the devil offered Americans a Faustian bargain. The devil would raise our current standard of living if we would agree to let him substantially lower our future standard of living. If such a deal were offered explicitly most Americans would, I believe, turn it down. We don't want to lower our future standard of living, or that of our children and grandchildren.

But the devil is too clever to offer us such an explicit bargain. He simply put tempting options for raising our current standard of living in front of us and let us choose what to do without explicitly telling us what would happen in the future. And in four important cases we opted to raise our current standard of living at the expense of lowering our future standard of living.

In the past 6 1/2 years America's trade deficit has taken the United States from being the world's largest creditor nation, with more than \$150 billion of net foreign assets, to being the world's largest debtor nation, with international debts of about \$600 billion in mid-1989. But this process, importing more than we export, lets Americans consume an extra \$750 billion in goods and services they could not otherwise have consumed.

At the moment we are borrowing the money necessary to pay interest on our international indebtedness, but eventually we will have to make the interest ourselves. If interest payments were to start today, Americans would have to give up \$60 billion in current consumption each and every year from now to infinity to make the necessary annual interest payments. In the future those interest payments will be even larger—our borrowing has yet to stop, but even the current debt represents a significant drawdown on our future standard of living.

The federal deficit has the same effect. In the short run a deficit means that the public services handed out by government can exceed the taxes collected by government. In the long run, however, interest on the national debt becomes a larger and larger fraction of government expenditures. At some point in the future the services handed out by government must be significantly smaller than the taxes collected by government. That's because each year more and more of our taxes have to be used to pay interest to the bond holders who won the national debt. If we pay more taxes and get fewer public services, our future standard of living goes down.

The same is true if we refuse to invest in plant and equipment or to invest in the skills and education of our work force. By cutting back on today's investment, one frees up funds that can be used for current consumption. But with less investment and fewer skills, future production and hence future incomes will be lower than

therwise.

Today we have a world-class standard of living. But these four activities guarantee that tomorrow we won't have a world-class standard of living. But how do we break out of our implicit Faustian bargain? Many political observers argue that we need some kind of an economic crisis to wake Americans up and make them realize that they are digging themselves into a deeper and deeper future hole.

But the devil has been too clever for these political observers. None of the four factors that he has designed to lower our future incomes is going to generate a crisis.

For Mexico there came a crisis day (Aug. 13, 1982) when the world's financial markets refused to continue lending. But there will be no crisis day when it refuses to lend to the United States. Our fate is different because we are rich.

Although economists use the terms "lending and borrowing", we don't really borrow from the rest of the world. We Americans sell assets to pay for our extra consumption. And even if we are selling assets at the rate of \$200 billion per year, we have a lot of years of high consumption to go before all of our assets have been sold

There are about \$20,000 billion worth of private assets in the United States. As we sell assets, however, the earnings on those assets cease to be American earnings and become foreign earnings—each year re-

ducing the total income available to be spent by Americans.

Similarly the federal deficit is not going to lead to a crisis. More money can always be borrowed. The price is simply giving a larger fraction of our national income to the bond holders—a high proportion of which are now foreign.

If we invest too little in plant and equipment and human skills, our per capita GNP simply grows at a slower pace—1 percent rather than 3 percent. Not a crisis, but something that lowers our future standard of living below where it otherwise would be.

If these four factors reduce our standard of living by a percentage point or two per year and they are allowed to continue for a decade or two, they can reduce America's standard of living from one of the best in the industrial world to one of the worst in the industrial world. But there will be no point in that period of time when anyone can stand up and scream economic crisis.

How then are we Americans going to back out of our Faustian bargains? A good question to which there is at the moment no good answer.

(This opinion piece originally appeared in the Business Section of the Boston Globe on August 22 and is reprinted here by permission of Dean Thurow.)

-Here & There-

MIT alumnus **Arthur Hu** is an engineer who likes to express his views in writing.

He is familiar to readers of The Tech as a contributing columnist starting back in his student days in 1977 and continuing to the present. As a writer of letters to the editor, he's also had his comments published in newspapers, including The Boston Globe, and magazines such as Business Week and Fortune. Since last May, he's written a regular column for Asian Week, a San Francisco-based newspaper that focuses on Asian American issues and race relations.

But in terms of reaching a wide audience, Mr. Hu hit the jackpot this summer with a letter to the syndicated columnist Ann Landers. In it, he puts forth some of his most strongly held beliefs, countering what he sees as a prevailing pessimism in some circles that "the world is going to hell in a handbasket."

He describes himself as a "neo-conservative," defining that as someone "who cares about social issues and things of the 60s," but who cares about results as well as intentions

Mr. Hu received two degrees in 1981, the SB in computer science and engineering and the SM in electrical engineering and computer science. He is head engineer for Mosaic Software Inc., of Cambridge, lives in Stoneham and is marrying Jenny Tang on September 23.

This is his letter to Ann Landers, and her comment:

"I am an MIT graduate who would like to say a few things to that 23-year-old who was depressed about her generation.

"When I was growing up, we could blow up only half the world with one blast, but we were still able to remember a war that killed tens of millions...

"Back then, kids used to call me a Jap. Segregation was legal, and most women never dreamed of being more than housewives. We didn't have two-car families and three-car garages, space shuttles, car telephones, air-conditioned malls, quartz watches, personal computers, VCRs, microwave ovens or color TV.

"Vietnam, Watergate and the energy crisis changed the thinking of a lot of people. Some folks stopped believing that maybe one day we might be able to eradicate war, sexism, racism or poverty.

"With all its shortcomings America is still the envy of every nation in the world. How often do you read about US citizens leaving to find a better life in Japan or the Soviet Union? The good news is that war is finally going out of style. The bad news is that we are having trade problems with the formerly poverty-stricken countries that we helped get back on their feet.

"You may never read about it in the papers, but a great many young people feel positively about the future. They are get-

ting married and raising their children with optimism and hope, just like the good old days. Things are looking up, Ann."

Her response: "Dear Arthur: Your letter is a refreshing switch from the gloom-and-doom-type comments that we've had so much of lately. Thank you for an upbeat overview."

Dr. Nelson Y.S. Kiang, Eaton-Peabody Professor of Communication Sciences in the Department of Brain and Cognitive Sciences and director of the Eaton-Peabody Laboratory at the Massachusetts Eye and Ear Infirmary, was honored on the occasion of his 60th birthday with a symposium celebrating 30 years of research at the laboratory.

Researchers from across the world presented nearly 40 scientific papers during the three-day symposium at MIT's Endicott House.

Professor Kiang is one of the world's leading experts on the neurophysiology of hearing.

Dr. Arnold L. Demain, professor of industrial microbiology in the Department of Biology, was given the award of the Italian Association of Pharmaceutical Industry in Varese, Italy, at the European Conference on Industrial Biotechnology.

In his lecture, "The Beta-Lactam Ring: Sixty and Still Going Strong," Professor Demain discussed the biosynthesis of penicillins, cephalosporins, carbapenems, clavams and monobactams and their regulation.

In an epilogue to the book, The Star-flight Handbook: A Pioneer's Guide to Interstellar Travel, co-author **Eugene Mallove**, science writer in the MIT News Office, writes:

"In 1988, we have just witnessed the spectacular flight of... Daedalus—a [70 pound] human-powered aircraft designed and built by engineers and students at MIT. . . It took only 3,500 years for the myth of Daedalus to be realized in plastic film, aluminum and fibrous filament, not so long in the cosmic run of things. So it is not too hard to imagine, with the much greater acceleration of technology in modern times, that before many more centuries—perhaps only decades—another real Daedalus' will set out, this time for the stars, seeking freedom from imprisonment in an island Solar System. . ."

Duane S. Boning, a graduate student in the Department of Electrical Engineering and Computer Science, has been granted a fellowship by the Intel Foundation. The Intel Corporation is the nation's largest producer of semiconductors. The 12-month fellowship is intended for a PhD candidate studying semiconductor device fabrication and manufacturing, semicon-

ductor device processing and/or semiconductor device physics.

Mr. Boning earned two SB degrees at MIT in 1984, in electrical engineering and in computer science, and the SM in 1986. He was awarded a General Motors Fellowship as an undergraduate and worked at the GM Research Labs, where he met his wife, Margaret Anne Morris, a 1985 MIT graduate.

Dr. David C. Page, assistant professor of biology, has become the sixth MIT researcher to be named a Searle Scholar.

He is one of 17 outstanding individuals doing research in the biological sciences selected as 1989 Searle Scholars. Each receives a three-year grant of \$180,000 from the Searle Scholars Program of the Chicago Community Trust to help support his or her research. Dr. Page was cited for his work in "The Sex-determining Signal and its Homologs in Man and Mouse."

The total awarded to MIT researchers through the program now stands at \$1,057,500.

Dr. Ann M. Graybiel, professor of neuroanatomy in the Department of Brain and Cognitive Sciences, is one of 34 scientific investigators awarded grants from the National Alliance for Research on Schizophrenia and Depression for research into mental illnesses.

The organization's Established Investigators Program encourages experienced scientists to devise innovative projects in diverse areas of mental illness research and to pursue them on a large scale.

Economics professor **Peter Temin** was one of 12 persons cited by the Bureau of Jewish Education of Greater Boston for contributing significantly to the advancement of Jewish education. He has served as president both of the Harvard Hillel Children's School and the MIT Hillel Foundation.

Navy Commander Paul E. Sullivan has received the Meritorious Service Medal, awarded by the President, for outstanding service while assigned to the Naval Reserve Officers Training Corps and the Naval Administrative Unit at MIT from 1986 to 1989.

The citation said that, as associate professor of naval architecture in the Department of Ocean Engineering, he "displayed extraordinary intellectual depth and great initiative." It added: "He was both an inspiring lecturer and an excellent role model and... a very positive influence on the next generation of ship designers."

He has completed his assignment at MIT and has gone to a Navy facility in Groton, Conn.

Professor Gary T. Marx has been awarded the prestigious Jensen Lecture-ship given biannually by the American Sociological Association and Duke University. The lectureship, which carries an honorarium of \$8,000, is intended to encourage and make more visible sociological investigations that enrich the common good.

Professor Marx will give a series of lectures on the topic, "Windows into the Soul: Surveillance and Society in an Age of High Technology." These will provide the basis for a book to be published jointly by the lectureship sponsors.

Dr. Marx is professor of sociology in the Department of Urban Studies and Planning. He recently published *Undercover:* Police Surveillance in America.

CLIPS AND QUOTES:

—In an Associated Press article on the growing importance of methane as an energy source, chemical engineering professor Raymond F. Baddour downplayed fears that increased use of natural gas would deplete supplies and increase reliance on foreign energy suppliers: "We have such huge methane reserves we don't know how much we have. I think this fuel has a very bright future for you, your children and grandchildren."

—Economics professor James M. Poterba told The Washington Post he agreed with a new study predicting that a decline in the pool of young buyers would contribute significantly to a softening of the housing market in the 1990s and into the next century: "I think they're right. The coming of age of the baby boom was a fairly unusual episode in that it corresponded to a rapid demand for housing over a relatively short time period. We won't see anything like that at any time in the foreseeable future."

—In an AP report on a meeting of geophysicists in Washington, D.C., civil engineering professor **Rafael L. Bras** described how Next Generation Weather Radar (NEXRAD) can lessen the danger of flash floods: "It's more than a pipe dream; the reality... is here. I believe our way of predicting floods in the future will change because our sources of data are changing."

—Charlie Ball