

## MIT's Horvitz shares Nobel Prize in physiology

■ By Deborah Halber  
News Office

Although he is “delighted and incredibly honored” to share the 2002 Nobel Prize in physiology with two friends and colleagues, MIT Professor H. Robert Horvitz said Wednesday he would find nothing more gratifying than to have his work lead one day to a treatment for a disease such as cancer or any of the neurodegenerative disorders thought to be tied

to a malfunction of programmed cell death.

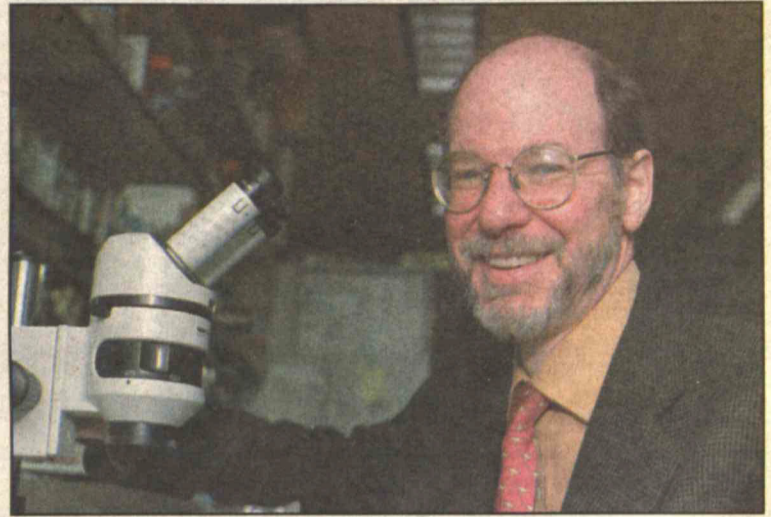
Horvitz is a busy man. He is the David H. Koch Professor of Cancer Biology at MIT, an investigator for the Howard Hughes Medical Institute and for the McGovern Institute for Brain Research at MIT, and a member of the MIT Center for Cancer Research. He also holds appointments at the Massachusetts General Hospital in neurology and in medicine.

Horvitz received the prize for dis-

covering and characterizing the genes controlling cell death in the nematode *Caenorhabditis elegans*, a roundworm about a millimeter long that lives in the soil. He later showed that these genes interact with each other in cell death, a normal process in every living cell, and that these genes correspond to existing genes in humans.

On vacation in the French Alps, he spoke at an MIT news conference on Monday by phone.

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Professor H. Robert Horvitz, MIT's newest Nobel laureate, in his lab.

Photo by Donna Coveney

## Two landmark buildings join an evolving campus

Two major landmarks in MIT's evolving campus—the Zesiger Sports and Fitness Center and the Simmons Hall dormitory—were dedicated Friday in back-to-back ceremonies at the fitness center's pool

and on Briggs Field opposite the new dorm.

The buildings usher in a new era in Institute life. The dorm marks the first time that freshmen can be universally accommodated in campus housing, and the fitness center

is a state-of-the-art facility that brings the entire MIT community together for recreation, fitness and athletic activities.

“The Zesiger Center and Simmons Hall demonstrate the crucial and enduring bond

between MIT's alumni community and its students,” said Alex d'Arbeloff, chair of the MIT Corporation. “They also confirm the centrality of our undergraduate students in the life of the Institute.”

### Simmons Hall shines from Vassar

■ By Sarah H. Wright  
News Office

The road to the Simmons Hall dedication on Friday was a golf cart route from the Johnson Athletic Center that wound through the athletic fields, affording a broadside view of the building from a distance. The multicolored aluminum sheathing glittered over the 10-story

concrete block perforated with some 5,500 two-foot square windows.

Donors and their family members, students and staff tramped into a six-peaked white tent for the dedication, set up directly opposite the new undergraduate residence. Its opening on Aug. 20 marked the first time all freshmen could be housed on the MIT campus.

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### Z Center makes splash

■ By Deborah Halber  
News Office

The Zesiger Sports and Fitness Center was dedicated Friday in a ceremony beside the larger of the new center's two pools. Both the pool and the sports center are named for donors Albert L. Zesiger, a 1951 MIT graduate and a long-time member of the Athletics Visiting Committee, and his wife, Barrie M. Zesiger, a member of the MIT Corporation.

Thanking those who played a role

in the project, Vest said, “Magnificent is not too great a word for what you have achieved here.”

Alex d'Arbeloff (S.B. 1949) and his wife, Brit (S.M. 1961), contributed the men's and women's locker rooms at the Zesiger Center. He spoke at Friday's dedication as chair of the MIT Corporation and as a friend of the Zesigers, whose gift made the fitness center possible.

“Let others lend their names to the more glamorous parts of the”

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Simmons family members in the front row at the new dorm's dedication include (left to right) Richard Simmons, Erin Sebastian (on his lap), Porter Simmons, Reilly Simmons and Richard's son Brian. The building's architect, Steven Holl, is in the second row between Porter and Reilly.

Photo by Donna Coveney



Taking the plunge into the new pool are Barrie and Al Zesiger, who took an early-morning swim on Friday. They drew thanks from some of the swimmers and staff who recognized them.

Photo by Donna Coveney

### MIT raises campaign goal

At last Friday's meeting of the MIT Corporation, President Charles M. Vest announced that a generous gift of trustee A. Neil Pappalardo (S.B. 1964) has put MIT over its \$1.5 billion campaign goal. This achievement comes two years earlier than the date originally set for the conclusion of the campaign.

At the meeting, campaign chair Raymond S. Stata (S.B. 1957) pro-

posed that the Corporation approve an increase in the campaign goal to \$2 billion, which was met with the unanimous endorsement of the trustees.

Vest said this increase will be targeted toward the campaign's original priorities, with a special emphasis on student life and learning, graduate and undergraduate

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### Crop circles: MIT's most ambitious hack?

■ By Darren J. Clarke  
News Office

Few pranks can match the creativity and intricacy of MIT's most famous hacks. When a car appears on a roof or giant stone-engraved words change overnight, pranksters everywhere show deference.

Tomorrow night (Oct. 10), the Discovery Channel will put the spotlight on the only tradition of hacks that can compare to (and in terms of scale, even outstrip) MIT's. Crop circles—the giant, geometric indentations that appear in fields around the world and which some people believe are made by extraterrestrial visitors—are the subject of the

hour-long special “Crop Circles: Mystery in the Fields.”

At the request of the show's producers, five MIT students conceived, built and analyzed a crop circle of their own. Dominic Rizzo, Lisa Messeri and Devjit Chakravarti, all juniors in aeronautics and astronautics, were recruited to build the circle, while Zoz Brooks and Mark Feldmeier, both graduate students at the Media Lab, were charged with analyzing the final product.

Before heading to Ohio for the TV shoot, the students spoke with members of the BLT Research Team, a Cambridge-based group of crop circle investigators. While everyone agrees that at least some crop circles are human-

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# OCW site gets over 13 million hits

More than 13 million hits from approximately 120,000 unique visitors were recorded on the MIT OpenCourseWare web site in the first week after course materials appeared online last week.

The pilot site for MIT OpenCourseWare (MIT OCW) opened to the public on Sept. 30 with no formal announcement. But word spread quickly, and by Monday, Oct. 7 at 7 p.m., there had been 13,381,691 web page hits on the MIT OCW site, with an average of 1.91 million hits per day and 12 average page views per visitor. Those 13.38 million hits included almost 7 million just last weekend.

As of Oct. 4, 43 percent of visitors were from the United States and 28 percent from other countries (the remainder were of unknown origin). The top five geographical regions for visitors to the MIT OCW site were California, South Korea, Massachu-

setts, the United Kingdom and Germany.

"We received an overwhelmingly positive response through our e-mail feedback form," said Anne H. Margulies, executive director of MIT OCW. "It's also clear that people are impressed with the depth and breadth, and the caliber, of the course materials."

Through the the morning of Oct. 8, MIT OCW staff had received 1,369 e-mails from users. Some of their comments:

"You guys are gods. I have been dreaming about taking a course at MIT but never was able to afford one until now. I live in New York and I was up [on the morning of Sept. 30] just to be the first few to try the OpenCourseWare. Thank you, thank you, thank you."—New York City.

"Today is a historic day. It's the Big Bang in the knowledge universe."—Algeria.

"I'm a current MIT undergrad, and I think this is a great idea. This gives me a chance to look at course materials for classes I don't have time (and money) to register for, and it gives people a valuable resource for self-study. And a display of the depth of study available to students if they decide to enroll at MIT... Please continue to expand the offerings."—Cambridge, Mass.

"I read about your initiative in the [New York] Times online and have to say this is one of the most exciting applications of the Internet to date. I look forward to taking advantage of this opportunity to 'take a dip' in MIT's enormous reservoir of human intellect."—Africa.

On Oct. 7, MIT OCW staff sent out an e-mail invitation to view the pilot site to more than 2,600 people who have contacted MIT OCW or the MIT News Office since the plan was first announced in April 2001.

## Share your hobby with others during IAP 2003

How about sharing your hobby with the rest of MIT? Independent Activities Period offers the perfect opportunity to talk about your special interest to an audience that chooses to listen.

From Jan. 6-31, hundreds of MIT community members will bring their favorite authors, actors, recipes, activities and skills to campus to share their joy and satisfaction with the rest of the community. The eclectic course selection in past years has included medieval cooking demonstrations, investigating the properties of Silly Putty, building loudspeakers, and

a how-to guide for becoming a disc jockey.

"Teaching an IAP activity is a great way to meet community members you might not normally have contact with in your day-to-day MIT life," said Associate Dean Julie Norman, head of the Academic Resource Center, which organizes IAP. "It's an opportunity to help them discover something new by sharing your hobby or expertise. So spread your contagious enthusiasm and introduce others to your area of interest."

Any MIT affiliate can create an activity, either independently or together

with his or her department, club or living group. Interested people should post their activities directly on the IAP web site at <http://web.mit.edu/iap>. An MIT personal certificate is required.

Activities posted by Friday, Nov. 1 will make it into the printed version of the IAP 2003 guide, which will be distributed the first week of December.

Preregistration for credit subjects begins Dec. 2; students should preregister using WebSIS.

For more information about listing an IAP activity, contact the Academic Resource Center at 253-1668 or [iap-www@mit.edu](mailto:iap-www@mit.edu).

## MIT Federal Credit Union seeks directors

The MIT Federal Credit Union's nominating committee is seeking credit union members who are interested in serving on the board of directors. Three incumbent three-year terms on the board will be open for election in the spring. Anyone interested may contact Gina D'Allesandro at 452-3708 or [ginad@mit.edu](mailto:ginad@mit.edu).

## IAP traveling fellowship available

The Kelly-Douglas Fund has added an IAP traveling fellowship to its roster of grants. The application deadline is Wednesday, Nov. 6.

Any junior or first-term senior with IAP travel plans related to a project within any field of the humanities, arts or social sciences is invited to apply for a fellowship. Applications should consist of two letters. The first is a description of the travel itinerary, the reasons for and goals of the expedition, and an estimate of cost for transportation, lodging and food. The second is an evaluation of the description by an MIT instructor who is familiar with the

applicant's work.

The Kelly-Douglas Fund is in its 29th year of providing grants of up to \$400 each for humanistic scholarship and teaching. Three years ago, it established a summer traveling fellowship for juniors. Ten fellowships of up to \$1,500 apiece have been given so far.

Application letters for IAP traveling fellowships should be sent to Pamela Hamada in music and theater arts (Room 4-246, [phamada@mit.edu](mailto:phamada@mit.edu)). Questions should be addressed to Professor Lowell Lindgren ([lindgren@mit.edu](mailto:lindgren@mit.edu)), director of the Kelly-Douglas Fund.

## Tim time



Tim, MIT's beaver mascot, toasts the new clock donated by the Class of 2000 and installed above one of the entrances to the Stratton Student Center. The clock, which was the result of the class' senior gift campaign that started three years ago, began ticking at a dedication ceremony at 6 p.m. on Sept. 27. Class of 2000 alumni Anna K. Benefiel and Bhuvana K. Husain formally presented the gift, which was accepted on behalf of MIT by Peter Cummings, assistant director of business and financial services for the Campus Activities Complex. Photo by Heather Kispert

## Luce Scholars are sought

The Center for International Studies has set a Nov. 18 deadline for applications to the Luce Scholars Program.

The program, which is open to seniors, graduate students, alumni from recent classes and junior faculty, places young scholars from a wide variety of intellectual fields in 10-month internships throughout Asia. Past assignments have included settings as diverse as an architect's office, a newspaper, a forestry project, a family planning center, a hospital and local government agencies. The program is aimed specifically at those with no prior experience in Asia.

Nominees must be American citizens not yet 30 by Sept. 1, 2003, who have earned at least a bachelor's degree or expect to receive one by that date, and who are in good physical condition and emotional health. MIT faculty members are urged to nominate former students with records of outstanding achievements.

Application forms may be picked up in Room E38-651. For additional information, contact Carolyn Makinson, CIS executive director, at 253-9861 or Marsha Bolton at 258-8552.

The Luce Foundation, which funds

the program, was established in 1936 by the late Henry Luce, co-founder and editor-in-chief of Time, Inc., who was himself born in China. He created the foundation as a tribute to his missionary parents.

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## Student Notices

\* Open to public  
\*\* Open to MIT community only

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

October 9 - 27

### ANNOUNCEMENTS

**CIS Fellowships Information Meeting\*\*—Oct 16.** CIS executive director Carolyn Makinson will present information on fellowship opportunities for the coming year. Sponsored by Center for International Studies. More info: 258-8552 or [marsha5@mit.edu](mailto:marsha5@mit.edu).

**Career Services and Preprofessional Advising Recruitment Presentations\*\*—Oct 9:** Air Liquide, 6:30pm, Rm 66-144. Colgate-Palmolive, 5:30pm, Rm 5-217. Susquehanna International Group LLP, 7pm, Rm 4-153. Visteon Corp, 6pm, Rm 4-159. Wolf Greenfield, 5:30pm, Rm 4-149. **Oct 10:** Lockheed Martin, 7pm, Rm 4-163. Siebel Systems Inc, 5:30pm, Rm 5-217. Vanguard Group, 5:30pm, Rm 4-149. **Oct 15:** Exxon/Mobil, 7pm, Rm 4-237. **Oct 16:** Charles River Associates, 6pm, Rm 2-105. **Oct 17:** American Express, 6pm, Rm 5-217. IBM Strategy and Change, 6pm, Rm 4-145. **Oct 21:** Avery Dennison, 7pm, Rm 3-442. Electric Boat Corp, 7pm, Rm 5-217. Medtronic, 7pm, Rm 8-302. Praxair Inc, 7pm,

Rm 2-135. 3M Co, 5:30pm, Rm 4-149. **Oct 22:** Health Advances Inc, 6pm, Rm 4-149. IBM, 7pm, Rm 4-159. Jet Propulsion Lab, 5:30pm, Rm 4-145. Lehman Brothers, 6pm, Rm 2-105. Sabre Inc, 6pm, Rm 4-153.

### RELIGIOUS ACTIVITIES

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

**Baptist Campus Ministry\*\*—Monthly events:** First Sunday, 6pm, food followed by Christian discussion, Westgate Lounge, Bldg W85 bsmnt. Weekly: Mondays, 1:30pm, sm group Bible study, Westgate Lounge. Thursdays, 1-3pm, free intl student English classes, Bldg W11 board rm. Thursdays, 7pm, BSF Bible study/worship, contact [bgoza@mit.edu](mailto:bgoza@mit.edu). Chaplain: Michael Dean (W11-029), Campus Minister: Bryan Goza. More info: 253-2328 or [mdean@mit.edu](mailto:mdean@mit.edu).

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

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

**Communitas-Life Together\*\*—Protestant worship, Sundays, 11am.** Sponsored by Amer Baptist Church, United Church of Christ, United

Methodist Church, Presbyterian Church. Chaplain John Wuestneck, 252-1780 or [chaplain@mit.edu](mailto:chaplain@mit.edu).

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

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

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

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

**MIT Hillel\*\*—Daily Orthodox services,** Sun-Fri, 7:30am and 7:45am and each afternoon. Kosher dinners, Mon-Thurs, 6-7:30pm. Sundays, 11am, volunteer group at local soup kitchen. Mondays, 6pm, Jewish philosophy class. Tuesdays, 5pm, Jewish holidays class. Tuesdays, 6:45 pm, Tanya Class. Wednesdays, 5pm, advanced Talmud class. Thursdays, noon, weekly Torah class. Fridays, 6pm, Shab-

bat evening services (Conservative, Orthodox and Reform). Fridays, 7pm, Shabbat dinner. Saturdays, 9am, Shabbat services (Orthodox). Saturdays, 12:30pm, Shabbat lunch. More info: 253-2982 or [web.mit.edu/hillel](http://web.mit.edu/hillel).

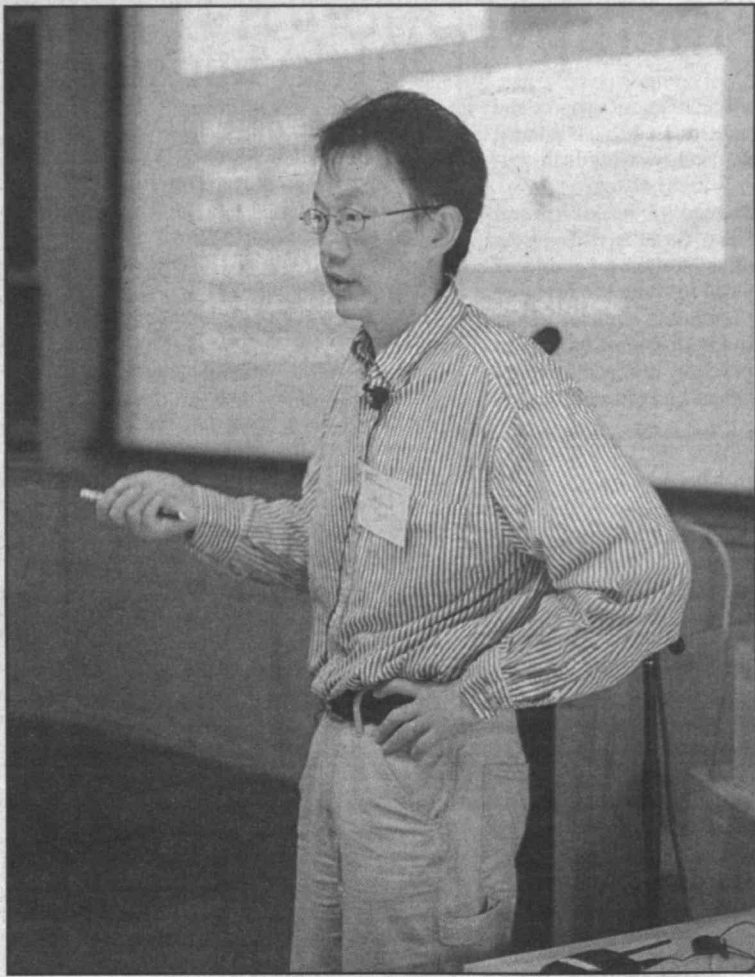
**MIT Muslim Students Association\*—Five** daily prayers, Bldg W11. Also, Friday congregation 1:10-1:45pm, Rm W11-110. Daily Iftars during Ramadan. More info: [msa-ec@mit.edu](mailto:msa-ec@mit.edu).

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

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

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

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



Morgan Sheng, Menicon Professor of Neuroscience, makes his presentation for "Brainwork: Knowing What We See and Changing What We Know." Photo by Laura Wulf

## Basic research is key to future brain treatments

■ By Lori Valigra  
Special to MIT Tech Talk

Basic science will be the route to finding the cause and treatments for ailments of the brain such as Alzheimer's disease and attention deficit disorder, say experts from MIT's new brain and cognitive science research laboratories.

At one of 15 seminars held on Oct. 5 for donors and alumni, scientists from the McGovern Institute for Brain Research and the Picower Center for Learning and Memory discussed the latest discoveries about the brain's "plasticity"—the organ's ability to adapt to change, and to learn and memorize.

"The brain is plastic and changeable. The more we understand it, the more we can intervene and push it in a directed way," said Elly Nedivi, a Picower Center researcher and the Fred and Carole Middleton Assistant Professor of Neurobiology in the Department of Brain and Cognitive Sciences and the Department of Biology.

Nedivi was joined by Professor Morgan H. Sheng, a researcher at the Picower Center and the RIKEN-MIT Neuroscience Research Center, as well as by James J. DiCarlo, assistant professor of neuroscience and an investigator at the McGovern Institute for Brain Research. Dean of Science Robert J. Silbey chaired the session.

Nedivi and her colleagues are applying a new type of imaging to the brain: two-photon laser scanning microscopy, which lets her see and assess the properties of individual cells within tissues, giving a much deeper look into tissues than previously possible. The technique is used for patient imaging but had not been applied to the brain before, she said. This interdisciplinary approach is giving researchers better tools to look at changes in the brain. Eventually they hope to use computers to track movements of spines—tiny structural elements of brain cells that try to make connections with other brain cells to improve the brain's function.

"Two-photon microscopy is coming into general use in neuroscience and biology. So advances in physics and other areas are being brought to bear on areas not previously thought of," said Silbey.

The number of spines in the brain decrease with age. The same is true of other critical elements of the brain

such as proteins known as AMPA receptors, which move around constantly and receive signals from brain cells. The more AMPA receptors, the stronger the connections in the brain. The brain has about 100 billion brain cells, and each can connect to between 1,000 and 10,000 partners.

"We hope in the future that we'll be able to alter the rate of change [of the AMPA receptors]," said Sheng, who is the Menicon Professor of Neuroscience in Brain and Cognitive Science in the Department of Brain and Cognitive Sciences and Department of Biology. "The microstructure and molecular organization of the brain is highly dynamic, constantly reorganizing itself, and it's 'molded' by environment and experience."

Sheng doesn't like comparisons between the brain and a computer, because "the brain does not go out of date in two to three years," he said. Instead, he likened the brain to a social organization that constantly is trying to make new synapses, or areas where a nerve impulse travels from one brain cell to another. The brain automatically knows which new connections to make, and eliminates the ones that are not effective.

In a more specific look at the brain, DiCarlo wants to understand how the brain recognizes objects, how they move, and how the response of the brain to the recognition and movement ultimately contributes to perception and behavior.

DiCarlo envisions some near-term results from his research. For example, within five years, there may be ways to develop enhanced human-like machine vision, and in 10 years there may even be artificial implants for human vision assistance and augmentation, he said.

"In 20 years, we may have molecular-based restoration of perceptual function," he said.

The researchers noted that MIT's collaborative neuroscience labs already are receiving world recognition. A new 376,000-square-foot building housing the McGovern Institute, the Picower Center, the Athinoula A. Martinos Center for Functional and Structural Biomedical Imaging, and the Department of Brain and Cognitive Sciences is to be completed by 2005.

"No place has the holistic theme that is as comprehensive as what we're trying to do," said President Charles M. Vest, who attended the session.

## Vest's report urges security, openness

How can the United States remain secure against terrorism while maintaining the openness needed for the advancements in science and technology that sustain our economy and well-being?

It will require a careful balance, President Charles M. Vest said Wednesday in his annual report, titled "Response and Responsibility: Balancing Security and Openness in Research and Education." The complete text is available on the web at <http://web.mit.edu/president/communications>.

"The future health, economic strength and quality of life in America, and indeed the world, depend on the continued rapid advance of science and technology and on the education of scientists and engineers at the most advanced levels," he wrote.

"The rapid progress of science and technology and the advanced education of scientists and engineers, in turn, depend critically on openness of process, openness of publication and openness of participation within our institutions and across national boundaries."

Now, in the wake of Sept. 11, said Vest, "we must not unintentionally disable the quality and rapid evolution of American science and technology, or of advanced education, by closing their various boundaries."

He noted that "MIT and our sister institutions take very seriously our responsibility to serve our nation by applying our talents and capabilities to the protection of human life and infrastructure in our homeland and throughout the world."

The balance between security and openness, he said, depends on effective dialogue and close collaboration between the government and the leaders of the scientific, engineering and higher education communities.

"During the past 12 months, such a dialogue has begun and in general has proceeded well," Vest wrote. "Nonetheless, the underlying sense of partnership is fragile and is vulnerable to political winds that can shift in a moment."

Vest observed that "the nebulous, diffuse nature of terrorism makes a simple prescription for the responsibilities of academic institutions impossible."

### INTERNATIONAL STUDENTS

Vest noted that a matter of current debate and legislation is the degree to which universities should remain open to international students and scholars.

He noted that America relies greatly on scientists and engineers

who have come here from other countries. In American industry, for example, one-third of the science and engineering Ph.D.s were born elsewhere, and most came to this country as graduate students.

"The openness of U.S. research universities to foreign students and scholars," he said, "has been overwhelmingly successful in building the excellence of our institutions, enhancing the educational experience of our students, contributing to American industry and academia, advancing nations around the world, and discharging good will toward and understanding of our system and values."

With regard to the division of labor between universities and the government on this question, Vest said that after international students have been admitted to study at a U.S. university, U.S. consular officers around the world must have the responsibility for judging the appropriateness of issuing a visa to each such student.

Once students arrive in this country, he said, they should be allowed full access to the courses and publications generally available on the campus.

On the question of tracking international students, he said that universities are in broad agreement that they should maintain and provide to the government fundamental "directory information" including whether each individual is enrolled and what area of study he or she is pursuing.

### SCIENTIFIC MATERIALS

Regarding scientific materials, Vest wrote that universities have the responsibility not to be a source of materials that could be used by those who would do harm. "Access to pathogens and dangerous chemicals must be carefully restricted and monitored in the normal course of doing science."

"It is the further responsibility of universities to educate all of their research and laboratory students about security issues regarding their materials and equipment. This should be integrated with education and training regarding the health, safety, and environmental responsibilities of laboratory practice. Things as basic as not working alone in chemical and biological laboratories must be reinforced," he said.

### SCIENTIFIC INFORMATION

Vest said the publication of scientific information poses a critical challenge, because "openness is so essential to America's basic principles, to

the excellence of our universities, and to the conduct of science."

### THREE SUGGESTIONS

Vest offered three suggestions for the resolution of the issues of select agents in the life sciences, sensitive areas of study and publication of scientific information.

"First, consultation by the federal government with the academic and scientific communities is essential ... As pointed out with great clarity by John J. Hamre, former U.S. Deputy Secretary of Defense, all too often security professionals do not understand or trust scientists, and scientists may be quite unaware of some of some real risks associated with their work..."

"Second, distinct boundaries must be drawn where it actually is possible and appropriate. It is the ambiguity and uncertainty of what is inappropriate to publish, or in the use by the government of ill-defined terms like 'sensitive but unclassified,' that creates danger for the scientific enterprise and invites bad decisions..."

"Third, we should not underestimate the power of voluntary agreements within the scientific community," said Vest. He cited the following precedents.

"In the war years preceding the development of the atomic bomb, Allied scientists stopped publishing research associated with uranium physics, although they continued to discuss the topic privately among themselves. And when recombinant DNA first became possible, leading scientists, led by David Baltimore, established a moratorium on their work, pending open discussion among themselves and a wide range of lay people to establish standards. Work and open publication proceeded smoothly thereafter. Neither of these examples provides a direct guidance for the less focused situation we face today, but the point is that the scientists themselves, in consultation with many others as appropriate, found an effective path forward."

Vest concluded, "traditional American values of openness in education and research must prevail. But this will be possible only if we in research universities contribute our talents to maintaining the security of our homeland, and if the federal government and academia maintain a respectful, substantive and effective dialogue between those who do science and those who are charged with protecting the nation."

## Researchers tout opportunities in nanotech

■ By Sarah Putnam  
Special to MIT Tech Talk

Nanotechnology will give researchers at MIT "lots of new opportunities and phenomena" to tackle, said Professor Edwin L. Thomas at an Oct. 5 seminar on "Nanotechnology: Building New Materials Atom by Atom, Molecule by Molecule."

Nanotechnology involves creating new matter at the level of atoms, molecules and supramolecular structures, and generating larger structures with fundamentally new physical organizations. These new materials exhibit novel physical, chemical and biological properties.

MIT was selected in March 2002 as the single academic institution to be awarded a \$50 million dollar grant by the U.S. Army for the establishment of an institute to work in partnership with industry to develop nanotechnology for the protection of future soldiers (see MIT Tech Talk, March 20).

Thomas, the Morris Cohen Professor of Materials Science and Engineering and director of the new Institute for Soldier Nanotechnologies (ISN), was one of three who outlined research opportunities in nanotechnology and detailed the background, structure and visions of the work to be done at the ISN. The other presenters were Timothy M. Swager, professor of chemistry and associate director of ISN; and Ian Hunter, professor of mechanical engineering and head of the Bio-Instrumentation Lab.

As Thomas explained, "nano" is not a specific link scale you can quote, like meters or inches. Its scale depends on the properties involved, so mechanical properties may become nano at a different scale than optical properties. The challenge is how to create new materials by mixing components on link scales that are very, very fine, he said.

"What appeals to me as a scientist is that when you go to nanoscale, new stuff happens. You get lots of new opportunities and phenomena, and you can put things together in new links. You can make hybrids at a very small

link scale. You can get new things, better things, and that's why it's so exciting," said Thomas.

"MIT is the kind of place that if you bring in a really hard problem, lots of people get interested," Thomas continued as he explained that ISN draws on the interests and work of many partners.

"The beauty of MIT is we don't have boundaries in our collaborations," Hunter agreed.

Thirty-five faculty members from eight departments will work with partners from industry (Dupont and Raytheon) and the medical world (Massachusetts General Hospital and Brigham and Women's Hospital). Additional industrial partners will be recruited in the future. Seven research teams are forming in three primary areas: protection, performance enhancement, and intervention and cure. A new building in Tech Square scheduled to open in May will house all equipment and new facilities for ISN.

The ISN is starting with a number of projects growing out of existing work. Swager discussed how electronic polymers can be used to create ultrasensitive sensors for detecting land mines, explosives, nerve gas and nitric oxide, as well as amplifying DNA binding.

Hunter described work to automate the process of material discovery and the need for advances in instrumentation to speed up this discovery. Attempts to produce an artificial muscle or a "super exomuscle" to benefit a wounded soldier will spin off multiple uses beyond the military, he said.

In 1960, physicist Richard P. Feynmann began talking about the theoretical possibilities of manipulating and controlling things on a very small scale. On Saturday, Hunter reminded the audience, "It is worth remembering that the blue whale, the largest living entity, is constructed from nanoscopic entities. Nature scales up from nanoscopic scale." The challenge ahead for the ISN is how to spiral the nanotechnology level up to the microtechnology level, then to the macrotechnology level and finally up to the functional level, he said.

# Stratton Lecture looks at cloning, gene therapy

Four scientists in the rapidly expanding fields of stem cell research, cloning and gene therapy will explore the promise and myths surrounding these new technologies at the ninth annual Catherine N. Stratton Lecture on Critical Issues.

The panel discussion takes place on Tuesday, Oct. 22 at 4 p.m. in the Tang Center (Building E51). It is free and open to the public.

Researchers hope that advances in these areas may one day be used to replace damaged cells and tissues and provide novel therapies for diseases such as Alzheimer's, Parkinson's and diabetes. But the scientific hurdles are tremendous, and the ethical dilemmas that these technologies raise for society are equally challenging.

The moderator for "Stem Cells, Cloning and Gene Therapy: The Biology Behind It" will be Nancy Hopkins, the Amgen Professor of Biology at MIT's Center for Cancer Research. Her lab isolates genes required for the normal development of zebrafish embryo. This study of vertebrate development could lead to new drugs and therapies for humans because of the similar-

ity of gene sequences among these organisms.

Panelists are Helen M. Blau, the Donald E. and Delia B. Baxter Professor at Stanford University School of Medicine; and Rudolf Jaenisch and Harvey Lodish, both founding members of the Whitehead Institute and professors of biology at MIT.

Blau studies how cells differentiate during human development and aging, and how that process goes away in diseases such as cancer. Jaenisch works at the frontier of cloning technology and creates mouse models of human disease that

are leading to new understanding of cancers and various neurological diseases. Lodish has isolated and cloned proteins that regulate cell growth, glucose transport and energy metabolism.

The lecture is sponsored by the MIT Women's League to honor Kay Stratton, wife of the late MIT President Julius Stratton, whose ideas and energy have enhanced Institute life for more than 60 years. Susan Lindquist, director of the Whitehead Institute and professor of biology at MIT, assembled the panelists in response to an invitation from the Women's League.

## 401(k) fair slated

The Benefits Office and Fidelity Investments will hold a 401(k) Investment Fair for MIT employees on Tuesday, Oct. 22 from 8 a.m. to 4 p.m. on the third floor of the Stratton Student Center.

The event will help employees not currently participating in MIT's 401(k) plan to enroll, and will provide investment information and resources to help with retirement planning. Workshops will include "Basics of Investing"; "Understanding, Selecting and Evaluating Investment Options"; and "An Overview of the MIT Retirement Plans." Additionally, there will be sessions between 7 and 8:30 a.m. for third-shift employees.

There will be two keynote speakers: Professor Andrew Lo of the Sloan School of Management, and Paul Antico, a portfolio manager from Fidelity Investments. Employees will be able to log on to their accounts in the Student Center's Cyber Café as well as speak with Fidelity representatives.

## Directory deadline is this Friday

Friday, Oct. 11 is the last day that MIT community members can make changes to the way their contact information will be listed in the white pages of the printed faculty and staff telephone directory. Changes should be made

using the employee self-service function on the web at <http://web.mit.edu/sapwebss>. Changes made via employee self-service after Oct. 11 will update the online directory but not the printed version.

## Institute Calendar

\* Open to public  
\*\* Open to MIT community only

(For arts-related listings, see page 11.)

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

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

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

Next deadline for all types of listings is noon Friday, October 18, covering events from Wednesday, October 23 through Sunday, November 3.

### October 9 - 27

#### SEMINARS & LECTURES

##### WEDNESDAY, OCTOBER 9

**Phase Coherent Stabilization of Single and Multiple Femtosecond Lasers: Development and Applications\***—David Jones, Univ of Colorado. Sponsored by Optics. 11am-noon. Grier Rm B (34-401B). More info: 253-8504 or [ippen@mit.edu](mailto:ippen@mit.edu).

**Prospects and Pitfalls: Getting Published in the Social Sciences\***—Roger Haydon. Sponsored by Ctr for Intl Studies. 4pm. Rm E38-615. More info: 253-3121 or [lauries@mit.edu](mailto:lauries@mit.edu).

**Linearity in Combinatorics and Topology\***—Daniel Biss, Univ of Chicago. Combinatorics Seminar. 4:15-5:15pm. Rm 2-338. More info: 253-4390 or <http://www-math.mit.edu/~combin/oct02.html>.

**Medical Devices: The Long Road to Commercialization\***—David Cassak, In Vivo and Startup. Sponsored by MIT Enterprise Forum of Cambridge. 6-8:30pm. Rm 10-250. More info: 253-8240 or [http://www.mitforumcambridge.org/cases/c\\_oct02.html](http://www.mitforumcambridge.org/cases/c_oct02.html).

**Advisor/Advisee Mixer\*—6:30-9pm.** Sponsored by OCSPA. Mezzanine Lounge, Student Ctr. More info: 258-9154 or <http://web.mit.edu/career/www/pmevents.html>.

##### THURSDAY, OCTOBER 10

**What Should an Educated Person Know About Computers?\***—Brian Kernighan, Princeton Univ. LCS Dertouzos Lecturer Series. 3:30-5pm. Rm 34-101. More info: 253-0145 or <http://www.lcs.mit.edu/news/lectures.html>.

**A Dynamical Approach to Understanding the NAO: Moving Beyond Statistics\***—Judah Cohen, AER. Atmospheric Science Seminar. 4-5pm. Rm 54-915. More info: 253-1984 or <http://www.mit.edu/~donnan/MASSEminars>.

**The Digital 3-D Universe in the National Virtual Observatory\***—Neil deGrasse Tyson, Hayden Planetarium. Pappalardo Lecture. 4:15-5:15pm. Rm 10-250. More info: 253-4801 or [physaa@mit.edu](mailto:physaa@mit.edu).

**Industry Leaders in Technology and Management Lecture\***—Louis Gerstner, IBM.

Sponsored by Office of Corporate Relations/ILP, Ctr for Technology, Policy and Industrial Development. 5-6:30pm. Wong Aud, Tang Ctr. More info: 258-9419 or [ilp.mit.edu/ilp](mailto:ilp.mit.edu/ilp).

**Erewhons of the Eye: The Figure of the Writer/Photographer in Nineteenth-Century Europe\***—Elinor Shaffer. Sponsored by History Office, Program in Writing and Humanistic Studies. 5-6:30pm. Rm 14E-304. More info: 253-4965 or [history-info@mit.edu](mailto:history-info@mit.edu).

**authors@mit: Between Human and Machine\***—David Mindell. Sponsored by The MIT Press Bookstore. 5:30pm. Rm 34-101. More info: 253-5249 or <http://web.mit.edu/bookstore/www/events>.

**It's Your Planet: How You Can Make A Difference\***—Amy Meadows and Shefali Oza. Sponsored by MIT Western Hemisphere Project. 7pm. Rm 3-133. More info: [hemi-sphere-admin@mit.edu](mailto:hemi-sphere-admin@mit.edu) or <http://web.mit.edu/hemisphere/events/your-planet.shtml>.

##### FRIDAY, OCTOBER 11

**Friendships Between Gay and Straight Men and the Politics of Masculinity\***—Dwight Fee. Sponsored by Women's Studies Program. 2-4pm. Rm E51-095. More info: <http://web.mit.edu/womens-studies/www>.

**Patents\***—Robert Langer, MIT. Sponsored by Dept of Chemical Engineering. 3-4pm. Rm 66-110. More info: 253-6500 or <http://web.mit.edu/cheme/cheme-stage/news/schedule.html>.

**Resistive Wall Modes and Error Field Amplification\***—Allen Boozer, Columbia Univ. PSFC Seminar. 4-5pm. Rm NW17-218. More info: 253-8101 or [rivenberg@psfc.mit.edu](mailto:rivenberg@psfc.mit.edu).

**The Combinatorics of the Universe\***—Christian Hasse, Duke Univ. Combinatorics Seminar. 4:15-5:15pm. Rm 2-338. More info: 253-4390 or <http://www-math.mit.edu/~combin/oct02.html>.

##### WEDNESDAY, OCTOBER 16

**Optics and Quantum Electronics Seminar\***—Richard Chang, Yale Univ. Sponsored by Optics. 11am-noon. Grier Rm B (34-401B). More info: 253-8504 or [ippen@mit.edu](mailto:ippen@mit.edu).

**Dental Care: The Future Is Now!\***—Jay Afrow. Sponsored by MIT Medical. Noon-1pm. Rm E25-401. More info: 253-5770 or <http://web.mit.edu/medical/yourhealth>.

**The Dawning of the Age of Stochastic Simulations\***—George Karniadakis, Brown Univ. Sponsored by Singapore-MIT Alliance/HPCES. 4-5pm. Rm 4-237. More info: 253-1981 or <http://web.mit.edu/smia/events/seminars/summaries/karniadakis.html>.

**The Higher Stasheff-Tamari Posets and the Higher Bruhat Orders\***—Hugh Thomas, Univ of Toronto. Combinatorics Seminar. 4:15-5:15pm. Rm 2-338. More info: 253-4390 or <http://www-math.mit.edu/~combin/oct02.html>.

**Standards and the Consequences in Built Form: From Local to Global\***—Schlomo Angel, NYU; Ralph Gakenheimer, MIT; Jennifer Davis, MIT. Sponsored by Dept of Urban Studies and Planning. 5-6:30pm. Rm 10-485. More info: 253-2024 or <http://dusp.mit.edu/standards/index.html>.

##### THURSDAY, OCTOBER 17

**RNA in Gene Silencing and Expression\***—Phillip Sharp, MIT. Sponsored by The Cambridge-MIT Institute. 11:45am-12:50pm. Rm

8-404. More info: 253-7732 or <http://www.cambridge-mit.org>.

**Clouds in Climate Models: Progress and Prospects\***—Wojciech Grabowski, NCAR. Atmospheric Science Seminar. 4-5pm. Rm 54-915. More info: 253-1984 or <http://www.mit.edu/~donnan/MASSEminars>.

**Is Life Analog or Digital?\***—Freeman Dyson, Institute for Advanced Study. Physics Colloquium. 4:15-5:15pm. Rm 10-250. More info: 253-4801 or [http://web.mit.edu/physics/fyi/physics\\_colloquia\\_sched.htm](http://web.mit.edu/physics/fyi/physics_colloquia_sched.htm).

**African Women Writers and Engagement Today\***—Ken Bugul. Sponsored by Women's Studies Program. 4:30pm. Rm 4-163. More info: <http://web.mit.edu/womens-studies/www>.

**What's the Matter with Bilbao? New Museums in Historical Perspective\***—Andrew McClellan, Tufts Univ. Sponsored by History, Theory and Criticism of Architecture and Art. 6-8pm. Rm 3-133. More info: 258-8438 or [http://architecture.mit.edu/disc\\_grp/htc-of-acts/forum.html](http://architecture.mit.edu/disc_grp/htc-of-acts/forum.html).

##### FRIDAY, OCTOBER 18

**From Embryology to Evo-Devo\*—9:30am-5:30pm.** Sponsored by Dibner Institute. Rm E56-100. More info: 253-8721 or [carlac@mit.edu](mailto:carlac@mit.edu).

**For Graduate Students: Creating an Effective CV\***—Steve Strange and Hannah Bernstein. Sponsored by OCSPA, Writing and Communication Ctr. 1:30-3:30pm. More info: 253-4733 or <http://web.mit.edu/career/www/gradworkshops.html>.

**Control of Sheet and Film Processes\***—Richard Braatz, Univ of Illinois, Urbana. Sponsored by Dept of Chemical Engineering. 3-4pm. Rm 66-110. More info: 253-4562 or <http://web.mit.edu/cheme/cheme-stage/news/schedule.html>.

**The Politics and Work of Motherhood\***—Lotte Bailyn and Mona Harrington. Sponsored by Women's Studies Program. 3-5pm. Rm E51-345. More info: 253-0108 or <http://web.mit.edu/tac/www>.

**Resistive Wall Modes and Error Field Amplification\***—Enrique Henestroza, Lawrence Berkeley Ntl Lab. Sponsored by Plasma Science and Fusion Ctr. 4-5pm. Rm NW17-218. More info: 253-8101 or [rivenberg@psfc.mit.edu](mailto:rivenberg@psfc.mit.edu).

**How Many Strings Graphs Are There?\***—Geza Toth, Renyi Institute of Mathematics, Hungary. Combinatorics Seminar. 4:15-5:15pm. Rm 2-338. More info: 253-4390 or <http://www-math.mit.edu/~combin/oct02.html>.

##### MONDAY, OCTOBER 21

**Resettlement of the Sudanese 'Lost Boys' from Kakuma Refugee Camp in 17 States of the USA\***—Martin Masumbuko and Nyakato Kiganzi, Tufts Univ. Sponsored by Ctr for Intl Studies. Noon-1pm. Rm E38-615. More info: [hsgregg@mit.edu](mailto:hsgregg@mit.edu).

**Templated Self Assembly: The Role of Nanolithography in the Nanotechnology Revolution\***—Henry Smith, MIT. CMSE Colloquium. 4-5pm. Rm 13-2137. More info: 253-6850 or <http://web.mit.edu/cmse>.

**Mean Curvature Flow of Surfaces in 4-Manifolds\***—Jiayu Li, Academia Sinica, Beijing. Differential Geometry Seminar. 4:5-5:30pm. Rm 4-145. More info: 253-4384 or [http://www-math.mit.edu/~jefv/DG\\_Current.html](http://www-math.mit.edu/~jefv/DG_Current.html).

**Falling Light: A History of Light, Space and Human Perception\***—Arthur Zajonc, Amherst College. Sponsored by Building Technology Program. 5-6:30pm. Rm 7-431. More info: 253-4087 or [jao@mit.edu](mailto:jao@mit.edu).

##### TUESDAY, OCTOBER 22

**Anthrax, Smallpox and the Invention of the 'Large Area Concept' in the History of Biological Weapons\***—Jeanne Guillemin. Sponsored by Dibner Institute. Noon-2pm. Rm E56-100. More info: 253-6989 or <http://www.dibinst.mit.edu>.

**Stem Cells, Cloning and Gene Therapy: The Biology Behind It\*—4-6pm.** Sponsored by MIT Women's League. Wong Aud, Tang Ctr. More info: 253-3656 or [http://web.mit.edu/womensleague/cns\\_lectures\\_critical\\_02.html](http://web.mit.edu/womensleague/cns_lectures_critical_02.html).

**Weighted Monte Carlo: Large Sample Properties and Applications\***—Paul Glasserman, Columbia Business School. Sponsored by Operations Research Ctr. 4:15-5:15pm. Rm E40-298. More info: 253-7412 or <http://web.mit.edu/orc/www>.

**Self-Recirculating Casing Treatment Concept for Enhanced Compressor Performance\***—Michael Hathaway, NASA. Sponsored by Gas Turbine Lab, AeroAstro. 4:15-5:30pm. Rm 31-161. More info: 253-2481 or [dragonl@mit.edu](mailto:dragonl@mit.edu).

**Palestinian Labor Migration to Israel: Is It Over?\***—Leila Farsakh, MIT. Sponsored by Ctr for Intl Studies. 4:30pm. Rm E51-095. More info: 253-8961 or [mcollett@mit.edu](mailto:mcollett@mit.edu).

**Behavioral Interviewing with Intel\***—Bernadette Flood, Intel. Sponsored by OCSPA. 4:30-6pm. Rm 4-231. More info: 253-4733 or <http://web.mit.edu/career/www>.

**authors@mit: Smart Mobs\***—Howard Rheingold. Sponsored by Communications Forum, The MIT Press Bookstore. 5pm. Rm 26-100. More info: 253-5249 or <http://web.mit.edu/bookstore/www/events>.

**Tilting at Mills: Green Dreams, Dirty Dealings and the Corporate Squeeze\***—Allen Hershkowitz, NRDC and Lis Harris, Columbia Univ. Sponsored by STS, The Technology and Culture Forum at MIT, Lab for Energy and the Environment. 5-7pm. Rm TBA. More info: 253-0108 or <http://web.mit.edu/tac/www>.

**City Renewal in East Germany after Reunification\***—Hinrich Lehmann-Grube. Sponsored by Dept of Architecture. 6:30pm. Rm 10-250. More info: 253-7791.

##### WEDNESDAY, OCTOBER 23

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

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

**\$50k/Deshpande Center IP Panel Discussion\*—7-9pm.** Sponsored by Deshpande Ctr for Technological Innovation. Rm 4-270. More info: 253-0943 or [deshpandecenter@mit.edu](mailto:deshpandecenter@mit.edu).

##### THURSDAY, OCTOBER 24

**Nonlinearity and Multifractality of Climate Change in the Past 420,000 Years\***—Yosef Ashkenazy, MIT. Atmospheric Sci-

ence Seminar. 4-5pm. Rm 54-915. More info: 253-1984 or <http://www.mit.edu/~donnan/MASSEminars>.

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

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

**Journalism, Media and Human Rights\*—5-7pm.** Sponsored by Program on Human Rights and Justice. Rm TBA. More info: 253-7692 or <http://web.mit.edu/phrj>.

##### FRIDAY, OCTOBER 25

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

**The Physics of Collisionless Magnetic Reconnection\***—Barrett Rogers, Dartmouth College. Sponsored by Plasma Science and Fusion Center. 4-5pm. Rm NW17-218. More info: 253-8101 or [rivenberg@psfc.mit.edu](mailto:rivenberg@psfc.mit.edu).

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

##### SATURDAY, OCTOBER 26

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

#### COMMUNITY CALENDAR

**spouses&partners@mit weekly meetings\***—Oct 9: Craft group. Oct 16: Fall foliage tour. Meet in front of MIT Coop in Kendall Square at 2:15pm. Oct 18: Halloween potluck party, bring a dish to share. 6-8pm. Lobdell Dining Rm (Student Ctr, 2nd flr). Oct 23: Volunteer opportunities. Wednesdays, 3-5pm, W20-400, unless otherwise noted. More info: 253-1614 or <http://web.mit.edu/medical/spousesandpartners>.

**For the Children: A Rummage Sale—Oct 15.** Lightly used clothing for children (infant-12) will be sold to benefit Adoptive Families at MIT and an adoption-related charity. Donations will be collected from 10/7-10/12 at: MIT Medical Pediatrics (E23 ground flr), the Cashier's Office (10-180) and the Ctr for Work, Family and Personal Life (16-151). Sponsored by Center for Work, Family and Personal Life. 11am-2pm. Lobby 10. More info: 617-452-3499 or [gunst@mit.edu](mailto:gunst@mit.edu).

**Reception for Members of MIT Community Associated with Oxford and Cambridge Universities\*\*—Oct 17.** All members of the MIT community with ties to Oxford or Cambridge are welcome to attend the fall reception of the Oxford and Cambridge Society of New England. Complimentary wine, beer, light refreshments. 6:00-8:30pm. Adams House (Harvard), Plympton Street. More info: 508-213-2241 or [tippercs@nichols.edu](mailto:tippercs@nichols.edu).

# MIT's robotic helicopter autonomously performs new stunt

■ **By Lauren Clark**  
Laboratory for Information and Decision Systems

A team of MIT researchers looked on recently as the pilot of their model X-Cell 60 helicopter flipped a switch on a remote control box. In response to this simple command, the chopper executed a complex maneuver never before performed autonomously by a helicopter.

It rolled 180 degrees, flew upside-down for an instant, then completed a half-loop to end up flying upright in the opposite direction. This maneuver, called a split-S, allows an aircraft to reverse direction quickly in a horizontally confined space. It is one of a variety of aggressive, agile maneuvers that the next generation of unmanned aerial vehicles (UAVs) will be expected to perform in military combat.

"It's the most complex maneuver ever completed automatically by any helicopter," said Eric Feron, a professor of aeronautics and astronautics and a researcher in the Laboratory for Information and Decision Systems who leads a team of researchers in aerial robotics.

With the U.S. military's campaign in Afghanistan in response to the Sept. 11 attacks and the related emphasis on homeland security, interest in UAVs for national defense has increased.

Vlad Gavrilets, the aero/astro graduate student primarily involved in the project, and colleagues spent the six months prior to the Sept. 12 flight programming the split-S maneuver into

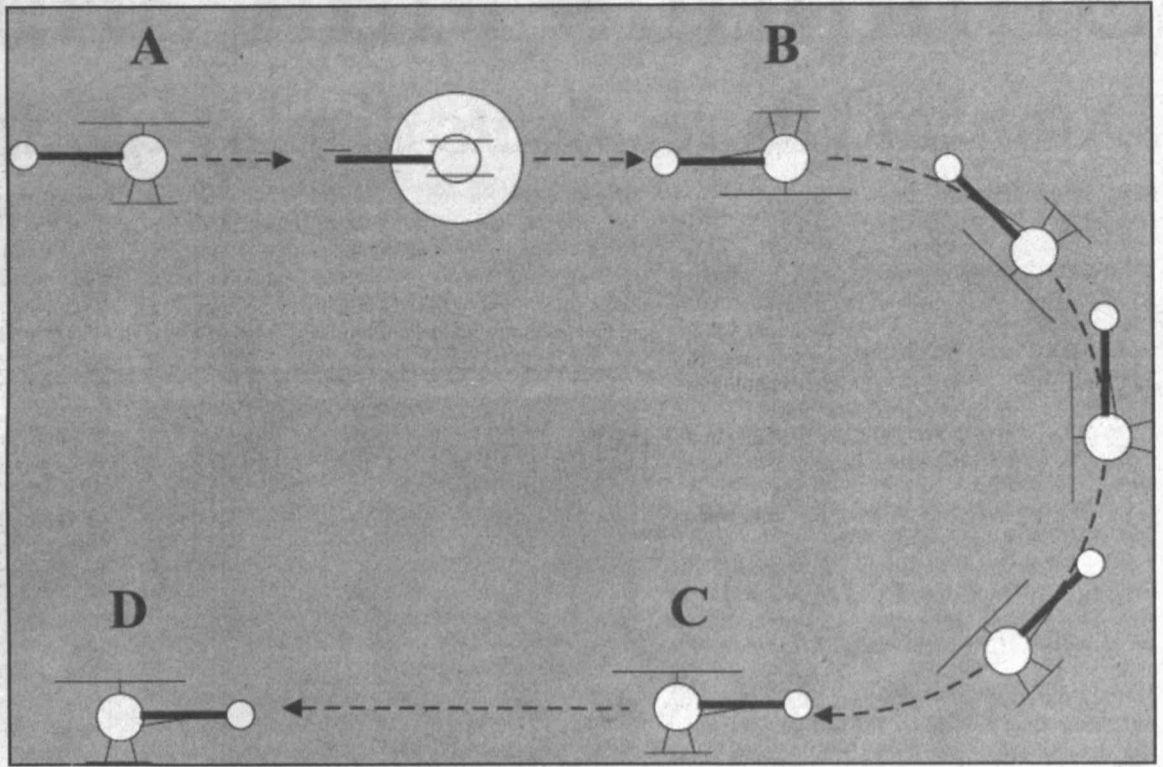
the helicopter's onboard computer and testing their results on a simulator. Late last year, they successfully demonstrated what they believe to be the first-ever autonomous maneuver by a helicopter: an aileron roll (a corkscrew-like maneuver). The event was reported in the Feb. 13 issue of Tech Talk.

Previously, such stunts required the skill of an elite pilot. The technology developed by the MIT team makes it possible for anyone to operate its aerobatic craft.

Small, agile, autonomous helicopters like MIT's X-Cell 60 could provide a new tool for military reconnaissance or weapons delivery in mountainous, urban and other challenging terrain that's off-limits to larger aircraft and too dangerous for manned aircraft. Their small size, operational ease and potentially low cost—in comparison with the current generation of UAVs, such as the Predator—make them especially appealing, and not just to the military. The entertainment industry could use miniature robotic rotorcraft as a new means of capturing aerial imagery.

Besides Gavrilets, other students who have played key roles in the project are postdoctoral associate Bernard Mettler, aero/astro graduate students Ioannis Martinos and Rodin Lyasoff, and alumni Kara Sprague and Alex Shterenberg, both of whom received the M.Eng. in electrical engineering and computer science in 2000. The robochopper's pilot is Raja Bortcosh.

The work is funded by DARPA, NASA and the Office of Naval Research.



This diagram depicts a helicopter completing a split-S. The helicopter starts in straight level flight (A), completes a half-roll (A-B) followed immediately by a half-loop (B-C), and resumes straight and level flight in the reverse direction (C-D).  
Diagram by Bernard Mettler

# Breast cancer treatment first discovered at Lincoln Lab approved for final clinical tests

■ **By Elizabeth A. Thomson**  
News Office

A breast cancer treatment based on MIT Lincoln Lab radar research has advanced to randomized clinical trials, the final phase of clinical testing.

Approximately 220 women with early-stage breast cancer will participate in the new study, which began Oct. 1, the first day of Breast Cancer Awareness Month.

In the study, microwave radiation focused externally on the breast will be delivered prior to lumpectomy and radiation therapy. The goal is to kill tumor cells and reduce additional surgery.

Early results from a phase II clinical trial were promising. A majority of the patients treated with the microwave heat therapy showed significant

tumor kill prior to lumpectomy, according to Dr. Robert A. Gardner, a breast surgeon at Columbia Hospital's Center for Breast Care in West Palm Beach, Fla. (see MIT Tech Talk, May 8).

Gardner and Dr. Hernan I. Vargas of Harbor-UCLA Medical Center presented the results at the 2002 American Society of Breast Surgeons Meeting in April and in the May 2002 issue of the *Annals of Surgical Oncology*. The data for 20 patients treated in that trial were submitted to the U.S. Food and Drug Administration, which resulted in FDA approval to proceed to the randomized final phase of clinical testing.

The women in the randomized clinical trials will be treated at Columbia Hospital, at the University of Oklahoma, Harbor-UCLA Medical Center, Martin Luther University in

Halle, Germany, and the Comprehensive Breast Center in Coral Springs, Fla. Additional sites have applied for Institutional Review Board approval. The final phase of randomized clinical testing is expected to be completed by February 2004.

The technology itself was invented by Dr. Alan J. Fenn, a senior staff member at MIT Lincoln Lab. Fenn realized that the same focused microwave technology he'd used for missile detection could, in theory, be used to treat cancer cells.

Celsion Corp. exclusively licenses the focused microwave thermotherapy technology from MIT. The company has developed the clinical thermotherapy system and is funding the current clinical studies. The Department of the Air Force funded the original MIT Lincoln Lab research by Fenn.

## Construction update

### SIMMONS HALL

Temporary ceiling tiles in the main lobby have been replaced; other tiles will be replaced floor by floor. Noise from continuing construction is being mitigated so residents will be disturbed as little as possible. Work toward the final certificate of occupancy continues.

### BUILDING 7 ENTRANCE

Construction of an ADA-accessible entrance to Building 7 has begun (see MIT Tech Talk, Oct. 2). Shrubs and trees on the north side of the 77 Massachusetts Ave. steps will be removed to make room for the entrance, while plants on the south side will also be removed to provide a balanced look once the project is complete.

### VASSAR STREET UTILITIES

Excavation for a steam line from Building 45 across the railroad tracks to Advanced Energy (a company on Main Street that produces and sells steam to large building owners in Cambridge) has begun. MIT will buy or sell steam to the company at various times as dictated by the local market. Work will

take place during the night shift from 9 p.m. to 5 a.m. to minimize traffic impact.

Farther down Vassar Street, the steam piping and backfill at the Johnson Athletics Center is nearing completion. Vassar Street will remain one way between Main Street and Massachusetts Avenue until January.

### STATA CENTER

Temporary building enclosures are being installed in preparation for inclement weather. Below-grade supports for the exterior stairs leading to the raised garden are being installed. Exterior brickwork and work on interior masonry, HVAC, plumbing and fire protection continue, as does installation of exposed pipes on Levels P2 through 4.

### HAYDEN LIBRARY

The new circulation area is now open. There is still work being done on the 24-hour study space, which will open later this fall. The after-hours book drop will be installed later this month. Signs and lighting for the main entrance are almost finished.

## President Vest issues statement on Boston's UNICCO custodian strike

About 70 supporters of the striking UNICCO custodians in Boston gathered on the steps of 77 Massachusetts Ave. last Thursday to voice their concerns and attempt to enlist MIT in their cause.

Kenneth Campbell, director of the News Office, read the following statement from President Charles M. Vest: "We are supportive of workers' needs for health benefits and fair wages. All custodians working on the MIT campus have health care benefits and all MIT employees are paid fairly.

"We have faith that the collective bargaining process will yield a reasonable and fair result. We hope that

this matter can be resolved quickly and that the workers will be treated fairly."

Campbell added, "Contrary to a statement by a community activist group, MIT does not employ UNICCO workers on the MIT campus. Regarding University Park, MIT has leased the land to Forest City for 75 years and Forest City has the operating responsibility for University Park. UNICCO custodians do much of the cleaning at University Park.

The demonstrators marched inside to Lobby 7 to conclude their rally, chanting slogans for about 15 minutes. They dispersed at about 6 p.m.

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[web.mit.edu/news](http://web.mit.edu/news)

The screenshot shows the MIT News website interface. At the top, it says "Netscape: MIT: News". Below that is the "MIT News" logo. A navigation bar includes links for "tech talk", "news releases", "research digest", "subscribe to e-news", "calendar", "special reports", "from the president", and "search". The main content area features several news items: "CAMPUS NEWS" with sub-headers like "MIT women engineers to hold conference", "Nominations sought for year-end awards", and "MIT responds, denies liability in Shin case"; "Age discrepancy throws pulsar theories into turmoil"; "Cosmic Tango"; and "'Auditory chimeras' may help hearing impaired". A sidebar on the right shows "Tuesday, March 12, 2002" and "Updated as news breaks".

# Simmons Hall and Zesiger Center

## Dorm and its residents display quirky character

■ By Denise Brehm  
News Office

Freshmen Dheera Venkatraman of Flemington, N.J., and Akhil Shashidhar of Pickerington, Ohio, met in August when they arrived on campus to discover they'd been slotted to share a room in Simmons Hall. Five weeks into their first semester at college, the two act as a synergistic pair.

In a fast-paced conversational volley, they describe the décor of their double and their feelings about Simmons' architecture.

"I love it," says Venkatraman. "Where else do you get a pentagonal-shaped room?"

"It's not really a pentagonal shape, is it?" interrupts Shashidhar, and a discussion breaks out over what to call this rectangular room with an amorphous rock-like curve reaching from ceiling to floor.

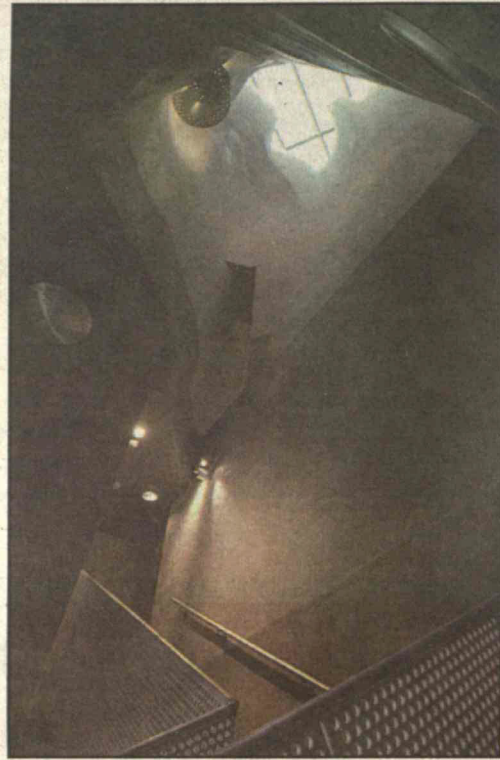
The "splodge," as Shashidhar calls it, takes up part of the front and side walls and grows smaller near the top, so it takes up less ceiling space than floor. The room has only three corners. In the common room next door, the "negative splodge" creates a recessed curve. The splodge looks like white, dusty rock.

"Welcome," a loud, deep voice suddenly booms from the computer on Venkatraman's desk, apparently responding to an unseen visitor outside the door. A laser installed by the two freshmen reacts to anyone entering the recessed entryway leading to three dorm rooms—theirs and two neighbors. The feature stays on all night, they said. "By the time you go to bed at 4 o'clock, you don't hear anything," says Shashidhar.

"It's definitely different from the usual four-sided room," concludes Venkatraman. "There are things you can do with a curved wall that you can't

do with a straight one." But neither could really put their fingers on just what those things might be. Rock-climbing was mentioned as a possibility, but quickly dismissed as impractical in a dorm room. Besides, the wall is plaster, not rock.

All the furniture in the room is modular. Shashidhar has moved his lower bunk, placing it across the



Looking up through a "study cave" in Simmons.

room from the top half. The area under the top bunk is now common space. Two desks sit head to head in the middle of the floor. Two narrow closets stand side by side between the top bunk and the front door, across from the splodge. A tall bookcase filled mostly with packages of food and empty water bottles stands on the bit of wall between the door and the splodge. The room has six windows each two feet square, seemingly placed randomly in two rows running from the middle of the wall to the corner. Some rooms have as many as 38 windows, according to Venkatraman.

The building's completion date slipped a bit, so students moved in before work was finished, and the first few weeks have presented some challenges for residents. The kitchen is not yet operational, so the evening meal is brought in and placed in a common area downstairs.

"I really like the whole dorm," says Venkatraman. "There are problems with living in a new dormitory, but in general, I totally like the architecture."

"It's really great to walk into your dorm and see, 'Wow! We got an Athena cluster!' or 'Wow! We have a dinner today,'" says Shashidhar. "One day I walked into the bathroom and it suddenly had a mirror. The game room? One day it just appeared."

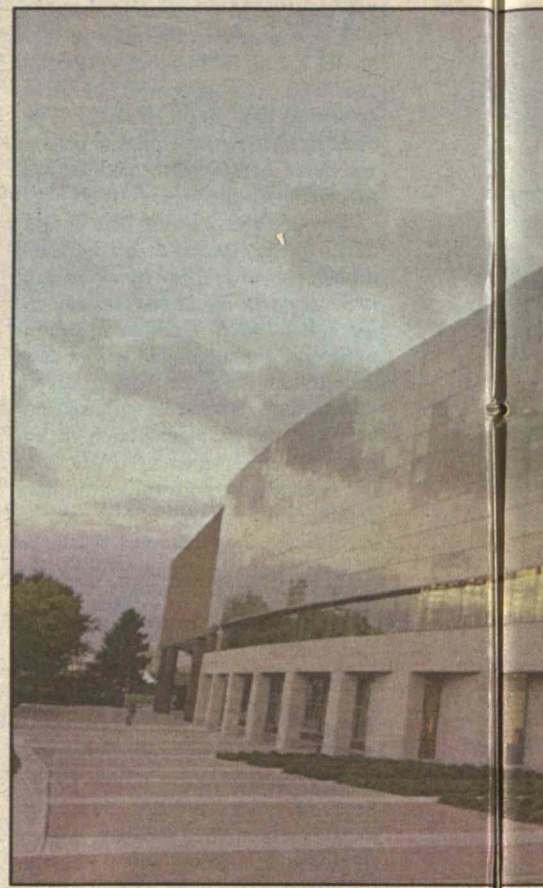
The two agree that they love the new residence hall but disagree on just what makes it beautiful.

"It's so great because it's so ugly. You can't walk past it without noticing it," says Shashidhar.

"It's like something from Mars just landed in the middle of MIT. That's what it's like," says Venkatraman. "Beautiful and interesting."

"It's just cool," says Shashidhar.

"It's just cool," agrees Venkatraman. "It's something apart from the traditional architecture at MIT."



The Zesiger Sports and Fitness Center comes to life.

Photos by Donna Coveney

## Innovative Simmons Hall dedicated to goal of community

(continued from page 1)

Simmons Hall, designed by New York-based architect Steven Holl, has generated critical acclaim from a number of critics. That enthusiasm was mostly mirrored by the crowd, who later toured the building.

President Charles Vest, welcoming the group, described Simmons Hall as "far more than a dormitory. This new residence provides dining, meeting and performance spaces, a fitness center, music rooms and more. It is already a remarkable student community."

Vest underscored the diverse challenges and pressures inherent in designing any new building at MIT, and he emphasized that Simmons Hall symbolized not only the "courage and commitment of Dick and Dottie Simmons" but also a "harmonious whole far greater than the sum of its parts."

To illustrate his "harmonious whole" point, Vest cited pressures on the design and building processes that included mandates to create daring and innovative architecture; to truly serve the needs of its users; to be a good neighbor to its abutters, and to realize the commitment to community-building stressed in the 1998 Re-

port of the Presidential Task Force on Student Life and Learning.

"The brilliance Steven Holl brought to the design of Simmons Hall makes it unlike anything on this campus or anywhere else. It will be a marker for architectural excellence for years to come. Thank you, Steven, for this extraordinary gift," said Vest.

President Vest thanked major donor Richard P. Simmons (S.B. 1953) and his late wife and partner in philanthropy, Dorothy Simmons, for their generosity.

"Like so many of MIT's great financial donors, Dick has been generous not only with his money but with his time. His service with the Corporation and with our visiting committees has been of enormous value to the Institute, and has kept him in close touch with the needs and aspirations of his alma mater.

"As an alumnus, an accomplished and successful businessman, and a

sympathetic advisor to the Institute, he has been in a perfect position to make many contributions to the improvement of student life at MIT," said Vest.

He also acknowledged another "debt of thanks" to Bill and Betsy Leitch, who endowed the Leitch Professorship in Residence to assure that MIT could provide the necessary support for a senior faculty member to serve as a housemaster for Simmons Hall.

Vest departed from prepared text twice to express his personal enthusiasm. Describing his own early-morning runner's-eye view of Simmons Hall as one of "flashing brilliance" due to the way the windows reflected sunlight, Vest recommended everyone "get up at 6:30 a.m. to get the view." He also asked Vicki Sirianni, director of the Department of Facilities, to stand for a round of applause for her leadership in the construction

and maintenance of MIT's facilities.

The program of speakers at the Simmons dedication event featured Vikash Gilja, house president of Simmons Hall; Chancellor Phillip Clay; John Essigman, Simmons housemaster and professor of toxicology and chemistry; Richard Simmons; and his children, Amy Simmons Sebastian and Brian Simmons; and Alexander V. d'Arbeloff (S.B. 1949), chairman of the MIT Corporation.

Each person who stood at the Mondrian-style stained-glass podium expressed enthusiasm for the building, gratitude to the donor and his family, and confidence in MIT's vision of a strong and constantly renewed residential community.

Said Gilja, "Living groups are the building blocks of MIT community life, and the 240 upperclassmen and 110 freshmen in Simmons Hall express our gratitude to Richard Simmons. It's a work that's still under

construction. It's a place that's changing every day. Thank you!"

"We celebrate this new milestone in our campaign to increase community at MIT," Clay said. "With its spaces for study, student collaboration, performance and artistic work, Simmons Hall has already shown itself to be a building that is also a vessel for a continual renewal of student community."

Essigman focused on the positive effects Holl's design has had on his own role as housemaster of the new dorm.

"What a gift! This is really the right direction. As for mandatory dining, it is really working. It allows several hundred students to come together nightly over dinner. And, to Steven Holl, thank you for the great acoustical insulation," Essigman said.

Essigman also thanked the Leitches for "removing from our shoulders the need to raise money for special events" and for "offering to come by with brooms and mops when it looked like construction might slow down."

Associate housemaster Muriel Medard, professor of electrical engineering and computer science, presented Holl with a watercolor of Simmons Hall and a set of the final building plans.

Simmons' comments showed his warm regard for MIT and his love for his family. "We are proud to have our name identified with MIT and this new building," he said.

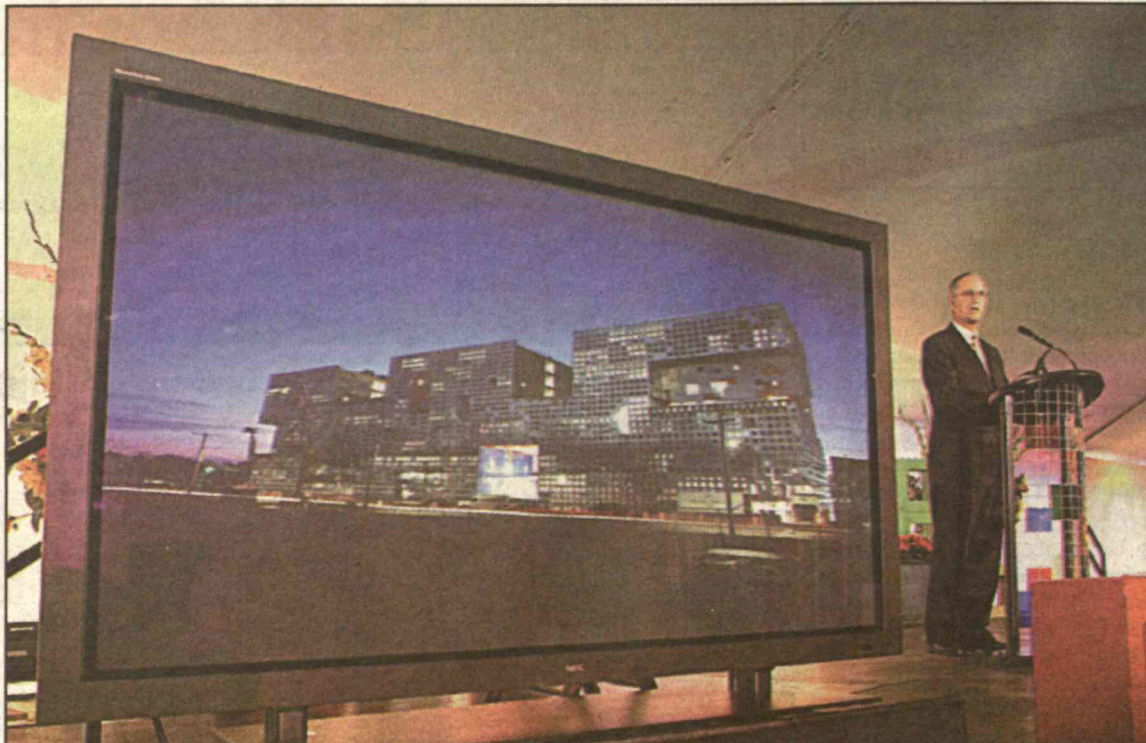
Simmons' daughter, son and grandchildren joined him at the podium. Said Amy Simmons Sebastian, "This means a lot to three generations of our family. Our father's love for MIT goes back many years, and Simmons Hall gives us a chance to thank MIT for all it has done for my father and all of us."

Sebastian also "appreciated the opportunity to honor the memory of my mother, who always encouraged us to strive for excellence," she said.

Brian Simmons, who had spent quite some time in Boston traffic and arrived a little late, said with enthusiasm, "What a thrill it is to see this building completed and to be here for the dedication."



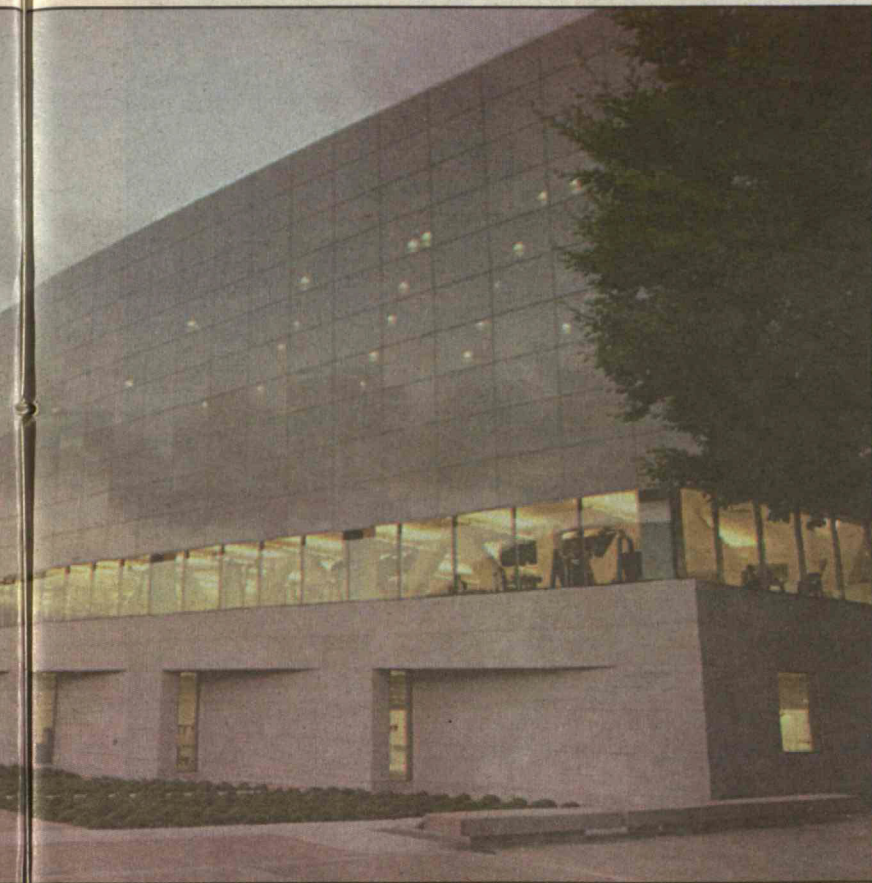
A closeup of the multicolored exterior windows at Simmons.



Simmons Hall is aglow on screen to President Charles Vest's right at the dedication of the new dorm last Friday.

# er welcomed into MIT campus

## Zesiger Center makes a big splash



ness to life beneath early-morning clouds.

(continued from page 1)

building: the pool, the fitness center, the squash courts and the refreshment center," d'Arbeloff joked. "Brit and I are happy to have our names associated with the elegant new 'his' and 'hers' locker rooms. Brit maintains that the locker rooms are every bit as glamorous as the rest of the facility."

D'Arbeloff (S.B. 1949) continued, "Athletics programs have provided both an outlet and proving ground for the natural competitiveness and drive to succeed so typical of MIT students."

R. John Hansman Jr., professor of aeronautics and astronautics and co-chair of the Presidential Task Force on Student Life and Learning, said that when the student group focused on ways of tying together the community, they talked about the intensity of the MIT experience. They talked about community space such as coffee shops, but never envisioned such a world-class facility.

"In my experience at MIT, I've never seen any facility transform the place the way this place has," he said. "You only have to come here at 5 o'clock to see the mix of students, faculty and staff."

Kirstin Alberi, captain of the women's varsity swim team and a senior in

materials science and engineering, said swimming has been part of her life since she was seven. Through swimming, she said, she learned discipline, time management, leadership and acceptance of the importance of coaching.

"The Zesiger Center is a place where MIT athletes will be proud to compete and demonstrate the high standard of excellence we strive for each day," she said. "After practicing in the pool for only two weeks, I see a desire in my teammates to push themselves even harder ... Thank you for this gift."

Alberi, on behalf of the MIT swim team, presented the Zesigers with team warmup outfits. Wearing the red and black zipper-front jackets, the Zesigers took the podium. Recalling that he had gotten a \$700 scholarship to MIT in 1947, Al Zesiger said, "If you took that \$700 and compounded it every year, you would have a swim center."

Al Zesiger said he used to follow the regimen described in a book of the Royal Canadian Air Force exercises and one day decided to run outside instead of running in place as specified in the book. "I've probably run 50,000 miles since then," he said, until his hip gave out in 1984 and he stopped running and started swimming. "Some people say they're too busy for ex-



Director of Athletics Candace Royer thanked the Zesigers, d'Arbeloffs and other donors for making the Z Center possible.

ercise. I've got to tell you, the more busy, the more stressed-out you are, the more you need the exercise."

The Zesigers tested the pool during an early morning swim prior to the dedication ceremonies.

Al Zesiger, who has climbed Mt. Kilimanjaro, reflected that while he had done most things he had set out to do, an intimate relationship had eluded him until he met Barrie. "I've been blessed with one of the most loving relationships I can imagine," he said. "It's just like compounding interest and sports training—the longer you do it, the better it gets, and it lasts forever."

Barrie said, "To the students who have asked why we do this, we do it for ourselves," she said. "It just makes us feel good."

Larry Benedict, dean for student life, said the Z Center has done more for student morale than anything else on campus in the last 10 years. He said students have been continually coming up to him and expressing amazement and appreciation for the world-class facility.

Candace L. Royer, director of athletics and head of the Department of Athletics, Physical Education and Recreation, called the building the "realization of a magnificent dream" for the department as well as for the Zesigers. During tours since the facility opened, Royer said, "The prevailing exclamation throughout the building has been a resounding 'Wow!'"

Vest remarked that the Task Force on Student Life and Learning's 1998 report noted that athletics have played a continuing role in fostering a sense of community at MIT and that an upgraded athletics plant was urgently needed. The Zesiger Center is thus "a manifestation of the abiding community spirit that informs and energizes the physical, social and intellectual life of the Institute," he said.

## Zesiger Pool design promotes swimmer speed

■ By Denise Brehm  
News Office

The Olympic-class Zesiger Pool was built to accommodate the MIT swimming, diving and water polo teams in a well-lit natatorium that soars five stories high.

"We were struck most by how freeing it feels to be in the water. The huge expanse above the pool gave us a sense of being suspended in a large space, far away from the distractions even of other swimmers," said Barrie Zesiger about the first swim she and her husband Albert took in the new pool named for them. "We have lived with a computer-rendered picture for the past several years; there is nothing that can compete with the real thing."

A second pool in the natatorium, this one for teaching and recreational lap swimming, looks small next to the Zesiger Pool. But it's actually the same size as the old Alumni Pool. All three pools are available to the MIT community now.

"We have long been appalled at the incongruence between fitness and beauty," said Zesiger. "Now at the Z Center these two important attributes have been brought together."

The Zesiger Pool's design incorporates all the characteristics of a really fast pool, and the bleacher seating on three sides of the shallow (seven-foot) end will allow 450 spectators to watch the MIT athletes take advantage of that design to set speed records and win matches.

"There will be new MIT records set here constantly during the next year because the pool is fast and we've got some really good swimmers on the teams," said Roger Crosley, director of sports information and communications.

"The new facility finally allows the water polo team to practice in a regulation facility: 20 meters by 20 meters," said Jeffrey Ma (S.B. 1994), MIT's varsity water polo coach. "We can host invitationals and championships. Other teams are actually begging to play us in the Z Center."

### LANE OF LEAST RESISTANCE

A fast pool is one that offers little resistance to a swimmer. According to Carrie Moore, aquatics director at the Zesiger Center, there are



Al and Barrie Zesiger are all smiles after their first swim in the pool that bears their name.

four primary ways to reduce resistance in a pool.

One is to make it deep. The Z Pool is seven feet deep along one of its 50-meter sides. The other side is seven feet deep at the shallow end and 14 feet at the deep end. "When you take a stroke, you push the water back and down. It hits the bottom of the pool and bounces back up at you, causing resistance and slowing the swimmer down," said Moore. Obviously, the deeper the pool, the less resistance the swimmer gets with every stroke.

The second way to reduce resistance is to eliminate side vents that shoot out water laterally, sometimes directly opposing the swimmer's motion. The Z Pool is bottom-fed by many vents sprinkled throughout the pool.

"In the older pools, the vents would be in the front and back and there would literally be slow lanes," said Moore. "You've seen those things on TV when there's a swimmer swimming against a current [and not making any progress]. Well, that's a gross exaggeration, but you get the idea."

Third is the width of the lanes. Wide lanes make a pool faster, because each swimmer's wake dissipates before it can enter the next lane and create resistance for another swim-

mer. The Z Pool has 20 eight-foot-wide lanes along its 50 meters. Each lane is 25 yards in length.

And finally, a deep gutter keeps the water from rolling back out. In the Z Pool, the gutters drop down two feet

to swallow the water, which is sent through a filtration system and back into the pool. A shallow gutter fills up quickly, and the water rolls back out, creating waves and—you guessed it—resistance.

The ceramic tiled walls of the pool help a swimmer's speed as well, said Moore. A fiberglass pool wall will flex to absorb some of the energy of a swimmer's push, but when a swimmer pushes off against a hard ceramic wall, little energy is absorbed.

The more than one million gallons of water in the Z Pool are kept at 80 degrees (plus or minus one degree); the teaching pool is kept at 83 degrees, with one degree of variance. Ambient temperature in the natatorium is about 85 degrees.

The "small" teaching pool is 48 by 25 yards, the same size as Alumni Pool. The pool lanes range from three and a half feet deep on one side to four and a half feet deep along the other. Having the pool depth change across the width rather than down the length makes it better for teaching. "You've got a whole length that's three and a half feet. I can give an instructor 25 yards of edge for beginners to hang onto," said Moore.



Squash courts with spectator seating are one of the many Z Center offerings.

# Retirees honored at annual dinner

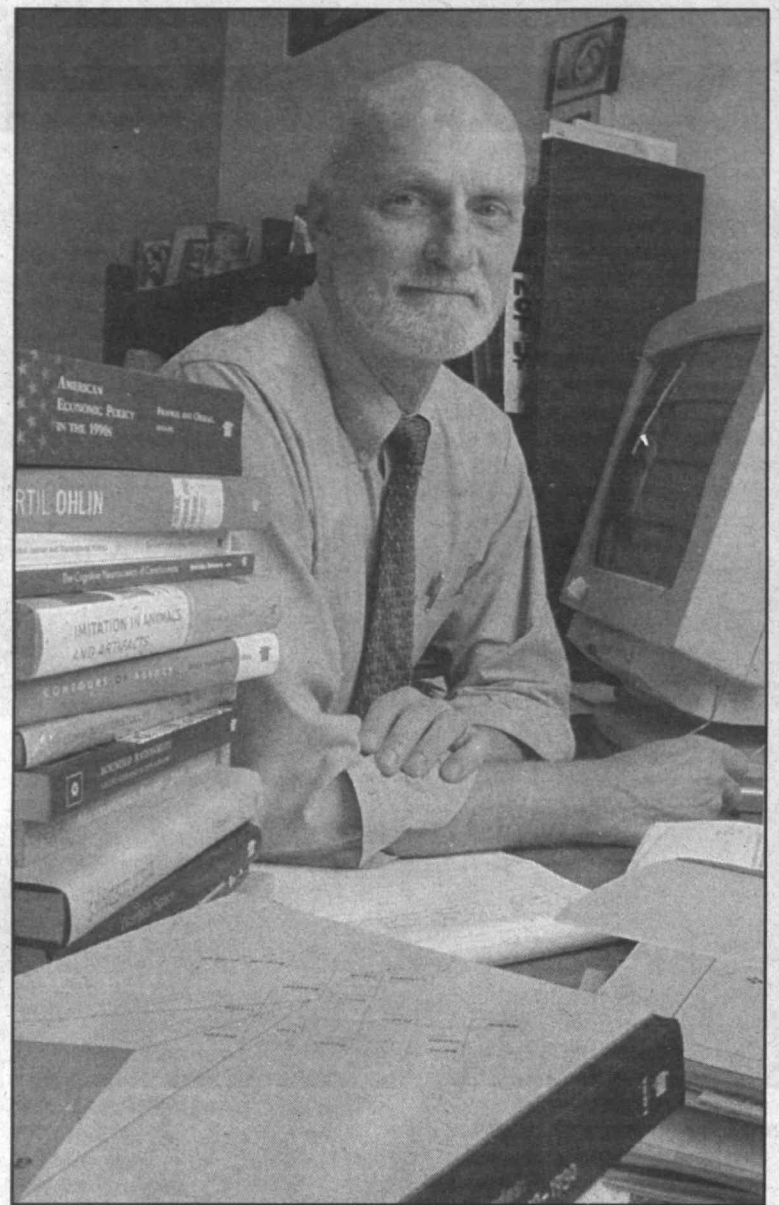
A dinner at Endicott House on Oct. 1 honored the 109 MIT employees who retired in fiscal 2002. Of that total, 83 worked on campus and 26 at Lincoln Lab. The employees averaged 27 years of service, with Professor Frederick J. McGarry topping the longevity list at 52 years.

Following is a list of the retirees, together with the area in which they worked and the number of years they were employed at MIT.

Roshan L. Aggarwal, Physics (37)  
 Keith J. Arnold, Lincoln Lab (11)  
 Joseph E. Baclawski, Corporate Development (14)  
 Mary J. Bacon, Purchasing (37)  
 Mary Barry, Student Financial Services (14)  
 Eda Barsoum, Human Resources (11)  
 Monica B. Bell, Electrical Engineering and Computer Science, or EECS (13)  
 Aron M. Bernstein, Physics (40)  
 Andrea Bodo, Clinical Research Center (11)  
 Jeanne M. Bryan, Facilities (36)  
 Louis L. Bucciarelli Jr., School of Engineering (35)  
 James J. Cassidy, Facilities (20)  
 Eileen C. Cecca, Medical (28)  
 Noam A. Chomsky, Institute Professors (46)  
 Vincent P. Clark, Facilities (33)  
 Bertram M. Clement, Lincoln Lab (25)  
 John C. Connolly, Lincoln Lab (22)  
 Nora Davis, Facilities (12)  
 Frances M. Davis, Lincoln Lab (25)  
 Herminda DeSabogal, Medical (22)  
 James F. Donahue, Lab for Nuclear Science (41)  
 James S. Edison, Facilities (16)  
 Virginia M. Esau, Physics (14)  
 John T. Fay, Facilities (16)  
 Thomas L. Ferrari, Lab for Nuclear Science (24)  
 Jean P. Flanagan, Lab for Nuclear Science (32)  
 Muriel A. Frederick, Center for Environmental Initiatives (13)  
 David P. Gale, Lincoln Lab (40)  
 Richard Gaudette, Haystack Observatory (41)  
 Elizabeth M. Gervais, Lincoln Lab (11)  
 Harvey P. Greenspan, Mathematics (42)  
 Sebastiano Gulino, Housing (16)

Ralph Gurney, Lincoln Lab (42)  
 David A. Gwinn, Plasma Science and Fusion Center (37)  
 Elizabeth S. Hafen, Lab for Nuclear Science (28)  
 Joan L. Hagerman, Lincoln Lab (24)  
 Carl William Hage II, Facilities (28)  
 Kenneth R. Hamilton, Lincoln Lab (38)  
 Noel P. Hart, Information Systems (35)  
 David J. Heaslip, Lincoln Lab (25)  
 William G. Henderson, Lincoln Lab (31)  
 Frederick C. Hennie III, EECS (46)  
 Karen Hersey, Intellectual Property (18)  
 Joanna B. Hills, Media Lab (10)  
 Bernard Hoop, Harvard-MIT Division of Health Sciences and Technology (4)  
 Penelope J. Karageorge, Human Resources (14)  
 Edwin T. Kinnear, Lincoln Lab (24)  
 Jordan Kirsch, Physics (14)  
 Arthur L. Lafleur, Center for Environmental Health Sciences (29)  
 Alan J. Lazarus, Physics (42)  
 Robert E. Lee, Treasurer's Office (43)  
 Edward Levine, Architecture (13)  
 Barbara A. Lindstrom, Division of Comparative Medicine (7)  
 Lorraine M. Long, Facilities (5)  
 Susan C. Lowance, Sloan School of Management (10)  
 Richard E. Lowe, Housing (28)  
 Thomas M. Lynch, Environmental Health and Safety (28)  
 Harriet D. MacAskill, Medical (16)  
 Norman L. MacAskill, Mechanical Engineering (16)  
 Elizabeth P. Maksutian, EECS (35)  
 Robert L. Malster, Corporate Development (11)  
 Richard S. Marcus, EECS (35)  
 Stephen Marcus, Lincoln Lab (32)  
 Malcolm J. Mason, Facilities (36)  
 Jacqueline M. McCarthy, Lincoln Lab (12)  
 Peter McCarthy Jr., Facilities (33)  
 Patricia A. McCosco, Mechanical Engineering (25)  
 Frederick J. McGarry, Professional Institute (52)  
 J. Terence Meehan, Property Office (27)  
 Rudolph G. Mercuri, Lincoln Lab (12)  
 Robert G. Miller, Lincoln Lab (24)

Anthony J. Modestino, Chemical Engineering (25)  
 John P. Mumley, Environmental Health and Safety (20)  
 Paul F. Murray, Lincoln Lab (39)  
 William J. Piacentini, Lincoln Lab (33)  
 Dorothy E. Purdy, Human Resources (11)  
 Marjory D. Ray, MIT Press (10)  
 Barbara E. Rice, Copy Technology Centers (23)  
 John F. Rockart, Sloan School of Management (40)  
 Anthony Rogers, Medical (15)  
 Lawrence Rosenson, Physics (43)  
 Dorrit G.H. Schuchter, Architecture (22)  
 Michael Scott Morton, Sloan School of Management (36)  
 Roger R. Seaborne, Lincoln Lab (30)  
 Stephen D. Senturia, EECS (36)  
 Thomas B. Sheridan, Mechanical Engineering (47)  
 Arthur C. Smith, EECS (43)  
 T.C.L. Gerhard Sollner, Lincoln Lab (20)  
 Susan M. Staecker, Lincoln Lab (26)  
 Cynthia M. Stevens, Medical (23)  
 W. Sara Gardiner Stillwell, Division of Bioengineering and Environmental Health (17)  
 Marilyn J. Stone, Lincoln Lab (21)  
 Charles R. Studebaker, Facilities (21)  
 James P. Sullivan, Facilities (24)  
 Betty H. Sultan, Dean for Student Life (14)  
 Catherine V. Taylor, Audio Visual Services (16)  
 Anthony Tentindo, Facilities (14)  
 Doris M. Theobald, Lincoln Lab (27)  
 Edward A. Thibeault, Plasma Science and Fusion Center (30)  
 Richard P. Thibodeau, Lincoln Lab (33)  
 James N. Walpole, School of Engineering (35)  
 Rainer Weiss, Physics (46)  
 Sonia White, Brain and Cognitive Sciences (10)  
 Richard E. Williams, Facilities (16)  
 Frederick D. Wilson, Materials Science and Engineering (43)  
 F. Wesley Wilson, Lincoln Lab (11)  
 August F. Witt, Materials Science and Engineering (42)  
 Sally Wright, Medical (33)  
 Dorothy A. Zibkowski, Lincoln Lab (29)



Frank Urbanowski, director of the MIT Press, will retire after 27 years this January. Photo by Mark Morelli

## Director of MIT Press to retire in January

■ By Ruth Seidman  
 MIT Libraries

Frank Urbanowski, who built the MIT Press into one of the world's largest and most successful university publishers during 27 years as its director, has announced his retirement as of Jan. 31, 2003.

Under Urbanowski's leadership, the MIT Press went from a \$2.6 million-a-year operation with an annual list of 135 titles and four journals to more than \$22 million a year with 220 titles and 37 journals. More than one million copies of books and journals bearing the MIT Press imprint are sold each year, 30 percent to export markets. During his tenure, the press published more than 4,000 original book titles and over 1,000 paperback reprints.

Urbanowski published a range of publications in key areas which reflected MIT's strengths, including architecture/arts, computer science and artificial intelligence, economics/finance, brain and cognitive science, neuroscience and environmental studies. Smaller but also important areas are technology studies, critical theory, social theory, and the history of science and technology.

"My favorite book projects were the first and the last," Urbanowski said. "The first was the 'Encyclopedic Dictionary of Mathematics,' a 6,000-page manuscript roughly translated from the Japanese that was gathering dust in a closet when I came to the press. The last on my list was 'Zen and the Brain,' a seemingly offbeat book which was rejected by many publishers before finding its way to the MIT Press, and which has received high scholarly praise and has become one of our ongoing best-sellers."

Urbanowski brought the MIT Press into the forefront of electronic innovation in the publishing industry. It received a matching grant from the Kresge Foundation in 1979 to create a typesetting operation built around

a minicomputer; in the late 1980s, it developed a small desktop publishing operation and later full electronic processes. The MIT Press also brought up the first university press web site and produced the first electronic book, William Mitchell's "City of Bits," in 1994.

Later, the press established its Digital Projects Lab. One outcome of that has been the new electronic communities of CogNet and ArchNet. CogNet is now a fee-based program managed by the MIT Press Journals division and marketed primarily through site licenses. ArchNet, derived from CogNet technology, was designed and developed by the lab for the School of Architecture and Planning and the Aga Khan Program for Islamic Architecture (see MIT Tech Talk, Oct. 2).

Other highlights of Urbanowski's career were opening the MIT Press Bookstore in 1981, expanding the international marketing operation in London and establishing the Japanese office.

Urbanowski, a material science major at Virginia Tech, joined the college division at Macmillan Co. in New York in 1961 as an editor for science and engineering text books. In 1966 he became publisher at Glencoe Press, a new imprint division of Macmillan that focused on texts and curriculum materials for community colleges. After a brief stop at Educational Testing Service in Princeton, N.J., he joined the MIT Press as director in the summer of 1975.

Urbanowski looks forward to moving permanently to Middlebury, Vt., where he and his wife built a house in 1997. In addition to doing a lot of yard work, he'll keep his hand in publishing as a member of the board of directors and consultant for a number of publishers, including the University of California Press, Transaction Publishers, SUNY Press and the Massachusetts Continuing Legal Education Council.

## Classified ■ Ads

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Deadline is noon Friday before publication.

### ■ FOR SALE

Sailboat. 1988 C&C, 30ft cruiser/racer, 20HP Yanmar prop, Doyle Stack Pack main, radar, autopilot, GPS, stove, teak interior. \$47,500. David, 781-981-4277 or dckettner@ll.mit.edu.

Yield House kitchen/dining rm table, solid wood, \$100/bst. Left handed golf clubs w/bag, \$100/bst. Weight bench w/weights, \$100/bst. Don, 978-692-4764 (days) or drs@haystack.mit.edu.

Sofa chair, \$12. Sofa recliner, \$15. Lrg corner sofa, \$80. Queen size bedrm set, \$100. Lamps, \$5. Old TV (works) w/cart, \$10. Xiao,

xjfiang@mit.edu or 617-253-6750.

Cherry queen size bed and chest of drawers (Queen Anne style), \$600. Merlene, 253-4649.

Bookcase from This End Up. California yellow wood (heavy), 6 yrs old, in gd shape, \$75. dianem@mit.edu or 253-6730.

### ■ VEHICLES

1990 Honda Civic hatchback. 110k Miles, A/C, CD player, tires in gd cond, \$2,400/bst. dcrespo@sloan.mit.edu or 617-899-0390.

1991 Subaru station wagon. 131k miles, vry reliable, \$1,500. rader@ll.mit.edu or 181-2574.

1991 Honda Civic 4D DX. Auto, 70k miles, A/C, exc cond, Must sell this weekend! \$3,850. kwintner@sloan.mit.edu or 617-577-5732.

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

1993 Acura Integra hatchback. 5-spd, leather int, moonroof, 72k miles, drk green. Gd cond, fun to drive, \$4,600. lpass@mit.edu or 617-258-5661.

1994 Saturn SL2. 4dr, blue/green, 87k miles, 1 owner, ABS, A/C, alarm, body looks gd, gd mech cond, clean title, vry reliable, \$3,500/bst. Amy, 258-8185 or harry@wi.mit.edu.

1997 Ford Ranger XL Supercab. 53k miles, black w/white aluminum cap, rear slider, stereo, well maintained, \$4,000. 617-452-3976 or mrieb@mit.edu.

### ■ HOUSING

Cambridge: Furn rm in hse, Walk to MIT/Harvard,

kitchen/laundry, modern. Wireless Internet, phone costs shared. Avail 10/10. \$735/mo incl utils. 617-625-9839 or sokolovska@mac.com.

Cambridge: Furnished rms in prvt home, kitchen privs, w/d, cable, walk to Draper/MIT/subway, \$250/wk, \$800/mo, prkg extra. Jan Blair, 258-2843.

Londonderry, VT: 3BR, 2b, secluded, scenic views, pond, wood stove, Stratton/Bromley/Magic Mts within 15min. Seasonal or holiday/part-seasonal. knopp@mit.edu or 253-8437.

Killington: Lrg ski hse in gd cond, 2people/rm, prvt baths, hot tub, nr access road, \$1,750/full or \$925/half shares. Paul, 203-287-0040 or paul.berzinis@outokumpu.com.

### ■ ROOMMATES

Everett: Seeking female to share 2BR, 6 rm 2nd flr apt. Laundry, prkg, nr bus/Orange Line, start time flexible, no smokers/pets, \$600/mo + utils. Jacqui, 252-2017 or jtaylor@mit.edu.

East Arlington: Seeking responsible female grad/prof to share lrg 2BR. Near 77 bus/Alewife T/Minuteman bike trail. Avail Nov 1, \$650 + utils. 781-643-3988.

### ■ CHILD CARE

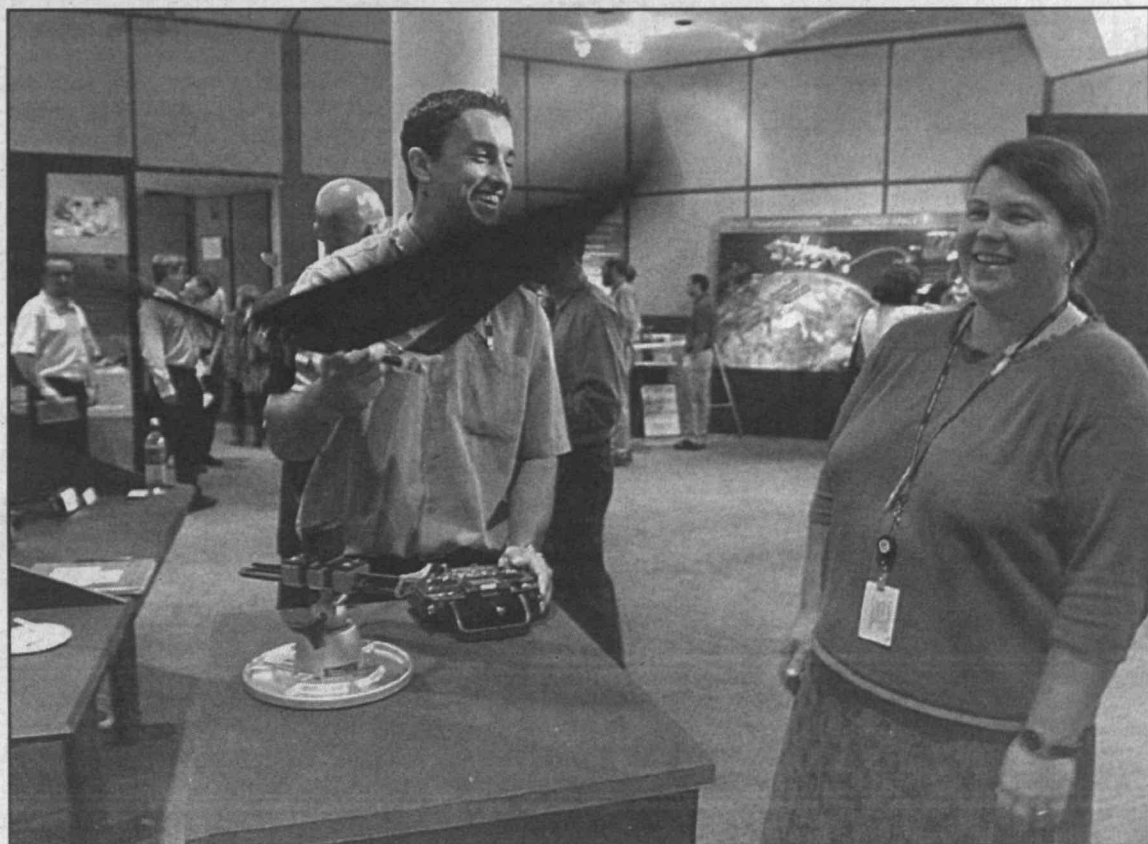
Exc nanny avail. 5 yrs exp as live-in for same family. Certified to teach toddlers, CPR/First Aid certified, exc refs, non-smoker, have own car. Seeking full time live-out position. Sharon, 617-840-9494.

### ■ MISCELLANEOUS

Free sofabed. 6'6", needs reupholstering but gd frame and mattress. Pick up and it's yours. 253-3780.



# Machines and technology showcased at Draper Lab expo



George Costa (S.B. 2000) shows fellow alumnus Jamie Anderson (S.M. 1992, Ph.D.) the ornithopter he's working on at Draper Lab at the last week's Tech Expo.

Photo by Donna Coveney

■ By Deborah Halber  
News Office

A black, bird-like unmanned aerial vehicle for battlefield reconnaissance called an Ornithopter and a metal and rubber robotic snake (a search-and-rescue robot that could make its way into rubble for rescue operations) were among the devices flapping, crawling and beaming laser light for the benefit of the visitors to the Draper Lab Technology Exposition.

Members of Draper Lab staff and administration, others from the MIT community and students from Cambridge public schools were among those attending the Tech Expo on Oct. 2-3.

With demonstrations, video presentations and hands-on activities, Draper showcased projects and technologies in several areas, including Special Operations, which is dedicated to improving U.S. intelligence and special operations capabilities; Tactical Systems, which addresses integrated target prosecution for the military; Biomedical Engineering, which develops technologies and novel systems for disease treatment and oversight; Strategic Systems, which supports the U.S. Navy's requirement to extend the service life of the Tri-

dent II guidance system to 2042; and Space Systems, which develops autonomous, reliable flight systems to meet the need for advanced space-based systems.

Actuality Systems demonstrated its Perspecta spatial 3-D platform, a commercialization project by Navigator Technology Ventures, LLC, Draper's venture capital subsidiary. In a globe-shaped projection, the device provides full-color, 360-degree views of images useful for medical and military applications. The images can be manipulated with a joystick to allow users to navigate around them.

A number of projects are by students, particularly through the Draper Fellow Program. Each year, graduate students participate in sponsored research at Draper Lab. This program gives the students an opportunity to gain practical experience in their technical fields that coincide with Draper research.

Thirty-three Fellows are new to Draper this year, joining 30 Fellows who are continuing their thesis research at Draper toward master's or doctoral degrees. This year's group of 63 Fellows is the largest in the last nine years. In addition to 55 MIT Fellows, there are six from Rice University, one from Tufts and one from Boston University.

## Mars travel explored at MIT conference

■ By Richard Trombley  
Special to MIT Tech Talk

Nearly 80 students and professionals interested in learning the latest in Mars-related research attended the fourth annual MIT Mars Week, a student-run conference from Oct. 4-6.

Ten speakers who represent the top talent studying the red planet were on the roster, including Vyacheslav Shurshakov, a representative of the Russian Space Agency; Orlando Figueroa, director of NASA's Mars Program Office; and Robert Zubrin, president of the Mars Society.

"MarsWeek is an opportunity to share ideas and interact with the community," said Figueroa. "There is clearly a great interest in Mars research. It's exciting to hear the various perspectives."

The event was hosted and organized by MIT students and the MIT Mars Society. Aeronautics and astronautics senior Joshua Neubert and graduate student Mirna Daouk co-chaired the conference.

"I've been interested in space and astronomy for as long as I can remember," said Neubert, president of the MIT Mars Society. "I fell in love with the idea of exploring the solar system and the benefits it could produce." Human space flight has provided many benefits, and further exploration of Mars will result in greater advances, he said.

"There are many reasons to go to Mars," Neubert added. "It's the best

place beyond the Earth in the solar system to look for past or present life. Humanity is ready to leave the cradle and explore."

Zubrin noted MIT's leading role in the Mars Gravity Biosatellite project, an effort to study the effects of Martian gravity on mammals (see MIT Tech Talk, April 10).

Freshman Christina Edwards said she chose MIT because of the opportunities to do research and get involved with projects like the Mars gravity project.

"The conference was very informative," said Edwards. "[Shurshakov's] presentation on radiation factors made it clear that we need to work toward improving safety for human missions."

"The conference is valuable because I was able to learn about some of the key issues for Mars research as it relates to my field of study," said Madhusudhan Nikku, a graduate student studying geotechnical engineering in the Department of Civil and Environmental Engineering. "I can only get that here, from these first-hand experts."

Mars Week received funding from the Undergraduate Association; the Department of Aeronautics and Astronautics; the Department of Earth, Atmospheric and Planetary Sciences; the Massachusetts Space Grant Consortium; the American Institute of Aeronautics and Astronautics; the Mars Society; and the National Space Society.

## ■ Here and There

### AND THE QUESTION IS....

The Institute was featured on TV's "Jeopardy" recently in the context of the following "answer" in the category Science Prizes: "An annual half-million dollar prize for invention and innovation is given by MIT: the Massachusetts Institute of this."

The correct "question" is an easy one for any reader of this paper—"What is Technology?"—so let's rephrase the answer to make it a tad more challenging. "MIT's annual half-million dollar prize for invention is named this." And the question, of course, is "What is the Lemelson-MIT Prize?"

### SMART LAUNDRY: PART II

Students at some 40 campuses in the midwest will soon be able to monitor their laundry by computer—a feat achieved at MIT in 1999.

According to an Aug. 31 story by the Associated Press, IBM plans to install some 9,000 smart washers and dryers at universities including Ohio State. The company "hopes the eSuds system ... will instill a little efficiency in the college dormitory laundry room, letting students keep tabs on their laundry from anywhere they can access the Internet."

"It's an idea many students have dreamed about, and some clever ones have already made work," according to the story, which went on to credit the cyber-laundry at MIT. See the April 14, 1999 issue of MIT Tech Talk for more on the system developed by Philip A. Lisiecki (S.B. 1996).

### SCIENCE PHOTOGRAPHY

National Public Radio's "Science Friday" focused on photographing science in a Sept. 27 show that featured a live interview with MIT's Felice Frankel and two others.

"From the very large to the very small, a distant galaxy or an individual atom, scientific photographers

capture images that can reveal hidden aspects of the natural world," write the producers in a web site about the show at [http://www.sciencefriday.com/pages/2002/Sep/hour2\\_092702.html](http://www.sciencefriday.com/pages/2002/Sep/hour2_092702.html).

Frankel, a research scientist and photographer, has been in the news several times recently since publication of her latest book, "Envisioning Science: The Design and Craft of the Science Image" (MIT Press, 2002). "Open the book at random, and your eye will be dazzled: a three-centimeter drop of ferrofluid, gold on gold (one-centimeter patterned chips on a gold wafer), or a flowerlike yeast colony illuminated by daylight," write the editors of Scientific American in a review on the magazine's web site recommending the book.

The magazine also lauds Frankel's goal of "encouraging science workers 'to find a place in your research for a new way of seeing and presenting your work' so as to see 'the potential of using your images to communicate to those outside the research community.'"

### CLIPS AND QUOTES

■ "I think we've done well. Al Qaeda is on the run. Domestic security has become a bigger issue. We're focused. They are a dangerous group, but so far they don't have the worst weapons."—Professor Harvey Sapolsky, director of the Security Studies Program, in a Sept. 8 story in the Austin American-Statesman about the war on terrorism.

■ "After being immersed in this very different field of creative writing, I think it takes them by surprise that they actually need it."—Professor of Writing Anita Desai on students who take creative writing and other humanities courses, in Boston Magazine, Sept. 1.

■ "I genuinely think there was an 'a-ha' moment."—Anne Margulies, executive director of MIT OpenCourseWare, on MIT's decision to place all its course materials online for free, on BBC News, Sept. 22.

Elizabeth Thomson

## Institute holidays through January 2004

The following are recognized Institute holidays during 2002-03 and the dates on which they are observed. This list is linked to the Human Resources home page at <http://web.mit.edu/personnel/www>.

Labor Day	Monday, Sept. 2, 2002
Columbus Day	Monday, Oct. 14
Veterans Day	Monday, Nov. 11
Thanksgiving Day	Thursday, Nov. 28
Day after Thanksgiving	Friday, Nov. 29
Christmas Day	Wednesday, Dec. 25
New Year's Day	Wednesday, Jan. 1, 2003

Martin Luther King Jr. Day	Monday, Jan. 20
Presidents Day	Monday, Feb. 17
Patriots Day	Monday, April 21
Memorial Day	Monday, May 26
Independence Day	Friday, July 4
Labor Day	Monday, Sept. 1
Columbus Day	Monday, Oct. 13
Veterans Day	Tuesday, Nov. 11
Thanksgiving Day	Thursday, Nov. 27
Day after Thanksgiving	Friday, Nov. 28
Christmas Day	Thursday, Dec. 25
New Year's Day	Thursday, Jan. 1, 2004

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## Family Weekend coming up

Family Weekend 2002, hosted by the MIT Parents Association, will offer three days of classes, on-campus activities and opportunities to explore Cambridge and New England from Oct. 18-20.

Highlights of Family Weekend include Friday's Nobel laureate luncheon featuring a talk by Professor Wolfgang Ketterle on "The Coldest Matter in the Universe." Ketterle won the 2001 Nobel in physics.

Professor Robert Langer will deliver Saturday's keynote address on "Biomaterials: How They Will Change Our Lives." Langer received the Charles Stark Draper Prize, the world's most prestigious engineering prize, in 2002.

Unique this year will be tours of the new Zesiger Sports and Fitness

Center and Simmons Hall dormitory. There will also be faculty and research presentations, laboratory tours, and numerous student performances as well as a community meeting with Institute leaders including President Charles Vest, Chancellor Phillip Clay, Dean for Undergraduate Education Robert P. Redwine and Dean for Student Life Larry G. Benedict.

Some events have limited enrollment, and preregistration is required for tours, talks and luncheons. Students are welcome to attend all events. On-site registration will be in Lobby 10 from 8 a.m. to 5 p.m. on Friday and 7:30 a.m. to noon on Saturday.

A detailed schedule is online at <http://web.mit.edu/alum/connect/parents/family-weekend>.

## Job hunters



A Sept. 25 career fair in Johnson Athletic Center was well attended by representatives searching for potential employees and students checking out their options.  
Photo by Donna Coveney

# Scientists race to observe fading burst found by MIT satellite

Scientists have captured the optical afterglow of a gamma-ray burst just nine minutes after the explosion, a result of precision coordination and fast slewing of ground-based telescopes upon detection of the burst by the High-Energy Transient Explorer (HETE) satellite developed by an MIT-led international team.

The quick turnaround has so far allowed scientists to determine a minimum distance to the explosion, which likely marks the creation of a black hole. Results continue to pour in, as nearly 100 telescopes in 11 countries have tracked the burst.

The burst, named GRB021004, was detected on Friday, Oct. 4 at 8:06 a.m. EDT. Follow-up observations, including those quickly scheduled with NASA's Chandra X-ray Observatory and Hubble Space Telescope, are providing valuable clues to the mysterious nature of the gamma-ray burst, an example of the most powerful explosions known.

"This is the big one that didn't get away," said George R. Ricker, senior research scientist at MIT's Center for Space Research and principal investigator for the 20-person international HETE team. "HETE sent out a burst alert in 11 seconds and then followed up with an accurate location just 48 seconds later, while the bright gamma-ray emission was still in progress. HETE's prompt localization has resulted in GRB021004 being by far the best observed burst in the 30-year history of gamma-ray burst astronomy."

Gamma-ray bursts have the energy of a billion trillion suns, yet they occur randomly and disappear within a few seconds to about a minute. Thus, scientists have been hard-pressed to determine the origin of these events. Theorists say the bursts are a result of massive star explosions (larger than supernovae) or the merger of neutron stars, or both.

HETE is designed to detect gamma-ray bursts and relay their locations within seconds to a worldwide network of radio, optical and X-ray telescopes. While the burst itself—a flash of gamma rays, the most energetic form of light—disappears quickly, the afterglow may linger in lower-energy light forms for days or weeks. HETE is crucial in notifying telescopes where to look for the afterglow, which contains information about the burst's origin.

Currently, the optical afterglow of burst GRB021004 is still so bright that it outshines the entire galaxy in which it is located. This is too bright to attain information about its host galaxy, according to Shri Kulkarni of the California Institute of Technology, who leads an effort there to understand gamma-ray bursts. Over the next month, as the afterglow fades, the faint host galaxy will become visible and can be studied in detail.

Burst GRB021004 lasted approximately 100 seconds, a relatively bright and long burst. Racing the clock and the break of dawn, Derek Fox, a Caltech astronomer, turned the 48-inch Oschin Schmidt telescope at the Palomar Observatory to the location that HETE provided. Just nine minutes after the burst, Fox detected a fading, 15th magnitude source—the afterglow of the burst. The afterglow lay neatly within the 1-arcminute location region derived by HETE's soft X-ray camera (SXC), clinching the identification.

Japanese astronomers in Kyoto and Bisei, under a blanket of dark sky, confirmed the Palomar observation and watched the source fade over the next two hours by about a factor of two. Seven hours after the burst occurred, a Caltech-Cambridge-Sydney collaboration at the Siding Spring Observatory in Australia reported an absorption redshift of 1.6, roughly equivalent to a dis-

tance of 15 billion light years.

The measurement is based on material—perhaps a galaxy or cloud of gas—that absorbed some of the burst's light as it passed through on its long journey to Earth. This means that the burst occurred beyond the absorption region, at 15 billion light years distance or greater.

By Saturday, amateur astronomers—tuned to the Gamma-ray Burst Coordinates Network—were also observing the spectacle. In the hours and days to come, astronomers will comb the burst region with radio, X-ray and other optical telescopes, searching for more clues to the burst's origin.

HETE was built by MIT as a mission of opportunity under the NASA Explorer Program. The HETE program is a collaboration between MIT, NASA, Los Alamos National Laboratory, the Centre National d'Etudes Spatiales, the Centre d'Etude Spatiale des Rayonnements and the Ecole Nationale Supérieure de l'Aéronautique et de l'Espace (all in France), and Japan's Institute of Physical and Chemical Research (RIKEN). The science team includes members from the University of California (Berkeley and Santa Cruz) and the University of Chicago, as well as from Brazil, India and Italy.

At MIT, the HETE-2 team includes Ricker, Nat Butler, Geoffrey Crew, John Doty, Allyn Dullaghan, Steve Kissel, Alan Levine, Francois Martel, Fred Miller, Glen Monnelly, Gregory Prigozhin, Roland Vanderspek and Joel Villasenor.

HETE, the first satellite dedicated to the study of gamma-ray bursts, is on an extended mission until 2004.

## Awards and Honors

**Alexander Rich**, the William Thompson Sedgwick Professor of Biophysics, received the 2002 Institute of Human Virology (IHV) Lifetime Achievement Award last month at the organization's international meeting in Baltimore. Long recognized as a pre-eminent researcher in structural molecular biology, Rich is best known for his discovery of left-handed DNA, or Z-DNA, and the three-dimensional structures of

transfer RNA. "This award is given to a senior scientist who has a dramatic impact on biomedical science that affects all of us at the IHV," said Dr. Robert C. Gallo, director of the Institute and co-discoverer of the HIV virus that causes AIDS.

**Douglas A. Lauffenburger**, the Uncas and Helen Whitaker Professor of Bioengineering in the Biological Engineering Division, chemical en-

gineering department and biology department, received the William H. Walker Award for Excellence in Contributions to Chemical Engineering Literature from the American Institute of Chemical Engineers. He was cited for "intellectual leadership in combining chemical engineering with molecular cell biology, and for developing innovative biotechnologies based on molecular- and cell-level design principles."

## Talks focus on politics and technology of motherhood

On Friday, Oct. 18, the first of three lectures in an MIT series on "The Politics and Technology of Motherhood" will take place in Room E51-345. The series is sponsored by the Technology and Culture Forum, the Program in Women's Studies, MIT Medical and the MIT Workplace Center.

Next Friday's speakers will be Lotte Bailyn, co-director of the MIT Workplace Center, and Mona Harrington, the center's program director. They will be questioning social and work structures, looking especially at two difficult dimensions of the problems women face in dealing with motherhood and work. One is reliance on the rhetoric and policies of gender neutrality; the other is the question of social responsibility for children.

Bailyn is the T Wilson (1953)

Professor in Management at the Sloan School and the author, most recently, of "Beyond Work-Family Balance: Advancing Gender Equity and Workplace Performance" (Jossey-Bass, 2002). Harrington's latest book is "Care and Equality: Inventing a New Family Politics" (Routledge, 2000).

The remaining lectures in the "Motherhood" series are "Making Babies: Should There be an Open Market and Anonymous Donation of Human Eggs and Sperm?" on Nov. 14, and "Women As Egg Factories? The Health and Freedom of Choice of Women in the Face of Stem Cell Research and Cloning" on March 4.

For more information, contact the Technology and Culture Forum at 253-0108.

Sarah H. Wright

## Professor August 'Gus' F. Witt dies at 71; electronic materials expert here for 40 years

August F. Witt, internationally noted for his research in electronic materials and his devotion to teaching undergraduates, died Oct. 7 of gastric cancer at his home in Winchester.

Professor Witt was born in Innsbruck, Austria, in 1931. From 1953-54 he did graduate research in nuclear chemistry with Madame Joliot-Curie, a 1935 Nobel laureate, in Paris.



Witt

In 1958 he worked on radiation chemistry at the Atomic Energy Research Establishment in Harwell, England. He received his Ph.D. in 1959 in physical chemistry from the University of Innsbruck.

Professor Witt came to MIT in 1960 as a research associate in what was then the Department of Metallurgy, working on surface chemistry problems related to mineral flotation. In 1962 he was appointed to the faculty as an assistant professor and his primary research focus became the processing and characterization of electronic materials. He was promoted to professor in materials science in 1972.

In 1974 he received NASA's Outstanding Scientific Achievement Award for his work as a Skylab co-principal investigator for advancing materials processing in space. In 1976 Austria presented him with the Exner Medal for Outstanding Contributions to Science and Technology. Professor Witt was a member of the American Association of Crystal Growth (past President 1975-1981), the American Ceramic Society, Sigma Xi and Tau Beta Pi. He chaired NASA's Electronic Materials Working Group from 1982-89.

In 1990 he was the first recipient of the Amar Bose Award for Sustained Efforts in Undergraduate Teaching as well as being named TDK Professor in Materials Science and Engineering. In 1992 he received the Space Processing

Award from the American Institute of Aeronautics and Astronautics. In 1993 he became Ford Professor of Engineering and was also elected to a 10-year term as a MacVicar Faculty Fellow.

"As a researcher, Professor Witt has made major contributions to the understanding of the processing and characterization of electronic materials," said Professor Merton C. Flemings, former head of the Department of Materials Science and Engineering. "He is widely and warmly respected for his outstanding commitment to students and for his enthusiastic and innovative teaching, especially in the first-year course, 3.091, Introduction to Solid State Chemistry, which he headed for over two decades. Half of MIT's undergraduates over that time have been his students."

"Professor Witt was an outstanding teacher and faculty colleague in the Department of Materials Science and Engineering since 1962," said Professor Subra Suresh, current head of the department. "His passion for undergraduate teaching and his strong concern for the welfare of the MIT undergraduates were extraordinary."

For many years, Professor Witt was a member of Austria's national saber fencing team and was national saber champion in 1956. He tied for first at the Academic World Championships in 1954. He was also a meticulous gardener, had a passion for classical music and was an avid Boston sports fan.

Professor Witt is survived by his wife Karin (Morawski), sons Karl of Winchester and Thomas of Boston, and daughter Andrea (Witt) Sendlenski and her husband Michael Sendlenski of Winchester. A funeral Mass will be held at Saint Mary's Church, 155 Washington St., Winchester at 9 a.m. Saturday, Oct. 12. In lieu of flowers, the family requests that contributions may be made to the August F. Witt Student Fund in the Department of Materials Science and Engineering. A memorial service will be held on campus at a future date.

## MIT RECYCLING



### Did you know?

MIT composted 370 tons of grounds and yard waste in 2001. The effort saved money and also produced a high-quality mulch.

Environmental Programs Task Force (EPTF)

be-green@mit.edu

## Campaign raises fund goal

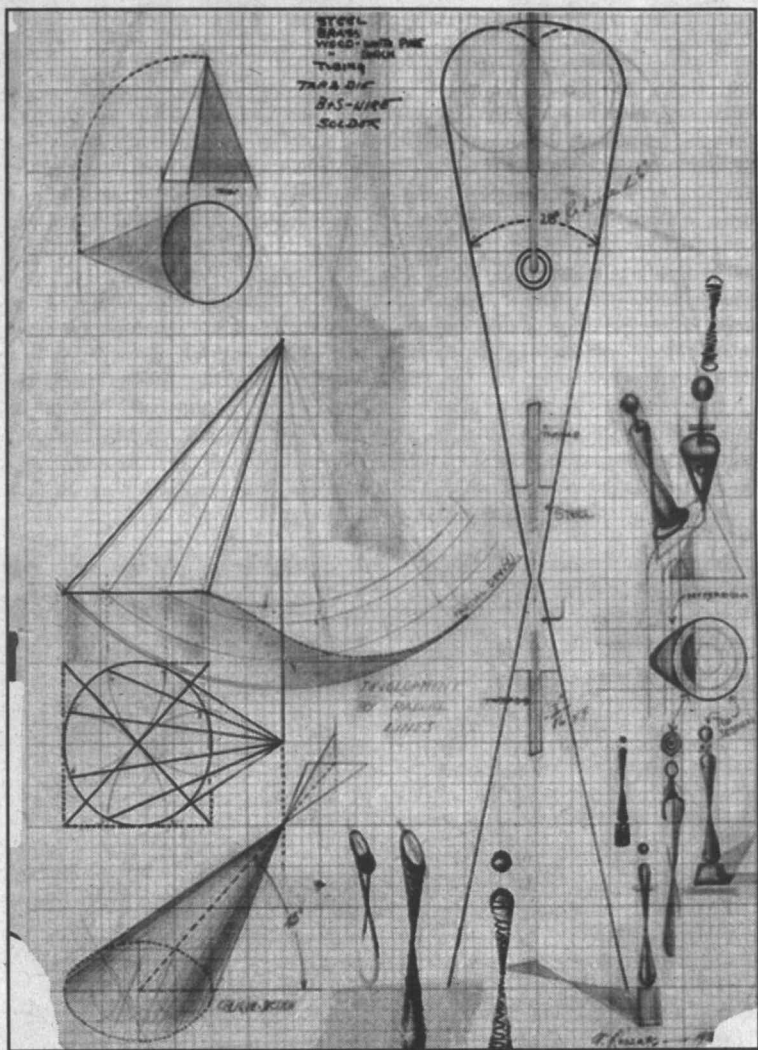
(continued from page 1)

student support, and capital construction.

"While the increased goal may take us a few more months to achieve," he said, "it is critically important that

we sustain the momentum of this campaign, which has been made possible by the remarkable generosity of alumni and alumnae and friends of MIT as well as corporate and foundation donors."

# List examines creative process in season opener



Theodore Roszak's "Development by Radial Lines, 1936" will be on display during the List Center's fall exhibition, "After the Beginning and Before the End." Photo by R.H. Hensleigh

How does a work of art begin? And where does it end? In the artist's mind or in his hands? "After the Beginning and Before the End," opening at the List Visual Arts Center on Thursday, Oct. 17, focuses on the creative process from the initial moment of inspiration to the final composition.

The exhibition of "Instruction Drawings" focuses on the artist's thinking process and the idea of how to execute a work. It features working drawings, installation instructions, musical scores, sketches, visual or textual memoranda, fabrication notes and work records of artists including Vito Acconci, Louise Bourgeois, Pablo Picasso, Alexander Calder, Sol LeWitt, Piet Mondrian, Henry Moore, Robert Rauschenberg, Diego Rivera, Roni Horn and Robert Gober. All of the works are from the collection of Gilbert and Lila Silverman in Detroit.

"Gilbert Silverman was a real visionary," said List Center curator Bill Arning. "No one had collected this material and he realized he could acquire a world-class collection, much of it for very little money."

The collection includes a broad selection of works by celebrated artists from the early 1930s to the present.

"If I was still teaching, this would be an excellent chance to teach art of the 20th century," said Arning. "You could do it all from this one show."

Opening events on Friday, Oct. 18 include a panel discussion, "On Considering Instruction Drawings as Permanent Records of the Evanescent Origins of Creative Thought," moderated by Jan van der Marck, with exhibition curator Jon Hendricks, Gilbert Silverman and Carolee Schneemann, one of the artists in the show. The discussion will take place from 5:30 to 7 p.m., followed by a reception. The show runs through Sunday, Jan. 5, 2003.

## VIDEO SERIES BEGINS

Oct. 17 also marks the inauguration of the List Center's year-long video program. Videos by the Latvian artists Viesturs Kariss and Ilmars Blumbergs ("Magic Flute") and Laila Pakalnina ("Papagena"), originally produced and shown in Riga, Latvia in 2001 as part of the city's 800th anniversary celebration, will be shown in the List Center's Bakalar Gallery through Sunday, Jan. 5, 2003.

The List Visual Arts Center conducts gallery talks on Wednesdays at noon and Sundays at 2 p.m.

## Poet laureate



Nobel Prize-winning poet Seamus Heaney will present a poetry@mit reading on Thursday, Oct. 17 at 7 p.m. in Room 10-250. Heaney first earned attention in the mid-1960s as an author in what became known as the "Northern School" within Irish writing. He won the Nobel Prize in literature in 1995. A resident of Dublin, he returns to Harvard University every other year, where he is the Ralph Waldo Emerson Visiting Poet.

## Memorial scheduled for Edward Cohen

A memorial service to celebrate the life and work of the late Senior Lecturer Edward Cohen will be held Sunday, Oct. 20 at 3 p.m. in Wong Auditorium in Building E51. Cohen died on April 27 at the age of 61 (see MIT Tech Talk, May 8).

The service will include speeches and performances by MIT faculty

members, alumni, musicians and family members.

Cohen, who began teaching at MIT in 1977, was a classically trained musician inspired by jazz and devoted to new music. His compositions included pieces for solo instruments, chamber ensembles and orchestra, as well as two operas. His last major

work, "The Bridal Night," was premiered by the Collage New Music Ensemble in Boston in January 2002.

This service will inaugurate the Edward Cohen Fund for New Music. Donations are welcome; checks should be made out to the fund and sent to MIT Room 4-246, 77 Massachusetts Ave., Cambridge, MA 02139.

## Arts News

The Pro Arte Chamber Orchestra will perform the world premiere of "Frog's Eye" by Professor of Music Evan Ziporyn on Saturday, Oct. 12 at 7:30 p.m. at Dorchester's Strand Theater and Sunday, Oct. 13 at 3 p.m. at Harvard University's Sanders Theater. Tickets for the Strand concert are available in advance for \$10, \$19, \$29 and \$42 with discounts for seniors and students; the Sanders tickets range from \$9-\$42. For more information, call Pro Arte at (617) 661-7067.

Discussing his inspiration for

the piece, Ziporyn describes a frog sitting almost entirely immersed in water. "Perfect stillness, perfect contemplation, patience, serenity, all that good Zen stuff... [but] they are in fact hard at work, staring intently, waiting for a moment of action and violence, for insects, for food." Humans, in contrast, "strive for a certain type of awareness, for multilayered perception, and occasionally we get there," he says, "but we seem to be built for subjective narrative. We've got to catch the fly to survive."

## Boston Symphony Orchestra offers MIT students free concert tickets

The Council for the Arts at MIT is again offering MIT students the opportunity to attend Boston Symphony Orchestra performances during the 2002-03 season for no charge. BSO College Cards are available at the BSO box office at Symphony Hall (301 Massachusetts Ave.) by showing a valid MIT student ID.

Each card offers a seat at up to 20 concerts and open rehearsals during the season.

For more information on how the program works and a listing of the concerts and rehearsals covered by the College Card program, see <http://web.mit.edu/arts/general/BSO.html>.

## Art tours

The List Visual Arts Center now offers free group tours of both its current exhibitions and MIT's public art collection, featuring works by international figures such as Alexander Calder, Henry Moore and Louise Nevelson. Call 253-4400 for reservations and information.

## Institute Arts

\* Open to public  
\*\* Open to MIT community only

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

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

October 9 - 27

### MUSIC

**MIT Chapel Concert\***—Oct 10: Takae Onishi, harpsichord. J.S. Bach's "Goldberg Variations." Oct 17: Maksut Koca will perform traditional poetry and music-making in a range of secular and sacred themes. Oct 24: Renaissance. Italian Renaissance chamber music, dance music and improvisations. Noon. Chapel. More info: 253-2906.

**MIT Symphony Orchestra Pre-Concert Concert\***—Oct 10. Frederick Harris, acting music director, conducts and presents brief commentary with Assoc Prof of History Jeffrey Ravel on the historical context of Beethoven's Eroica symphony. 7:30pm. Kresge Aud. More info: 253-2906.

**MIT Family Weekend Concert\***—Oct 18. MIT Wind Ensemble and Festival Jazz Ensemble, Frederick Harris, acting music director, present an evening of music from around the globe. 8pm. Kresge Aud. More info: 253-2826.

**MIT Faculty Concert\***—Oct 19. Interensemble (from Italy) performs new Italian repertoire and a piece by Prof Peter Child. 8pm. Killian

Hall. More info: 253-2826.

**Global Rhythms: Sounds of Peace and Progress\***—Oct 20. A Miami Univ-Ohio production featuring over 60 musicians from India, Egypt and Bosnia performing Indian raaga-based music. \$15/\$25 general admission, \$10 MIT students w/ID. Avail at The Source and <http://www.aidboston.org/globalrhythms/buy-tickets.htm>. 5pm. Kresge Aud. More info: [ansiv@mit.edu](mailto:ansiv@mit.edu) or <http://www.aidboston.org/globalrhythms>.

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

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

### DANCE

**Tech Squares Dance\***—Oct 19. MIT's Square and Round Dance Club participatory event with Tom Rinker calling and Barbara Strong cueing. 8-11pm. Lobdell Dining Hall. More info: 253-7000 or <http://www.mit.edu/activities/tech-squares>.

**Kathak Dance\***—Oct 27. Featuring Chitresh Das, solo and the Chitresh Das Dance Company; w/Swapnamoy Banerjee, sarodi; Kousic Sen, tabla. \$20, \$16 members, \$12 students (avail at door). 4pm. Paine Hall (Music Bldg, North Yard, Harvard Univ). More info: 258-7971 or <http://web.mit.edu/mta/mithas>.

### THEATER

**Artists Behind the Desk Fall Concert\***—Oct 9. Adult storyteller Ed Dolan, sr consultant, Info Systems. Noon-1pm. Killian Hall. More info: 253-1712 or <http://web.mit.edu/abd>.

### READINGS

**poetry@MIT: Seamus Heaney\***—Oct 17. See caption above. More info: 253-7894.

**"Pleasures of Poetry" Seminar\*\***—Oct 23. Discussion of Jane Kenyon's "Evening at a Country Inn" and "Things" led by Steven Cramer. Noon-1pm. Rm 14N-304. More info: <http://web.mit.edu/liu/www/pop.html>.

### EXHIBITS

**List Visual Arts Ctr (E15)\***—"After the Beginning and Before the End." See article above. Oct 18: Panel Discussion: "On Considering Instruction Drawings as Permanent Records of the Evanescent Origins of Creative Thought." Moderated by Jan van der Marck with Jon Hendricks, exhibition curator, Gilbert Silverman and artists in the exhibition. 5:30-7pm. Public Reception: 7-9pm. "Videos by Latvian Artists." Viesturs Kairis and Ilmars Blumbergs: "Magic Flute"; Laila Pakalnina: "Papagena." Gallery Talks. Wednesdays at noon and Sundays at 2pm. Both shows Oct 17-Jan 5. List Visual Arts Ctr (20 Ames St). Tues-Thurs and weekends noon-6pm, Fri noon-8pm, closed holidays. More info: 253-4680 or <http://web.mit.edu/lvac/www>.

**MIT Museum (N52)\***—"Perils of the Sea." Exhibition and accompanying lecture series

exploring historic shipwrecks and disasters at sea features more than 30 rarely-seen lithographs from the Captain Arthur H. Clark Collection of the MIT Museum Hart Nautical Collection. Through Nov 3. Oct 27: **FAST (Family Adventures in Science and Technology) Sunday Laser Day.** You've seen them in the movies, you've played laser tag, you may even have had your nearsightedness corrected by them. Come see light "sculptures", holograms and a variety of other applications of lasers. Free w/Museum admission. 2-4pm, MIT Museum. 452-2827 or [fastsci@mit.edu](mailto:fastsci@mit.edu). Oct 19: **MIT Museum Family Program—Invention Studio: Aquatronics.** Invent an interactive water sculpture that splashes, dribbles and drips. Use pumps and motors to move water, and use sensors to detect wet, dry, cold or warm areas. Create a musical water fountain or a puddle detector during this water-inspired invention studio. \$25 per child/adult team (includes Museum admission). 1-3:30pm. MIT Museum. More info: 253-4444 or <http://web.mit.edu/museum/programs/familyprograms.html>. **Ongoing:** "Mind and Hand: The Making of MIT Scientists and Engineers"; "Robots and Beyond"; "Exploring Artificial Intelligence at MIT"; "Gestural Engineering: The Sculpture of Arthur Ganson"; "Holography: The Light Fantastic"; "Flashes of Inspiration: The Work of Doc Edgerton"; "Thinkapalooza." \$5 adults, \$2 non-MIT students/srs/children 5-18, free w/MIT ID. 265 Mass Ave. Tues-Fri 10-5, Sat-Sun noon-5. More info: 253-4444 or <http://web.mit.edu/museum>.

**Compton Gallery\***—"From Page to Stage: A Theatrical Process." A look into the process by which directors and designers collaborate to put a play onto the stage. Oct 4-Jan 6. Compton Gallery (Rm 10-150). Wkdays 9:30am-5pm. More info: 253-4444 or <http://web.mit.edu/museum/exhibitions/>

[comptongallery.html](http://comptongallery.html).

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

**The Dean's Gallery\***—"K. Levni Sinanoglu: Searches for an Imaginary Kingdom." Mixed media works. Through Nov 1. The Dean's Gallery, Sloan School of Management (E52-466). Wkdays 9-5pm. More info: 253-9455 or <http://mitsloan.mit.edu/deansgallery>.

**Artists Behind the Desk Exhibition.** The women and men who keep the MIT machine humming will show their creative side through a variety of media. Through Nov 15. Oct 11: Reception. 4:30-6:30pm. Mon-Thurs, 9am-8pm, Fri 9am-6pm. Rotch Library (Rm 7-238). More info: 253-1712 or <http://web.mit.edu/abd>.

**Building 56 Media Test Wall\***—"Spinning." Ten short videos examine the use of spinning movements and circular/spherical figures. Through Oct 30. Administered by List Visual Arts Ctr. More info: 253-4680 or <http://web.mit.edu/lvac/www>.

### OTHER

**Arts Colloquium\*\***—Oct 16. All MIT faculty and arts staff are invited to hear Leslie Cocuzzo Held, Theater Arts costume designer speak on her work. 5-7pm. Location TBA. More info: 253-9821 or [mdhinkle@mit.edu](mailto:mdhinkle@mit.edu) by Oct 11.

# MIT students create an 'authentic' crop circle for TV show



Graduate students Mark Feldmeier (left) and Zoz Brooks leave the crop circle site after completing a radiological analysis, part of a battery of tests the pair performed on the site to check how it compared to "real" crop circles. Photos courtesy Zoz Brooks

(continued from page 1)

made hoaxes, the students learned from BLT staff that a "true" crop circle is marked not only by a complex and precise design, but by deformation of the grains of wheat and the presence of tiny iron molecules in the vicinity of the circle.

Working out of an Ohio farmer's barn and a mobile lab dubbed the "Winnebago of Science," the students

*"Right away, we wanted something that only an MIT student would get. Dom wanted to put a beaver in the circle, but that was decidedly asymmetric."*

—Lisa Messeri

built machines to reproduce these subtle indicators of "real" crop circles. Brooks, who claims an interest in amateur pyrotechnics, developed the "Flammschmeisser," a device that sprays molten iron particles. Rizzo used his own expertise to supervise construction of a device that deformed grains of wheat using parts from a microwave oven.

"The funniest part was observing how the TV people weren't quite prepared for the MIT work ethic. They

wanted to film us having dinner... but had trouble getting us to stop work to eat," Brooks said.

The team also put a lot of forethought into how their crop circle should look.

"Right away, we wanted something that only an MIT student would get," Messeri said. "Dom wanted to put a beaver in the circle, but that was decidedly asymmetric. We joked about using the Stata Center, but my involvement in theater led us to use the footprint of Kresge."

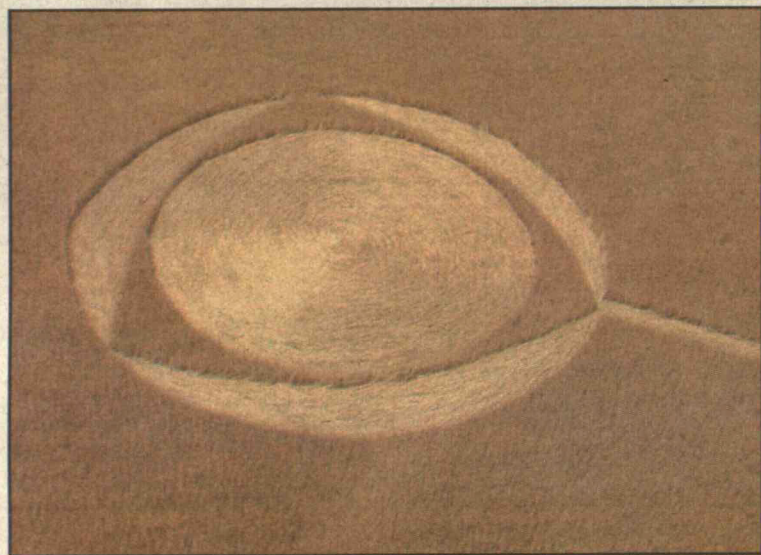
In fact, the final product does resemble MIT's unique auditorium, as if it had been created by an alien with a taste for Finnish architecture.

The analysis team was justifiably

impressed with the final product. When they had completed a battery of tests on the site, the circle was deemed on a par with any of the documented cases.

"After building what we consider a damn good crop circle with almost perfectly straight lines and an interesting geometry, I find it hard to put any faith in tales of crop circle construction by aliens," Rizzo said. "I think they are a result of free time, boredom and a good sense of humor."

"Crop Circles: Mysteries in the Fields" will premiere at 10 p.m. on Thursday, Oct. 10 on the Discovery Channel. It will be rebroadcast at 1 a.m. on Oct. 11 and 4 p.m. on Oct. 12.



An aerial view of the finished crop circle reveals its inspiration: the footprint of Kresge Auditorium.

# Horvitz shares Nobel for work on programmed cell death

(continued from page 1)

"The wonderful thing about this discovery is that is relevant to all branches of biological science and to the brain," said fellow Nobel laureate Phillip Sharp, director of the McGovern Institute. "Half of Bob Horvitz's lab works in neuroscience." Horvitz is currently analyzing how the nervous system controls behavior and how genes specify the functioning of a neuromuscular system.

"This is a great day for Bob Horvitz, a great day for MIT, a great day for science and a great day for the future of human health," said President Charles M. Vest. He said the Nobel recognition is a boost for research universities, where the bulk of the country's basic fundamental research is accomplished.

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

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

"These two men are heroes to me," Horvitz said of Brenner and Sulston. "Each could have received a Nobel prize for something different. It's an honor to be joined with these two friends and colleagues in this way."

Programmed cell death—in which healthy, normal cells kill themselves—is a necessary part of shaping developing tissues and organs and refining the central nervous system. The process also is used by the body in immune cell development and function, and for removing unnecessary or damaged cells.

## BIOLOGY LATECOMER

Horvitz, who grew up in Illinois, did not take a conventional path to this honor in biological science. He came to MIT to major in economics and math. He decided to switch to biology because "the new biology seemed to be very interesting—I was ignorant about it and thought it was something I would try. The nervous system was very interesting to me. So I went into this field of biology out of ignorance and continued on *C. elegans* because I thought

it offered the prospect of studying the nervous system in detail."

At the time, no one was sure how working on a microscopic worm could relate to human disease. It turns out that *C. elegans*—and other models such as the fruit fly and the zebrafish—are very relevant to humans and the "genetic pathways" in these creatures also show up in people. But before this was established, Horvitz said he had to make a choice about whether to pursue this basic research.

The late Nobel laureate and MIT biology professor Salvador E. Luria helped him decide. Luria studied bacteria and bacterial viruses to understand genes and the process of heredity, even though it was then thought by some that viruses don't have genes. Horvitz decided to concentrate on the roundworm and pursued his own research with the "unsubstantiated bias that what we learned from a nematode would be applicable to human beings," he said.

Programmed cell death is a key mechanism for regulating cell numbers and connections and for sculpting tissues, Horvitz has said. "Its misregulation can play a central role in certain cancers, autoimmune diseases and neurodegenerative diseases. We now know many of the molecules that control programmed cell death." Researchers hope that by fully understanding the mechanism behind programmed cell death, they may be able to develop treatments for cancer and a vast array of other diseases in which misregulated programmed cell death plays a role. In some diseases, cells live that should die, and in others, cells die that should live.

"When we found the gene responsible for the killing process [in *C. elegans*] we found that a similar protein had been isolated by two pharmaceutical companies in connection with human inflammation. No one had any notion these proteins could be involved with cell death. So now we have [information about] human genes involved in killing cells. If the process is involved in human disease, we could take those genes and attempt to prevent them from working," he said. "That way, one could eliminate the death and, one hopes, the disease. A large number of major pharmaceutical companies and small biotech companies are seeking to use this scientific knowledge to define targets for disease."

## A MODEL ORGANISM

Horvitz, known internationally as an expert on the genetic analysis of animal development, is noted for his work on how genes control three aspects of animal development: cell lineage, or

how a single fertilized egg undergoes repeated divisions to create the many distinct cell types of an adult animal; cell signaling, or how cells communicate with each other; and programmed cell death, known as apoptosis.

To better understand these processes, Horvitz has made a close study of *C. elegans*. The tiny worm contains exactly 1,090 cells, of which 131 undergo apoptosis, most during embryonic development.

Research by Horvitz's team has shown that four proteins—EGL-1, CED-9, CED-4 and CED-3—play a central role in the apoptotic machinery. The worm genes governing cell lineage, cell signaling, and cell death are similar to those found in other organisms, including humans. As a result, studies of the worm have provided insights into human development and disease.

For example, the discovery in Horvitz's laboratory of a nematode gene that causes programmed cell death led to the identification of related human genes. "Knowledge of what makes cells die and of what can block the cell-death process in the nematode may help lead to the identification of agents that can regulate the cell deaths involved in a variety of human disorders, such as cancer and neurodegenerative diseases," Horvitz said. He established that programmed cell death, a major and normal aspect of animal development, is an active biological process, dependent upon the functioning of particular genes.

By identifying and characterizing such genes in the nematode, Horvitz discovered mechanisms of broad significance in biology and medicine. Most recently, his laboratory found that phagocytes, or engulfing cells, believed to be only a cleanup crew that got rid of dying cells so harmful by-products wouldn't hurt the organism, actually play a role in helping cells die.

A separate research team led by Horvitz, with colleagues at Harvard, also discovered a new type of receptor in *C. elegans* that responds to serotonin. This finding could help explain how drugs such as Prozac, which manipulate levels of serotonin signaling, bring about their therapeutic effects. "We have identified a new mechanism of signaling in the nervous system, whereby serotonin can rapidly turn off, instead of turn on, the actions of nerve cells," Horvitz said.

The nematode is an important organism for research: It is the only animal for which scientists have developed a complete map of its cells (including a complete wiring diagram of its nervous system), a complete sequence of its DNA and a complete cell lineage. The latter

was deduced in part through the efforts of Horvitz in collaboration with Sulston of the Wellcome Trust Sanger Institute.

## EARLIER HONORS

Among Horvitz's many honors are the 1999 Gairdner Foundation International Award, the 1998 General Motors Cancer Research Foundation's Alfred P. Sloan Jr. Prize, the 1996 Ciba-Drew Award for Biomedical Science, the 1995 Charles A. Dana Award for Pioneering Achievements in Health, the 1993 V.D. Mattia Award from the Roche Institute of Molecular Biology, and the 1986 Warren Triennial Prize of the Massachusetts General Hospital.

In announcing the Mattia award, Roche Institute Director Hebert Weissbach said that Horvitz has made "fundamental contributions to our understanding of the role of specific genes in the development of an organism. His work on nematodes is a clear example of how research on what some might consider an obscure organism can yield valuable information that is relevant to other species, including man."

In 1993, Horvitz was one of the lead researchers of a collaborative nationwide effort by 32 researchers who found an association between a gene mutation and the inherited form of amyotrophic lateral sclerosis (ALS), or Lou Gehrig's disease.

Horvitz is a member of the National Academy of Sciences and a Fellow of the American Academy of Arts and Sciences and the American Academy of Microbiology. He is a member of several professional societies, including the Genetics Society of America (he was president in 1995). He is also a member of the National Advisory Council of the National Human Genome Research Institute and was co-chair of the Working Group on Preclinical Models for Cancer of the National Cancer Institute.

Horvitz was born on May 8, 1947, in Chicago. He received bachelor's degrees in mathematics and economics from MIT (1968) and the master's degree (1972) and Ph.D. (1974) in biology from Harvard University. He was a postdoctoral researcher at the Medical Research Council Laboratory of Molecular Biology in Cambridge, England. He joined the faculty of MIT in 1978 and became professor of biology in 1986 and an investigator of the Howard Hughes Medical Institute in 1988.

He and his family live in Newton, Mass. It's a home that really knows its biology—his wife is MIT biology professor Martha Constantine-Paton.