



Volume 50 – Number 14  
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## New web site delves into energy issues

EnergyClasses, a web-based tool that identifies MIT classes that revolve around or include energy research, policy or technology in their curricula, launches today ([energyclasses.mit.edu](http://energyclasses.mit.edu)).

Under the leadership of the Energy Research Council's (ERC) education subcommittee, a group of faculty, students and staff created the energy classes database. EnergyClasses will be managed initially by the education program of the Laboratory for Energy and the Environment (LFEE).

The ERC, created by MIT President Susan Hockfield in June 2005 to come up with an MIT strategy for dealing with the global energy crisis, is made up of 16 faculty members from every school across the Institute.

Co-chaired by Chevron Professor Robert C. Armstrong, head of the Department of Chemical Engineering, and Cecil and Ida Green Professor Ernest J. Moniz, co-director of LFEE, the council is working on a set of recommendations for Hockfield about how MIT can have an even bigger impact on addressing the world's energy problems in the future.

EnergyClasses will be part of a larger ERC web site that will feature a comprehensive database of energy initiatives on campus related to seeking out and manipulating primary sources of energy; innovative ways to harvest, store and transport energy; new ways to make buildings, vehicles, utilities, etc., more efficient; and the science, technology, policy and politics behind energy's impact on people and the planet.

In addition, the site will highlight individuals, student groups and laboratories involved in energy research, provide links to global energy news and promote upcoming energy-related MIT events.

Inquiries and new class suggestions for EnergyClasses can be forwarded to Amanda Graham at [agraham@mit.edu](mailto:agraham@mit.edu).

—Deborah Halber

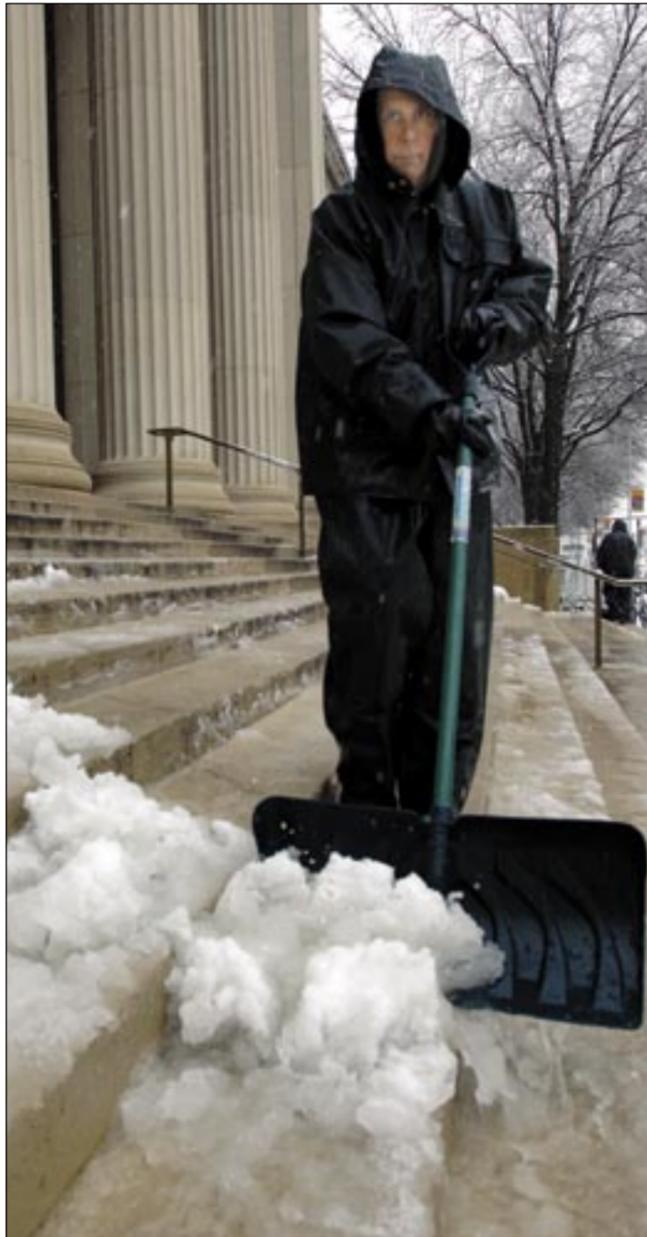


PHOTO / DONNA COVENEY

### Mush ado

Landscape worker Tom O'Neil of the Department of Facilities clears slush from the steps of 77 Mass. Ave. during the wintry mix of snow, sleet and rain that hit Monday, Jan. 23.

## Researchers find cloning yields normal stem cells

David Cameron  
Whitehead Institute

Scientists generally agree that all cloned animals are biologically flawed. But they don't agree about what that means for stem cells derived from cloned embryos, the basis for therapeutic cloning.

Also known as somatic cell nuclear transfer, therapeutic cloning is a promising approach to creating individually customized cellular therapies for treating certain disorders. Demonstrated in mice but not in humans, it begins with stem cells derived from a cloned embryo. But if cloned embryos can't produce normal organisms, how can they produce normal stem cells?

Scientists succeed in multiplying stem cells. Read about this breakthrough at [web.mit.edu/newsoffice](http://web.mit.edu/newsoffice)

Analyzing the complete gene-expression profiles of both cloned and fertilization-derived stem cells in mice, scientists at MIT and the Whitehead Institute for Biomedical Research now have concluded that the two are, in fact, indistinguishable.

"This paper demonstrates clearly that it doesn't matter if a stem cell has been derived from a cloned embryo or from a fertilized embryo," says Whitehead member and MIT biology Professor Rudolf Jaenisch, senior author on a paper that will appear online the week of Jan. 16 in the Proceedings of the National Academy of Sciences. "Both can be equally good for therapy."

To create a clone, a scientist removes the nucleus from a donor cell, then places it into an egg from which the nucleus has been removed. The researcher then tricks the egg into thinking it's been fertilized. The egg develops into a blastocyst, an early-stage embryo consisting of no more than 100 or so cells. The scientist can then either remove the stem cells from this blastocyst,

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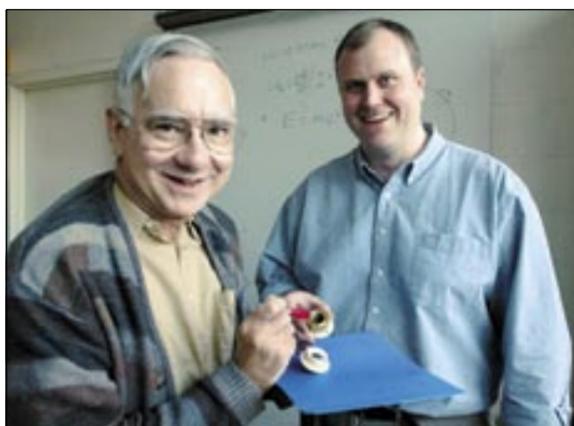


PHOTO / DONNA COVENEY

MIT physics Professor David E. Pritchard, left, and James K. Thompson display the key part of the apparatus they used to check Einstein's most famous equation. Their test was 55 times more accurate than previous tests.

## $E=mc^2$ passes tough MIT test

Elizabeth A. Thomson  
News Office

In a fitting cap to the World Year of Physics 2005, MIT physicists and colleagues report the most precise direct test yet of Einstein's most famous equation,  $E=mc^2$ .

And, yes, Einstein still rules.

The team found that the formula predicting that energy and mass are equivalent is correct to an incredible accuracy of better than one part in a million. That's 55 times more precise than the best previous test.

Why undertake the exercise? "In spite of widespread acceptance of this equation as gospel, we should remember that it is a theory. It can be trusted only to the extent that it is tested with experiments," said team member David E. Pritchard, the Cecil and Ida Green Professor

of Physics at MIT, associate director of MIT's Research Laboratory for Electronics (RLE) and a principal investigator in the MIT-Harvard Center for Ultracold Atoms.

Pritchard and colleagues from the National Institute of Standards and Technology (NIST), the Institut Laue Langevin (ILL), Florida State and the University of Oxford report their results in the Dec. 22 issue of *Nature*. They write: "If this equation were found to be even slightly incorrect, the impact would be enormous — given the degree to which [it] is woven into the theoretical fabric of modern physics and everyday applications such as global positioning systems."

In the famous equation,  $E$  stands for energy,  $m$  for mass, and  $c$  for the speed of light. "In the test, we at MIT

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### NEWS

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### RESEARCH



#### POINT OF NO RETURN

New research helps explain the enigmatic behavior of black holes.

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#### IAP ROUNDUP

Independent Activities Period offerings run the gamut from economics to fishing to mine removal (left).

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# Physicist earns share of Bruno Rossi Prize

Elizabeth A. Thomson  
News Office

MIT physicist Deepto Chakrabarty and two other scientists will share this year's Bruno Rossi Prize for their pioneering work on understanding the exotic environment around fast-spinning neutron stars, where matter can whirl about at nearly light speed and where space itself is warped.

The prize, named for the late MIT Institute Professor Emeritus, is the top award given each year by the High Energy Astrophysics Division of the American Astronomical Society (AAS). Announced earlier this month, the prize will be officially awarded at an AAS meeting next January in Seattle.

"Bruno Rossi was a giant at MIT, and as an MIT professor, I am humbled to receive an award named in his honor," Chakrabarty said.

Chakrabarty, an associate professor of physics at MIT and a researcher at MIT's Kavli Institute for Astrophysics and Space Research, shares the prize with Tod Strohmayer of the NASA

Goddard Space Flight Center and Rudy Wijnands of the University of Amsterdam.

Their work, done both independently and in collaboration, has been described as a breakthrough in interpreting the complex signals emitted as X-ray light from millisecond pulsars. A millisecond pulsar is a type of fast-spinning neutron star in a binary system with an ordinary star. Gas pulled away from the surface of the companion star crashes onto the neutron star, spinning it up to rotation rates of hundreds of revolutions per second.

These scientists have revealed that oscillations in the emitted X-ray light can be used to measure the pulsar's spin rate and other key parameters. Their observations were made with NASA's Rossi X-ray Timing Explorer, which marks its 10th year in orbit this month.

"The Rossi Explorer is a powerful tool to probe the environs of black holes and neutron stars," Chakrabarty said. "It has been thrilling to join my colleagues in so many discoveries."

Chakrabarty is an expert on millisecond pulsars. He credits his MIT colleagues and collaborators, especially research scientist Edward Morgan, with making his discoveries possible.

# Senior Senate aide to head MIT's Washington office

Sarah H. Wright  
News Office

William Boone Bonvillian, an attorney with experience in the legislative and executive branches of national government, expertise in science and technology policy, and knowledge of the university community, has been appointed director of federal relations for MIT. He will head MIT's Washington, D.C., office.

MIT President Susan Hockfield described Bonvillian as "widely respected on both sides of Capitol Hill and in the federal agencies. He has earned that respect through years of major contributions in the policy arena, including drafting many pieces of legislation and ferrying them through the process."

Bonvillian's "understanding and skill in matters of national science policy and higher education are extraordinary, and I am delighted to welcome him to MIT," she said.

Bonvillian will assume his MIT duties on Jan. 30. He succeeds John C. Crowley, vice president for government relations and founder, in 1991, of MIT's Washington Office, which works with Congress and the executive branch to raise understanding of the contributions of higher education and research to the national welfare.

Bonvillian said he is looking forward to his new role. "I have long viewed MIT as a critical institution in the future of our society and economy and have respected its historic role in national science policymaking. I am excited about supporting the ideas that flow from its great talent base," he said.

Bonvillian has served as legislative director and chief counsel to Sen. Joseph Lieberman (D-Conn.) since 1989. In that senior role, he has directed the senator's legislative staff and drafted and managed action on the senator's legislative policy initiatives, including initiatives in science and technology, economic growth, and defense research and development.

Bonvillian served in the executive branch as deputy assistant secretary for the U.S. Department of Transportation, from 1977 to 1980. There he worked on major legislation covering transportation deregulation and funding.

Bonvillian received the B.A., with honors, from Columbia University in 1969, the M.A.R. from Yale University in 1972 and the J.D. from Columbia University School of Law in 1974.

He and his wife live in Great Falls, Va.; they have two children.

For fuller story, visit <http://web.mit.edu/newsoffice/2006/dc-bonvillian.html>.



PHOTO / DONNA COVENEY

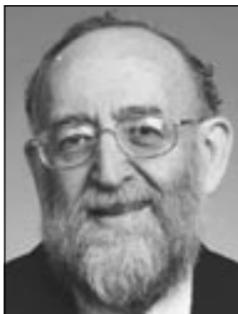
## Two for the road

In spite of raw temperatures, Jamal Isa gives Giselle Andrejack a ride on his bike on Wednesday, Jan. 11. Both are seniors in management.

# Moses named Engineering Systems Division acting director

Dean of Engineering Thomas Magnanti announced that he has appointed Institute Professor Joel Moses as acting director of MIT's Engineering Systems Division, an academic and research division formed to tackle the large-scale engineering challenges of the 21st century.

Magnanti also said he will convene a faculty advisory committee to search for a replacement for Professor Daniel Hastings, who has been ESD director since 2003. Hastings, a professor of aeronautics and astronautics and of engineering systems, was appointed Dean of Undergraduate Education effective Jan. 1.



Joel Moses

"I would like to take this opportunity to thank Dan Hastings for the spectacular job he has done as ESD director and to congratulate him on his well-deserved appointment as Dean of Undergraduate Education," Magnanti said. "It has been an enormous pleasure to work closely with Dan and I look forward to continuing to work with him in his new position."

Moses, a computer scientist, was MIT provost from 1995 to 1998, Dean of Engineering from 1991 to 1995, and head of the Department of Electrical Engineering and Computer Science from 1981 to 1989. He was named Institute Professor in 1999.

## DIGITALK: WHERE IT'S AT



### Computer security

The recent Windows Meta File vulnerability is one more example of why it's critical to keep computers protected against security and virus threats. The easiest and most effective way to do this is to set up your computer for automatic updates and patches. Windows users can subscribe to MIT's Windows Automatic Update Service (WAUS) at [web.mit.edu/ist/topics/windows/updates](http://web.mit.edu/ist/topics/windows/updates), and Linux users can register for Red Hat Network at [web.mit.edu/ist/topics/linux/rhn.html](http://web.mit.edu/ist/topics/linux/rhn.html). On the Macintosh, Software Update is set by default to check for updates weekly.

It's also important to keep Microsoft Office 2004 up to date. The WAUS service includes these updates for Windows users. Macintosh users can select the "check for updates" command under the help menu in any open Office 2004 program.

### Online MIT invitations

Hosting an event? MIT's online ordering system, ECAT, now features a customizable invitation package.

Using this simple system, MIT offices can order invitations and matching envelopes and have them delivered to their door. Two layouts accommodate both short and long text blocks. The MIT Publishing Services Bureau negotiated discounted print prices for a single-panel 5-inch-by-7-inch invitation card and matching A6 envelope: they print in two colors (MIT red and black) on your choice of white or natural white recycled paper.

Browse the MIT products or place your order online with ECAT partner Ambit Press at [web.mit.edu/ecat/businesspapers/](http://web.mit.edu/ecat/businesspapers/). For more information or to request samples, contact the Publishing Services Bureau at [psb-ecat@mit.edu](mailto:psb-ecat@mit.edu).

### Statistically speaking

Do you use statistical software packages, such as Stata, SAS or SPSS? Lynda Zhang, a newly hired statistical consultant at the Harvard-MIT Data Center, is available to answer questions about these packages and provide hands-on support. She can help employees learn how to use the programs, import and manage datasets, and perform statistical analysis and graphing.

Zhang is available for one-on-one help sessions at Dewey Library. To make an appointment or to ask for tips, send e-mail to [dataquest@help.hmdc.harvard.edu](mailto:dataquest@help.hmdc.harvard.edu). For more information on support for statistical software, visit [libraries.mit.edu/guides/subjects/data/software/consultant.html](http://libraries.mit.edu/guides/subjects/data/software/consultant.html). To learn about the Harvard-MIT Data Center, visit [libraries.mit.edu/get/hmdc](http://libraries.mit.edu/get/hmdc).

### Access rights in TechTime

MIT's TechTime calendar system is set up so that any MIT TechTime user may view any other MIT TechTime user's agenda. You control what others can see in your agenda by setting an access level when you create a meeting, event, note or task. The pre-set access levels when others view your agenda are:

- Normal and personal: For meetings, another user sees only the time and no other details; for events, notes and tasks, nothing is shown.
- Confidential: Nothing is shown for the entry.
- Public: All details are shown for the entry, and other users can copy the entry into their own agendas.

You can redefine access rights to your calendar for specified MIT TechTime users or for MIT TechTime users in general. You can also create Designate rights (also known as proxy rights) for a specified user, so that person is able to make changes to your calendar.

For more information, visit [itinfo.mit.edu/article.php?id=6741](http://itinfo.mit.edu/article.php?id=6741).

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# MIT to sell share in Technology Square

Denise Brehm  
News Office

MIT announced last week that it intends to sell some share in the seven buildings of Technology Square while retaining ownership of the land itself. This transaction will not affect current tenants, including about half a dozen MIT offices and departments in the development, which is located a few blocks from Kendall Square in Cambridge.

"MIT is looking to recapitalize the property at this time to take advantage of favorable market conditions," said Steve Marsh, managing director of MIT's real estate investments office.

"We are fully committed to keeping the space leased by MIT offices and departments in Technology Square fully integrated into our campus and to making a smooth transition to the new building owners," said MIT Provost L. Rafael Reif.

"MIT's decision to sell its interest in the buildings is a prudent investment decision that will enhance our overall financial strength. Decisions to recapitalize in this way occur frequently in the real estate investment world and usually result in a seamless transition with no impacts on the tenants," he said. "MIT intends to retain ownership of the land at Technology Square and therefore would be the landlord to anyone who owns an interest in the buildings."

MIT purchased Technology Square from Beacon Capital Partners for \$278.8 million in January 2001. At that time, there were four buildings on the property and three more under construction. MIT converted the parcel from an office park to a life sciences and technology center with laboratory, office and retail space, and a parking garage. The parcel is bounded by Main, Portland and Broadway streets, with Draper Laboratory on the fourth side.

In addition to large biotechnology firms, including Novartis, the 1.15-million-square-foot development is home to MIT's Institute for Soldier Nanotechnologies,



PHOTO / DONNA COVENEY

MIT announced last week it plans to sell some share in Technology Square, which is a few blocks from Kendall Square in Cambridge.

Center for Biomedical Engineering, Facilities, Central Accounting Office and the MIT Federal Credit Union. Before moving into the Stata Center in 2004, the Laboratory for Computer Science and the Artificial Intelligence Laboratory were tenants of 200 Technology Square for many years when MIT did not own the property.

At the city's request, MIT marketed first-floor space to small retailers as a way

of bringing foot traffic to the area. Quizno's Subs, 7-Eleven Convenience Store, Kinko's, Fitcorp and Bank of America all lease space in the development, and the university is working to identify new retail establishments to take space recently vacated by Polcari's restaurant.

High-tech and life sciences firms, including Novartis, Dyax, TolerRx, Forrester and Elsevier publishing company, lease office

and lab space at Technology Square.

The increase in property values since 2001 has meant increased real estate tax revenue for Cambridge. MIT paid the city \$2.8 million in taxes on the parcel in 2001, and will pay nearly \$6.2 million in 2006. Because MIT will continue to own the land at Technology Square even after the recapitalization, the Institute will continue to pay the city real estate taxes for the entire parcel.

## Happy birthday, Endicott House

Endicott House is celebrating 50 years as part of MIT with a new book detailing the history of the families who once lived on the estate in Dedham, Mass. The original house, Rockweld (photo at far left), was built around the time of the Civil War by the grandfather of Rose Weld Baldwin (far right). Baldwin attended a Jan. 17 celebration at the house, with Priscilla and Bradford Endicott, siblings whose father built Endicott House on the site where Rockweld once stood. For full story, visit [web.mit.edu/newsoffice](http://web.mit.edu/newsoffice).



PHOTO / LAURA WULF

## Political strategist will give keynote at MLK breakfast

Sarah H. Wright  
News Office

Donna Brazile, the first African-American woman to lead a major presidential campaign, will be the keynote speaker at MIT's 32nd annual celebration of the life and legacy of Martin Luther King Jr.

The theme for the 2006 celebration is "Dr. King's Unfinished Agenda: A Call for Economic and Social Justice in the 21st Century." Brazile will deliver her remarks at a breakfast event honoring King on Thursday, Feb. 9 at 7:30 a.m. in Morss Hall. MIT President Susan Hockfield and Dr. Thomas Byrne will host the celebration.

Brazile served as senior strategist and campaign manager for Democrat Al Gore's 2000 presidential bid.

A native of New Orleans, she is currently chair of the Democratic National Committee's Voting Rights Institute, an adjunct professor at Georgetown University and managing director of her own political consulting firm, Brazile and Associates, in Washington, D.C.

Brazile's 2004 book, "Cooking With Grease: Stirring the Pots in American Politics," is a memoir of her career as a political strategist, including such accomplishments as organizing demonstrations to make Martin Luther King Jr.'s birthday a national holiday as well as working in senior roles in the presidential campaigns of Jesse Jackson, Richard Gephardt, Michael Dukakis and Bill Clinton.

According to "Cooking With Grease," Brazile discovered her flair for political organizing as a youngster, when she campaigned for a candidate who promised her neighborhood a playground. She committed her professional life to political and social activism the day after King was assassinated in 1968.

Prior to managing the Gore-Lieberman campaign in 2000, Brazile was chief of staff and press secretary to U.S. Representative Eleanor Holmes Norton (D-District of Columbia).

A frequent contributor and political commentator on CNN's "Inside Politics" and "Crossfire," Brazile is a columnist for Roll Call, the newspaper of Capitol Hill, and a con-

See **MLK**

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## Challenger anniversary recalls MIT's contributions

This week the world will mark the 20th anniversary of the explosion of the space shuttle Challenger, a disaster felt deeply at MIT, which has a long history of close connections to the space program.

When the Challenger exploded, 73 seconds after liftoff on Jan. 28, 1986, all seven crew members were killed — including MIT alumnus Ronald E. McNair (Ph.D. 1976).

Over the years, contributions to NASA's mission by MIT scientists and engineers have ranged from developing the guidance and navigation system that allowed Apollo astronauts to reach the lunar surface, to exploring the frontiers of X-ray astronomy with the Chandra Observatory.

"MIT has always been key to NASA's success. Our people, technology development and scientific investigations have been intertwined since the earliest days of the space program," said William Readdy, NASA associate administrator for space operations.

NASA was founded in 1958. As of July 2004, MIT had 32 alumni astronauts, among them Buzz Aldrin (Sc.D. 1963), Franklin Chang-Diaz (Sc.D. 1977) and Janice Voss (Ph.D. 1987), the first alumna to fly in space.

Two former astronauts are on the MIT faculty: Jeffrey Hoffman, veteran of five shuttle missions, and Laurence Young (S.B. 1957, Ph.D. 1962), alternate payload specialist

for the 1993 Columbia mission.

Some highlights of the MIT-NASA collaboration:

- 1961, the MIT Instrumentation Lab wins the first major contract of the Apollo program.
- 1960-1968, Robert C. Seamans Jr., alumnus (S.M. 1942, Sc.D.) and professor emeritus, serves as NASA's deputy administrator.
- 1973, Professors Harry G. Gatos and the late August F. Witt lead MIT materials scientists in the first experiments to grow crystals aboard NASA's first space station, Skylab.
- 1988, Frederick H. Hauck (S.M. 1966) commands Discovery, the first shuttle mission after Challenger.
- 1997, NASA astronaut Wendy Lawrence (S.M. 1988) participates her first shuttle-Mir docking sessions.
- 1999, NASA astronaut Catherine G. "Cady" Coleman (S.B. 1983) leads deployment of the Chandra X-ray Observatory.
- 2000, astronaut William M. Shepherd (OCE 1978) commands the first crew to live and work aboard the International Space Station.
- 2004, alumnus Lt. Col. Mike Fincke (S.B. 1989) begins a six-month stay on the International Space Station.

—Elizabeth A. Thomson

# Nuclear energy projects get \$2M

Denise Brehm  
News Office

The U.S. Department of Energy (DOE) awarded \$2 million in grants to three MIT projects as part of an initiative to encourage nuclear energy research and development in the United States.

The research will be done through MIT's Center for Advanced Nuclear Energy Systems, which was established in 2000 to work on the development of technologies for nuclear energy plants and fuel facilities. Professor Mujid S. Kazimi of the Department of Nuclear Science and Engineering directs the center.

The grants were awarded under the DOE's Nuclear Energy Research Initiative (NERI) to develop advanced nuclear technologies to make the United States less reliant on imported fossil fuels.

About 85 percent of the world's energy currently comes from fossil fuels, which also account for most of the carbon dioxide in the atmosphere.

The United States is responsible for the world's largest percentage of carbon dioxide emissions relative to its gross domestic product. By contrast, France,

which uses nuclear power to produce electricity, has the lowest emissions per gross domestic product.

In the next few years, MIT is expected to make a big push in the area of energy research, following the creation by President Susan Hockfield of the MIT Energy Research Council. The council is charged with determining the areas of energy research in which MIT can make the greatest impact.

The DOE selected the 24 NERI research projects totaling \$12 million from a pool of 144 proposals. MIT and Purdue University each earned three awards; the University of Wisconsin, North Carolina State University and University of Michigan each received two grants.

"These awards support the department's advanced nuclear technology development efforts and foster the education and training of the next generation of scientists and engineers needed to move this vital industry forward," said U.S. Secretary of Energy Samuel W. Bodman, an MIT alumnus (Sc.D. 1965).

The three MIT projects funded under the NERI grants are:

- MIT Professor Ronald Ballinger is the principal investigator on a collaborative project with Los Alamos National Labora-

tory that will seek to develop a corrosion-resistant material to use for making fuel cladding and structural materials in lead-cooled reactor systems. The project will receive about \$1 million in funding over three years.

- MIT Professor Neil Todreas and Pavel Hejzlar, a principal research scientist, are co-principal investigators on a project to develop nuclear reactor designs with a flexible conversion ratio for lead alloy and liquid salt coolants. This is a \$500,000 grant over two years.

- MIT Professor Paul Barton will develop a model for the simulation and optimization of a system to produce hydrogen from water using the heat and/or electricity generated by a nuclear plant. The grant is for \$500,000 over three years and is part of a larger project to design a plant that could produce hydrogen without creating greenhouse gas emissions.

In addition, Todreas is co-principal investigator with Ehud Greenspan and Donald Olander of the University of California at Berkeley on a project to assess the feasibility of improving pressurized water reactors by using hydride instead of oxide fuels. MIT's award is a \$190,000 subcontract from Berkeley for two years.

## STEM

Continued from Page 1

or place it into a uterus where it has the potential to develop into a fetus.

Here's where things get complicated. The original donated nucleus may have come from, say, a skin cell. For a viable fetus to develop, the egg needs to reprogram the genome of the skin cell, shutting off genes specific for skin tissue and turning on genes needed for embryonic development, genes that are normally dormant in tissue-specific cells. In other words, the egg needs to erase all tissue-specific memories from the skin cell and revert it into a genomic blank slate.

But this entire process is almost never perfect, and nearly all cells in a cloned blastocyst retain some memory of their original source. As a result, the developing fetus inevitably has some degree of genetic abnormality. Most clones, in fact, die in utero or at birth. The few clones that make it into adulthood are often plagued by bizarre health complications. This is one reason why scientists generally believe that attempting to clone a human being is morally reprehensible.

But are the cloned embryo's stem cells beleaguered by the same defects?

Studies have demonstrated that a small number of stem cells in the blastocyst appear to be spared this faulty reprogramming. When stem cells from a cloned blastocyst are removed and placed into a dish, most die. A few, however, survive and give rise to an embryonic stem cell line, and these appear to be thoroughly reprogrammed.

Researchers have tried to test the integrity of these surviving stem cells by transplanting them into fertilized blastocysts and then observing the overall health of the resulting animal. Although these animals generated entirely from cloned stem cells appear to be fine, many scientists don't accept this result as definitive.

Tobias Brambrink, a postdoctoral researcher in the Jaenisch lab, tried a different approach, comparing gene expression in cloned and fertilization-derived stem cells. With a series of microarray chips, Brambrink measured which genes were active and which were silent in both kinds of cells. To ensure the accuracy of his results, he compared five lines of cloned stem cells with five fertilization-derived stem cell lines.

"The results are very clear," says Brambrink. "If a gene is active in fertilized stem cells, it's also active in cloned stem cells, and at the same level of activity. The same goes for genes that are silent. There is really no significant molecular difference between both kinds of stem cells."

"In my opinion, these results solidify the argument that while a cloned animal is abnormal, a cloned stem cell is perfectly normal," says Jaenisch.

This study was funded by the National Institutes of Health.

## Committee solicits animal care concerns

The chairman of the Committee on Animal Care and Alice Gast, the vice president for research and associate provost, are once again soliciting any information that would aid MIT's effort to maintain the humane care of animals used in research.

MIT's Committee on Animal Care was established to ensure that all MIT researchers working with animals comply with federal, state, local and institutional regulations on animal care. To that end, the committee inspects animals, animal facilities and laboratories, and reviews all research and teaching exercises which involve animals before experiments are performed.

If you have information about inadequate animal care or treatment or any information that would help the Committee on Animal Care fulfill its responsibilities, please call x3-9436 or call Professor Gast at x3-1403.

All concerns about animal care will be handled confidentially and will be investigated by the committee. The panel will report its findings to anyone who has such concerns, as well as to the vice president for research and associate provost.

## Black hole's 'point of no return' found

Scientists have found new evidence that black holes are performing the disappearing acts for which they are known.

A team from MIT and Harvard has found that a certain type of X-ray explosion common on neutron stars is never seen around their black hole cousins, as if the gas that fuels these explosions has vanished into a void.

This is strong evidence, the team said, for the existence of a theoretical border around a black hole called an event horizon, a point from beyond which nothing, not even light, can escape.

Ron Remillard of the Kavli Institute for Astrophysics and Space Research at MIT in Cambridge, Mass., led the analysis and discussed his team's result earlier this month at a press conference at the 207th meeting of the American Astronomical Society in Washington, D.C. His colleagues are Dacheng Lin of MIT and Randall Cooper and Ramesh Narayan of the Harvard-Smithsonian Center for Astrophysics in Cambridge.

The scientists studied a complete sample of transient X-ray sources detected with NASA's Rossi X-ray Timing Explorer during the last nine years. They detected 135 X-ray bursts from the 13 sources believed to be neutron stars, but none from the 18 suspected black holes.

Gas released by a nearby star can accumulate on the hard surface of a neutron star, and it will eventually erupt in a thermonuclear explosion.

The more massive compact objects in this study suspected of being black holes appeared to have no surface. Gas falling toward the black hole seems to disappear.

"Event horizons are invisible by definition, so it seems impossible to prove their existence," said Remillard. "Yet by looking at dense objects that pull in gas, we can infer whether that gas crashes and accumulates onto a hard surface or just quietly vanishes. For the group of suspected black holes we studied, there is a complete absence of surface explosions called X-ray bursts."

A black hole forms when a very massive star runs out of fuel. Without energy to support its mass, the star implodes. If the star is more than 25 times more massive than our sun, the core will collapse to a point of infinite density with no surface.

Within a boundary of about 50 miles from the black hole center, gravity is so strong that not even light can escape its pull. This boundary is the theoretical

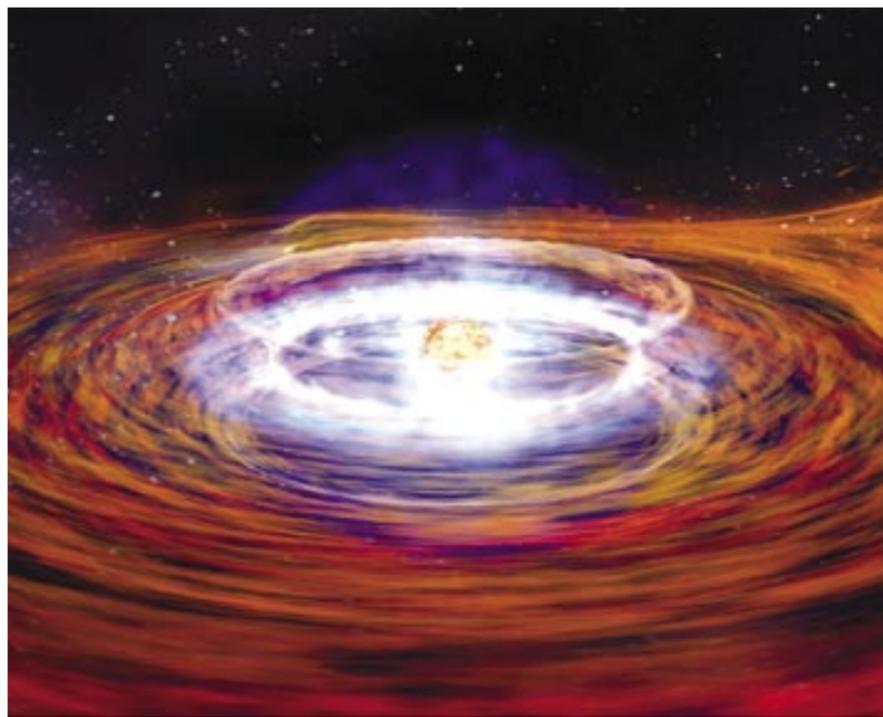


IMAGE / NASA/DANA BERRY

MIT and Harvard researchers have found evidence for the existence of an event horizon — a point beyond which light and X-rays from neutron stars like this one cannot escape.

event horizon.

Stars of about 10 to 25 solar masses will collapse into compact spheres about 10 miles across, called neutron stars. These objects have a hard surface and no event horizon.

Black holes and their neutron star cousins are sometimes located in binary systems, orbiting a relatively normal star companion. Gas from these stars, lured by strong gravity, can flow toward the compact object periodically. This process, called accretion, releases large amounts of energy, predominantly in the form of X-rays.

Gas can accumulate on a neutron star surface, and when conditions are ripe, the gas will ignite in a thermonuclear explosion that is visible as a one-minute event called a Type I X-ray burst.

The suspected black holes — that is, the more massive types of compact objects in this study — behave as if they have no surface and are located behind event horizons.

The idea of using the absence of X-ray bursts to confirm the presence of event horizons in black holes was proposed in 2002 by Harvard's Narayan and Jeremy Heyl of the University of British Columbia in Vancouver.

The Rossi Explorer, launched on Dec. 30, 1995, is operated by NASA Goddard Space Flight Center in Greenbelt, Md.

For more information, including images, visit [http://universe.nasa.gov/press/event\\_horizon/event\\_horizon.html](http://universe.nasa.gov/press/event_horizon/event_horizon.html).

## Hole dents space-time

MIT scientists and colleagues have found a black hole that has chiseled a remarkably stable indentation in the fabric of space and time, like a dimple in one's favorite spot on the sofa.

The finding may help scientists measure a black hole's mass and how it spins, two long-sought measurements, by virtue of the extent of this indentation. Using NASA's Rossi X-ray Timing Explorer, the team saw identical patterns in the X-ray light emitted near the black hole nine years apart, as captured in archived data from 1996 and in a new, unprecedented 550-hour observation from 2005.

Black hole regions are notoriously chaotic, generating light at a range of frequencies. Similarities seen nine years apart imply something very fundamental is producing a pair of observed frequencies, namely the warping of space and time predicted by Einstein but rarely seen in such detail.

Jeroen Homan of the Kavli Institute for Astrophysics and Space Research at MIT and his colleagues from the University of Michigan, Amsterdam University and MIT presented this result on Monday, Jan. 9, at the annual meeting of the American Astronomical Society in Washington, D.C.

For the full story, visit [web.mit.edu/newsoffice/2006/blackhole2.html](http://web.mit.edu/newsoffice/2006/blackhole2.html).

# Tarot, fishing, landmines round out IAP

Independent Activities Period (IAP) offered MIT students the chance to take part in some out-of-the-ordinary offerings — from planning a trip to Mars to trying their hand at fly fishing. To read more about these and other activities, visit <http://web.mit.edu/newsoffice/topic/iap.html>.

## Teaching tarot

Financial Aid Director Daniel Barkowitz uses IAP as a time to share his interests — both professional and personal. In “Financial Aid 101,” Barkowitz walks students, staff and faculty through the mysterious and sometimes daunting world of financial aid for school. He shifts gears to teach his other annual IAP offering, “History and Mystery of the Tarot.” “IAP really gives everyone the chance to get out of the daily rut,” Barkowitz said. (Published Jan. 11)

## Dating analysis

In a lecture sponsored by the Department of Economics, economist Ray Fisman, who has studied speed dating, analyzed men’s and women’s dating preferences. Fisman found that men are less likely to date women they believe are smarter or more ambitious than they are. They also place higher value on physical attractiveness than women do. On the other hand, women’s interest in dating a man grows with his intelligence, even if they believe it exceeds their own. (Jan. 11)

## Trip to Mars

Planning for a colony on Mars is well underway, according to MIT graduate student Joseph Palaia, who presented the Mars Homestead Foundation’s vision for settling the red planet by 2025. The foundation sponsored several IAP brainstorming sessions for students who want to get involved in the project. (Jan. 12)

## Taste of Middle Ages

Participants in “Old Food: Ancient and Medieval Cooking,” a one-session IAP course led by Anne E.C. McCants, associate professor of history and MacVicar Faculty Fellow, “ate exceptionally well,” she said. The jolly crew of 25 enjoyed a medieval meal that included sourdough bread, fresh butter churned right in Next House, roast pork in a strong wine and spice marinade, a green “poree” with spinach and chard, a white “poree” with leek whites and milk; and lasagna with hand-made noodles but no sauce, as tomatoes are a New World food. (Jan. 13)

## Kid-friendly engineering

Contrary to popular belief, engineering concepts can be taught to children as young as 5, graduate student Kristen Bethke said at an Independent Activities Period seminar called “Teaching Engineering to Kids.” In the seminar, MIT students used Lego building blocks with computerized engines to learn how students as young as 5 can explore math, science and simple engineering concepts. (Jan. 17)

## Cleaning up landmines

IAP sessions titled “MIT Design for Demining” challenged students to clean up the cruelest litter of war. The sessions introduced humanitarian demining — the process of detecting, removing and disposing of landmines — and demonstrated inventions or improvements in hand tools, protective gear, safety equip-



Graduate students Shaya Famini, left, and Joseph Laracy catch a fly-fishing lesson on Wednesday, Jan. 11. The IAP session was held in Walker Memorial Hall with the murals by Edwin H. Blashfield as a backdrop.



Associate Professor Anne McCants bastes the roast pork for her IAP session ‘Old Food: Ancient and Medieval Cooking,’ held in the kitchen of Next House.

ment, educational graphics and teaching materials developed by past students in Andrew Heafitz’ spring course on demining, SP.776. (Jan. 17)

## Faith of scientists

Faith and science were not mutually exclusive for many great scientists, including astronomer Johannes Kepler. A series



MIT Financial Aid Director Daniel Barkowitz teaches two courses during the Independent Activities Period — one on financial aid and one on tarot.

of lectures sponsored by the Department of Nuclear Science and Engineering is exploring the work of Kepler, Sir John Carew Eccles, Robert Boyle and James Clerk Maxwell. (Jan. 19)

## Wal-Mart is good for you

Economics Professor Jerry Hausman spoke about his research on Wal-Mart,

## PHOTOS / DONNA COVENEY



Andrew Heafitz, instructor at the Edgerton Center, shows graduate student Olivia Leiternann, in protective gear, how to find a mine during ‘MIT Design for Demining.’

which shows that the store improves overall consumer welfare. Hausman, whose specialty is econometrics, argues that Wal-Mart’s low food prices benefit consumers, especially the poorest families. His research contradicts other findings by the U.S. Bureau of Labor Statistics, which says that consumers are no better off when a Wal-Mart enters their community. (Jan. 20)

## EINSTEIN

Continued from Page 1

measured  $m$ , or rather the change in  $m$  associated with the energy released by a nucleus when it captures a neutron,” said former MIT graduate student Simon Rainville.

The NIST/ILL scientists, led by Hans Börner of ILL and the late Richard Deslattes of NIST, measured  $E$ . (The speed of light is a defined and therefore exactly known quantity, so it was simply plugged into the equation.)

Specifically, the ILL/NIST team determined the energy of the particles of light, or gamma rays, emitted by the nucleus when it captures a neutron. They did so using a special spectrometer to detect the small deflection of the gamma rays after

they passed through a very pure crystal of silicon.

The mass loss was obtained at MIT by measuring the difference between the mass of the nucleus before the emission of a gamma ray and after. The mass difference was measured by comparing the cyclotron orbit frequencies of two single molecules trapped in a strong magnetic field for several weeks.

Pritchard notes that the mass of the nucleus is about 4,000 times larger than the much smaller mass difference. As a result, “determining the mass difference requires the individual masses to be measured with the incredible accuracy of one part in 100 billion — equivalent to measuring the distance from Boston to Los Angeles to within the width of a human

hair!”

Despite the results of the current test of  $E=mc^2$ , Pritchard said, “This doesn’t mean it has been proven to be completely correct. Future physicists will undoubtedly subject it to even more precise tests because more accurate checks imply that our theory of the world is in fact more and more complete.”

Pritchard’s MIT colleagues are Rainville (now at Université Laval, Quebec) and James K. Thompson (now an RLE postdoctoral associate in the MIT-Harvard Center for Ultracold Atoms). Rainville and Thompson are co-lead authors of the Nature paper.

This work was funded by the National Science Foundation and by a Precision Measurement Grant from NIST.

## Einstein on $E=mc^2$

“It followed from the special theory of relativity that mass and energy are both but different manifestations of the same thing — a somewhat unfamiliar conception for the average mind. Furthermore, the equation  $E$  is equal to  $mc^2$ , in which energy is put equal to mass, multiplied by the square of the velocity of light, showed that very small amounts of mass may be converted into a very large amount of energy and vice versa. The mass and energy were in fact equivalent, according to the formula mentioned above. This was demonstrated by Cockcroft and Walton in 1932, experimentally.”

To hear an audio clip of Einstein explaining this, go to <http://www.aip.org/history/einstein/voice1.htm>.

# Biological engineering may become Course 20

Kathryn M. O'Neill  
News Office

Biological engineering faculty put forward an ambitious proposal for a new Course 20 at the faculty meeting held Dec. 21 in the Stata Center's Room 141.

Founded in 1998 as a new academic unit, the Biological Engineering Division received approval in February 2005 to accept undergraduate majors. The course number its faculty propose to use has been unassigned for nearly two decades.

Changing or renaming a course occurs only after careful deliberation by the faculty and generally in response to developments in science and engineering practices.

Only one course has remained constant throughout the Institute's history — Course 2 (mechanical engineering) was named in 1868, while many others have been renamed as education and practices have changed. One example is Course 3, established as mining engineering and metallurgy in 1868. In 1940, mining engineering was discontinued, and metallurgy took over Course 3. Today's Course 3, materials science and engineering, was named in 1975.

The history of Course 20 reflects similar developments. Established in 1946 as food technology, it was renamed in 1961 to nutrition, food science and technology, refined in 1963 to nutrition and food science, and known from 1985 to 1989 as applied biological sciences.

The Committee on Curriculum and the Faculty Policy Committee have both approved the division's request for a course number, which was endorsed by Dean of Engineering Thomas Magnanti. Professor Douglas Lauffenburger, the Whitaker Professor of Bioengineering and director of the Biological Engineering Division, presented the proposal to the faculty.

He said the division had to meet the following six criteria to attain a course number:

- The entity wishing to assume a course number should hire, promote and tenure its own faculty.
- The entity should have a clear place in the MIT organizational scheme.
- The entity should be assured of reasonable permanence and the dean of the school should attest to its permanence.
- The entity should be authorized by the Corporation to grant degrees, preferably both graduate and undergraduate.
- The entity should be authorized to admit graduate students, serve as the focus of registration for them, teach all of the core required courses, offer the exams needed to qualify for degrees and qualify the students.
- The entity should not contain or be contained within another entity with a course number.

Lauffenburger noted that Dean Magnanti had asserted in his endorsement memo to the Committee on Curricula and the Faculty Policy Committee that biological engineering had met each of the criteria. The division now has 20 full-time

equivalent faculty (with a total number of more than 40 members) and more than 125 doctoral students. The new S.B. has an initial cohort of about 30 students, Lauffenburger said.

The division is requesting Course 20, Lauffenburger said, because of its history as the number for the former Department of Applied Biological Sciences.

Magnanti spoke in support of the motion, calling biological engineering "a very vibrant unit by almost any measure." He added, "For example, the Ph.D. program is, I believe, one of the most competitive to get into at MIT."

The faculty will be asked to vote on the proposal at its next regular meeting on Feb. 15.

The faculty also heard two reviews of M.Eng. programs, one in civil and environmental engineering, and the other in logistics. At MIT, M.Eng. programs offer a one-year master's degree and are targeted at students who plan to work in industry, rather than academia. A number of M.Eng. professional programs were begun in the late 1990s, and reviews were begun in 2001 to monitor their continued viability. Three programs have been eliminated since that time, said Magnanti — aeronautical engineering, ocean engineering and nuclear engineering — and one has been added, in manufacturing.

Patrick Jaillet, the Edmund K. Turner Professor and head of the Department of Civil and Environmental Engineering, presented the review of the M.Eng. in civil and environmental engineering, a nine-month program. He noted that companies hiring students from the program "like the way we are educating these students." He concluded that, "Yes, indeed, this program is a central mission of the department."

Professor Yossi Sheffi of civil and environmental engineering and engineering systems, who is director of the Center for Transportation and Logistics, presented the review of the M.Eng. in logistics (MLOG), also a nine-month program. The program is popular, selective and profitable for the Institute, Sheffi commented.

"We see a lot of universities around the world following in our footsteps and we help them establish their own programs," he said. All of the 2005 graduates received job offers within two weeks of graduation and saw salary increases averaging 60 percent, not including bonuses, he said.

"It is clear to us that we could run a program three to four times this size," Sheffi said.

Professor Daniel Hastings of aeronautics and astronautics and engineering systems, commented, "We see the MLOG program as one of our core programs." At the time of the meeting, Hastings was the director of the Engineering Systems Division. He became the dean for undergraduate education on Jan. 1.

In other business, the faculty approved a change to the rules for electing members to standing committees. The change is designed to provide the faculty with more information about candidates nominated off the slate, said Professor Bruce Tidor, associate chair of the faculty.

## OBITUARIES

### FRANK T. CARY

Frank T. Cary, former IBM chair and life member emeritus of the MIT Corporation, died Jan. 1 at his home in Darien, Conn. He was 85.

Cary spent his entire career at IBM, where he started as a marketing representative and eventually served as president, chair, chief executive officer and director. He retired from IBM in 1991.

Cary joined the MIT Corporation in 1974, was elected a life member in 1984 and became a life member emeritus in 1983. He also served on the boards of several corporations, including ABC, J.P. Morgan, Texaco and Merck, and of several nonprofits, including the American Museum of Natural History, the Museum of Modern Art and Rockefeller University.

For full obituary information, visit [web.mit.edu/newsoffice](http://web.mit.edu/newsoffice).

### KENNETH L. THOMPSON

Kenneth L. Thompson, a retired product manager in the Department of Physical Plant, died Oct. 27 at the age of 82.

Thompson worked at MIT for 42 years redesigning and supervising the reconstruction of classrooms and laboratories, said his wife, Ruth Thompson. He was also

a longtime member of the Committee for Review of Space Planning. He retired from MIT in 1992.

Born and raised in Marblehead, he joined the Air Force in 1943 and served as a pilot during World War II and the Korean War. He graduated from St. Anselm College and the Wentworth Institute of Technology, majoring in architectural construction.

He is survived by his wife, Ruth Thompson; two daughters, Linda Olmstead of Westford and Kristin Doucet of Bedford; and four grandchildren.

### PAULINE M. MARCHANT

Pauline M. Marchant, a research nurse at the MIT General Clinical Research Center for 26 years, died Jan. 4. She was 64.

Marchant, who had planned to retire this February, was a protocol nurse for many clinical studies and cared for patients with a wide variety of ailments.

Marchant is survived by a son, Peter Marchant of Stoneham; a daughter, Paula Stavre of Stoneham; a brother, James Byrne of Revere; a sister, Barbara Bernis of Somerville; and four grandchildren.

Donations may be made to the Middlesex East VNA/Sawtelle Hospice House, 320 Haverhill St., Reading, MA 01867.



PHOTO / DONNA COVENEY

### A moving experience

Freshman Kiersten Pollard, center, makes her moves during a Middle Eastern dance class led by MIT staffer Loni Butera, left, on Wednesday, Jan. 18, at the T-Club Lounge.

## MLK

### Continued from Page 3

tributing writer for Ms. magazine. She has also produced and hosted "A View From the Hill," on Radio One in Washington, D.C., and Baltimore, Md.

In addition to working on political campaigns, Brazile has served as a senior lecturer and adjunct professor at the University of Maryland and as a fellow at Harvard's Institute of Politics. She is presently the Senator Wynona Lipman Chair in Women's Political Leadership at Rutgers University.

Brazile is the founder and executive director of the National Political

Congress of Black Women. She is the recipient of numerous awards and honors, including the Congressional Black Caucus Foundation's Award for Political Achievement. She was also named one of Washingtonian magazine's 100 most powerful women in Washington, D.C. Brazile earned the B.A. degree from Louisiana State University.

The MIT breakfast honoring King is open to students and other members of the MIT community. Space is limited and reservations are necessary. To request an invitation, please visit [web.mit.edu/mlk-ing/www/event\\_index.html](http://web.mit.edu/mlk-ing/www/event_index.html).

## CLASSIFIED ADS

Members of the MIT community may submit one classified ad each issue. Ads can be resubmitted, but not two weeks in a row. Ads should be 30 words maximum; they will be edited. Submit by e-mail to [ttads@mit.edu](mailto:ttads@mit.edu) or mail to Classifieds, Rm 11-400. Deadline is noon Wednesday the week before publication.

### HOUSING

House/apartment rental or house-sitting arrangement for March, April, May 2006 sought by longtime MIT administrative staffer. 617-413-6220.

Single furnished room, new, modern, for visiting post-docs, faculty. Fee includes linens, kitchen, laundry privileges, services and utilities. Walk to Harvard/MIT. References. \$950/mo. Available February or March. E-mail [sokolovska@mac.com](mailto:sokolovska@mac.com) or call 617-625-9839.

Beautiful condo, Commonwealth Ave (Allston), on Green Line. Living room, dining room, den, foyer, bedroom, renovated kitchen and bath, high ceilings, hardwood floors, deeded parking, storage.

Asking \$375K. Contact [plw@albertcorp.com](mailto:plw@albertcorp.com).

Lexington, 6 rm contemporized cape, \$599,000, master BR suite, study, 2 BR's and bath upstairs, skylights, hdwd flrs, AC, 2 car gar. 781-981-2671.

### FOR SALE

Crib with mattress, new, \$150; Ethan Allen bachelor chest, new \$650, sell \$250; wood file cabinets, \$60 each; misc. tables and chairs, some oriental scatter rugs, older Apple computer with printer, best offer. Call 617-332-8251 or [rgunder@mit.edu](mailto:rgunder@mit.edu).

Men's jacket: Size large, medium brown leather-look, below hip length, fleece lining throughout, made in Italy, new, \$150 value - asking \$50. Call Rosalie at 781-391-1307.

Cherry hutch approx 7' high by approx. 67" long and approx 19" deep; also cherry dining table 44" by 66". Best offer. Call Pat at 617-625-7524 after 6 p.m.

### MISCELLANEOUS

GRTs wanted! Foster supportive, safe and positive living environment for undergraduates in MIT's dorms. Compensation: free room year-round and stipend of \$1460/academic year. Contact Ed Ruiz at 617-452-4280 or [edruiz@mit.edu](mailto:edruiz@mit.edu). Or visit [web.mit.edu/slp/rfp](http://web.mit.edu/slp/rfp).

Volunteer needed to assist a blind student with some technical work. A couple of hours per week. Please call 617-734-0777.

Writing your thesis? Submitting a paper to a journal? Experienced MIT-based editor can fix grammar, improve style, and enhance the clarity of your document. Reasonable rates. E-mail [wordplayer06@yahoo.com](mailto:wordplayer06@yahoo.com).

### STUDENT EMPLOYMENT

Positions for students with work-study eligibility

Jr. Achievement of Eastern Mass provides economic & financial literacy programs for grades K-12. Seeking student for position in Development

Dept., spring semester, possibly summer. Report directly to Development Mgr, responsible for assisting w/ researching possible prospects such as local companies & foundations; updating database; donor recognition & mailings. Also work w/ Marketing Mgr on several projects related to special events. Prior knowledge not required, just a willingness to learn. Training provided, collaborative work environment. Contact Jessica Loew (617) 368-3566. [jloew@ja-eastern-mass.org](mailto:jloew@ja-eastern-mass.org). \$15/hr.

SUMMER 2006 - Media and Technology Charter High School (MATCH) is looking for committed, caring and enthusiastic individuals to tutor in our Summer Academy. Looking for English, math, science & history tutors. Be part of an exciting organization that is changing lives & reversing underachievement in inner-city teens. Summer Academy runs July 17-Aug. 17. Mandatory training, one full day & one three-hour session, prior to start of Academy. Summer Academy meets Monday-Thursday, 7:45 a.m.-1 p.m. Contact Bob Hill (617) 232-0300. [bob.hill@matchschool.org](mailto:bob.hill@matchschool.org). \$17/hr.

## Arts provost Alan Brody to step down

Lynn Heinemann  
Office of the Arts

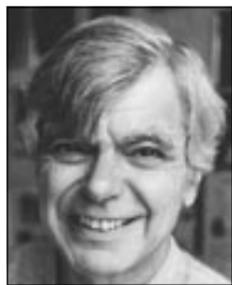
MIT Provost L. Rafael Reif has announced that Associate Provost for the Arts Alan Brody will step down at the end of the academic year after 10 years in the position. Brody will return to full-time teaching in the music and theater arts section and to his own playwriting.

In making the announcement, Reif called Brody an "unswerving and passionate advocate of the arts at MIT," who had worked with faculty, students, staff and alumni to "guide, support and enhance MIT's dynamic arts community."

President Susan Hockfield said, "The arts at MIT are simply extraordinary — reflecting the creativity and insight that are hallmarks of the Institute. As associate

provost for the arts, Alan Brody has fostered a climate where the talents and imagination of our faculty and students can find their fullest artistic expression."

Brody, a professor of theater at MIT since 1988, was promoted to the



Alan Brody

position of associate provost for the arts in 1996, succeeding Ellen T. Harris, the first person to hold the post at MIT.

Reif said, "Under his leadership, artist-in-residence programs expanded and flourished in a number of areas, including the List Visual Arts Center and the Office of the Arts. In addition, he fostered a sense of community and identity among students and faculty engaged in the arts, through such activities as the creation of the Freshman Arts Seminar and Advising Program and the MIT Arts Scholars Program. With his guidance and perseverance, the MIT Museum acquired inspiring new leadership; the Museum Loan Network expanded as a major national resource; and the vision of a Laboratory for Performing Arts began to take shape."

A noted playwright, Brody has won numerous awards, most recently including the Bloomington Playwrights Project (BPP) Reva Shiner Full Length Play Contest for "The Housewives of Mannheim." The drama, set in 1944 working-class Brooklyn, deals with homosexuality, anti-Semitism and gender roles and will be staged Feb. 9-25 at the BPP's theater in Bloomington, Ind.

Brody also led MIT's Student Art Association and facilitated the cross-registration programs between MIT and the Massachusetts College of Art and the School of the Museum of Fine Arts.

Brody took a leadership position with Teachers as Scholars and served as the MIT representative on the board of trustees of the Museum of Fine Arts.

In 2004, Brody helped initiate the STAR Conference ("Science, Theatre, Audience, Reader: Theoretical Physics in Drama and Narrative"), an ongoing discourse on theater and science. He also produced a series of videoconferences to introduce the arts as a component of the MIT education in the Singapore-MIT Alliance.

"As associate provost, Alan Brody has done a terrific job of strengthening and integrating MIT's various arts programs," said Philip S. Khoury, Kenan Sahin Dean of the School of Humanities, Arts, and Social Sciences. "In so doing, he has helped to ensure that the Institute will remain a truly creative force in the performing and visual arts for years to come."

Reif is meeting with members of the MIT community interested in the arts as part of the process of identifying Brody's successor. He invites confidential comments and/or advice to be e-mailed to [assoc-prov-arts@mit.edu](mailto:assoc-prov-arts@mit.edu).

For fuller story, visit <http://web.mit.edu/newsoffice/2006/brody.html>.

# Rockin' robots take stage

It'll be a jamming night at the Museum of Science as humans, computers and robots join forces to present a musical hybrid of Western and traditional Balinese music. "Music and the Invasion of Technology," featuring premieres by Professor Evan Ziporyn and alumna Christine Southworth, will take place at the Boston Museum of Science's Cahners Theater on Wednesday, Jan. 25, at 7 p.m.

Best-known for compositions that bridge Balinese and Western musical idi-

oms to forge a new sound, Ziporyn has composed "Belle Labs" as a virtuosic dialogue between two humans (Todd Reynolds on violin and Ziporyn on clarinet) and a robot, pushing the musicians and the machine to their limits.

Southworth, who graduated from MIT in 2002 in mathematics with a minor in music, is co-founder of Ensemble Robot, which premiered "Zap!" — a work for Van de Graaff generator, robots and musicians — at the Museum of Science in February

2005. The Boston Phoenix called the work "truly electrifying."

Southworth's "Zap" and Ziporyn's "Belle Labs" both use the Heliphon robot, a Musical Instrument Digital Interface (MIDI)-controlled double-helix-shaped xylophone that plays by striking metal keys with solenoids.

Southworth, who's currently pursuing a master's degree in computer music and multimedia composition at Brown University, will premiere "Heavy Metal," a new piece for Balinese gamelan, robots and electric strings. The work will feature MIT's Gamelan Galak Tika, Ensemble Robot, Reynolds on violin, Eddie Whalen on guitar, Erik Nugent on lyrico and Blake Newman on bass. "Heavy Metal" will also introduce Ensemble Robot's two newest members, the Bot(i)Cello and the BlowBot.

The Bot(i)Cello uses windshield wiper motors to reel in guitar strings, plucked by computer fans rotating at varying speeds. The strings are attached to bows made of tempered spring-steel, which hold them at a constant tension. When the motor reels in a string, the pitch of the string goes up, and vice versa. "The instrument looks like a three-legged spider, or perhaps a strange metal tree," says Southworth, who designed and built the robot with Boston artists Giles Hall and Andy Cavatorta.

The BlowBot, developed by Cavatorta, is a dancing tetrahedron made of air cylinders that expand from 2 to 4 feet in length, according to Southworth. As each of its six cylinders expands and contracts, one of 12 flutes is played. "It's very beautiful, quite organic-looking and very active," says Southworth.

The concert will be followed by a discussion of the impact of technology on music with Ziporyn, Southworth and Reynolds, as well as a dessert reception with a cash bar. Tickets are \$10. Limited additional seating is available in a separate theater with simulcast projection of the event for free.

The program is the third in a Museum of Science Series titled "When Science Meets Art," which examines how both art and science investigate and involve theories and transforming information into something else.

The Museum's next "When Science Meets Art" event on Wednesday, Feb. 1 also features MIT talent. Titled "Seamless: Computational Couture" and produced by Nick Knouf and Christine Liu of the Media Lab, the program will be a runway fashion show, showcasing innovative, wearable works of interactive and technology-based design. Emceed by Assistant Professor Chris Csikszentmihalyi of the Media Lab, the show will take place in the Galaxy Café at 7 p.m. Tickets are \$10 and a dessert reception is included.

The Museum of Science is located at Science Park, in Boston. For more information, call (617) 723-2500 or visit [www.mos.org/brainyacts](http://www.mos.org/brainyacts).

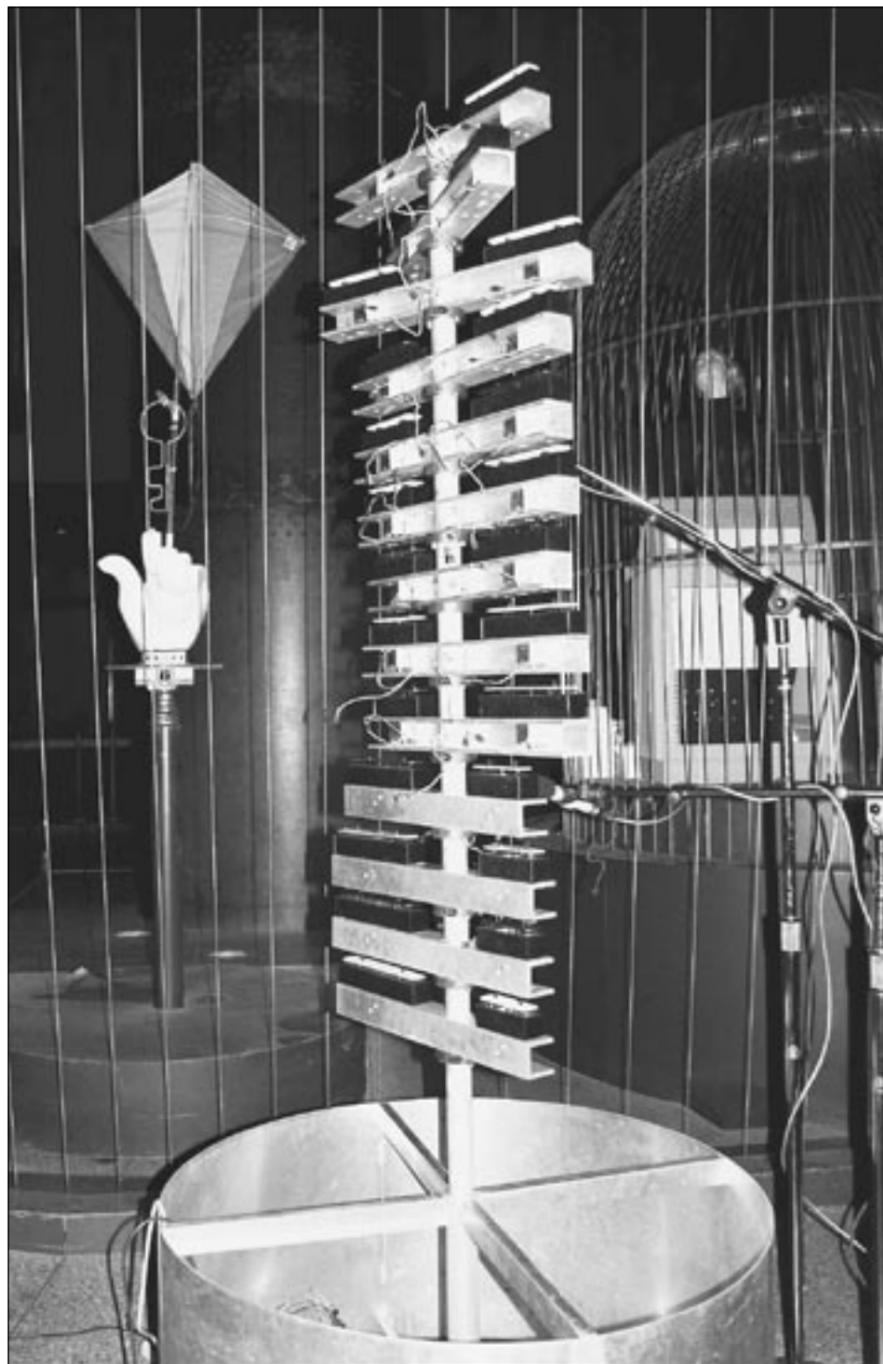


PHOTO / BILL SOUTHWORTH

The Heliphon robot, which appeared in "Zap!" at Boston's Museum of Science last February, will get another chance to jam there on Wednesday, Jan. 25.

## Annual origami competition gets under way

### Will you join the fold?

Folding's fine, but not spindling or mutilating. Taping and trimming are also taboo.

Submissions for the fourth annual Student Origami Competition are due in the Office of the Arts (Room E15-205) by 5 p.m. Tuesday, Feb. 21.

The competition, open to MIT students and sponsored by the Office of the Arts/Student & Artist-in-Residence Programs, the MIT Japan Program and the office of Associate Professor Erik Demaine, is designed to promote interest in origami within the MIT community and to showcase student work.

Models must be made entirely by folding — no glue or tape can be used — although they may be modular. Both original designs and credited executions of existing designs are welcome and will be judged in separate categories by a jury of origami experts. Past submissions have included everything from bugs and flowers to stars and helices. Winning entries will be exhibited in the Wiesner Student Art Gallery.

For more information, or to see images of past submissions, visit [http://web.mit.edu/arts/special\\_programs/studentp/origami.html](http://web.mit.edu/arts/special_programs/studentp/origami.html). Or, e-mail Irene Brisson, [irony@mit.edu](mailto:irony@mit.edu).

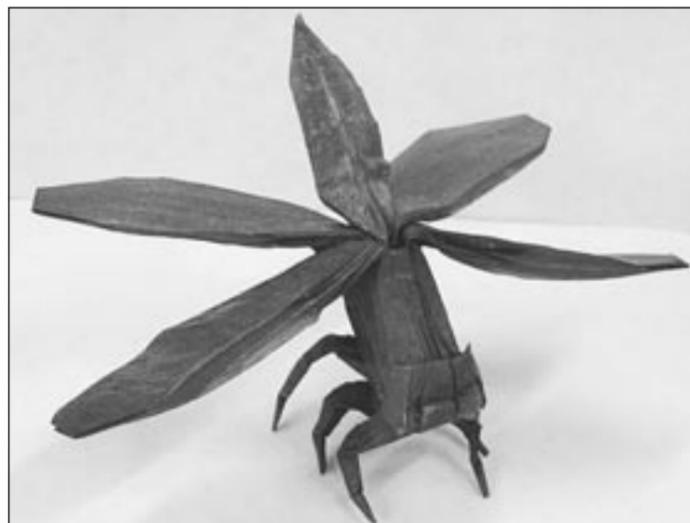


PHOTO / ELSA CHEN

Origami skimmer dragonfly folded by graduate student Brian Chan, who won Best Technical Folding and Best Original Design for his leaves and insects collection in the 2005 origami contest.

MIT EVENT HIGHLIGHTS JANUARY 25-29

-  Science/Technology
-  Performance
-  Architecture/Planning
-  Humanities
-  Music
-  Exhibit
-  Reading
-  Special Interest
-  Business/Money
-  Film
-  Sports
-  Featured Event



Artists on film

Professor Judith Wechsler of Tufts University, formerly of MIT, presents film portraits of Jasper Johns, Harry Callahan and Flora Natapoff on Wednesday, Jan. 25. Above is a screen shot from Wechsler's film on Jasper Johns. The films start at 5 p.m. in E15, Bartos Theater.

**WEDNESDAY**  
January 25

 **"Is it the Economy, the Media or What? Electing a Mexican President in 2006"**  
Talk by Alejandro Poire, visiting professor at Harvard, and MIT Associate Professor Chappell Lawson. Noon. Room E51-095. 252-1483.

 **"Impact of Mechanical Forces on Morphology, Development and Function of the Primate Cerebral Cortex"**  
Talk by Professor Claus C. Hilgetag of the International University Bremen. 4 p.m. Room 46-3189. 432-1738.

 **Workshop: Sculpting with Light**  
Study animation, video and sculpture in a three-dimensional space with Boston artist Andy Zimmermann. Open to ages 18+. 5:30 p.m. Room N52-200. 253-4405.

**THURSDAY**  
January 26

 **Truffle Making**  
10 a.m. \$8. McCormick Country Kitchen.

 **Recyclemania Planning Session**  
Dorm residents, recycling coordinators, house managers and any willing volunteers meet to discuss this year's MIT Recyclemania Competition. 6-8 p.m. Room NW86-159. 258-5648.

 **Yoga class**  
The eight-fold yoga practice for body, mind and spirit. Thursdays through Feb. 2. 6:30-8:30 p.m. Room 34-302.

 **IFilm Movie Seminar**  
Talk by graduate student Nikolas Meitanis on a movie related to Japanese classes at MIT. 8-10 p.m. Room 4-237.

**FRIDAY**  
January 27

 **HKN Student Project Expo**  
Informal event where students in Course VI will show off projects they have been working on. 2-4 p.m. Room 10-105.

 **MIT Staff Concert**  
Baritone Philip Lima with William Merrill on the piano and mezzo-soprano Krista River. \$10. 5:30 p.m. Killian Hall. 445-2762.

 **MIT Anime Club Weekly Showing**  
The MIT Anime Club shows current and classic Japanese animated films and programs. Fridays through Dec. 18, 2006. 7 p.m. Room 6-120.

 **LIVEmusic @theEAR: Arielle Silver**  
Must be over 21. ID required. 9 p.m. The Thirsty Ear Pub. 258-9754.

**SATURDAY**  
January 28

 **Varsity Rifle Beanpot**  
8 a.m. MIT Pistol and Rifle Range in du Pont Athletic Center. 258-5265.

 **Chess Match and Chess Tournament**  
Three-level chess tournament plus a match pitting MIT alumni against current students. Noon-5 p.m. Stata Center Lounge.

 **Varsity Women's Swimming and Diving**  
MIT competes against Amherst College and Connecticut College. 1 p.m. Zesiger Sports and Fitness Center Pool. 258-5265.

**SUNDAY**  
January 29

 **"Finding Form: The Art of Richard Filipowski"**  
The work of renowned sculptor and MIT faculty member Richard Filipowski. MIT Museum. Noon-5 p.m. \$5, adults; \$2, students, seniors and children 5-18; free with an MIT ID. 253-4444.

 **F.A.S.T. Program: "Safe and Sound: Protecting Soldiers and First Responders"**  
Presentation by Eve Downing of The Institute for Soldier Nanotechnology. \$5, adults; \$2, students, seniors and children 5-18; free with an MIT ID. 2-4 p.m. MIT Museum. 452-2111.

 **International Folk Dancing**  
8-11 p.m. Every Sunday night. Student Center. 253-FOLK.

Go Online! For complete events listings, see the MIT Events Calendar at: <http://events.mit.edu>.  
Go Online! Office of the Arts website at: <http://web.mit.edu/arts/office>.

EDITOR'S CHOICE

**"URINETOWN"**  
Musical Theatre Guild production. Jan. 25-29 and Feb. 2-4. 8 p.m. except 2 p.m. on Jan. 29.

*Jan. 25*  
**Sala de Puerto Rico**  
8 p.m.

**AN EVENING OF SILENT FILM**  
Martin Marks and Dawn Perner provide live musical accompaniment to classic silent films.

*Jan. 26*  
**Room 14-111**  
8-10:30 p.m.

**"THE ANATOMY OF RECONCILIATION"**  
Webcast from New York includes keynote speech by Sister Helen Prejean, author of "Dead Man Walking." Jan. 31-Feb. 1.

*Jan. 31*  
**Room 3-270**  
9 a.m.-5 p.m.

MIT EVENT HIGHLIGHTS JANUARY 30-FEBRUARY 5

**MONDAY**  
January 30

 **Undergraduate Study Abroad Information Session**  
2:30-4:30 p.m. Room 56-114. 253-0676.

 **"Introduction to Allopathy"**  
Talk by Dr. Louis Kuchnir, MIT premedical advisor. 3-4 p.m. Room 26-204. 253-4733.

 **"The Joy of Clinical Medicine"**  
Talk by Dr. Louis Kuchnir, MIT premedical Advisor. 4-5 p.m. Room 26-204.

 **Trivia Night**  
Must be over 21. ID required. 8-11:30 p.m. Thirsty Ear Pub. 258-9754.

**TUESDAY**  
January 31

 **"An Epistemological Culture in the Mathematics of Ancient China"**  
Talk by Karine Chemla, professor at the University of Paris. Noon. Room E56-100. 253-6989.

 **Ethnomedicine and Bioprospecting Conference**  
Panel discussion with Kathy Moran of the Healing Forest Conservancy, Steven King of Shaman Pharmaceuticals and Christopher Herndon of the Amazon Conservation Team. 5-7 p.m. Room 10-250.

 **Varsity Men's Basketball vs. Springfield College**  
6 p.m. Rockwell Cage. 258-5265.

**WEDNESDAY**  
February 1

 **Kosher Chocolate Taste Test**  
Sample unique flavors of American, Israeli and European kosher varieties. Noon. 20 Chimneys. 253-2982.

 **Israeli Dancing Beginner's Night**  
8-11 p.m. Lobby 13. 253-FOLK.

 **"Google, or Google Scholar: That Is the Question!"**  
Learn about databases and other tools to search for scholarly information. 3-4 p.m. Room 14N-132. 253-9320.

**THURSDAY**  
February 2

 **"Amorous Intent: Looking for Love at MIT"**  
Curated exhibition exploring the cynical, the sweet, the humorous, the melancholy, the fuzzy, the bitter and any other interpretation on the theme of love at MIT. 24 hours. Wiesner Student Art Gallery. 253-7019.

 **"Lean Engineering: Doing the Right Thing Right"**  
Talk by Professor Earl M. Murman. 2-3:30 p.m. Room 33-206. 253-2279.

 **IDEAS Competition Project Consulting**  
6-8 p.m. Room 4-402.

**FRIDAY**  
February 3

 **"Christian Marclay: Mixed Reviews (American Sign Language)"**  
American Sign Language (ASL) interpreter Jonathan Kovacks signs a long collaged text by artist Christian Marclay from reviews of musical performances. On view 24 hours. Media Test Wall, Whitaker Building 56. 253-4400.

 **"Arnold Newman: 20th Century Photographs"**  
Forty photographs on exhibit. 9:30 a.m.-5 p.m. Room 10-150. 253-4444.

 **"Aircraft Fire and Explosion? How Safe Are You in the Friendly Skies?"**  
Multimedia presentation by Albert Moussa. 2-3:30 p.m. Room 33-206. 253-2279.

 **Karate Practice**  
6:30-8 p.m. Room W31-225.

**SATURDAY**  
February 4

 **"COLLISION box #2: Cars and Stars"**  
Andy Zimmermann's multimedia installation, "Cars and Stars," projects digital animation and video onto a three-dimensional sculpture, with accompanying digital sound composition. \$5, adults; \$2 students; free with MIT ID. Noon-5 p.m. MIT Museum. 253-4444.

 **Ballroom Social Dance (participatory)**  
Evening of social dancing including ballroom and Latin dances, along with favorites such as salsa, hustle and merengue. \$6, students; \$10, general. 8 p.m. Morss Hall in Walker Memorial.

 **Grads on Ice**  
Skate party for Jewish grad students from all over Boston. 9-11:30 p.m. Johnson Ice Rink. 253-2982.

**SUNDAY**  
February 5

 **"Deep Frontiers: Ocean Engineering at MIT"**  
Exhibit. 9 a.m.-8 p.m. Hart Nautical Gallery. 253-5942.

 **"Scopes, Station Wagons and Solder: Unexpected Images From the Rad Lab and RLE Collections"**  
Collection of photographic negatives from the MIT Radiation Laboratory and the MIT Research Laboratory of Electronics. \$5, adults; \$2 students; free with MIT ID. Noon-5 p.m. MIT Museum. 253-4444.

 **International Folk Dancing**  
8-11 p.m. Kresge Rehearsal Room. 253-FOLK.