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TechTalk

S E R V I N G T H E M I T C O M M U N I T Y



PHOTO / RICARDO OLIVEIRA

Jose Mariano Gago, Portuguese minister of science, technology and higher education, center, signs a document launching the MIT-Portugal Program. MIT Chancellor Phillip Clay, left, and João Sentieiro, chair of the board of the MIT-Portugal Program, look on.

MIT, Portugal form collaboration

MIT and the Portuguese Ministry of Science, Technology and Higher Education recently unveiled plans to begin a long-term collaboration to expand research and education in engineering and management across many of Portugal's top national universities.

The MIT-Portugal Program is part of a major initiative undertaken by the Portuguese government to strengthen the country's knowledge base. The program was announced Oct. 11 at a public session headed by Portuguese Prime Minister José Sócrates and attended by senior MIT administrators and leaders from Portuguese institutions involved in the collaboration.

"The creation of the MIT-Portugal Program expands upon successful faculty collaborations already in place and will bring new academic and research insights," said Thomas L. Magnanti, dean of MIT's School of Engineering. "This relationship is an exciting step in allowing both parties to collaborate on scientific and technological

discoveries that are critical to the future of Portugal, of importance to MIT, and will impact Europe to the north and the Mediterranean to the south."

More than 40 faculty members from all five schools at MIT will participate in the MIT-Portugal Program, undertaking research and education in several focus areas. MIT researchers will be able to gain insight into the planning, design and implementation of transportation, energy, manufacturing and bioengineering systems in Portugal, all critical sectors of the global economy.

The design of the program was based on an assessment study conducted by MIT from February to July 2006.

The study concluded, "The commitment of the Portuguese government in strengthening science and tech-

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New material halts bleeding

Anne Trafton
News Office

MIT and Hong Kong University researchers have shown that some simple biodegradable liquids can stop bleeding in wounded rodents within seconds, a development that could significantly impact medicine.

When the liquid, composed of protein fragments called peptides, is applied to open wounds, the peptides self-assemble into a nanoscale protective barrier gel that seals the wound and halts bleeding. Once the injury heals, the nontoxic gel is broken down into molecules that cells can use as building blocks for tissue repair.

"We have found a way to stop bleeding, in less than 15 seconds, that could revolutionize bleeding control," said Rutledge Ellis-Behnke, research scientist in the MIT Department of Brain and Cognitive Sciences.

This study, which will appear in the online edition of the journal *Nanomedicine* on Oct. 10, marks the first time that nanotechnology has been used to achieve complete hemostasis, the process of halting bleeding from a damaged blood vessel.

Doctors currently have few effective methods to stop bleeding without causing other damage. More than 57 million Americans undergo nonelective surgery each year, and as much as 50 percent of surgical time is spent working to control bleeding. Current tools used to stop bleeding include clamps, pressure, cauterization, vasoconstriction and sponges.

In their experiments on hamsters and rats, the MIT and HKU researchers



PHOTO / JULIE ELLIS-BEHNKE

MIT Professor Rutledge Ellis-Behnke, right, and Kwok-Fai So, an MIT alumnus and professor of anatomy at the University of Hong Kong, work in So's Hong Kong laboratory. The researchers have shown that a nanofiber material can stop bleeding within seconds.

applied the clear liquid containing short peptides to open wounds in several different types of tissue—brain, liver, skin, spinal cord and intestine.

"In almost every one of the cases, we were able to immediately stop the bleeding," said Ellis-Behnke, the lead author of the study.

Earlier this year, the same researchers

reported that a similar liquid was able to partially restore sight in hamsters that had had their visual tract severed. In that case, the self-assembling peptides served as an internal matrix on which brain cells could

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Physicists catch glimpse of subatomic particle

Deborah Halber
News Office Correspondent

It's taken 19 long years of painstaking, high-precision experiments, but it's finally official: Physicists have announced the observation of a subatomic particle known as the B_s (pronounced "B sub s") meson switching between matter and antimatter

states at a mind-boggling 3 trillion times per second. The work could lead to a better understanding of the early universe, in which these particles were present in great abundance. It will also help physicists refine different theoretical models in high-energy physics.

Christoph Paus, associate professor of physics at MIT, led the analysis of years' worth of data from the world's highest-

energy particle accelerator. Representing the 700-member team of the Collider Detector at Fermilab (CDF) collaboration, Paus presented the discovery to the scientific community Sept. 22 at the Fermi National Accelerator Laboratory in Illinois.

"The CDF result is an exquisite exam-

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Task force recommends changes to undergrad curriculum

Faculty recommendations for the most far-reaching changes to MIT's undergraduate curriculum in the past half-century were released Oct. 13.

The Institute's Task Force on the Undergraduate Educational Commons has spent the last two and a half years in a comprehensive review of MIT's educational mission and core curriculum. It recommends new requirements in science, mathematics and engineering as well as in the humanities, arts and social sciences. The task force also endorses an increased role for international educational experiences in the undergraduate years.

In endorsing the report of the task force and recommending its consideration by the Institute's full faculty, MIT President Susan Hockfield said, "MIT has a tremendous institutional tradition of innovation. The changes to our core curriculum proposed by the Task Force on the Undergraduate Educational Commons respond creatively to changes in science, technology and the world around us and will ensure that MIT continues to educate the leaders the world needs."

The curricular proposals address the explosive growth in scientific and technological knowledge over the last half-century; the need for graduates to be confident participants in what MIT's founding president, William Barton Rogers, called "the humane culture of society"; and the global context in which today's students will live and work.

The task force was chaired by Robert J. Silbey, MIT's Class of 1942 Professor of Chemistry and dean of science. Commenting on the recommendations, Silbey said, "We stand at a critical juncture in higher

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Pulitzer Prize-winning playwright Suzan-Lori Parks wins MIT's McDermott Award.

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Comedian Margaret Cho will host 'Fierce Forever 6.'

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MIT releases endowment figures

The Massachusetts Institute of Technology Investment Management Company (MITIMCo) has announced that the Institute's endowment generated a return of 23 percent for the fiscal year ending June 30, 2006.

As a result of strong investment performance and gifts, the endowment's assets totaled \$8.4 billion as of June 30, 2006, an increase of \$1.7 billion from the previous year, net of



Seth Alexander

Institute's endowment has had an annualized return of 15.3 percent.

Investment gains were broadly spread across MITIMCo's diversified portfolio, with real estate, real assets, private equity and international equities performing particularly well.

Strong investment performance and gifts to the Institute have made it possible for spending from the endowment to more than triple

over the past 10 years. Total spending is projected to be \$345 million in fiscal year 2007, up from \$109 million just 10 years ago.

MITIMCo is led by Seth Alexander, who became president in May, succeeding Allan S. Bufferd, who retired as MIT's treasurer and founding president of MITIMCo after 34 years of service to the Institute.

MITIMCo is a division of MIT, created to manage and oversee the investment of the Institute's endowment, retirement plans and operating funds. As of June 30, 2006, MITIMCo had \$12.4 billion of total assets under management.

Family Weekend offered a taste of MIT

Nancy DuVergne Smith
MIT Alumni Association

Parents don't normally get to sit in on a polymer engineering class or hear a Nobel laureate describe the miracle of memory. But this weekend, more than 2,400 MIT parents and relatives sampled the MIT education their son or daughter experiences every day. During Family Weekend, Oct. 13-15, 623 families from 47 states, Puerto Rico, and 10 foreign nations, including Spain, Mongolia and Brazil, chose from nearly 100 events including lectures, tours, department receptions, performances, sports events, and panels on topics ranging from parenting young adults to how students can tap into MIT's entrepreneurial ecosystem. President Susan Hockfield led a community meeting for students and families and hosted a reception, both on Saturday.

Families were invited to learn from Nobel laureate Susumu Tonegawa, who presented a Friday lunch talk on "How We Acquire, Consolidate, and Recall Memory." At Saturday's keynote address, Robert C. Armstrong, co-chair of MIT Energy Research Council, discussed MIT's Energy Initiative. Faculty lectures followed on managing risk, the brain architecture enabling vision and MIT's bio-engineering advances.

Activities throughout Family Weekend, hosted by the MIT Alumni Association's Parents Association, spanned the campus. The Stata Center's student street showcased public service efforts at MIT and in the world. The MIT Museum offered the history and lore of pranks and hacks. A Glass Lab tour in Building 4's basement introduced the art and science of this sparkling materials science. And sports fans gathered on the playing fields to watch football, soccer and field hockey.



PHOTO / MING-TAI HUH '03

Tim the Beaver welcomes Carol McKenna, left, and her daughter, Claire, an MIT senior, during Family Weekend, held Oct. 13-15.

Faculty to meet today

A regular meeting of the faculty will take place Wednesday, Oct. 18, at 3:30 p.m. in Room 32-123. The agenda includes:

- Update on underrepresented minority faculty and graduate student recruitment and retention
- Financial foundation for MIT's future: Fiscal year 2008 and beyond
- Report from the Task Force on the Undergraduate Educational Commons
- Remarks from President Susan Hockfield
- Topics arising and questions for the president, provost and chancellor

Henderson named dean for curriculum and faculty

Dean for Undergraduate Education Daniel Hastings has named Professor Diana Henderson the dean for curriculum and faculty.

In that role she will serve as director of the new Office of Faculty Support.

Henderson is a literature professor in the School of Humanities, Arts and Social Sciences. Her research interests include gender studies, Shakespeare, early modern culture, modernism and world drama.

In 2005, she was awarded the 2005 Everett Moore Baker Memorial Award for Excellence in Undergraduate Teaching.

In announcing her appointment, Hastings pointed out that Henderson "has been an active and strong participant during the deliberations of the Task Force on the Undergraduate Educational Commons."

Henderson's appointment is

the latest in a series of changes in the Office of the Dean for Undergraduate Education (DUE).

This summer, Hastings announced a major reorganization and senior personnel changes within the DUE.

The planning effort also identified six key strategic themes for DUE: catalyze the undergraduate commons; champion information technology for the provision of information to the students and faculty; develop a holistic student experience; provide global educational opportunities that enable MIT students to appreciate and learn from other cultures; advance from teaching to learning in MIT's classrooms; and champion and increase pipeline diversity.

For more detailed information about the DUE changes, visit web.mit.edu/newsoffice/2006/duereorg.html.

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education. Our graduates need the skills to navigate a world in which the pace of discovery and innovation is faster than ever before. The task force aimed to design a core curriculum that maintains MIT's characteristic intellectual rigor while allowing students the flexibility they need to enter exciting new areas of science and technology and giving them an even stronger grounding in the humanities, arts and social sciences."

The major recommendations of the task force are as follows:

- In the future, students will take eight subjects as part of a new science, mathematics and engineering requirement. Three of these will continue to be prescribed as in the past (single-variable calculus, multivariable calculus and classical mechanics). The remaining five will be selected from a very small and tightly regulated number of subjects organized into six foundational technical categories: chemical sciences; computation and engineering; life sciences; mathematics; physical sciences; and project-based experiences. Students will have to take at least one course from five of these six categories. The new requirement will replace the existing science core and related requirements.

- The current requirement in the humanities, arts and social sciences (HASS) will be more clearly articulated to provide a rigorous foundation in the first and second years for the further study of human culture, expression and social organization. First-year students will generally take one foundational elective affiliated with a new Freshman Experience Program, focusing on broad topics that require multiple perspectives to be grasped deeply. The first and second years will also include foundational HASS electives, distributed across the humanities, arts and social sciences. Juniors and seniors will continue to pursue a concentration in the humanities, arts and social sciences, as they do now.

- The task force has also urged MIT to make it clear that acquiring a global educational experience is essential to an undergraduate education. This will require expanding current international education programs that have proven successful in the MIT environment, as well as developing strategies to create new opportunities that are especially relevant to an environment that emphasizes science and technology. The ultimate goal is to allow any MIT undergraduate who wishes to participate in a meaningful experience abroad to be able to do so.

MIT's current core curriculum is based on a model first developed by the faculty in 1950; the central requirements have been periodically revised since then. In recent years, the Institute has launched a number of innovative new major and minor programs while intensifying its commitment to undergraduate internships in research and professional settings on its Cambridge campus, in the United States and abroad.

The recommendations of the current task force build on the work of MIT's 1998 Task Force on Student Life and Learning, which was co-chaired by Dean Silbey. Taken together, the two reports serve as a decade-long reassessment of the Institute's undergraduate curriculum and student experience. In addition to its central curricular proposals, the Task Force on the Undergraduate Educational Commons also recommends initiatives and administrative changes that will help MIT sustain educational innovation.

The Institute's faculty will discuss the task force recommendations beginning on Oct. 18. If the full faculty endorses the spirit of the report and its recommendations, it will charge the Faculty Committee on the Undergraduate Program with refining the recommendations over the course of the next 12 to 18 months.

The Committee on the Undergraduate Program would work closely with the office of the Dean for Undergraduate Education, the deans of the Institute's five schools, and individual departments and academic programs. The final changes to the core curriculum would then come back to the full faculty for approval.

More information, including the full report of the Task Force on the Undergraduate Educational Commons, is available at web.mit.edu/committees/edcommons/documents/task_force_report.html.

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Faculty named to Academy of Arts and Sciences

Institute Professor Bizzi is installed as president

Sasha Brown
News Office

Three MIT professors were inducted Oct. 7 into the American Academy of Arts and Sciences as part of the 226th class of fellows.

The new MIT fellows are Timothy M. Swager, professor of chemistry; K. Daron Acemoglu, the Charles P. Kindleberger Professor in Applied Economics; and Joshua Angrist, professor of economics. They were all inducted into a class of 175 fellows and 20 foreign honorary members. The academy also installed Institute Professor Emilio Bizzi, a brain scientist, as its 44th president.

"The academy takes great pride in honoring the accomplishments of these out-



Emilio Bizzi



K. Daron Acemoglu



Timothy M. Swager

standing and influential individuals," said Bizzi, who officiated the day's proceedings. "Throughout its history, fellows of the academy have been dedicated to advancing intellectual thought and constructive action in America and the world. We are confident that our newest group of fellows will help us fulfill that mission in significant ways."

The academy, located in Cambridge, was founded in 1780 and has elected more than 4,000 fellows since then, including Benjamin Franklin, Albert Einstein and Winston Churchill.

This year's 211 inductees include former Secretary of State Madeleine Albright, composer and lyricist Stephen Sondheim,

photographer Richard Avedon and former President Vaclav Havel of the Czech Republic.

The academy's charter is "to cultivate every art and science which may tend to advance the interest, honor, dignity and happiness of a free, independent and virtuous people."

Institute of Medicine elects 3 from MIT

Elizabeth Thomson
News Office

Three members of the MIT faculty were among the 65 scientists elected to the Institute of Medicine (IOM) of the National Academies this week, bringing the total IOM membership to 1,651.

The new MIT members are Elazer R. Edelman, the Thomas D. and Virginia W. Cabot Professor of Health Sciences and Technology; Rudolf Jaenisch, a professor of biology and founding member of the Whitehead Institute for Biomedical Research; and Susan L. Lindquist, a professor of biology, member of the Whitehead Institute, and a Howard Hughes Medical Institute investigator.

"It is a great pleasure to welcome these distinguished and influential individuals to the Institute of Medicine," said IOM President Harvey V. Fineberg. "Members are

elected through a highly selective process that recognizes people who have made major contributions to the advancement of the medical sciences, health care and public health.

"Election is considered one of the high-



Elazer R. Edelman



Rudolf Jaenisch



Susan L. Lindquist

est honors in the fields of medicine and health."

The Institute of Medicine is unique for its structure as both an honorific membership organization and an advisory organization. Established in 1970 by the National Academy of Sciences, the institute has

become recognized as a national resource for independent, scientifically informed analysis and recommendations on issues related to human health. With their election, members make a commitment to devote a significant amount of volunteer time as members of IOM study committees.

Studies from the institute completed in the past year include "The Future of Drug Safety: Promoting and Protecting the Health of the Public," an agenda for addressing the vulnerabilities that have hindered the optimal functioning of the nation's drug safety system; "Preventing Medication Errors," which documents the impact of drug-

related mishaps and provides an agenda for improving the safety of medication use; and "The Future of Emergency Care," a series of three reports that recommend steps to shore up the nation's struggling emergency care system.



PHOTO / DONNA COVENY

MIT research scientist Rutledge Ellis-Behnke, left, and Professor Gerald Schneider bracket a monitor showing a transected liver after it has been treated with a liquid solution containing peptides. The peptides self-assemble into a gel that essentially seals over the wound. The two developed the technique with MIT colleagues and researchers at the University of Hong Kong.

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regrow.

While experimenting with the liquid during brain surgery, the researchers discovered that some of the peptides could also stop bleeding, Ellis-Behnke said. He foresees that the material could be of great use during surgery, especially surgery that is done in a messy environment such as a battlefield. A fast and reliable way to stop bleeding during surgery would allow surgeons better access and better visibility during the operation.

"The time to perform an operation could potentially be reduced by up to 50 percent," said Ellis-Behnke.

Unlike some methods now used for hemostasis, the new materials can be used in a wet environment. And unlike

some other agents, it does not induce an immune response in the animals being treated.

When the solution containing the peptides is applied to bleeding wounds, the peptides self-assemble into a gel that essentially seals over the wound, without harming the nearby cells. Even after excess gel is removed, the wound remains sealed. The gel eventually breaks down into amino acids, the building blocks for proteins, which can be used by surrounding cells.

The exact mechanism of the solutions' action is still unknown, but the researchers believe the peptides interact with the extracellular matrix surrounding the cells. "It is a completely new way to stop bleeding; whether it produces a physical barrier is unclear at this time," Ellis-Behnke said.

The researchers are confident, however, that the material does not work by inducing blood clotting. Clotting generally takes at least 90 seconds to start, and the researchers found no platelet aggregation, a telltale sign of clotting.

Other MIT researchers who are co-authors on the paper are Gerald Schneider, professor of brain and cognitive sciences, and Shuguang Zhang, associate director of MIT's Center for Biomedical Engineering. Collaborators at the University of Hong Kong Li Ka Shing Faculty of Medicine, Department of Anatomy, include Yu-Xiang Liang, David Tay, Wutian Wu, Phillis Kau and Kwok-Fai So, an MIT alumnus.

The research is funded by the Deshpande Center for Technological Innovation at MIT and the Technology Transfer Seed Fund at HKU.

MIT joins higher-ed recruitment consortium

MIT recently formed a consortium with 35 higher-education institutions and affiliated teaching hospitals to address the challenges of recruiting and retaining the best faculty members and employees.

The New England Higher Education Recruitment Consortium (New England HERC) offers a free online database of all job openings at member institutions, including 12 of the region's largest employers. The web site, www.newenglandherc.org, launched Oct. 2.

"Historically, universities have competed with each other for top talent. The reality is that as a region, we are much stronger if we work together to address

these recruitment challenges," said Lotte Bailyn, professor of management at the MIT Sloan School of Management and co-director of the MIT Workplace Center.

Opening with more than 3,000 job openings for faculty, staff and hospital personnel, the site also includes relocation resources.

Bailyn described the HERC search engine and site as an innovative way to address recruitment challenges that arise as couples, both working in academia, seek jobs for themselves and day care and school information for their children.

Employment applicants can search HERC's listings for all jobs at all 35 mem-

ber institutions; there is no charge for the service.

"As many deans who work on these issues at institutions throughout the country would say, we're no longer recruiting individuals, we're recruiting families. When university recruitment efforts fail, the spouse's situation is the most often-cited reason," said Evelyn Hammonds, senior vice provost for faculty development and diversity at Harvard University, the host institution for New England HERC.

"By responding to the needs of couples, HERC will help support diversity in faculty recruiting," Hammonds said.



Lotte Bailyn

MIT's Deshpande Center announces fall 2006 research grants

The Deshpande Center for Technological Innovation at MIT today announced it is awarding \$488,000 in grants to six MIT research teams currently working on discoveries that may revolutionize energy storage, medicine delivery, drug development and high throughput wireless networks.

For the past four years, The Deshpande Center has funded 56 projects with more than \$6.5 million in grants, acting as a catalyst for innovation and entrepreneurship by supporting leading-edge MIT research and increasing the impact of MIT technologies in the marketplace. More than nine projects have spun out of the center as independent startups, having collectively raised more than \$40 million in outside financing from top-tier venture capitalists.

The fall 2006 grant recipients are:
Alexander Slocum, Omid

Farokhzad and Jeff Karp: Device for sensing tissues and tissue compartments. A new device to assist in sensing tissue as catheter needles are inserted during common medical procedures.

Donald Sadoway: High-amperage energy storage device. A new technology to store high-amperage energy for industrial settings.

Carol Livermore: Portable power sources. A new method for creating efficient long-lasting portable power sources that could change the battery market.

Yet-Ming Chiang: Continuous drug delivery. A new device to provide medicine through a portable delivery device to assist individuals with chronic diseases.

Dina Katabi: High-throughput dense wireless networks. A new network design to create high-throughput for wireless networks to increase network availability

in urban settings.

Sangeeta Bhatia: Human liver models for faster, safer drug development. This miniature human liver tissue could lead to safer, faster and more cost-effective drug development by measuring toxicity at an early stage in the development process.

"The projects we are funding this fall are indicative of the innovative ideas MIT researchers have begun: projects aimed at improving the way of life worldwide. The goal of the center is to assist in bringing these ideas out of the labs and into real-world applications," said Leon Sandler, executive director of the Deshpande Center. "In the past four years, the center successfully bridged the gap between concept to actual entrepreneurial innovation for a number of new technologies in medicine, technology and other areas."

Each spring and fall, the Deshpande Center awards \$50,000 Ignition Grants, which fund proof-of-concept explorations, and Innovation Grants ranging from \$50,000 to \$250,000 to help recipients assess and reduce the technical and market risks associated with their innovations. In addition to financial support, the Deshpande Center's network of entrepreneurs, venture capitalists and academic and legal experts helps recipients assess the commercial potential of their innovations and make decisions that accelerate progress toward the development of a business plan or licensing strategy.

MIT professors interested in securing a Deshpande Center Ignition or Innovation Grant should submit a pre-proposal by Oct. 16 for the spring 2007 funding round. For more information on how to submit a pre-proposal see web.mit.edu/deshpandecenter/instructions.html.

Inner lives of red blood cells revealed

Work could aid research on sickle cell anemia and malaria

Anne Trafton
News Office

For the first time, researchers at MIT can see every vibration of a cell membrane, using a technique that could one day allow scientists to create three-dimensional images of the inner workings of living cells.

Studying cell membrane dynamics can help scientists gain insight into diseases such as sickle cell anemia, malaria and cancer. Using a technique known as quantitative phase imaging, researchers at MIT's George R. Harrison Spectroscopy Laboratory can see cell membrane vibrations as tiny as a few tens of nanometers (billionths of a meter).

But cell membrane dynamics are just the beginning.

Soon, the researchers hope to extend their view beyond the cell membrane into the cell, to create images of what is happening inside living cells—including how cells communicate with each other and what causes them to become cancerous.

"One of our goals is create 3-D tomographic images of the internal structure of a cell," said Michael Feld, MIT professor of physics and director of the Spectroscopy Lab. "The beauty is that with this technique, you can study dynamical processes in living cells in real time."

Scientists have long been able to peer into cells using electron microscopy, which offers a much higher magnification than a traditional light microscope. However, electron microscopy can only be used on cells that are dehydrated, frozen or treated in other ways. Thus it cannot be used to view living cells.

Quantitative phase imaging, on the other hand, allows researchers to observe living cells for as long a time period as they want. After years of fine tuning, the MIT researchers can now create images with a resolution of 0.2 nanometers. (A red blood cell has a diameter of about 8 microns, or 8,000 nanometers.)

Drums in Perpetual Vibration

So far, the team has focused its attention primarily on red blood cells and neurons. Red blood cells are an especially good model to study cell membrane dynamics because they are relatively simple cells, with no nuclei or internal cell structures, says Gabriel Popescu, a postdoctoral associate in the Spectroscopy Lab.

In work that is soon to be published in *Physical Review Letters*, the MIT researchers show that the frequency of

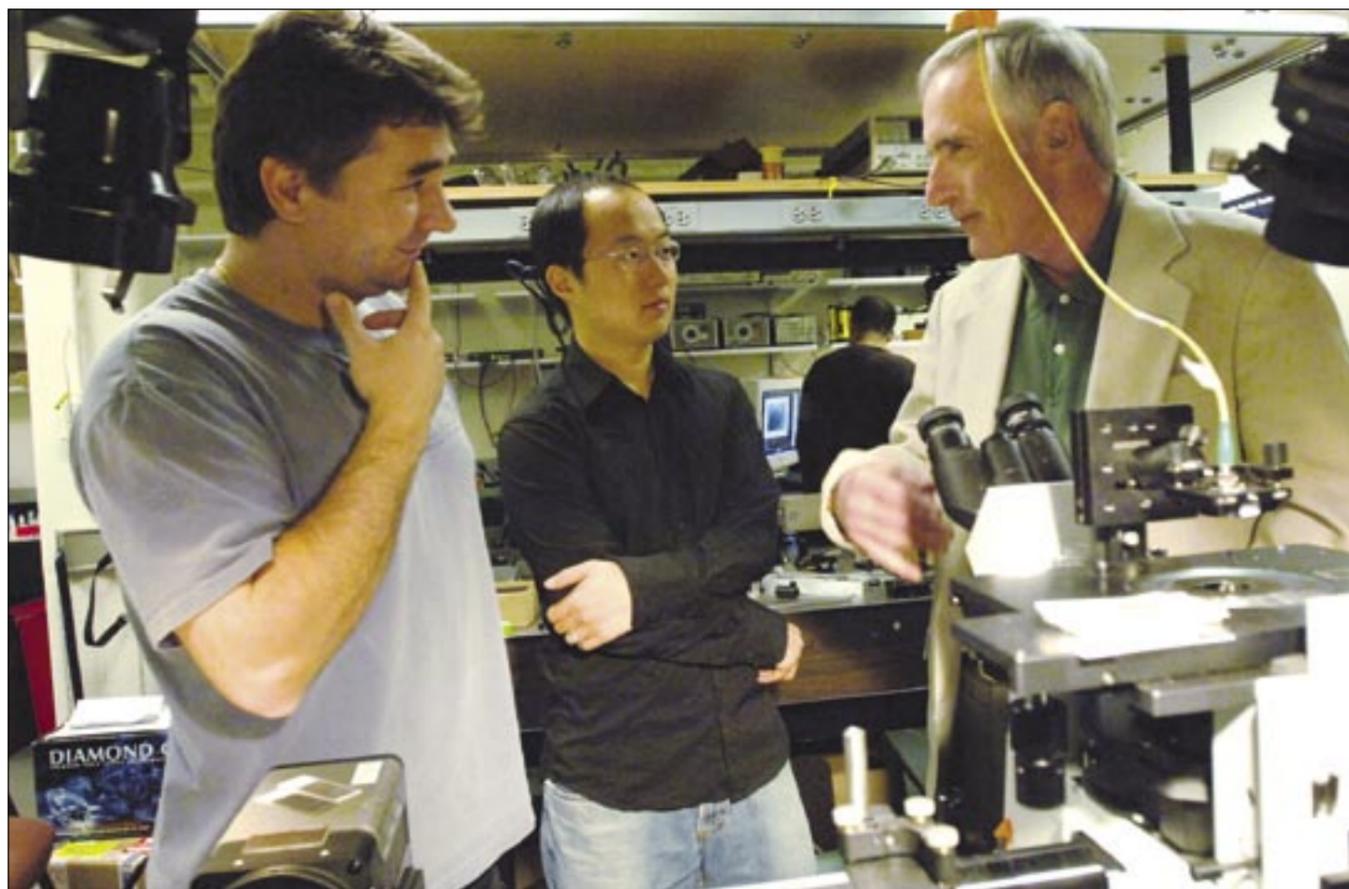


PHOTO / DONNA COVENRY

Postdoctoral associate Gabriel Popescu, left, mechanical engineering graduate student YongKeun Park, center, and Professor Michael Feld, right, use spectroscopy to study changes in the membranes of living cells.

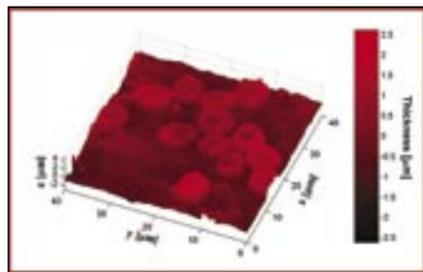


IMAGE COURTESY / GABRIEL POPESCU

Researchers at MIT's Spectroscopy Laboratory created this image of red blood cells using a technique known as quantitative phase imaging, which allows scientists to view living cells.

cell membrane vibration is related to the elasticity of the cell membrane. Elasticity is important for red blood cells because they have to be able to squeeze through tiny capillaries in the brain and elsewhere, as they deliver oxygen.

"The elasticity of these cells is crucial for their function," said Popescu.

It has been known for more than a century that red blood cell membranes are continuously undulating, or as Popescu puts it, a red blood cell is "effectively a drum in perpetual vibration." This undulation offers a chance to study the mechanical properties of the membrane, including how the membrane provides the cell with

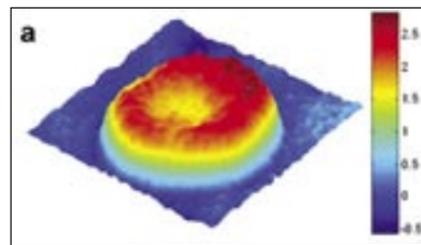


IMAGE COURTESY / GABRIEL POPESCU

This image shows a single red blood cell, as seen through quantitative phase imaging. The colors correspond to the thickness of the cell (in microns).

both the softness and the elasticity needed to squeeze through narrow capillaries.

Red blood cell abnormalities, such as the twisting deformation seen in sickle cell anemia, also influence membrane dynamics. The researchers are now studying how sickle cell anemia and malaria infection affect the mechanical properties of red blood cell membranes.

Popescu gave a talk on the blood cell work earlier this month at a meeting of the Optical Society of America.

Another group in the Spectroscopy Lab is studying signal propagation in neurons. This project, a collaboration with Sebastian Seung, a professor of brain and cognitive sciences, and led by Chris Fang-Yen, a postdoctoral associate in the Spectroscopy

Laboratory, is based on the fact that membranes undergo tiny mechanical deformations when an action potential (electrical current) travels along the neuron's axon.

The correlation between membrane vibration and electrical activity could "give us insight on how networks are organized on a neuron level," said Fang-Yen. They are especially interested in studying neural networks in the hippocampus, a brain area associated with memory.

The Trouble with Interferometry

Quantitative phase imaging builds on an optical phenomenon known as interferometry. With this method, a light wave passing through the cell is compared with a reference wave that doesn't pass through the sample. Combining those two waves creates an interference pattern that offers nanometer-scale images of individual cells.

The major problem with interferometry is that the apparatus is highly sensitive. Even breathing near the interferometer can disrupt the system, leading Popescu to observe that in a typical laboratory environment, trying to measure such tiny optical signals is "like trying to sense the waves of a jellyfish in a stormy ocean."

One way to overcome that is to mount the system in an isolated environment.

CIS reporters' panel paints bleak portrait of Iraq

Stephanie Schorow
News Office Correspondent

Is the Iraq that Americans see today on their TV screens—rife with escalating violence that seems to verge on civil war—the inevitable result of the U.S. invasion to depose Saddam Hussein? Or did critical mistakes doom our best intentions to establish a democracy?

Those questions, posed by MIT visiting scholar Barbara K. Bodine, jumpstarted a conversation between two prominent journalists appearing in a panel titled “Reporters’ Notebook: The U.S. in Iraq,” a MIT Center for International Studies (CIS) Starr Forum hosted by CIS on October 3.

“It’s fashionable in some circles to say now: ‘If only we had committed more resources to the occupation effort,’” said Rajiv Chandrasekaran, the former Baghdad bureau chief for the Washington Post and author of the recently published “Imperial Life in the Emerald City,” an account of life in the U.S. enclave in Baghdad, the Green Zone.

But Chandrasekaran speculates that perhaps the United States tried to do too much, too soon: “We needed to have had

a smaller footprint there, to be less ambitious.” For example, the United States didn’t want to impose “just any old democracy.” Officials wanted a secular, federalist democracy with an American-style free market, he said. They tried to institute bank sector reform, a flat tax, even laws on microchip design and intellectual property.

“We rewrote the traffic code,” Chandrasekaran said. “We wasted time telling people to have both hands on the wheel while driving.”

As a result, the United States did not move quickly enough to set up a system in which Iraqis could govern themselves, he said.

However, George Packer, who covers Iraq for The New Yorker, warned against “hindsight bias,” that is, the idea that the deeper Iraq spirals into violence, “the more it seems it was inevitable that Iraq was always going to spiral down into a civil war.”

Packer, author of the 2005 book “The Assassins’ Gate: America in Iraq,” said he is not convinced that disaster was inevitable. Yet “Iraq was a more tribal, a more religious, a more conservative and, at all levels, a more shattered society than most people understood. When the lid was lifted

and nothing took its place ... there was no center to hold Iraq together. The Americans were never in control from day one.”

Yet “it’s hard to know what would have happened if we didn’t make mistakes because we made every mistake we could make,” he said.

A key error, noted Bodine, was that Americans serving in the Iraqi Coalition Provisional Authority were selected for political credentials, not international experience. Chandrasekaran said that, for example, half of the incoming CPA staff had to apply for passports in order to go to Iraq.

Bodine, a former ambassador and diplomat for 30 years, said CPA officials chose to see Iraq as a “blank slate” in which they could impose their political vision. “The clean-slate school saw looting as a good thing,” she added.

What is truly “astonishing” is that “no one has been fired in this war,” Packer said. “No person has been made to pay a professional price for screwing up the most important American undertaking of my adult life.”

The most difficult question put to the two journalists was whether U.S. troops should be withdrawn. Chandrasekaran

speculates that a withdrawal could lead to a spike in violence, from dozens dead a week to hundreds slain. But he also wonders if the violence might level off over time. “Some (U.S.) presence might be necessary,” he said.

Packer was more pessimistic about either leaving or staying. “I see nothing but bad things in either case. We have the tiger by the ears,” he said.

Both agreed that no progress could be made until the Bush administration honestly assesses the situation and acknowledges the mistakes made. This, they said, is not being done, even behind closed doors.

Packer cited an incident in which Gen. Jay Garner, who briefly served as director of reconstruction and humanitarian assistance for Iraq, met with President Bush, Vice President Dick Cheney and other officials and waited for the chance to present his honest assessment of the reconstruction effort. Instead, the meeting “turned into a back-slapping session” of congratulations.

According to Packer, Bush even asked Garner, “Do you want to go to Iran for the next one?”

Expert in asset pricing wins innovation prize for economics

Economist Stephen A. Ross, whose work has significantly impacted how market participants measure and address risk, has been awarded the inaugural Chicago Mercantile Exchange-Mathematical Sciences Research Institute (CME-MSRI) Prize in Innovative Quantitative Applications for his “innovative work in arbitrage pricing theories.”

The award recognizes “individuals or groups who contribute original concepts and innovation in the use of mathematical,

statistical or computational methods for the study of the behavior of markets, and more broadly of economics,” according to CME and MSRI.



Stephen A. Ross

Ross, the Franco Modigliani Professor of Finance and Economics, said, “As the first recipient of the CME-MSRI award, I am deeply grateful to be recognized by these two prestigious organizations. CME is considered one of the most innovative financial institutions in the world. MSRI is one of the most esteemed mathematical research facilities in the world. This prize is a wonderful recognition by both of these organizations of the fundamental role that mathematics plays in finance and of the inspiration that finance provides mathematics.”

The focus of much of Ross’ work has been on understanding how markets price assets. He is the discoverer of the “no arbitrage theorem of asset pricing,” the inventor of “arbitrage pricing theory” and the co-discoverer of risk-neutral pricing and the binomial model for pricing derivatives. He is a widely published author in finance and economics.

David Eisenbud, CME-MSRI prize selection committee chair and director of MSRI, said, “The work of Dr. Ross exemplifies the very remarkable development in recent years of the application of mathematics in economics.”

Ross was presented with the CME-MSRI Prize at a ceremony in late September in Chicago. In conjunction with the award ceremony, a seminar was held with Nobel laureates Myron Scholes and Robert Merton speaking on the uses of mathematics in economics and the study of markets.

— Elizabeth Thomson



PHOTOS / DONNA COVENEY

Homeless shelters

Students from Professor Jan Wampler’s design studio course designed and built portable disaster shelters. Above, junior Gabriel Cira, Harvard student Slobodo Radoman, Wellesley student Lisa Roerick, Wampler, senior Melissa

Shin and junior Bill McKenna try out their shelter on Killian Court. Below, junior Chris Barnes carries his team’s shelter on his back while teammate Denver Thomas, a senior, walks alongside.



PORTUGAL

Continued from Page 1

nology and in promoting international collaborations in higher education and in science and technology is making Portugal an interesting place for doing research and a relevant partner for future joint ventures in the emerging knowledge-based, globalized economy.”

MIT’s Engineering Systems Division (ESD) will coordinate the engineering aspect of the MIT-Portugal Program. ESD will work with Portugal to broaden engineering education and practice and to create a new field of study and research in

engineering.

In this area of engineering systems, the MIT-Portugal Program will be led by Professor Daniel Roos, founding director of ESD, and Professor Paulo Manuel Cadete Ferrão, director of the Center for Innovation, Technology and Policy Research at Instituto Superior Técnico, the Technical University of Lisbon.

For the management segment of the MIT-Portugal Program, MIT’s Sloan School of Management faculty will collaborate with faculty from Portuguese universities for a nine-month exploration of program development.

MIT, Singapore create Game Lab

MIT recently announced plans to establish the Singapore-MIT International Game Lab in collaboration with the Singapore Media Development Authority.

The new initiative aims to further digital game research, develop world-class academic programs in game technology and establish Singapore as a vital node in the international game industry.

The directors of MIT’s Comparative Media Studies Program—Henry Jenkins, the DeFlorez Professor of Humanities, and William Uricchio, professor of comparative media studies—will co-direct the Game Lab, which will have offices both in Singapore and at MIT. Jenkins and Uricchio will serve as the leading principal investigators in the collaboration.

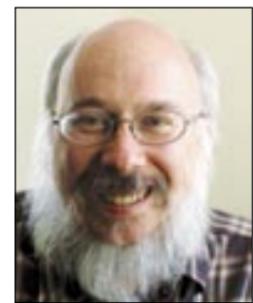
Uricchio, a specialist in transnational media distribution and reception, described the Game Lab as a “unique chance to reflect on games and to push them in new and unexpected directions, whether in terms of emerging technologies and interfaces, diverse cultural vocabularies or important niches that have simply been neglected in the rush to seize the largest market share.”

Jenkins, who researches media and the way people incorporate it into their lives, said, “The Singapore-MIT International Game Lab collaboration will provide a strong catalyst for innovation by bringing together students, industry leaders and faculty from very different cultures and backgrounds to work together and to conduct research that could have a great impact on the international game industry.”

The new initiative will enable students and researchers from Singapore to collaborate with MIT researchers and game industry professionals on international projects. Beyond technology development, the Game Lab will also conduct research on the artistic, creative, business and social aspects of games.

Michael Yap, executive director of the IDM R&D Programme Office, said, “Over the next five years, we expect some 300 of our best talents from the industry and academia to take advantage of this unique opportunity to work closely with the best research minds at MIT.”

“We are delighted to collaborate with MIT, one of the world’s leading technology and research institutes. The Singapore-MIT International Game Lab will initiate and produce groundbreaking research in games, which is rapidly emerging as a global research focus,” Yap said.



Henry Jenkins

EnergyNight shines a bright light on new work

Deborah Halber

News Office Correspondent

A voltmeter hooked up to the MIT Museum Friday night would have registered a giant two-hour spike during the second annual MIT EnergyNight.

Hundreds turned out for the event, which brought together the science, engineering, policy and business communities at MIT and showcased campus energy initiatives.

Engineering Systems Division graduate student Greg Singleton, MIT Energy Club president, welcomed people as they streamed up the entrance corridor of the museum at around 6 p.m., a half-hour into the two-hour event.

Mechanical engineering graduate student and Energy Club event chair Alissa J. Jones organized this year's event, which featured 30 booths and displays from laboratories including the Environmentally

Benign Manufacturing Lab and the Earth Resources Lab; companies including Shell Oil, Evergreen Solar and Stellaris Corp.; programs such as the Lemelson-MIT Program; and student efforts such as the Solar Car Team and the Solar Decathlon.

"There are twice as many presenters as last time," Jones said. The goal of the event is to provide an opportunity for people across campus working on unrelated projects to connect and for everyone interested in energy to see the wide range of energy work in progress. "We want people and groups in and around campus to understand what everyone else is doing," she said.

Students, faculty, staff, business professionals and family members attending Family Weekend milled around the museum exhibits, ate hors d'oeuvres, listened to live jazz and talked. Mechanical engineering graduate student Ethan J. Crumlin demonstrated an Electrochemical Energy Lab display of a tabletop fuel cell.

"Some people have heard of a fuel cell—here you can see a fuel cell in action," he said. He said he would like people to walk away with a sense of how simple a fuel cell (which does not produce energy but stores it) really is. "A fuel cell is a true enabler," he said.

David Colt, a junior majoring in energy and economics at Reed College, is spending this semester as a visiting student at Harvard and working part-time at the Cambridge, Mass.-based Prometheus Institute for Sustainable Development.

"I'm really excited about all these technologies," Colt said. "I've done research about risks, and far more than terrorism, I think that the biggest risk facing us is global warming." Colt is betting on solar energy for the future. Solar's ability to work independent of a grid will provide a power source for remote villages and give people flexibility, he said.

MIT parents Sammy Munuswamy and Kantha Arumugam of Hagerstown, Md.,

took in the atmosphere and checked out the MIT Museum exhibits while visiting their son, freshman Hemagiri Arumugam. Both engineers, they said they were intrigued by the latest advances in clean technologies.

The MIT Solar Decathlon team, which will vie against 19 other university teams to design, test and build a house powered solely by the sun that will operate for two weeks on the National Mall in Washington, D.C., in September 2007, was recruiting new members.

A member of the team also described the group's efforts to raise funds by selling "Smoot sticks," a reference to an MIT alumnus, Oliver R. Smoot '62, whose height was used as a unit of measure for the Harvard Bridge. The Solar Decathlon team intends to make all the measurements of its solar house in Smoots.

EnergyNight was sponsored by Cambridge Energy Research Associates, Shell Oil and General Catalyst.

Student inventors: Apply for the Lemelson \$30K

The Lemelson-MIT Program invites MIT student inventors to apply for its annual \$30,000 Lemelson-MIT Student Prize for inventiveness. All currently enrolled MIT seniors and graduate students are eligible to apply for the student prize, regardless of major or area of study. The application deadline is 4 p.m. on Jan. 12, 2007.

Past Lemelson-MIT Student Prize winners have garnered national media coverage from outlets such as CNN, MSNBC, the Associated Press, the Boston Globe, USA Weekend and Newsweek, which has served as valuable exposure to the investment community. Said 2006 winner Carl Dietrich, "I have put the money from the prize toward the development of my company, Terrafugia. The prize allowed Terrafugia to show our concept for a roadable aircraft at AirVenture Oshkosh—the biggest aviation celebration in the world. Because of our participation there, we now have a good number of place-holder deposits for our product, the Transition, and I am now in a much better position to raise the next round of money that Terrafugia will need to move forward." Andrew Heafitz, 2002 winner,



Carl Dietrich



Andrew Heafitz

gained a contract with the U.S. Air Force after he was featured on TV as a result of winning the student prize.

Interested students need to complete an online application that includes the following: a 1,000-word, or less, description of their inventiveness while at MIT, two letters of recommendation and a current resume or CV. Supporting photos or diagrams may also be included. Students must register as new users before accessing the application (web.mit.edu/invent/a-student.html). Questions can be directed to Lemelson-MIT Program Officer Ingrid Dudek at 617-253-3490 or idudek@mit.edu.

The winner will be announced at a press conference on Feb. 14, 2007.

The Lemelson-MIT Program recognizes outstanding inventors and inspires young people to pursue creative lives and careers through invention. The program was established in 1994 at MIT by Jerome Lemelson (1923-1997) and his wife, Dorothy. It is funded by the Lemelson Foundation and administered by MIT's School of Engineering. More information is online at web.mit.edu/invent/.

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New reading room is open 'round the clock

Sasha Brown

News Office

The new and improved reading room on the fifth floor of the Student Center officially opened with an afternoon bash in the Moran Lounge on Sept. 21.

The party featured an MIT string quartet, student-friendly fare including Buffalo wings, crudites, sushi and nachos as well as speeches from Larry Benedict, dean of student life, and Phillip Walsh, the director of the campus activities complex.

"This is a space students have shown time and again how important it is to them," Walsh said

during the opening celebration.

Benedict spoke of the room's significance as a true example of student input and collaboration. Several years ago, a group of students really pushed for the reading room. "Students know what is best for them," said Benedict, who called the room a "student initiative and student proposal." The new room features better lighting, a brighter color scheme and soft lounge furniture.

The space is the second renovated study space to open this fall, following the Building 10 community lounge Sept. 15.

The theme of the student center renovation is collaboration, Walsh said. The transformed space now offers seven group study spaces of varying sizes, equipped with LCD panels and electronic white boards, to accommodate groups from four to 10 students.

There is also space for individual study with desks that convert into study carrels, separated from the group study area by a sound sealed partition.

The reading room will be open 24 hours a day.

CELLS

Continued from Page 4

Another technique, known as the "common path" approach, places both arms of the interferometer (through which the light waves are traveling) in close proximity so the noise in the signals cancel each other out.

Quantitative phase imaging has not yet reached the level of resolution that electron microscopy offers, but Feld said he believes it will someday.

Other Spectroscopy Laboratory researchers involved in the work are Wonshik Choi, a postdoctoral associate; Ram-

achandra Dasari, principal research scientist; Kamran Badizadegan, a faculty member in the MIT-Harvard Division of Health Sciences and Technology; Shahrooz Amin, a graduate student in electrical engineering and computer science; Seungeun Oh, a graduate student in physics; YongKeun Park, a graduate student in mechanical engineering; and Niyom Lue, a graduate student at the University of Massachusetts College of Engineering.

Michael Laposata and Catherine Best Popescu from Massachusetts General Hospital are also collaborating on the red blood cell studies.

ANTIMATTER

Continued from Page 1

ple of precision measurements extracting a small and subtle effect from nature," said Richard G. Milner, professor of physics and director of MIT's Laboratory for Nuclear Science (LNS). "The MIT group under the leadership of Christoph Paus, and with the strong support of the U.S. Department of Energy Office of High Energy Physics, the MIT Department of Physics and the MIT School of Science, constructed a key detector that was essential to this measurement."

Like Jekyll and Hyde, some subatomic particles are able to act as both matter and their antimatter counterparts. Often referred to as mixing or oscillation, this process has been known to quantum physicists for 50 years. The CDF team looked at one of those particles, the B_s meson, which is composed of other subatomic particles: a heavy "bottom quark" bound to a "strange anti-quark."

Earlier this year, the CDF collaboration announced the first evidence of the oscillation process. "But only now the prob-

ability for a fluke (a signature caused by a random fluctuation) has been reduced to the commonly accepted standard to call it an observation," Paus said. To avoid false observations, particle physicists require this probability to be smaller than 5 in 10 million. For the CDF result the false observation probability is only 8 in 100 million.

Scientists hope that by assembling a large number of precise measurements involving the exotic behavior of these particles, they can begin to understand why they exist, how they interact with one another and what role they played in the development of the early universe. The researchers' goals are to discover the identity and properties of the particles and to understand the forces and interactions between them. None of these particles exist in nature today. They are created in particle collisions at large particle accelerators, where scientists can study them by analyzing the ghosts of the trails they leave in the detectors.

"The rapid matter-antimatter oscillations, three trillion times per second, give us a glimpse at the development of the

early universe and might help us understand why there is so little antimatter in it right now," Paus said.

The CDF physicists come from 61 institutions and 13 countries. Paus, a member of the LNS, led the data analysis effort involving 80 scientists from 27 institutions. "Scientists have been pursuing this measurement for two decades, but the convergence of capabilities to make it possible has occurred just now," said CDF spokesperson Jacobo Konigsberg.

Physicists will now have to check many theoretical models of how the universe works at a fundamental level to see if they comply with the CDF discovery. The 25-year-old Standard Model of particle physics predicted the bizarre behavior of the B_s meson, and the discovery reinforces its validity. The discovery also narrows down the possible forms of supersymmetry, a theory proposing that each known particle has its own more massive "super" partner particle. Some currently popular models of supersymmetry predict a much higher transition frequency than that observed by the CDF collaboration, and those models

will need to be refined.

"This measurement is not the end of the story. It opens new venues to pursue the quest for nature's best-kept secrets," Paus said.

"I am very proud that the MIT group played such a crucial role in this, one of the most important tests of the Standard Model of particle physics in many years," said Marc A. Kastner, head of the MIT Department of Physics and the Donner Professor of Science.

The results reported at Fermilab set important vectors for new research at the Large Hadron Collider at CERN in Geneva, Switzerland, which is expected to be turned on within 18 months, Milner said.

"We are all excited by this great result in which Christoph Paus and his group from our physics department played such a crucial role," said Robert Silbey, dean of the MIT School of Science. "Now on to the LHC at CERN!"

Fermilab is a Department of Energy Office of Science national laboratory. CDF is supported by the DOE, the NSF and international funding agencies.

Pulitzer-winning dramatist honored



PHOTO / STEPHANIE DIANI

Playwright Suzan-Lori-Parks will visit MIT.

Pulitzer Prize-winning dramatist Suzan-Lori Parks will receive the 2006-2007 Eugene McDermott Award in the Arts on Oct. 27 at MIT.

She will hold a reading and discuss her work on Oct. 26, at 7 p.m. in Room 10-250.

The MIT Council for the Arts presents the McDermott Award annually to an artist recognized for excellence and innovation in his/her field.

An American playwright and screenwriter, Parks received a MacArthur Foundation "genius" award in 2001 and a Pulitzer Prize for drama in 2002 for "Topdog/Underdog," a play about family identity, fraternal interdependence and the struggles of everyday African-American life.

She will be presented with the \$70,000 McDermott Award at the annual meeting of the MIT Council for the Arts at the MIT Museum. The award, established in 1974, honors Eugene McDermott, founder of Texas Instruments and longtime friend and benefactor to MIT.

In conjunction with the McDermott Award, she will return to MIT in the spring as an artist-in-residence, working with students and faculty and making a public presentation.

Parks was born in 1964 in Fort Knox, Ky., and went to high school in West Germany. She graduated Phi Beta Kappa from Mount Holyoke College in 1985 with a B.A. in English and German literature. While in college, Parks took a writing class with novelist James Baldwin, who called her "an utterly astounding and beautiful creature who may become one of the most valuable artists of our time." At his behest, she began to write plays.

Her play, "Imperceptible Mutabilities in the Third Kingdom" won the 1989-1990

Obie Award for Best New American Play. A later play, "Venus," about a woman from Africa who is exhibited as a sideshow attraction in 19th-century Europe, won the 1995-1996 Obie Award for Playwriting.

"I like my audiences to think for themselves," she said in a December 2005 interview for the Syracuse Post Standard. "This is America, after all. It's a free country, for the next 10 minutes. I enjoy hearing what my audiences think. That's the whole joy of art."

Parks' plays include "The Death of the Last Black Man in the Whole Entire World," "The America Play" (the opening scene of which inspired "Topdog/Underdog"), and "In the Blood" (2000 Pulitzer Prize nominee), a retelling of Nathaniel Hawthorne's 1850 novel, "The Scarlet Letter."

The first African-American woman to win a Pulitzer Prize for drama, Parks wrote her first screenplay for "Girl 6," a 1996 film directed by Spike Lee. She later wrote the teleplay for the 2005 film, "Their Eyes Were Watching God," based on the novel by Zora Neale Hurston, and co-wrote the film "The Great Debaters."

Her other awards include the Whiting Writers' Award in 1992 and the Guggenheim Fellowship for playwriting in 2000.

Parks' Oct. 26 presentation at MIT is sponsored by MIT's Program in Writing and Humanistic Studies and the Angus N. McDonald Fund, with additional support from the MIT literature section, Program in Women's Studies, Office of the Associate Provost, Campus Committee on Race Relations, theater arts section, the DeFlores Fund and the Council for the Arts at MIT.

For more information, call x3-7894.

Comedian Margaret Cho will host 'Fierce Forever'

Stand-up comedian Margaret Cho will headline MIT's sixth student drag show, "Fierce Forever 6," on Oct. 29 at 7 p.m. in Kresge Auditorium.

The award-winning celebrity is best known for her successful one-woman shows, including "I'm the One That I Want" (2000) and "Notorious C.H.O." (2001), and her 1994 television sitcom, "All-American Girl."

The main event of MIT's annual Fall Festival, "Fierce Forever" features more than 30 student and professional performers and usually plays to packed houses.

Hosting duties this year will be shared by Cho, Honey Dijon (aka Sylvain Bruni, a graduate student in aeronautics and astronautics) and Kitty Elektra (aka Ricky Ramirez, a senior in chemical engineering). Doors will open at 6 p.m.

A champion of gay rights, racial equality and feminism, Cho was described as a "sequined comic love child of Benny Hill and Gloria Steinem" by Helen Razer in The Age. The New York Times called her "equal parts inspired clown, committed advocate and ferocious Republican-baiter."

"I didn't mean to be a role model," Cho once said. "I just speak my truth. I guess

speaking from your heart really creates a huge impact, and if I can encourage people to do that, then I would love to be a role model. If I could encourage people to use their voices loudly, then that's my reward."

Cho, who regularly tours and maintains an award-winning blog, recently received the First Amendment Award from the American Civil Liberties Union of Southern California, and the Intrepid Award from the National Organization for Women. She last appeared at MIT in October 2003, when she performed at MIT's Fall Festival during her third national comedy tour, "Revolution."

The Oct. 29 event, which is expected to sell out, is open to MIT students and affiliates as well as to local college students and their guests. Advance tickets are \$10 for MIT students, \$20 for other students and MIT staff, faculty and affiliates, and \$30 for invited guests (tickets must be purchased by a student or affiliate and will become available on Oct. 23); an additional \$5 will be charged for any tickets available at the door.

For more information, call x3-0684, e-mail fierce@mit.edu or visit web.mit.edu/fierce.



PHOTO / DAVID KRAMER

Margaret Cho returns to MIT on Oct. 29 to headline the student drag show 'Fierce Forever 6' as part of the annual Fall Festival.

Iranian graphic novelist presents her recent works

Sarah Wright
News Office

The Center for Bilingual/Bicultural Studies will present an evening with Iranian graphic novelist Marjane Satrapi on Oct. 23 in the Stata Center's Kirsch Auditorium at 7 p.m.

A native of Tehran and a resident of Paris, Satrapi is the author and illustrator of the internationally acclaimed graphic autobiographies "Persepolis" (2004) and "Persepolis 2" (2005). She also created a graphic novel, "Embroideries" (2006).

At MIT, Satrapi will discuss her newest work, "Chicken With Plums." The book tells the story of her great-uncle, a celebrated Iranian musician who gave up his life for music and love.

Satrapi's memoir "Persepolis," originally published to wide critical acclaim in France, describes what it was like to grow up in an intellectual Marxist family during

the Islamic Revolution in Iran.

Using only stark, flat black-and-white comic strip images, Satrapi recounts her experiences as the overthrow of the Shah's regime, the triumph of the Islamic Revolution and war with Iraq in the 1980s took their terrible toll on society, family and personal life in Iran.



IMAGES © 2005 M. SATRAPI

From "Persepolis"

A sequel, "Persepolis 2," follows Satrapi as a young woman who has left her home to study in Vienna and Paris.

There is a thread connecting Satrapi's works that stands apart

from the political. "When I come to the United States, I'm supposed to be the axis of evil. They are supposed to be the nest of Satan," she said. But the "basic problem of a country like mine, apart from the regime, apart from the government, is the patriarchal culture that is leading my country. That is why the government is still there," she said.

Yet Satrapi does not define herself as a feminist. "I am a humanist. I believe in human beings. After what I have seen in the world, I don't think women are better than the men. See what the women soldiers did in Iraq—that was not better than the men. Margaret Thatcher was a woman, look what she did to Great Britain. Look at Madeleine Albright," she said.

Satrapi's talk is sponsored by MIT's foreign languages and literatures section, the MIT Contemporary French Studies Fund, the Center for Bilingual/Bicultural Studies, the De Florez Fund for Humor and the Council for the Arts at MIT.

MIT Museum Soap Box series focuses on future of energy

Sasha Brown
News Office

The popular Wednesday evening "Soap Box" series at the MIT Museum, now in its second season, will focus on the future of energy for three successive weeks this month with talks from MIT's world-renowned experts in the field.

On Oct. 18, Ernest Moniz, the Cecil and Ida Green Professor of Physics and co-director of the Laboratory for Energy and the Environment, will speak along with Kerry Emanuel, professor of meteorology. Their talk is titled "The Challenge: Meeting Global Energy Demands Sustainably."

A week later, on Oct. 25, Daniel Nocera, the W.M. Keck Professor of Energy and professor of chemistry, will speak along with Professor Angela Belcher of biological engineering and materials science and engineering. Their talk will focus on "The Role of New Technologies in a Sustainable Energy Economy."

Finally, the series will wrap up with a Nov. 1 talk featuring John Heywood, the Sun Jae Professor of Mechanical Engineering and the director of the Sloan Automotive Laboratory, together with Stephen Ansolabehere, professor of political science. Their talk will center around "Growing Pains: Transitioning to a Sustainable Energy Economy."

"Soap Box @ the MIT Museum is a series of salon-style, early-evening conversations with scientists and engineers who are making the news that really matters," according to the MIT Museum web site. "Soap Box is a public forum for debate about important ideas and issues in science and technology."

During its first season, hundreds of people came to the weekly meetings. The talks are held from 6-7:30 p.m. in the main gallery of the MIT Museum. Light food and drink is served.

Mini golf park owner tees up at Sloan

Sarah Foote

MIT Sloan School of Management

Miniature golf was the start of much bigger things for Elizabeth McQuillan, a second-year graduate student at the MIT Sloan School of Management.

A few years ago, while driving home from a day of snowboarding in New Hampshire, she noticed a "for sale at auction" sign on Banana Village, an amusement park in North Conway. Even though she had never played a full round of miniature golf in her life, McQuillan was interested in owning her first piece of property and excited to take on the challenge of running her own business.

After working at two failed start-ups, McQuillan had settled into a job in investment banking. But she was ready for something different. She had the winning bid at auction and became the new owner of the miniature golf course, waterslide park and video arcade in June 2003, just weeks before the park's peak season.

Purchasing Banana Village in the summer meant that prime miniature golf season was upon her, so McQuillan quickly set out to clean up and rebuild the course. She attributes the successful two-week

turnaround to good luck and a good attitude.

"Attitude is everything," she said. "Employees can sense a manager's emotions. So if you're having a bad day, it's easy for people to read that off of you and that spirals. With the right attitude you can achieve the impossible."

McQuillan said running Banana Village was a "ton of fun," but it was not her ultimate career goal. While she still owns the park, McQuillan turned over the day-to-day operations to a local small business owner so she can pursue her long-term goal, real estate, along with her new passion — business.

She's pursuing that passion at MIT. "Without a business background, the hardest thing for me to learn was the accounting at Banana Village. The first year I had an accountant help me with QuickBooks, but the second year I forced myself to understand and learn it and that helped me with projections, etc. One of the beauties of the MIT Sloan is that they are not teaching you to be an accountant.



Elizabeth McQuillan

They're teaching you how to understand the numbers in front of you," McQuillan said.

"MIT Sloan is the perfect place to take risks, like I did at Banana Village."

Now beginning her second year at MIT Sloan, McQuillan remains interested in real estate. With the help of her MIT Sloan network, McQuillan has already worked for two real estate companies.

McQuillan is also co-president of the MIT Sloan Real Estate Club. "What's fun about the Real Estate Club is that at some point in their lives everyone is in touch with real estate," she said.

When her lease with the new operator of Banana Village expires, McQuillan may sell the amusement park to him. But owning property and working in real estate is something McQuillan plans to continue. She hopes to work for a mid-sized real estate company in the Boston area when she completes her M.B.A.



PHOTO COURTESY / E. McQUILLAN

MIT Sloan student Elizabeth McQuillan gets into the spirit of Banana Village, the North Conway, N.H., amusement park she purchased and ran.



PHOTO / DONNA COVENY

Pachyderms on parade

Elephants from the Ringling Brothers and Barnum & Bailey Circus stopped traffic Oct. 5 during their annual march to Boston's TD Banknorth Garden, where the circus held performances Oct. 6-15. The

10 elephants, together with 15 horses, 3 ponies and their handlers, followed a route that took them past MIT on Mass. Ave., above, and then along Memorial Drive.

Choreographer's work, 'Not About Iraq,' explores rhetoric, race

Choreographer and filmmaker Victoria Marks creates works for stage, film, community settings and professional dancers with the overarching artistic and personal goals of "redressing stereotypes like physical ability, body shape and age," and of communicating the meaning of ordinary gestures. Winner of a Fulbright fellowship in choreography and numerous other awards, she will present her 2005 piece, "Not About Iraq" in Boston on Friday and Saturday, Oct. 20 and 21, at Boston University's Dance Theater.

Marks, a professor of choreography at UCLA, will perform "Iraq" with UCLA graduate student Taisha Paggett.

The MIT community is invited to a master class about this piece on Thursday, Oct. 19, from 1 to 3 p.m. in Room 50-201.

According to Marks, "Not About Iraq" questions the relationship between words and experience, government rhetoric and reality. "Victoria Marks is a spoiler, a troublemaker, a true subversive," wrote Lewis Siegel for the Los Angeles Times on Aug. 6, 2005.



PHOTO / STEVE GUNTHER

Taisha Paggett, front, and Victoria Marks, rear, will perform 'Not About Iraq' in Boston this week.

MIT junior sells high-school social networking site

Sasha Brown
News Office

Junior Joe Presbrey has a good idea how the owners of YouTube must have felt this week when they sold their site to Google for \$1.65 billion.

In March 2006, Presbrey sold Sconex, the high-school networking web site he cofounded, to New York teen marketing firm Alloy for more than \$6 million.

"We just had the right timing," said Presbrey, a Florida native, whose site is similar to established social networking sites like Friendster, Facebook and MySpace, except that it is exclusively for high-school-age students. "Had Facebook not started, we may not have become so popular."

Since its inception in 2005, Sconex has grown extremely popular with high school students. Thousands of students log on each day from high schools across the country to post information about themselves, read about classmates, link with friends, share photos, talk about classes and network with new friends.

Presbrey said the typical user spends at least 20 minutes on Sconex when they log on. That is 17 more minutes than the average user of other social networking sites, who log on just to check their e-mail. "I think high school students are a lot more bored than college students," Presbrey said with a laugh.

When Presbrey and his team launched the site, they were not sure how far it would go. "It spread mostly through word of mouth," Presbrey said. Although used nationwide, the site is most popular with urban high schools on the East Coast.

With all of the recent publicity about the security of sites like MySpace, social networking sites have to take security seriously, said Presbrey. All Sconex registrants answer security questions about their high school to verify they are real students. People who aren't recognized by others in their school can be removed.

Although he is young, Presbrey is no stranger to computers. In high school, he started his own computer business covering service, network programming and more. He has written various pieces of software, including security software for which he earned a copyright.

Presbrey and his partners started Sconex with an eye on selling eventually. It was a rough road, he said. "For a while I thought more about the health of the web site than my own health," said Presbrey. There were many late nights and hours spent working on the site. "It was definitely worth it in the end though," Presbrey said.

Since selling the site some things have changed, Presbrey said. High school students ask him questions and want him to hear their ideas. "It gets everyone excited and hopefully more motivated," he said.

Presbrey will continue to work on Sconex out of a Kendall Square office until he leaves Boston. But the electrical engineering and computer science major still finds time to stay involved with MIT. He is the president of his fraternity and takes his schoolwork very seriously. "MIT students are trained to do more than one thing," he said. "I like to keep things varied."

Presbrey said he is far from resting on his laurels. He hopes to continue his work and launch more successful web sites in the future. "This is one of the first big successes for me," he said. "It has all been a lot of fun."