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TechTalk
SERVING THE MIT COMMUNITY

MIT gears up for 140th Commencement

Sarah H. Wright
News Office

Macroeconomist Ben S. Bernanke, chair of the Federal Reserve and an MIT alumnus (Ph.D. 1979), will deliver the principal address at MIT's 140th Commencement exercises, to be held Friday, June 9, at 10 a.m. in Killian Court.

During the ceremony, 2,109 undergraduates and graduate students are scheduled to receive 1,036 bachelor's degrees, 1,048 master's degrees, 270 doctorates and nine engineer degrees.

"Bernanke's presence at the podium will have a special resonance given MIT's role as a wellspring of innovation in today's knowledge-based economy. His career has exemplified values that are central to MIT — personal integrity, analytical rigor, an uncompromising drive toward excellence and a commitment to public service — and I can think of no one who can better inspire our new graduates to use their talents to serve the nation and the world," said President Susan Hockfield.

A former chair of the President's Council of Advisors and a member of the Fed's Board of Governors since 2002, Bernanke was appointed by President Bush and approved by the U.S. Senate to assume leadership of the Federal Reserve on Feb. 1, 2006. The head of the Fed sometimes known as the nation's "banker in chief" — is widely considered to be the world's most powerful economist.

Bernanke, 52, is a native of Dillon, S.C. He received the B.A. in economics from Harvard in 1974, followed by the Ph.D. in economics from MIT. Bernanke was visiting professor of economics at MIT in 1989, an associate professor of economics at Stanford and a professor and department chair of economics at Princeton from 1996 to 2002.

Hockfield will deliver the traditional charge to the graduates. Other Commencement speakers will include Emilie Slaby, president of the Graduate Student Council, and Kimberley Wu, president of the Class of 2006.

Miriam Rosenblum, MIT Jewish chaplain, will deliver the Invocation.

Hockfield will also present the following degrees: bachelor of science; bachelor of science/master of science; bachelor of science/master of engineering; and advanced degrees in the School of Science, the Woods Hole Oceanographic Institution and the Whitaker College of Health Sciences and Technology.

Provost L. Rafael Reif will award advanced degrees in the Schools of Architecture and Planning; Engineering; Humanities, Arts and Social Sciences; and in the MIT Sloan School of Management.

Admission for ticketed guests begins at 7:30 a.m. Graduates will robe and assemble on the first floor of Johnson Athletic Center, beginning at 7:30 a.m. Between 8 a.m. and the beginning of the academic procession, families and guests may enjoy a live view of the graduates robing and assembling via television feed to Killian Court.

Following the exercises, a reception will be held for graduates and their guests on the West Campus Plaza.

A special hooding ceremony for Ph.D. recipients will take place on Thursday, June 8, at 1 p.m. in Rockwell Cage. Chancellor Phillip L. Clay will preside.

Commencement exercises require complex and precise planning and the

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What a LIFE! 50th reunion class was on mag's cover

Sasha Brown
News Office

Fifty years after being highlighted by Life magazine for future promise, the MIT Class of 1956 — which celebrates its 50th reunion this week — has more than lived up to the honor, producing such successful alumni as an astronaut and a communications revolutionary, among many others.

In the 1950s, MIT was being noticed on a national level, in large part due to the Institute's many contributions to World War II technology.

Life magazine recognized the class and MIT in general on the cover of its May 7, 1956, issue with an article titled "The Need for Better Scientists and MIT's Answer."

The article featured 27 photos by Life photographer Gjon Mili (S.B. 1927), followed by a three-page story by then-MIT President James R. Killian titled "A Bold Strategy to Beat Shortage."

The largest photo was of the Class of 1956 in the lobby of Building 7. "Pursued by industry and government, they are being offered average starting salaries of $425, 10 percent higher than offers a year ago," the article said.

The feature in Life was a thrill for many members of the class, according to Guy Spencer (S.B. 1956). "I would say it was like being on some popular national TV show today, perhaps 'Good Morning America' or maybe a guest shot with Jay Leno. Life was a big thing then," he said.

In the 50 years that have passed, members of the Class of 1956 have continued to distinguish themselves both nationally and

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PHOTO / **DONNA COVENEY**

Graduating senior Eric Mibuari used some of the skills he learned here at MIT to start a computer center in his hometown, Laare, Kenya.

Kenyan grad shares what he's learned

Sasha Brown
News Office

Without the Internet, graduating senior Eric Mibuari said he would never have known about MIT.

"That was a time when the Internet was getting really big in Kenya," explained Mibuari, an aeronautics and astronautics major.

During the gap year between high school and college that most Kenyan students take, Mibuari took information technology courses. "I realized that IT had a lot of potential," Mibuari said.

While surfing the Internet, Mibuari found a path to his future. Coming to MIT was amazing, Mibuari said, calling his four years here both "challenging and rewarding."

Mibuari decided he wanted to share those skills back home.

After attending Leader Shape at MIT, an intensive six-day leadership-development and community-building program, he got the idea to start a community computer center in Laare, Kenya, the town where he grew up.

"I just thought about how much IT helped me personally," Mibuari said. "Many people in Kenya have not even seen a computer in their lives."

Basic computer skills — especially word processing — are helpful when young people seek jobs after high school, Mibuari

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RESEARCH

SOLAR POWER

Students win a World Bank Development Marketplace grant to develop a solar micro generator in Lesotho.

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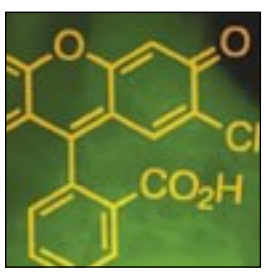

GET OXIDED

Researchers have created a sensor that can monitor nitric oxide in living cells.

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The Broad Institute of MIT and Harvard officially opens its new building at 7 Cambridge Center.

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TECH REUNIONS

A record number of alumni return to campus this weekend for events ranging from the Reunion Row to Technology Day.

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Ann Graybiel honored for Parkinson's work

Ann Graybiel, the Walter A. Rosenblith Professor of Neuroscience at MIT and a principal investigator at the McGovern Institute for Brain Research at MIT, has a new professorship to her name, external to MIT, in recognition of her important contributions to the understanding and treatment of Parkinson's disease.

The National Parkinson Foundation (NPF) earlier this year awarded her the first Harold S. Diamond Professorship, created through a donation from New York real-estate executive Lynn Diamond and named for Diamond's late father. The appointment comes with a grant of $150,000 per year for three years.

In 2004, Graybiel received the Woman Leader of Parkinson's Science award from the Parkinson's Disease Foundation, another major agency dedicated to Parkinson's disease.

"I am humbled and incredibly honored to receive these awards," Graybiel said. "My hope is that our lab's work will help patients with Parkinson's disease." The NPF described Graybiel as "one of the world's leading experts on the basal ganglia, the complex and inaccessible parts of the brain affected in people suffering from PD and related conditions."

The basal ganglia not only influence movement, they also are critical brain centers involved in motivation. "It's a great puzzle," Graybiel said. "Somehow the same or related circuitry that gets damaged in Parkinson's disease is also involved in habit formation, addiction and procedural learning."

Ann Graybiel

Graybiel's group is using experimental models of Parkinson's, addiction and habit learning to study how animals learn to perform familiar tasks and how their neuronal circuits respond to drugs that affect the dopamine system. Two postdoctoral lab members, Ken-ichi Amemori and Mark Ruffo, will be appointed Selma Diamond and Lynn Diamond research fellows.

PHOTO / **DONNA COVENEY**

Cutting the ribbon at the Broad Institute opening on Tuesday, May 30, are, from left, Harvard President Lawrence H. Summers; MIT President Susan Hockfield; Eli and Edythe L. Broad, founders of the Broad Institute of MIT and Harvard; and Broad Institute Director Eric S. Lander.

Broad dedicates new building

Nicole Davis
The Broad Institute

Less than two years after the first shovelful of dirt was turned, the Broad Institute of MIT and Harvard officially opened its new building at 7 Cambridge Center on Tuesday, May 30.

The event began with speeches from some of the principals — Los Angeles-based philanthropists Eli and Edythe L. Broad, MIT President Susan Hockfield, Harvard President Lawrence H. Summers and Broad Director Eric S. Lander — who shared a long-range vision for the future of biomedicine.

"I believe that the new model for big bioscience that has been established here will become increasingly important as we seek to take full advantage of the tools of modern science and engineering and of the opportunities for creating synergies among them," Hockfield said.

Eli Broad, founder and director of the Broad Foundations, spoke of his and his wife's belief in the promise that human genetics and genomics hold for advancing biomedical knowledge. In particular, he noted the scientific progress made in the three years since the creation of the Broad Institute and attributed such progress to the collaborative spirit that underpins the institute.

"This new Broad Institute building is a monument to collaboration," he said. "We have seen remarkable results when a community of the brightest minds in science today collaborates in very innovative ways."

Recent Broad accomplishments include the sequencing and analysis of the dog genome, the completion of phase I of the International Haplotype Map Project, the creation of the RNAi Consortium's RNAi library and new insights into human evolution.

Speaking in the airy sunlit atrium, Lander said, "This building embodies the principle that I think is most essential to the work of this generation, and that is openness."

The Broad Institute brings together two world-class universities, Harvard University and MIT, and their affiliated institutions and hospitals throughout Cambridge and Greater Boston. During its relatively brief existence to date, the Broad has operated in five distinct locations, including its central building at 320 Charles St.

The construction of the newest building emerged from the Broad's research efforts that reach across scientific disciplines as well as institutions. The building stands on the last major plot in the Cambridge Center area within the heart of Kendall Square, and thereby completes an urban renewal project that began some 30 years ago.

"This building is a scientific instrument — because of what it will make possible, because of the collaborations that it permits, because of the instrumentation that it houses and because of the facility that it provides for bringing people together," Summers said. "We are going to be able to see further, we are going to be able to see better, than we otherwise could have seen."

The revealing design of the new building is grounded in its own type of collaboration, reflecting the work of an architectural team led by Elkus-Manfredi Architects and including Signer/Harris Architects and Maryann Thompson Associates.

The morning event concluded with the ceremonial cutting of a ribbon imprinted with scientific data generated at the Broad Institute.

Undergraduate scholarships awarded

Three MIT undergraduates are among the 323 students recently named Barry Goldwater Scholars.

Goldwater Scholars receive up to $7,500 per year for each of their remaining academic years. The awards are given to sophomores and juniors planning careers in science and engineering.

The winners from MIT are junior Alexander Bagley, a chemical engineering major who plans to obtain an M.D./Ph.D. in biomedicine/tissue engineering; junior Jennifer Choy, a nuclear science and engineering major who plans to pursue a Ph.D. in nuclear physics; and junior Daniel Kane, a mathematics major who plans to obtain a Ph.D. in mathematics.

This year's Goldwater Scholars include 234 science majors, 47 engineering majors, 32 math majors and 10 computer science majors. They include 182 men and 141 women.

Putnam competition

Kane was also one of three MIT undergraduates who finished in the top six in the William Lowell Putnam Mathematical Competition, held throughout North America in December 2005.

The other two MIT students placing in the top six were Oleg Golberg and Matthew Ince, both sophomores majoring in mathematics.

A record 107 MIT undergraduates participated, and 23 of them ranked in the top 75, the most from any school to make it to the top 75.

The MIT Putnam team, composed of three students chosen by the math department, placed fourth in the team competition. Team members were Kane; Timothy Abbott, a junior majoring in mathematics and electrical engineering and computer science; and Vladimir Barzov, a senior majoring in mathematics and economics.

AWARDS & HONORS

Evelyn Fox Keller, professor of history and philosophy of science, has been elected to the American Philosophical Society. The society was founded in 1743 by Benjamin Franklin for the purpose of "promoting useful knowledge." Federal Reserve Chairman Ben S. Bernanke, who earned his Ph.D. at MIT in 1979 and will speak at the June 9 Commencement, is also among this year's inductees.

Three MIT employees have been named Susan Vogt Leadership Fellows. They are **Catherine Avril**, director of communications for the School of Engineering; **Peter Cummings**, associate director for financial services in the Office of the Dean of Student Life; and **David Weber**, director of corporate relations at the MIT Sloan School of Management. They were among 15 fellows chosen by the Boston Consortium to participate in the yearlong fellowship program, which is intended to develop leadership skills.

Margaret Ann Gray, director of organization and employee development in human resources, has been selected by the College and University Professional Association for Human Resources Eastern Region Board to receive the first Successful Practices Award for her implementation of the Leader to Leader Program.

HOW TO REACH US

News Office
Telephone: 617-253-2700
E-mail: newsoffice@mit.edu
http://web.mit.edu/newsoffice

Office of the Arts
http://web.mit.edu/arts

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Editor
Kathryn O'Neill

Photojournalist
Donna Coveney

Production
Anne Trafton

News Office Staff

Interim Director	Pamela Dumas Serfes
Senior Communications Officer/ Science Writer	Denise Brehm
News Manager/Editor	Kathryn O'Neill
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Technology Day will address 'global challenges'

Nancy DuVergne Smith
MIT Alumni Association

MIT alumni will return to campus in record numbers this weekend — more than 3,275 alumni and guests are registered for Tech Reunions, which is gathering classes ending in 6 and 1.

The centerpiece of the weekend will be the annual Technology Day program on Saturday, June 10, which this year will address the topic, "MIT Tackles Global Challenges."

The weekend will also feature the 10th anniversary of the Reunion Row, set for the Charles River Sunday morning, with a record 95 rowers. Alumni are also invited to mingle with graduating seniors at such traditional events as Tech Night at the Pops, Tech Challenge Games and the Techsas BBQ.

Tech Day faculty speakers include economist Esther Duflo (Ph.D. 1999) on "Fighting Poverty: What Works? The World of the Abdul Latif Jameel Poverty Action Lab at MIT"; materials scientist Subra Suresh (Sc.D. 1981) on "Nanotechnology and the Study of Human Disease"; mechanical engineer Woodie C. Flowers (S.M. 1968, M.E. 1972, Ph.D. 1973) speaking "On a Liberal Education for the 21st Century"; and civil and environmental engineer Philip M. Gschwend, who holds a Ph.D. from Woods Hole Oceanographic Institute, addressing "Engineering and Earth Systems: Can We Educate a New Breed of Engineers?" Duflo is a leading member of a group of scholars applying rigorous evaluation standards to development issues. "I'm interested in making the life of poor people better," Duflo said in an interview. "To me, that's unambiguously the most important and interesting question in economics."

She cofounded the economics department's Poverty Action Lab, which was renamed for Abdul Latif Jameel after a gift from his son, Mohammed Abdul Jameel (S.B. 1978). The lab aims to improve the effectiveness of poverty programs by providing clear scientific results that will help shape successful policies to combat poverty. Projects include studying the output of farmers in sub-Saharan Africa, racial bias in employment in the United States and the role of women political leaders in India.

Suresh spent two decades studying the mechanical properties of engineered materials, from the atomic to the structural scale, and then turned his attention to cures for malaria and pancreatic cancer. In a recent article, Suresh and colleagues reported a new quantitative characterization of how a healthy human blood cell changes shape when invaded by a malaria-inducing parasite and how the deformation of human pancreatic cancer cells in response to certain biomolecules may affect the metastasis of that disease.

"Such information at the molecular level is vital to gain insights into the pathogenesis of malaria, and potentially offers the opportunity to develop better drugs," Suresh said in a Tech Talk interview.

Flowers and Gschwend will both focus on educational innovation. In a recent MIT World video, Flowers called for a cultural shift that will change the student focus from doing well in courses to doing good for the world.

More than 1,400 people are expected to overflow Kresge Auditorium into Little Kresge for the Tech Day symposium.

Grads taking Dramashop on U.K. tour

Lynn Heinemann
Office of the Arts

Graduating seniors Kenneth L. Roraback and Adam A. Miller will get right back to work after Commencement on Friday, June 9, when each will receive a dual degree in physics and theater.

Both men are directors in MIT's cocurricular theater group, Dramashop, which will travel to England in its first trip abroad as an ensemble in a new initiative dubbed "Americans Come to Soliloquize," which aims to build trans-Atlantic bridges.

A total of 15 students, including cast members, directors and a technical team, will present two contemporary plays during their two-week stay. Roraback will direct the group in "Electronic City," by Falk Richter, and Miller will direct "Felutopia," which he developed with the MIT comedy group the Coalition Against Racist Propaganda and Other Crimes Perpetrated by the White Man.

The plays, to be staged at MIT in a free double bill through Thursday, June 8, at 8 p.m. at Simmons Hall, will be performed in independent and college theaters in London, Oxford, Cambridge, Warwick and Bristol.

Roraback is directing "Electronic City," a surreal exploration of how the gadget-ridden world of main characters Tom and Joy fragments. "What they ultimately need is love and human contact. 'Electronic City' makes us ask how to use technology in such a way that it strengthens, rather than replaces, our humanity," Roraback said.

Physics and theater question and explore possibilities in different, yet complementary ways, he noted. "My study of

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PHOTO / **HAYDEN TAYLOR**

Graduating senior Adam A. Miller, left, will direct 'Felutopia' starring, from left, Helen McCreery, Daniel Chonde and Adam Love.

PHOTO / **DONNA COVENEY**

Graduate Christine Chiu plans to spend the next two years working full time on the piano, thanks to an American Dream Fellowship.

Graduating senior plans musical interlude

Sasha Brown
News Office

It was love at first sight when graduating senior Christine Chiu saw her first piano 20 years ago at her older sister's lesson.

Though her sister has long since abandoned the instrument, Chiu's love has only grown. Now, thanks to a two-year, $20,000 American Dream Fellowship from the Merage Foundation, she will be able to pursue her musical dreams full time.

The fellowship, which is only available to recent immigrants, will give Chiu the opportunity to nurture her musical passion full time before heading off to medical school.

"I would like to learn to play Tchaikovsky's Piano Concerto," said Chiu. The piece is especially challenging for the smaller-boned Chiu, who mentioned the piece in her application for the fellowship. "You need large hands to play the piece," she explained.

Chiu does not shy away from challenges — musically or academically. When she was 12, she moved to the United States from Taiwan. Her family settled in Hacienda Heights, Calif.

"My parents wanted us to grow up in a more balanced environment where it was not just about the academics," Chiu said. Though she excelled academically, Chiu felt free to pursue her other interests, she said. She picked up the flute and also played tennis.

Still, the piano remained her first love, she said. Chiu pursued piano through much of high school, even competing, until her parents asked that she stop and focus on other activities. "I did miss piano," Chiu said.

For Chiu, who had excelled all her life, arriving at MIT four years ago was a shock. Surrounded by so many intelligent people, Chiu wanted a way to stand out. It was her talent for playing that helped. "Piano helps me feel OK about myself. It makes me feel like I can do something special," Chiu said.

She decided to audition for an Emerson Music Scholarship through MIT that paid for her private piano instruction. "That is how I have been keeping my piano up ever since," said Chiu, who practices at least one hour a day during noncompetition times, but she can spend upwards of four hours a day perfecting her technique before a performance.

For the next two years, Chiu plans to use the fellowship money to focus all of her energy on her art. She will offer piano lessons to recent immigrants so they can have the kind of experience she has had in the United States.

"I think music can really help people express themselves," Chiu said. "I know it is something that has always helped me."

Tech Night at Pops to star Marcus Thompson

Music Professor Marcus Thompson, an internationally acclaimed violinist, will be the featured soloist for the 109th annual Tech Night at Pops concert to be held this year on Thursday, June 8, in Boston's Symphony Hall. Pops leader Keith Lockhart will conduct the 8 p.m. performance, which is sold out.

Thompson has appeared throughout the Americas, Europe and the Far East as soloist, recitalist and in chamber music series. A Bronx native, Thompson earned his doctorate degree at the Juilliard School. At MIT, he heads programs in chamber music and performance studies. He is also a member of the viola faculty at the New England Conservatory of Music and a violist in the Boston Chamber Music Society.

Thompson last appeared with the Boston Pops in 1973 for Mount Holyoke Night at Pops just before he joined the MIT faculty. He is the Robert R. Taylor Professor of Music here.

The Tech Night program will include works by John Williams, Tchaikovsky, Mozart and movie themes from "Gone With the Wind," "Out of Africa," "Lawrence of Arabia," "The Days of Wine and Roses," "The Godfather," "The Little Mermaid" and "Star Wars."

The concert will conclude with the traditional sing-along version of MIT's alma mater, "In Praise of MIT."

Prior to the Pops concert, current members and alums of MIT's all-male a cappella ensemble, the Logarhythms, will serenade graduates and alumni concertgoers in the lobbies of Symphony Hall.

Scholarship site links students with donors

When Andrew Luckmann got his financial aid award letter last spring and saw that part of his package included scholarship money from the Mark E. Beckham (1977) Memorial Fund, the name didn't mean much to him. But that was before he met Beckham's family.

Thanks to a recently launched web project, enrolled undergraduates can now find out not only how much MIT scholarship money they're getting, but exactly which scholarship funds it comes from — and in many cases, details about how a fund was established and for whom it was named.

The web site is part of WebSIS and therefore has restricted access; students need MIT certificates to find this information.

MIT has more than 900 gift and endowed funds created by alumni or other friends of the Institute to support scholarship aid. Some of those donors have set specific conditions for who can receive a scholarship from that fund.

When undergraduates are awarded a scholarship by Student Financial Services (SFS) as part of their financial aid package, they fill out a form that gives SFS some information about their background and interests. Where needed, SFS donor relations manager Susan Wilson matches students to funds based on this information. Other students have scholarship money that comes out of endowed funds with no preferences or restrictions, or from the general MIT scholarship budget. The Institute guarantees it will meet the financial need of every student, "but a lot of them don't stop to think how MIT is able to do that," Wilson said.

The Beckham fund was created in 2000 by Cynthia Carlson Beckham in memory of her husband, a 1977 MIT graduate in civil engineering who died suddenly when he was 45. His wife stipulated that money from the fund should preferably go to a student in the Department of Civil and Environmental Engineering.

"Most students have no idea" where their scholarship money comes from, said Luckmann, of Scarsdale, N.Y., who will be a senior in civil engineering. In 2004-2005, 2,311 undergraduates (56 percent) received more than $50 million in MIT scholarships. The average scholarship from MIT funds was $21,650.

Now, by logging onto WebSIS and clicking on "financial record" and then "donor record," students can see the name of every fund that has contributed to their scholarship total — and each name has a link to a web page that includes some biographical information about the fund and the donor, when available. If a donor has requested anonymity, the only information that students will see is the name and purpose of the fund and the date it was established.

To gather information for the web project, every effort is being made to contact as many donors and family members as possible, asking for details about how and why the funds were established. Not all the scholarship fund web pages have donor information yet, since many scholarship funds were created decades ago and details about the establishment of many funds have been lost. But about one-third of the 900-plus scholarship funds are actively stewarded, meaning there is a living donor or family member associated with the fund.

Beckham was one of the first to participate. She said one of the benefits for her is that the scholarship fund offers a way for her and her two sons (now 12 and 10) to maintain a bond with MIT. In March, the family met Luckmann, the fund's first beneficiary. He is someone they can talk to about Mark, and he's a person they know Mark has helped.

"It's really meaningful for my sons to connect (to MIT) in this positive way," she said.

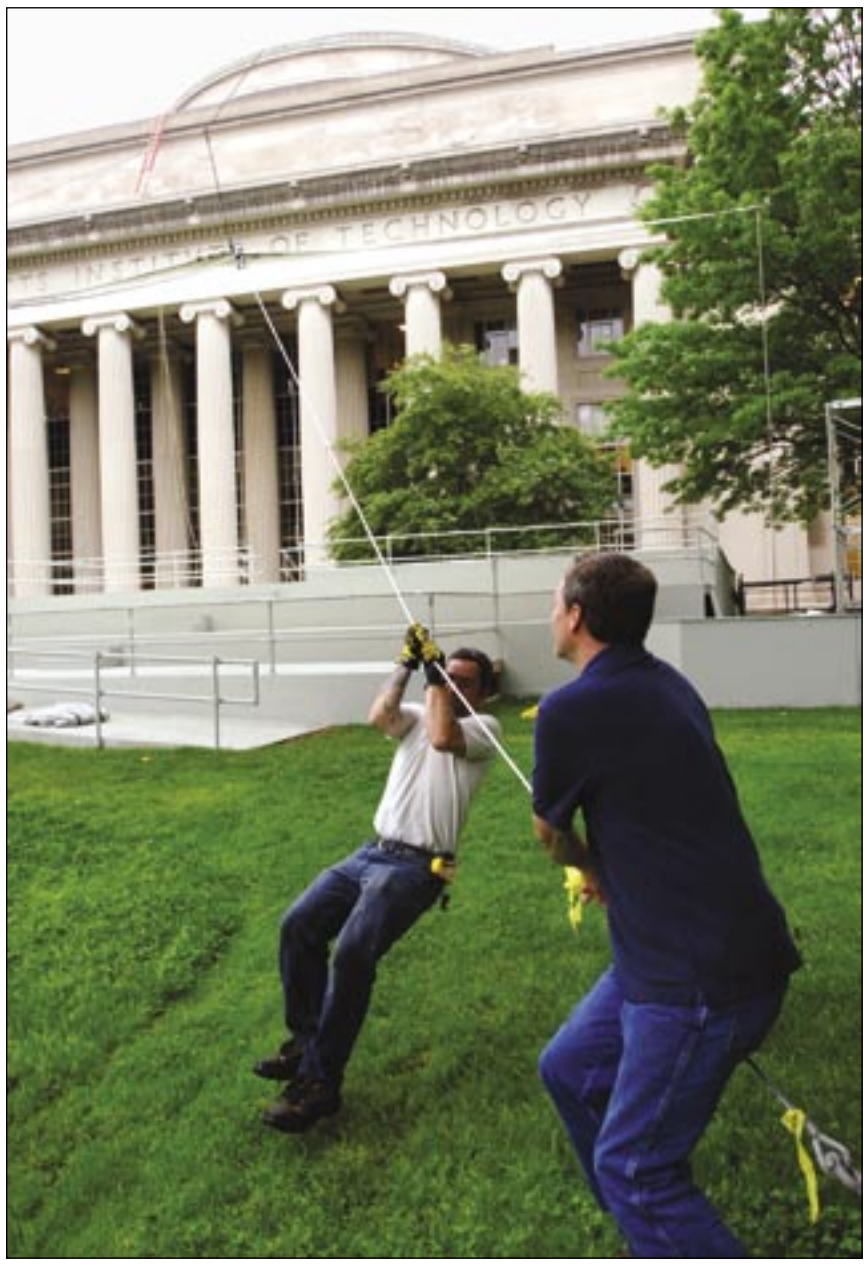

PHOTO / **DONNA COVENEY**

Getting ready for big day

Gary Cuhna of facilities, right, gets some help from John Grenier of Atlantic Plant Maintenance on Friday, June 2, to haul up the sail that will shade the stage during Commencement on Friday, June 9.

PREVIEW

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comings and goings of guests must be free of obstruction or interference.

In accordance with this policy, Killian Court will only be accessible to members of the graduating class, faculty, stage assembly and ticket holders. Access to Johnson Athletics Center will also be limited. In both Killian Court and Johnson, everyone will be electronically scanned as they enter.

For more specific details, please see the Statement by the Chancellor's Committee on Protocol for Demonstrations at Commencement and other Academic Exercises at: web.mit.edu/commencement/2005/ProtocolforDemonstrations.html. Questions regarding locations for demonstrations may be directed to Gayle Gallagher, executive officer for Commencement at gayle@mit.edu.

For those unable to get into Killian Court, a live online webcast of the Commencement exercises will be available on and after June 9.

Parking

For guests attending the Commencement exercises on Friday, complimentary parking will be available in the West Parking Garage on Vassar Street.

Paid parking will also be available in the Marriott Hotel parking garage (entrance at corner of Ames Street and Broadway) and the Technology Square parking garage (entrance on Broadway) on Thursday and Friday.

In the event the Commencement exercises in Killian Court are canceled due to severe weather conditions, the speeches will be held in Rockwell Cage for the stage assembly and graduates only. Guests may view the speeches on closed-circuit television in viewing locations throughout the campus.

Complete Commencement information is available at web.mit.edu/commencement/2006.

'Soap Box' series is a conversation starter

MIT Museum brings expert speakers, audiences together

Stephanie Schorow
News Office Correspondent

Who would think that the topic of batteries would heat up debate? Or that teachers would avidly discuss whether students should use computers like crayons? Or that the process of point and counterpoint would turn strangers into a salon of instant savants?

All this, however, has happened at the MIT Museum as part of its "Soap Box" program, a monthly series of presentations by MIT experts on critical issues designed to break down walls between the speaker and the spoken to.

"We wanted to make Soap Box less of a lecture and more of an introduction to a discussion," said MIT Museum Director John Durant, who launched the series in November, modeling it after European-style salons on science and technology topics held in cafes or pubs.

Soap Box is held in the museum's robotics gallery, and with support from the Boston Globe, the series has attracted a mix of different audiences who do more than listen quietly and politely raise hands at the end.

"We're trying to put the emphasis firmly on conversation," Durant said.

Thus, presenters are asked to speak for a tight, bright 20 minutes on a chosen topic and to leave those PowerPoint slides at home. The audience then is asked to break into small groups and, in "discuss-amongst-yourselves" fashion, develop a list of agenda questions. The questions are quickly typed up by museum staff and projected on a screen for general consideration.

Even after the evening concludes, discussion continues in an online forum on the museum's web site. A video of the event is also posted on MIT World (mitworld.mit.edu).

Past Soap Box presenters include Rodney Brooks, director of the Computer Science and Artificial Intelligence Laboratory; Professor Nancy Kanwisher of brain and cognitive sciences; Assistant Professor Andrew Endy of biological engineering; David Altshuler, a geneticist at the Broad Institute of MIT and Harvard; and Professor of Materials Science and Engineering Donald Sadoway, who roused his audience with a forceful debunking of hydrogen as an alternative energy source.

"You wouldn't think batteries would be all that interesting," said Jon Bijur, the museum's education coordinator. But Sadoway "got very passionate."

Like any new product, the Soap Box format has had bugs to work out. "There's a bit of a myth that most scientists and engineers just can't speak clearly to general audiences about what they do," Durant said. "I find that when you invite first-rate people, more often than not they turn out to be pretty good at explaining what they're about to a general audience. That's certainly been our experience."

A recent Soap Box speaker even took the discussion unabashedly down to the preschool level. In the May Soap Box, Professor Mitchel Resnick of the Media Lab called for educators to use computers less like televisions and more like paintbrushes. Educators, he argued, should think more like kindergarten teachers who give kids blocks and finger paints to encourage creativity and exploration.

"I see computers as having the potential to extend the kindergarten approach to learners of all ages — to allow work on more advanced ideas, but still use that kindergarten approach," he told a capacity crowd that included a large number of teachers and educators.

Resnick also demonstrated his new Cricket kit, a box of tools marketed through Playful Invention Co. and designed to let children create and program their own inventions.

Although wowed by the kits, the audience was dubious about how to work Resnick's ideas into an actual school day.

In his discussion group, John F. Howard, a Watertown engineer whose wife is a school principal in Salem, wondered if Resnick's emphasis on creativity was "out of touch with the political direction imposed on education, because that's not what we're testing nationwide."

His group thus put up for discussion questions such as: "How do teachers negotiate this with MCAS (Massachusetts Comprehensive Assessment System) pressure?" and "Why is it wrong to separate creative activities from more rigorous academic studies?"

Shirley Cassara, a child development teacher at Bunker Hill Community College, sadly told Resnick, "You have described kindergarten as it used to be in Massachusetts, not as it is now, because the MCAS has dictated the new frameworks for education, which has penetrated to the kindergarten level."

Resnick conceded, "What we're trying to do is take the kindergarten approach and move it up, and what, in fact, is happening is that the other (approach) is moving down."

Durant said he was pleased at the audience's challenging attitude. "We get quite different kinds of conversation and quite different kinds of debate from month to month," he said.

Soap Box will return in September and is planning a "Soap Box Special" in October on energy.

For more information, visit web.mit.edu/museum/programs/index.html.

Students win grant for Lesotho solar generator

Sarah H. Wright
News Office

Two MIT graduate students in civil and environmental engineering have won a 2006 World Bank Development Marketplace grant to develop a solar micro generator that would provide affordable energy to Lesotho, a mountainous African country where just 10 percent of the population has electricity and almost 30 percent of adults are living with HIV/AIDS.

The students, Matthew Orosz and Amy Mueller, received a little more than $100,000 for their project, one of 30 the World Bank funded this year in the competitive Development Marketplace (DM) grant program. More than 2,500 teams sought DM funding for projects on this year's theme, "Innovations in Water, Sanitation and Energy Services for Poor People."

The pioneering MIT technology combines solar thermal power with a microscale generator that is built and repaired with ordinary auto parts. The MIT team's goal is to provide not only energy but also support for the local economy through manufacturing the generator in Lesotho, a nation about the size of Maryland.

PHOTO COURTESY / **MIT SOLAR TURBINE GROUP**

Lehlohonolo Mpholo, left, and Keketso Khuele, right, work on the generator's mirrored 'troughs.'

A hot idea

Orosz, a former Peace Corps volunteer in Lesotho, was inspired to build the first iteration of the MIT generator when he observed a massive parabolic trough that "perfectly baked" 10 loaves of bread at a time for one community there.

He burned his hand on the trough, built by the Bethel Business and Community Development Center (BBCDC), now the team's partner in Lesotho, and "figured the heat was high grade enough to try mechanical conversion," he said.

As Orosz explained it, the system, known as an organic Rankine cycle (ORC), works by concentrating solar thermal energy to heat a fluid refrigerant to boiling. The typical ORC is a massive affair, but in the MIT micro version, the system's vapor is expanded through a rotary vane turbine (a car power-steering pump) that makes mechanical energy to spin a generator (a car alternator).

Concentration of the solar energy is achieved via an array of parabolic mirrors that electromechanically track the sun daily and focus its energy on an absorber tube that exchanges heat with the ORC, he said.

The latest prototype of the MIT system, built in Lesotho in January, is "sized to produce about 1 kilowatt of electricity, with about 10 kilowatts of heat recovered as hot water," Orosz said.

In Western terms, those are microamounts, sufficient to cover only a fraction of the energy consumed in a typical U.S. home. But in Lesotho, a kilowatt of electricity and additional hot water could transform lives now marooned by poverty, team members said.

Bringing affordable electricity and hot water into communities in Lesotho could "save women time they normally spend collecting fuel so they can heat water to take a bath, or power a TV so a village can watch their favorite soccer match. It could enable students to study at night in a lit school, or enable a seamstress to set up a local business with a couple of sewing machines," Orosz said.

PHOTO COURTESY / **MIT SOLAR TURBINE GROUP**

Keketso Khuele of Lesotho, MIT junior Charlie Hogg, Lehlohonolo Mpholo of Lesotho, Tumelo Makhetha of Lesotho, MIT seniors Monica Lewis and Mubarik Imam, and graduate student Matthew Orosz take a break from working on the new micro-generator in Lesotho in January.

Local partners

The micro generator team — known as the Solar Turbine Group — has already worked in Lesotho with BBCDC and local engineering students. Mueller, who joined the team this year, went to Lesotho in January with Orosz and team member Perry Hung, a sophomore in electrical engineering and computer science. Mueller and Orosz will return there for nine months in September, with team member Elizabeth Wayman (S.M. 2006).

The World Bank grant will support their trip and the work of taking the project from prototype to functioning generator for a Lesotho school or clinic. The project will include the training of Lesotho residents in how to operate and repair the generator.

Mueller's first trip to Lesotho's barren mountains convinced her that the MIT project is about "so much more than technology. As engineers, we're all excited about making things work. Once I was on the ground, the social and economic components were really brought home: All of the trees have been cut down and burned to heat water or cook food. People are in desperate need of an energy source other than brushwood," she said.

Yet technology does play a crucial role, according to Mueller. She believes it is useful to learn high-tech methods, then "scale back and find a simpler, less expensive way to tackle the same problems. It is also important to realize there are still places where one person can make a difference," she said.

MIT support

For Orosz and Mueller, one person has already made a difference in their lives and the life of their energy innovation. Their advisor, Harold Hemond, the William E. Leonhard Professor of Civil and Environmental Engineering, provided "insightful suggestions along the way and trusted us to strike the right balance between our graduate research and our commitment to making this project a reality," Orosz said.

Initially incubated in the D-Lab class taught by Amy Smith, an instructor in the Edgerton Center, the MIT solar microgenerator won numerous awards before receiving the World Bank grant. The team (then known as Parabolic Power) won two consecutive IDEAS competitions, and the Public Service Center has twice funded team members' work in Lesotho.

In 2006, Orosz received a Carol Wilson Award to advance the project and team members Sorin Grama, a graduate student in system design and management, and MIT affiliate Ignacio Aguirrer represented the team at the Massachusetts Ignite Clean Energy Competition, winning the project its third prize.

Scientists link human activity to rise in hurricanes

Elizabeth Thomson
News Office
and
A'ndrea Elyse Messer
Penn State

Human-induced climate change, rather than naturally occurring ocean cycles, may be responsible for the recent increases in the frequency and strength of North Atlantic hurricanes, according to MIT and Penn State researchers.

"Anthropogenic factors are likely responsible for long-term trends in tropical Atlantic warmth and tropical cyclone activity," the researchers report in an upcoming issue of Eos, the weekly newspaper of the American Geophysical Union.

From data going back to the 19th century, scientists have found a correlation between the temperature of the sea surface in the tropical Atlantic and tropical cyclone activity. Warmer surface temperatures are associated with increases in strength and duration of cyclones.

But what is causing the increased surface temperatures?

Some scientists believe human-induced climate change is behind the trend. Others cite a natural cause, the so-called Atlantic Multidecadal Oscillation (AMO) — an ocean cycle similar to, but weaker and less frequent than, the El Niño/La Niña cycle.

Kerry A. Emanuel, professor of atmospheric sciences at MIT, and Michael E. Mann, associate professor of meteorology and geosciences at Penn State, used a statistical method to separate the influences of one from the other.

"The important result of this work is that the tropical North Atlantic sea surface temperature appears to be controlled largely by radiative forcing, which has changed over the past century mainly owing to sulfate aerosol pollution and greenhouse gas increases," Emanuel said.

"There is no evidence of any 'natural cycle' in tropical North Atlantic sea surface temperatures in late summer and early fall. And since the sea surface temperature is strongly linked to Atlantic hurricane activity, this suggests there is no 'cycle' in the latter," he said.

In a seeming paradox, Emanuel and Mann also found that some pollutants have actually mitigated the warming problem.

Some gases, such as carbon dioxide and methane in the upper atmosphere, create the greenhouse effect associated with global warming; other pollutants, such as sulfur dioxide and nitrogen oxides in the lower atmosphere, cool the Earth's surface by reflecting sunlight.

Because of prevailing winds and air currents, pollutants from North America and Europe move into the area above the tropical Atlantic. The impact is greatest during the late summer when the reflection of sunlight by these pollutants is greatest, exactly at the time of highest hurricane activity.

This suggests that the cooling from pollutants in the atmosphere tempered the rise of sea surface temperatures and number of hurricanes. However, the industrialized world is doing much better at controlling the amounts of aerosols going into the atmosphere, and the cooling effect has been decreasing since the 1980s.

This work was sponsored by the National Science Foundation.

Professor Robert C. Reid dies at 81

Anne Trafton
News Office

Robert C. Reid, professor emeritus of chemical engineering, died May 18 at Winchester Hospital. He was 81 years old.

Reid retired from MIT in 1985 after 34 years at the Institute. His former students, many of whom went on to careers in teaching and research, remembered him as an inspiring mentor.

Jefferson Tester, the H.P. Meissner Professor of Chemical Engineering, said that when he came to MIT as a Ph.D. student in 1967, Reid was the first professor he got to know extremely well, both inside and outside the classroom.

"I couldn't have had a better experience," he said, adding that many of Reid's former students felt the same way. "Many, many generations of people have benefited from Bob's mentoring," Tester said.

Professor of Chemical Engineering Ken Smith, another former student of Reid's, said that Reid "brought a fresh, outward-looking perspective to the department. He was a fantastic teacher and much loved by students in whom he showed an active and highly individualized interest."

He was also humble and thoughtful in his approach to engineering problems, said another former student, Elisabeth Drake, visiting engineer in the Laboratory for Energy and the Environment.

"Because he took time thinking about technical challenges, he often came up with unusual approaches that were very effective," she said. "He also took time to get to know his professional colleagues as people — it was always both challenging and fun to interact with him."

Reid also liked to have fun with his classes, occasionally dressing up for a guest lecture as the great thermodynamicist Willard Gibbs, complete with 19th-century dress, wig and accent, Drake said.

Reid earned bachelor's degrees in marine engineering from the U.S. Merchant Marine Academy and in chemical engineering from Purdue University. He earned a master's degree from Purdue and the Sc.D. from MIT, both in chemical engineering.

Reid co-wrote two important textbooks, "The Properties of Gases and Liquids" and "Thermodynamics and Its Applications," and served as editor of the American Institute of Chemical Engineers Journal. He was director of the American Institute of Chemical Engineers from 1969 to 1971 and was a member of the National Academy of Engineering.

Reid is survived by his wife of 55 years, Anna M. (Murphy) Reid of Lexington; a son, Donald M. Reid of Chapel Hill, N.C.; a daughter, A. Christine Reid of Arlington, Va.; four grandchildren; and many nieces and nephews.

A funeral Mass was celebrated Tuesday, May 23, at St. Brigid's Church in Lexington, Mass.

Donations may be made to Cary Memorial Library, 1874 Massachusetts Ave., Lexington, MA 02420.

50th

Continued from Page 1

right here at MIT.

Just seven years after earning his bachelor's degree from MIT, Russell Schweickart (S.B. 1956, M.S. 1963) joined NASA. Six years later, in 1969, he served as lunar module pilot for Apollo 9, logging 241 hours in space.

Another member of the class, C. Gordon Bell, is considered by many to be "the civilian father of the Internet," said classmate Joseph Kaming. Bell was the first assistant director of the computer and information science and engineering directorate of the National Science Foundation. He led the cross-agency group that developed the modern Internet.

Class member Irwin Dorros (S.B. and M.S. 1956) was also a major contributor to technology and communications. Dorros started at AT&T in 1978 and served as assistant vice president for network planning.

In 1991, Dorros was awarded the Institute of Electrical and Electronics Engineers Inc. Founders Medal "for distinguished technical leadership in the evolution of national telecommunications networks and the implementation of a major research and development resource."

Class member William Dickson made his mark in the same spot where he started. In 1998, Dickson retired after serving as MIT's senior vice president for 16 years.

Dickson started his MIT career in 1960 as the assistant to the director of Physical Plant. When he retired, Dickson told The Tech student newspaper that his proudest accomplishment was helping the Institute grow from 3.5 million square feet in 1960 to 10 million square feet at the time he left.

This year, members of this class will don the red coats marking them as 50-year alumni. For many members of the class, the article so long ago proved something they already knew: They were going to be success stories.

"The national crisis called for first responders and the nation turned to MIT. The Class of 1956 was more than equal to this challenge," said Kaming, who is now an attorney in New York City.

PHOTO / **DONNA COVENEY**

Banner day for MIT Police

MIT Police marked the opening of their new headquarters at 301 Vassar St. on Thursday, June 1. From left are Patrol Officers David Smith, Jesus Ostolaza Jr. and David Sacco and Sgt. Cheryl Vossmer.

Cambridge First Day honors six

The 14th annual Cambridge First Day at MIT will honor six Cambridge institutions for "Bridging the Digital Divide" in the city.

Awards will be presented on Tuesday, June 13, to Cambridge Housing Authority's Community Computer Centers; Community Learning Center: Project LIFT; Margaret Fuller Neighborhood House's Computer Tech Center; East End House's Technology Center; Cambridge Community Television: ComputerCENTRAL; and MIT CommuniTech.

Each will receive a framed Cambridge First Day Award, $1,000 to help continue their work and a bound City Council resolution.

The program begins at 11 a.m. in the Mezzanine Lounge of the Stratton Student Center and will be followed by an informal buffet luncheon. Speakers will include Cambridge Mayor Kenneth E. Reeves, MIT Executive Vice President Sherwin Greenblatt and Cambridge City Manager Robert W. Healy.

Established in 1993, Cambridge First Day provides an opportunity for MIT to express its appreciation to the Cambridge community for the vital partnerships that exist among MIT and local businesses, public officials and residents of Cambridge.

Jointly planned and hosted by MIT and the city since 1997, Cambridge First Day focuses on a different theme each year.

'Pioneering' work earns Suresh honor

Elizabeth Thomson
News Office

The National University of Singapore (NUS) has named MIT Professor Subra Suresh one of two Centennial Professors, the university's most prestigious professorships.

Suresh, MIT's Ford Professor of Engineering and former head of the Department of Materials Science and Engineering, was awarded the first Tan Chin Tuan Centennial Professorship "for his pioneering contributions in materials science and engineering, mechanical engineering and biological engineering."

The other NUS Centennial Professor is Artur Ekert, a quantum physicist at the University of Cambridge, who was awarded the first Lee Kong Chian Centennial Professorship.

Candidates are appointed after a rigorous selection process that pinpoints academics locally and abroad who have demonstrated an exceptional level of achievement in their fields of study, as well as made significant contributions to the academic policies and programs of their universities.

Subra Suresh

The professorships were announced at an NUS banquet on Monday, May 29, at which each recipient presented a brief lecture. Suresh, through live video-conferencing from MIT, delivered a talk on nanotechnology and its applications at the intersections of engineering, life sciences and medicine.

Thomas Magnanti, dean of MIT's School of Engineering, said of Suresh and the NUS honor, "For someone who focuses so much of his research attention on the 'tiny,' Subra's reach as a scholar and academic leader is truly large.

"For his visionary leadership — as a founding co-chair of the Advanced Materials Programme of the Singapore-MIT Alliance, as a creator and first director of the Global Enterprise for Micro-Mechanics and Molecular Medicine, as an innovative researcher in several fields, and in making MIT's Department of Materials Science and Engineering a global leader and role model for other materials departments — Subra's receipt of this honor is a tribute to the worldwide impact of his many pioneering efforts," Magnanti said.

NUS President Shih Choon Fong said, "Professors Ekert and Suresh are leaders in their respective fields of research and NUS is honored to have them as our overseas Centennial Professors. Their contributions will no doubt help to enhance NUS' global standing as one of the world's rising research institutions."

The two professorships were launched to acknowledge the gifts of Singapore's Lee Foundation and Tan Chin Tuan Foundation.

Erratum

Due to a production error, the following award does not appear in its entirety in the preprinted Institute Awards pullout. Tech Talk regrets the error.

William L. Stewart, Jr. Award

- **Barun Singh G,** EECS, Montgomery, AL
- **Nici Ames G,** mechanical engineering, Kirkland, WA
- **Nikki Pfarr 2006,** literature, Issaquah, WA

Two named Trailblazers

Two MIT scientists have been chosen as 2006 Trailblazers by Science Spectrum magazine. The award honors outstanding Hispanic, Asian American, Native American and black professionals in science whose leadership and innovative thinking extend throughout and beyond their industry.

MIT faculty among the 2006 Trailblazers are James Sherley, associate professor of biomedical engineering, and Pardis Sabeti, a postdoctoral fellow at the Broad Institute of MIT and Harvard.

A luncheon honoring the Science Spectrum Trailblazers will be held on Friday, Sept. 16, in Baltimore during the Minorities in Research Science Conference.

NEWS YOU CAN USE

Willmore reception

A reception will be held to honor Kathryn Willmore, retiring vice president and secretary of the MIT Corporation, on Tuesday, June 13, in McDermott Court, between Walker Memorial and the Green Building.

Willmore, who announced her retirement in December, has been vice president since 1998 and has been at MIT for nearly 40 years.

For more information, visit web.mit.edu/newsoffice/2005/willmore.html.

The MIT community is invited to attend the reception, which will be held from 4 to 6 p.m.

Killian Court plant sale

The MIT Community Service Fund will host its annual fund-raising plant sale at 3:30 p.m. Friday in Killian Court.

Plants displayed on the Commencement podium and stage will be for sale, with proceeds to support service to the local community by MIT staff and student volunteers.

Schnitzer Prize-winning student art on display

Lynn Heinemann
Office of the Arts

Award-winning student designs in electronic furniture, video installation and wearable architecture will be exhibited at the Wiesner Student Art Gallery through the end of June. The exhibition features first-, second- and third-place winners of the 2006 Harold and Arlene Schnitzer Prize in the Visual Arts, awarded annually since 1996 for excellence in a body of work.

Lira Nikolovska, graduate student in architecture, won the Schnitzer first prize, $1,500, for her innovative furniture designs.

Nikolovska creates objects that portray "small moments and people's interactions with furniture," she said. For example, "Conversation Table" is designed to sense social dynamics and create a corresponding visual display. Light-emitting diodes run between people seated at opposite ends of the table, and microphones pick up the duration and volume of each person's contributions to the conversation. The resulting light animation clearly shows if there is an even exchange or domination at either end.

Another work, "Stealing Table," causes objects placed on the surface of a table to disappear via rotating planks.

Nikolovska wrote in her artist's statement, "I believe that a firm grounding in traditional design skills, methods and fabrication technologies is critical when making art. The process of making art (requires) balancing ideas with execution. Although the head 'manages' the journey, it is the heart that is in charge."

Architecture graduate student Oliver Lutz won second prize, $900, for video, painting and installation art.

In his artist's statement, Lutz said his recent work "focuses on fantasies of power, control and collapse." Lutz's genre-jumping works follow his main theme; titles in the Schnitzer exhibit are "Previously: Implication Traps," "Performative Analytic — Case Study: Grendel," and "Ascender (Upcoming)," which encompasses the work Lutz is currently developing.

Azra Aksamija, graduate student in architecture, was awarded third prize and $600 for her work in wearable architecture and video.

Aksamija, who identifies herself as a survivor of Bosnian Muslim genocide, seeks to resymbolize contemporary Muslim environments. Her "Nomadic Mosque" combines fashion and religious purpose through the design of a "wearable mosque" — clothes that can be transformed into prayer rugs. Not only does the wearable mosque accommodate the liturgical necessities, but it also acts as a "prosthetic device of the worshipper communicating his/her prayers: problems, needs and desires," said the designer. Her project includes a catalog of various designs for wearable mosques and a video showing Muslim prayer ritual in public space.

The Schnitzer Prize was established in 1996 by the Student Art Association through an endowment from Harold and Arlene Schnitzer of Portland, Ore. Schnitzer, a real estate investor, graduated from MIT in 1944 with a degree in metallurgy.

The Wiesner Student Art Gallery is located on the second floor of the Stratton Student Center and is open 24 hours a day.

DRAMA

Continued from Page 3

physics has enabled me to better step back and analyze the mechanics of an issue or a problem. Theater has enabled me to better examine an issue or a problem in terms of its human relevance," he said.

Miller is directing "Felutopia," a satirical piece dissecting racial tensions in the United States. After an average farmer becomes the president, his newfound power over other people's lives sends the community into a downward spiral. "Felix finds that he must fight to help the people before ultimately confronting his biggest enemy — the color of his skin," said Miller.

"Studying physics, I learn about the physical mechanisms of the world. Studying theater, I learn about people," said Miller, who will return to the University of Cambridge in the fall to begin work toward a Ph.D. in astrophysics under a Gates Scholarship. He hopes to write about theater.

Both Dramashop plays will be staged in London. "Felutopia" makes two performances at the famous King's Head Theatre, and "Electronic City" will be staged at the intimate Etcetera Theatre and at the Dana Centre, the London Science Museum's forum for topical discourse. Hayden K. Taylor, graduate student in electrical engineering and computer science, is producing the tour.

For more information, visit web.mit.edu/hkt/www/acts.htm.

MIBUARI

Continued from Page 1

said. The center he envisioned would focus primarily on those basic skills.

Armed with 12 older computers donated by MIT Libraries, Mibuari received a Public Service Center (PSC) fellowship for the January 2005 Independent Activities Period (IAP) to head to Kenya and start his new computer center in a room donated by a local church.

In just one month, Mibuari set the computers up — no small task in a room without electrical outlets — hired an instructor and a management team and advertised the new venture.

Mibuari formed collaborations with local universities that he hoped would sustain the center once he was back at MIT. He returned the following IAP, also on a PSC fellowship.

"The management had not worked out as I had hoped," Mibuari said.

During his second IAP visit, this past January, Mibuari held management seminars in Kenya and worked on a recruitment plan for students. He also worked with the management team to establish an annual plan.

Since then, the center has flourished. A local land developer even donated a plot to build a freestanding center.

"I am really happy I went back," said Mibuari, who hopes that the center will continue to grow, even after he graduates and begins a full-time job at Citigroup in Boston.

"Eventually, I would like to go home," said Mibuari. "I do feel like I have built an incredible set of skills here at MIT."

Mike Tannila's film 'Futuro: A New Stance for Tomorrow' documents the rise and fall of the plastic Futuro house designed by architect Matti Suuronen, shown in this still from the movie. The film will be screened Thursday, June 8, in Bartos Theater.

List Center presents futuristic Finnish films

Two films by Finnish filmmaker Mike Tannila will be presented at the List Visual Arts Center's Film Night on Thursday, June 8, at 7 p.m. in Bartos Theater.

"Futuro: A New Stance for Tomorrow" (1998) is a 29-minute documentary about the rise and fall of "Futuro," the flying-saucer-shaped plastic house designed by architect Matti Suuronen in 1968. The ovoid house with its porthole windows and groovy Austin Powers-style interior reflects the era's optimism about the conquest of space and belief that technology would ultimately solve all problems.

"The Future Is Not What It Used to Be "(2002) explores the innovative designs of Erkki Kurenniemi, a pioneer of Finnish electronic music whose work blends sound, film, computers and robotics to explore the relationships among art, nature and technology. The core of the 52-minute film documents Kurenniemi's obsessive effort to record his own life, preserving all his thoughts and observations through a constant stream of video and audio plus 20,000 photographs a year.

Organized by LVAC's guest film curator John Gianvito, the List Center's Film Nights offer screenings and discussions of films selected in conjunction with the gallery's current exhibitions, "9 Evenings Reconsidered: Art, Theatre and Engineering, 1966" and "The Choreographic Turn," both on view through Sunday, July 9.

In comic relief, Doonesbury is coming to MIT

Sarah H. Wright
News Office

Alex Doonesbury, 17-year-old cartoon offspring of "Doonesbury" cartoon dad Michael Doonesbury, will be attending MIT this fall, thanks to the Institute's victory over Cornell and Rensselaer in a straw cyberpoll launched Monday, May 15, by Doonesbury Town Hall, a Doonesbury.com feature in Slate, the online magazine.

In the April 12 "Doonesbury" strip, creator Garry Trudeau drew Alex ripping open the envelopes telling her she had been "accepted" by all three colleges. She described MIT as her "reach school" and herself as a "fairy princess on steroids," due to giddiness from her success.

Doonesbury Town Hall (DTH) invited its readers to choose their favorite among the three top-flight academic futures for Alex. The Straw Poll is a fey, weekly affair and was hardly prepared for the techno-voting tsunami that ensued.

The flood began at night

As DTH insiders told the tale, an MIT student put up a "Doonesbury Voting Hack" web site, which "enabled would-be-ballot-stuffers to spew out over a million votes in a single night." The DTH election-watchers denied the MIT network access to their server, but did take into consideration the "thoughtfulness" of the hacker and of his culture.

After all, DTH pollsters noted, "By tradition, engineers, hackers and techfolk will assume that in a problem-solving situation of this nature, there is no box out of which they are not expected to climb. The will, chutzpah and bodacious craft of the voting public will be respected."

Rensselaer partisans also tried hacking, but only "several hundred thousand votes bounced off our servers," the DTH summary said.

Cornell bloggers indicated that students there were watching the "fray" but were trapped in exams and had no time to write a Cornell spamming script. Instead, "students and alums managed to post many passionate, articulate, humorous, and convincing posts about why Alex should head to Ithaca," DTH wrote.

"Doonesbury" began publication in 1972. It now appears in about 1,400 newspapers.

Sensor opens up study of crucial molecule

Cathryn M. Delude
News Office Correspondent

MIT scientists have discovered a way to monitor a crucial molecule as it goes about its business within living cells.

The molecule, nitric oxide (NO), plays critical roles in the human body — from the destruction of invading micro-organisms to the relaying of neural signals.

But catching NO at work has long eluded scientists because it often exists in minute concentrations and for only short periods of time. Now, MIT chemists have developed a bright fluorescent sensor that, in conjunction with microscopy, captures and illuminates NO in living, functioning cells.

The work, reported May 28 in the online issue of Nature Chemical Biology, will aid scientists' understanding of how and when NO operates.

Stephen J. Lippard, the Arthur Amos Noyes Professor of Chemistry at MIT, developed the sensor with an eye toward understanding the role of NO in neural activity. But this work has broad biological applications since NO is produced throughout the body. "Our goal is to detect its formation in spatio-temporal terms, to see where and when it is produced in a cell, and in which collections of cells, and to connect its production with underlying chemical signaling events," Lippard said.

Until the 1990s, scientists mainly knew NO as a product of lightning and the combustion engine — and as an ingredient in smog. A simple molecule consisting of one nitrogen and one oxygen atom, it contains an unpaired electron that makes it highly reactive and destructive.

"Nobody thought it would be tolerated by a cell, much less used for biological purposes," Lippard said.

Then came the stunning discovery that the peculiar blood vessel relaxer, Endothelial Derived Relaxation Factor, identified in the 1980s, was actually NO. NO was then unmasked in macrophages (white blood cells), tumors, bones and neurons.

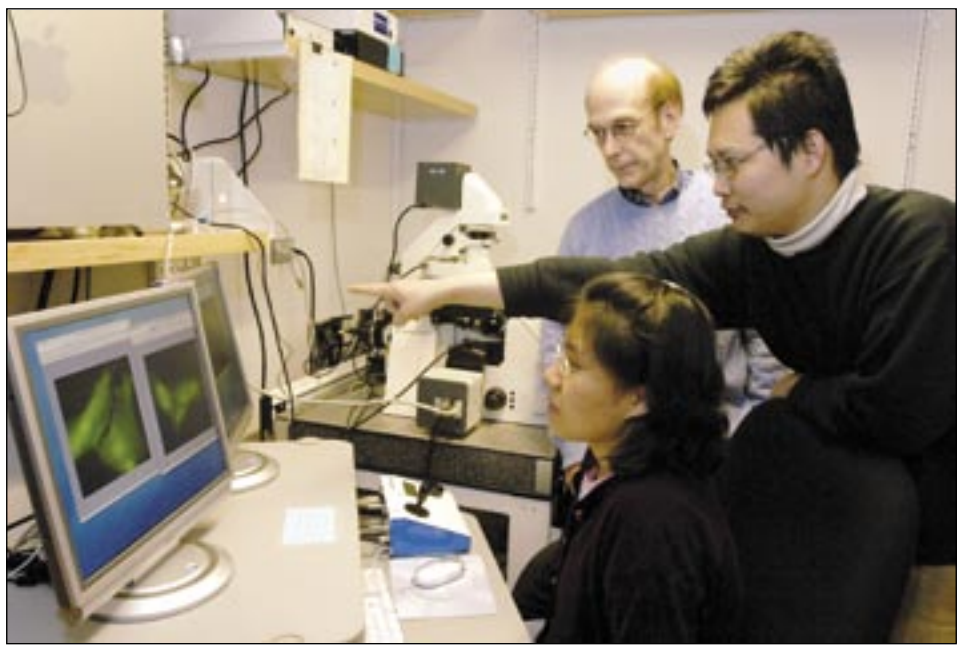

PHOTO / **DONNA COVENEY**

Postdoctoral associate Dong Xu points to an image that shows neuroblastoma cells producing nitric oxide. Xu, graduate student Mi Hee Lim, seated, and Professor Stephen J. Lippard have developed a new nitric oxide sensor.

In sweat and saliva it has antibacterial properties; in Viagra, rejuvenating effects. Paradoxically, NO often has contradictory behaviors. At some levels, it lowers high blood pressure, destroys invading microorganisms and tumor cells, maintains bone mass and relays neural signals. At other levels, it causes septic shock and promotes tumors, arthritis and nerve death.

These puzzles make understanding how and when NO operates in cells all the more relevant, and that requires a better means of monitoring it as cells go about their normal business. But existing assays have either been too invasive or measured NO only indirectly.

Lippard, together with graduate student Mi Hee Lim, the first author of the study, and postdoctoral researcher Dong Xu, produced a novel NO sensor by attaching a derivative of the widely used cellular imaging agent, fluorescein, to a copper atom. The resulting complex does not fluoresce until the fluorescein, in modified form, is released — which only happens in the presence of NO.

The sensor works in real time, in the aqueous, neutral pH conditions of tissues, and at the tiny nanomolar-concentrations of NO found in living cells.

How exclusive and selective is the NO detector? To find out, Lim and Xu made a mix of banana-shaped neuroblastomas and M&M-shaped macrophages, which each require different triggers to synthesize NO from a particular amino acid. When they triggered NO production in just the neuroblastomas, they could literally see that the sensor had selectively detected only those cells.

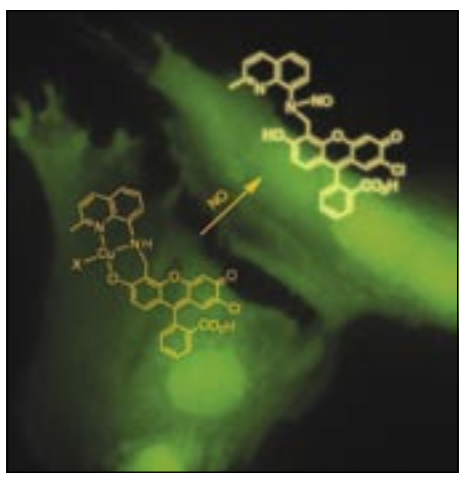

PHOTO COURTESY / **CHRISTY TINBERG AND MI HEE LIM**

A new sensor developed at MIT monitors when cultured neuroblastoma cells (green) are producing nitric oxide (NO). A copper complex of a fluorescein derivative (formula on lower left) reacts with NO and produces a nitrosated fluorescein (formula on upper right), which causes the cells to glow brightly under the fluorescent microscope.

"That delighted me the most because we want to detect one cell type selectively in a heterogeneous population of cells," Lippard said.

Lippard plans to use such NO sensors to learn about the role of this elusive molecule in neurobiology. In the nervous system, a neuron releases NO at the synapse after receiving a signal from another neuron. NO then diffuses back to the presynaptic neuron and surrounding cells, perhaps to say: "I got the message."

"The ability to visualize nitric oxide at the nanomolar level in cells and tissues should be of tremendous benefit in determining its effects on long term potentiation and neuronal development," commented Michael J. Clarke, a chemist at the National Science Foundation, which funded this research.

MIT EVENT HIGHLIGHTS JUNE 7-11

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

EDITOR'S CHOICE

HOODING CEREMONY *June 8*

The hooding ceremony for recipients of doctoral degrees.

Rockwell Cage

1 p.m.

COMMENCEMENT *June 9*

Speech by Ben S. Bernanke, 14th chairman of the Federal Reserve.

Killian Court

10 a.m.

WEDNESDAY June 7

"Why Choose an Academic Career?"
This series features panels of MIT faculty, postdocs, doctoral students and alumni. 4-5:15 p.m. Room 10-250.

"Talk to an Angel: Crucial Connections to Early Stage Capital"
Free for MIT students, faculty and staff, $20-$35 for others. 5:30-8:30 p.m. W-16. 253-0015.

"Felutopia" and "Electronic City"
Preview performances for Dramashop's ACTS UK tour (June 15-July 1). June 7 and 8. 8 p.m. Simmons Hall.

Israeli Dancing
8-11 p.m. Room 3-442. 253-FOLK.

Artist Behind the Desk Concert
Jazz piano performed by Bob Toabe, instructor at DAPER. Noon. Killian Hall.

THURSDAY June 8

List Visual Arts Center Film Night
Two films by Mike Tannila — "Futuro: A New Stance for Tomorrow" and "The Future is Not What it Used to Be." 7 p.m. Bartos Theater. 253-4680.

Karaoke Night at the Thirsty Ear
21+. Proper ID required. 8 p.m. The Thirsty Ear Pub. 258-9754.

PHOTO / **DONNA COVENEY**

Showtime!

The rhododendrons in Killian Court are in full bloom just in time for Commencement on Friday, June 9.

FRIDAY June 9

Campus Tour
Student-led campus tours are approximately 90 minutes long and provide a general overview of the main campus. 10:45 a.m. Meet in Lobby 7. 253-1875.

"Empirical Comparative Studies of Language and Music: Rhythm, Melody and Syntax"
Talk by Aniruddh Patel, Esther J. Burnham Senior Fellow at the Neurosciences Institute. Noon. Room 46-3189.

SATURDAY June 10

Alumni Memorial Service (part of Tech Reunions 2006)
Interdenominational service memorializing alumni who have passed away in the previous year. 8-9 a.m. MIT Chapel. 253-8824.

Technology Day Program (part of Tech Reunions 2006)
Technology Day is a traditional and unique opportunity for alumni and their guests to learn about new research and educational endeavors at the Institute. 9 a.m.-12:45 p.m. Kresge Auditorium. 253-8824.

hiLaRiUm @ Thirsty Ear Pub
21+. Proper ID required. 8 p.m. Thirsty Ear Pub. 258-9754.

SUNDAY June 11

Tech Challenge Games (part of Tech Reunions 2006)
Founded by alumni for alumni, the Games have become an integral and exciting part of Tech Reunion weekend. Noon. Steinbrenner Stadium. 253-8824.

International Folk Dancing
8-11 p.m. Room 3-442. 253-FOLK.

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