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TechTalk

SERVING THE MIT COMMUNITY

Three deans plan return to teaching

Magnanti, Schmalensee and Silbey to step down

Deborah Halber
News Office Correspondent

Three experts in their fields who served MIT as deans of the Schools of Engineering, Management and Science—collectively contributing more than two decades to Institute administration—will step down and return to academic pursuits, Provost L. Rafael Reif has announced.

Thomas Magnanti, dean of the School of Engineering since 1999, Richard Schmalensee, the John C. Head III Dean of the MIT Sloan School of Management since 1998, and Robert Silbey, dean of the School of Science since 2000, provided "wisdom and expertise" during periods of significant transition, making it "possible for us to move ahead without disruption," Reif wrote in a Sept. 22 e-mail to the MIT community.

Noting that all three deans had long "looked forward to pursuing academic interests they had put aside for some time," Reif expressed his gratitude to them for delaying their own plans "in favor of MIT's and their schools' best interests."

Magnanti and Silbey will stay on as deans until their successors are identified, while Schmalensee will stay on through the end of the current academic year.

In a message to the school's faculty and staff, Magnanti wrote, "It has been an immense pleasure, indeed a privilege, to

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IMAGE / **GREG TUCKER**

Making a Maki

MIT will break ground in the spring on the new Media Lab, designed by Fumihiko Maki. Above, the building's atrium. Story on Page 7.

Griffith gets 'Genius' award

Sasha Brown
News Office

Professor Linda Griffith, a noted biotechnologist, has won a 2006 MacArthur Fellowship, more commonly known as a "genius" grant. Griffith was honored for "shaping the frontiers of tissue engineering and synthetic regenerative technologies," according to the John D. and Catherine T. MacArthur Foundation.

This year, the foundation selected 25 MacArthur Fellows for their "creativity, originality and potential to make important contributions in the future," according to the MacArthur Foundation announcement.

Fellows receive $500,000 in "no strings attached" support over five years. Candidates for the fellowship are nominated, evaluated and selected through a confidential process; no one may apply for the awards and interviews are not conducted.

Griffith, 46, heard the news last week when she received a call from Daniel Socolow, director of the MacArthur Foundation.

Linda Griffith

"I was in with students and he called twice and left a message with his number but would not tell my assistant what it was about. His name also bears similarity to a law firm that advertises on late night TV around here, so I was very curious," Griffith said. "I called back and he started quizzing me on how many MacArthur Fellows I knew, and he kept saying he was sure I knew one more. I didn't get it until he told me."

Griffith called the fellowship "a huge surprise" and said it was coming at the perfect time in her career. "With all the activity of getting the new biological engineering S.B. off the ground the past couple of years, it has been hard to find the time to pursue new ideas," Griffith said. "This is such a terrific opportunity. I am elated."

According to the biography provided by the MacArthur Foundation, Griffith has "designed several methods for fabricating scaffolds on which cultured cells can adhere and grow."

She developed new polymers for controlling the physical presentation of cell adhesion molecules and growth factors that govern cell behaviors. Working with collaborators at MIT, she also developed new ways to make scaffolds for growth of bone tissue, precisely controlling the pore size and surface chemistry of three-dimensional substrates. Most recently her work has focused on creating microscale physiological models of liver using a combination of scaffold technology and fluid flow to induce organization and function of liver cells.

With these results, Griffith is developing a powerful tool for exploring the nor-

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MIT's intelligent aircraft fly, cooperate autonomously

Lauren Clark
School of Engineering

PHOTO / **DONNA COVENEY**

MIT graduate students Brett Bethke, left, and Mario Valenti watch an unmanned aerial vehicle, one in a fleet of four they helped develop to execute surveillance and tracking tasks.

The U.S. military depends on small, unmanned aerial vehicles (UAVs) to perform such tasks as serving as "eyes in the sky" for battalion commanders planning maneuvers. While some of these UAVs can be easily carried in a backpack and launched by hand, they typically require a team of trained operators on the ground, and they perform only short-term tasks individually rather than sustained missions in coordinated groups.

MIT researchers, in collaboration with Boeing's advanced research and development arm, Phantom Works, are working to change that.

They have developed a multiple-UAV test platform that could lay the groundwork for an intelligent airborne fleet that requires little human supervision, covers a wide area, and automatically maintains the "health" of its vehicles (for example, vehicles anticipate when they need refueling, and new vehicles launch to replace lost, damaged, or grounded ones).

Aeronautics and Astronautics Professor Jonathan How, who heads the research team, believes it is the first platform to publicly demonstrate sustained, coordinated, autonomous flight with multiple UAVs.

At the Boeing Tech Expo at Hanscom Air Force Base in May, students on the team conducted more than 60 flights on demand with two UAVs. In the MIT Aerospace Controls Laboratory, the research team regularly conducts flights using three to five UAVs, which have achieved complex tasks such as persistent surveillance of a defined area.

According to John Vian, a technical fellow at Phantom Works who collaborates with the MIT team, "They have demonstrated quite successfully that UAV swarms can achieve high-functional reliability by incorporating advanced health monitoring and adaptive control technology." Simply put, adaptive control addresses the fact that the parameters of the system being controlled are uncertain or vary slowly over time.

A fleet of UAVs could one day help the U.S. military and security agencies in difficult, often dangerous, missions such as round-the-clock surveillance, search-and-rescue operations, sniper detection, convoy protection and border patrol. The UAVs could also function as a mobile communication or sensor network, with each vehicle acting as a node in the network.

Such missions depend on "keeping vehicles in the air. The focus of this project is on persistence," said How. Persistence requires self-sufficiency. "You don't want 40 people on the ground operating 10 vehicles. The ultimate goal is to avoid a flight operator altogether."

The test platform consists of five miniature "quadrotor" aircraft—helicopters with

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NEWS

NATIONAL LEADER

The National Academy of Engineering nominates MIT President Emeritus Charles M. Vest to be its next president.

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GET SMART

The faculty considers the proposed Singapore-MIT Alliance for Research and Technology (SMART) Center.

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RESEARCH

IT'S A STRETCH

Mechanical engineering graduate student Trevor Shen Kuan Ng checks out how far dough goes.

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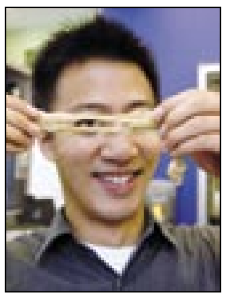

ARTS

GREAT PUMPKINS

MIT's Glass Lab lines up gourds large and small for its annual sale on Kresge Oval on Sept. 30.

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Vest nominated for NAE presidency

Elizabeth Thomson
News Office

President Emeritus Charles M. Vest has been nominated to be the next president of the National Academy of Engineering.

If elected by the NAE membership next March, Vest will succeed William A. Wulf, whose second term as NAE president will end on June 30, 2007. Vest's six-year term as president will begin on July 1.

"I could not be more pleased that Chuck Vest has accepted the nomination for the NAE presidency," said NAE Chair Craig Barrett, who is also chair of the board of Intel Corp. "Chuck's broad experience and leadership at the national level will benefit the NAE greatly and allow it to continue the distinguished service to the nation that has been a hallmark of Bill Wulf's presidency."

The National Academy of Engineering is part of the National Academies, which also include the National Academy of Sciences, Institute of Medicine and National Research Council. These independent, nonprofit institutions serve as advisers to government and the public on issues related to science, engineering and medicine. NAE's membership consists of the nation's premier engineers, who are elected by their peers for their distinguished achievements.

The NAE president is a full-time employee of the organization at its headquarters in Washington, DC, and also serves as the vice chair of the National Research Council, the principal research arm of the National Academies.

Vest, 65, served as MIT's president from 1990 through 2004. During that time, "he worked to strengthen federal-university-industry relations and undertook a number of initiatives to bring education and research issues to broader public attention," according to the NAE. "Vest placed special emphasis on enhancing science and engineering in undergraduate education. While stressing the importance of racial and cultural diversity among faculty and students at MIT, Vest also worked to build a stronger international dimension to the university's programs."

Selected as a member of the bipartisan Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction, which completed its report in 2005, Vest brought a strong science and engineering background to the analysis. He led a U.S. Department of Energy task force on the future of science programs in 2002-2003 and chaired a presidential advisory commission on the redesign of the International Space Station in 1992-1994.Vest was vice chair of the Council on Competitiveness for eight years, is a former chair of the Association of American Universities, and serves on the U.S. Commission on the Future of Higher Education.


Charles M. Vest

Vest was elected to the NAE in 1993 "for technical and educational contributions to holographic interferometry and leadership as an educator," and he currently serves on the NAE Council.

Among Vest's career honors is the NAE's Arthur M. Bueche Award in 2000 "for his outstanding university leadership, commitment, and effectiveness in helping mold government policy in support of research, and forging linkages between academia and industry."

AWARD

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mal function of the liver and the mechanisms of disease that attack it, offering the prospect of significant reduction in the need for future organ replacement or regeneration.

"Her latest experiments are expanding the use of 3-D scaffolds for growing other cell types, such as blood-forming cells; as with the liver culture studies, these experiments lay the groundwork for building in vitro models of toxicity and cancer metastasis," according to the foundation.

According to the biography, Griffith is helping to create the new discipline of biological engineering and its applications for diagnosing disease and regenerating damaged tissues at the intersection of materials science, cell biology and physiology.

For Griffith, the fellowship is a reflection on the MIT culture as much as anything else. "Lots of people have creative ideas, but to be successful you need an environment that fosters creativity—and there is no place like MIT for that," Griffith said. "I was very lucky to be a junior faculty member here, with such terrific colleagues to help me get some early ideas going, and I feel lucky every day for the spirit of adventure that pervades MIT."

"I am also very grateful that MIT fostered creation of biological engineering—now Course 20—having students who are educated as 'biological engineers' makes all the difference in my work and in the work of all my biological engineering colleagues," Griffith said.

Griffith received a B.ChE. (1982) from the Georgia Institute of Technology and a Ph.D. (1988) in chemical engineering from the University of California at Berkeley. In 1991, she joined the MIT faculty as an assistant professor of chemical engineering (1991-1996), after serving as a post-doctoral associate from 1988-1990. Her articles have appeared in such journals as Science, Biomaterials, and Proceedings of the National Academy of Sciences.

$100 million grant funds cancer center

The Broad Institute of MIT and Harvard will join forces with four prominent New York research centers to battle cancer thanks to a $100 million award from the Starr Foundation announced today.

Together these institutions will form the five-year Starr Cancer Consortium, which aims to harness the power of genomic technology for the understanding and treatment of cancer. In addition to the Broad, they include Cold Spring Harbor Laboratory, Memorial Sloan-Kettering Cancer Center, Rockefeller University, and Weill Medical College of Cornell University.

"Science and medicine have always been about teamwork," said MIT president Susan Hockfield. "Now, the philanthropy of the Starr Foundation will allow the world-class scientists at the Consortium institutions to take collaboration to a whole new level and accelerate our progress in cancer research."

The Broad Institute of MIT and Harvard is itself a research collaboration involving several Boston-area universities and teaching hospitals, with programs focused on a variety of human diseases.

"Genome technology offers enormous opportunities to accelerate the understanding and treatment of cancer, which is a genomic disease," said Todd Golub, the director of the Broad's Cancer program, an investigator at the Dana-Farber Cancer Institute, an associate professor at Harvard Medical School, and an investigator at the Howard Hughes Medical Institute.

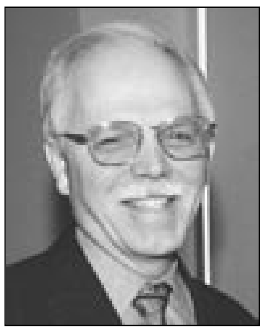
"With these tools, it will be possible to systematically define the molecular pathways underlying cancer and to reveal the Achilles' heels that can be targeted by new therapies."

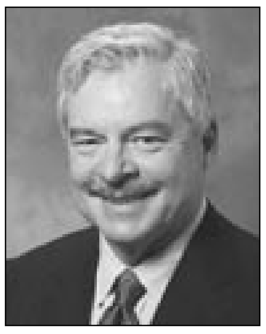
DEANS

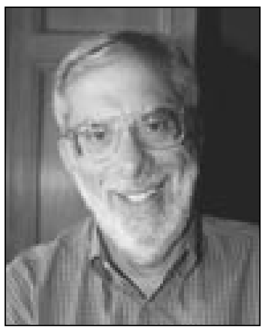
Continued from Page 1

collaborate with such outstanding faculty, staff, students, alumni/ae and friends of the Institute, and to serve as dean of what I have often referred to as the best engineering school in the galaxy.

"Over the past eight years, the school has hired 119 faculty members, including 34 women and nine underrepresented minority faculty. Through iCampus, the d'Arbeloff fund, school-based funding, and many departmental initiatives we have made significant investments in educational innovation, including the new Undergraduate Practice Opportunities Program, and we have developed many new vectors of research."


Thomas Magnanti


Richard Schmalensee


Robert Silbey

Magnanti has been a key player in the development of major industrial partnerships with Hewlett-Packard and Microsoft, as well as such pioneering collaborations as the Singapore-MIT Alliance.

"It's been a wonderful experience," Magnanti said.

Magnanti, named an Institute Professor in 1997, will return to his research on the theory and application of large-scale optimization. He said he is looking forward to "an opportunity to teach some of the brightest minds in the world" and plans to complete a couple of books.

After joining the MIT faculty as a professor of economics and management in 1977, Schmalensee directed the MIT Center for Energy and Environmental Policy Research from 1991 to 1999. He took over as deputy dean at Sloan in 1996.

Catalyzing the development of a landmark 209,000-square-foot management building, slated for a 2007 groundbreaking, and helping to raise $220 million are among Schmalensee's foremost accomplishments of the past eight years.

The high points, he said, "have been meeting and working with incredible people to help strengthen a school I care about."

Schmalensee's accomplishments include forming the MIT Sloan Fellows Program in Innovation and Global Leadership and redesigning the M.B.A. program.

Under Schmalensee's leadership, international programs, including the China Management Education Project and the Global Entrepreneurship Laboratory, have been enhanced. He oversaw the creation of the Global Leadership Lab (G-Lab) and the MIT Leadership Center.

With the MIT-Harvard Division of Health Sciences and Technology, Schmalensee created the dual-degree Biomedical Enterprise Program.

Schmalensee served on the President's Council of Economic Advisers from 1989 through 1991. He has served as a member of the Environmental Protection Agency's Environmental Economics Advisory Board and as chair of its Advisory Council on Clean Air Act Compliance Analysis.

Schmalensee's research centers on industrial economics and its application to managerial and public policy issues. "I plan to return to teaching and research, focusing on applying economics to understand market processes, as well as government regulation and its impacts," he said.

Silbey, the Class of '42 Professor of Chemistry, joined the MIT faculty in 1966, becoming head of the chemistry department in 1990 and director of the Center for Materials Science and Engineering in 1998. He took over as interim dean in February 2000 and was named dean the following year.

An advocate for excellence in teaching, Silbey supported innovative approaches to undergraduate education such as the Technology Enhanced Active Learning program, which changed the way freshman physics is taught. For the past two years, Silbey has chaired the Task Force on the Undergraduate Commons.

Silbey said some of the highlights of his tenure were the awarding of four Nobel prizes to School of Science faculty members; overseeing the construction, "on time and on budget," of the Brain and Cognitive Sciences Complex; and "convincing Maria Zuber to agree to be the first woman department head in the School of Science and convincing June Matthews to be the first woman director of a major laboratory (the Laboratory for Nuclear Science)—not because they are women, but because they were the best people for the jobs," he said.

During Silbey's tenure, the school hired more than 80 faculty members.

Silbey's research interests include theoretical studies of the low temperature thermal properties of glasses, energy and electron transfer and relaxation in molecular aggregates, optical and electronic properties of conjugated polymers and the dynamics of highly excited molecules. "I intend to return to full-time teaching and research when I step down as dean," he said.

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Professor wins national, international teaching prizes

Sasha Brown
News Office

During his 50-year career at MIT, Professor Gilbert Strang (S.B. 1955) of the Department of Mathematics has become one of the most recognized mathematicians in the world, thanks to his expertise in both teaching and writing.

This year it is his teaching that has received unusual attention.

In recent months Strang has been awarded three different prizes. The Northeastern Section of the Mathematical Association of America (MAA) chose him as 2006 Distinguished University Teacher of Mathematics. The nationwide Deborah and Franklin Tepper Haimo Award will be presented at the MAA's annual meeting in January. The new Su Buchin Prize, to be awarded for the first time in 2007, was announced on Sept. 18 by the International Council for Industrial and Applied Mathematics (ICIAM).

The Su Buchin Prize is particularly exciting for Strang because it honors his work teaching mathematics around the world. It was created on the initiative of the Chinese Society for Industrial and Applied Mathematics (CSIAM).

According to CSIAM materials, "The prize was established to provide international recognition of an outstanding contribution by an individual in the application of mathematics to emerging economies and human development, in particular at the economic and cultural level in developing countries."

Strang has visited China eight times. "During these visits Gil Strang spent much time in discussing mathematics and sharing teaching experiences with many Chinese students, researchers and teachers," said Professor Ian Sloan of the University of New South Wales, the president of ICIAM. "His great contributions in mathematics and his dedication to advancing public awareness of the power and potential of mathematics have been exceptional."

Strang has spent time in dozens of countries teaching and lecturing. "A big part of my life is to open mathematics to other people," Strang said. "I enjoy the travel and I enjoy meeting people."

Since the start of OpenCourseWare (OCW)—a five-year-old MIT program that offers curriculum and course materials from more than 1,500 MIT courses on the web—Strang's linear algebra course has shot to the top as its most visited course.

In many ways, Strang credits OCW for his Su Buchin prize.

"I am pleased not just about the prize and the personal part," he said. "I am more pleased that people are able to learn linear algebra because of OCW."

Making the seemingly inaccessible accessible has always been Strang's goal. His 1976 textbook on linear algebra launched a teaching revolution with its conversational tone and practical applications for the subject. "Up to that point, linear algebra had been primarily for math majors," he said.

In his estimation, linear algebra could be as useful to engineers as calculus. "I guess I knew its applications in a way that a pure algebraist might not," Strang said.

Since then, Strang has found many ways to incorporate mathematics into an engineering curriculum. His 18.085 and 18.086 courses on mathematical methods for engineers now attract 200 students a year. And the 18.06 linear algebra course is taken by more than a third of MIT undergraduates.

Over the years, Strang has published numerous textbooks, monographs and papers. For his work on the finite element method, he won the 2005 von Neumann Prize Medal from the U.S. Association for Computational Mechanics. Still, he is more impressed by the accomplishments of others: "I am very pleased, but a lot of mathematicians are doing terrific things," he said.

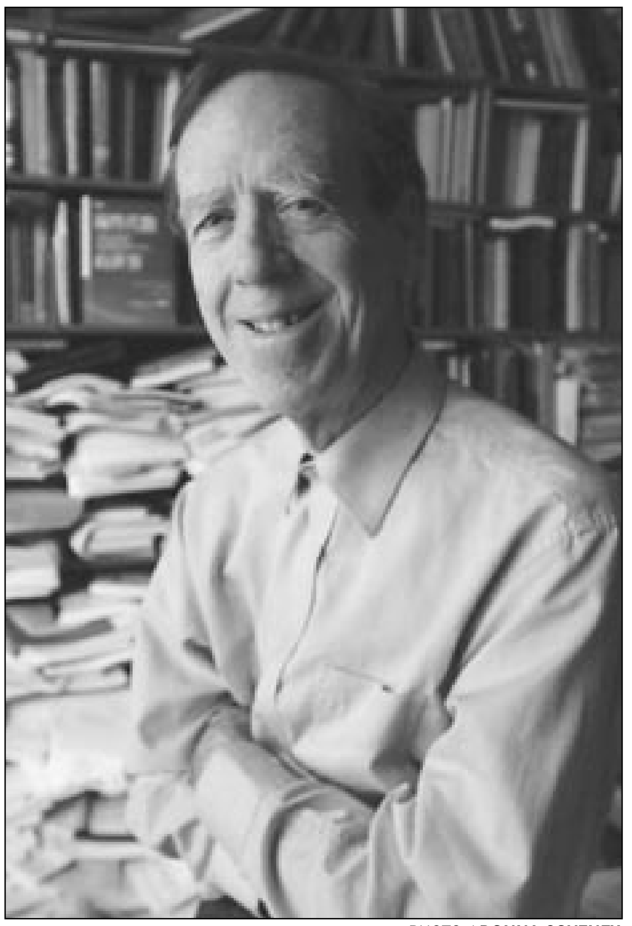

PHOTO / DONNA COVENEY

MIT Professor Gilbert Strang has recently received three major prizes in honor of his teaching.

Mathematician goes solar with a little MIT help

Sasha Brown
News Office

PHOTO / DONNA COVENEY

Professor David Vogan poses with his daughter, Ali, in front of their home in Arlington. The solar panels on their roof were installed thanks to support from MIT.

Professor David Vogan of mathematics says that one of the most exciting things about having solar panels on his Arlington roof is seeing his electricity meter run backward.

"I am the family member who appreciates that part the most," Vogan said with a laugh.

Vogan has had electricity-generating solar panels on his roof for three years. They were installed as part of MIT's Community Solar Power Initiative, which started in 2002 after the Massachusetts Technology Collaborative, which administers the Renewable Energy Trust Fund, awarded MIT a $455,700 grant.

The MIT Department of Facilities and the Laboratory for Energy and the Environment received the initial grants to launch 40 solar installations on campus as well as at schools, homes and businesses in Cambridge, Watertown, Arlington, Lexington and Waltham. One of those homes was Vogan's.

The grant paid for half the installation, a total of $9,000. Vogan paid $8,000 out of pocket, and he got a $1,000 state tax credit for the rest.

Vogan said he'd thought about putting in solar panels before, but was put off by the cost. When he saw that MIT was offering to help financially, he jumped at the opportunity. "Basically it became an economically feasible thing to do," he said.

"It is fun to be involved with the process of getting these things sorted out," said Vogan, who is no stranger to the green life. He drives a hybrid vehicle and looks for ways to conserve energy in his daily life. "It's been great, basically hassle-free," he said of the system.

There are 24 panels on Vogan's roof. "They provide about one-third (about 2,700 kilowatt hours) of the electricity we use," Vogan said.

Not every house can utilize solar power. The ideal house for such an installation is shade free and faces south, like Vogan's. There are about 22 other installations around the Boston area that are part of the MIT initiative.

Campus installations

On campus, there are three more. "The idea was to use the campus as a learning laboratory for students," said Steven Lanou, the deputy director of the sustainability program run out of the Environmental Programs Office.

The largest campus solar panel installation is on the roof of the Hayden Memorial Library, primarily because of its southern exposure. The 12,000-watt system on the library's roof is comprised of 42 panels, each measuring 2 feet by 5 feet and containing 72 photovoltaic cells. The system generates around 15,000 kilowatt-hours a year—roughly equivalent to the energy needed to power two homes for a year. The production of the electricity results in zero greenhouse gas emissions and supplements power provided by MIT's co-generation plant on Vassar Street.

Solar panels are also installed at the MIT Museum (N52) and at the Student Center; those panels generate a combined total of 11,500 kilowatt-hours.

Although the panels are not providing MIT with a substantial savings, they are raising awareness and visibility, Lanou said. "It has promoted the feasibility of the project," he said. "I think it has been hugely successful."

As for Vogan, he's certainly enjoying "net metering," the process that makes his meter run backward.

When the sun is shining but electricity is not being used, his panels are still producing. That power is then pumped back into the main grid so others can use it. Basically Vogan and his family are selling electricity back to the utility company and the meter runs backward.

In addition, Vogan receives quarterly checks from a government fund that total roughly $1,000 a year. Combining that with the energy savings, Vogan estimates the system will likely pay for itself in 10 years—"a winning proposition."

To learn more about the MIT Community Solar Power Initiative and view photos of solar power panel installations, visit solarpower.mit.edu.

Faculty discuss Singapore Alliance

Deborah Halber
News Office Correspondent

The first faculty meeting of the 2006-2007 academic year included a discussion of a proposed collaborative research center in Singapore, an overview of the Engineering Systems Division and a review of an unusually long misconduct proceeding involving Lincoln Laboratory.

Singapore-MIT Alliance for Research Technology Center

The proposed Singapore-MIT Alliance for Research and Technology (SMART) Center is a first-of-its-kind experiment in creating an MIT research center outside the United States, said MIT President Susan Hockfield, who is a member of the council overseeing the project.

Although there are "lots of details to be worked out," the overall concept of the center has been approved by the council, which is headed by the prime minister of Singapore, reported Subra Suresh, Ford Professor of Engineering and former head of the Department of Materials Science and Engineering. The center, which would involve up to 10 MIT faculty at a time working in the Singapore-based research facility, plans to develop initial research areas in topics that include, but are not limited to, biomedical sciences, interactive digital media, water technologies and environment, computational science and engineering, and materials sciences. An initial set of three to four research groups could start by the middle of 2007, with additional research groups introduced in stages in 2008 and 2009. A building for this non-degree-granting research facility is planned to be built by 2009.

The aim is to "provide opportunities for MIT faculty, students and postdocs to conduct cutting-edge scientific research in a global context," Suresh said. "This could evolve into a world-class research center that provides opportunities for new and unique research facilities and multinational collaborations for MIT faculty, postdocs and students. It could serve as an MIT research gateway, a stepping stone to broader connections in Asia, including China and India," he said. The National Research Foundation of Singapore is also in discussions with the Swiss Federal Institute of Technology in Zurich and Technion/Weizmann in Israel to set up similar

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MIT alumna to command space shuttle mission

John Tylko
News Office Correspondent

NASA recently announced that astronaut Pamela Melroy (S.M. 1984) will command the STS-120 space shuttle mission currently planned for August 2007, making her the second woman to command a U.S. space mission.

The STS-120 mission will utilize space shuttle Atlantis to deliver and assemble the Node 2 connecting module to the International Space Station.

The STS-120 flight crew has already begun its training activities. Last month, the crew spent two weeks in Alaska at the National Outdoor Leadership School. "It was a wonderful trip and a powerful training event aimed at developing leadership and improving teamwork," Melroy said in a recent interview.

Melroy became a NASA astronaut in 1994 and in 2000 became the third woman to pilot a space shuttle. She piloted a second mission in 2002 and has logged more than 23 days in space.

Melroy received her B.S. degree in physics and astronomy from Wellesley College in 1983. While at Wellesley, Melroy traveled to MIT at least once a week to participate in the Air Force ROTC program. She became the ROTC cadet commander during her senior year.

"My ROTC experience at MIT was the groundwork for my leadership training, starting in my freshman year," Melroy said. She was commissioned in 1984 and received her pilot wings in 1985. Melroy is currently a colonel in the Air Force.

> *My ROTC experience at MIT was the groundwork for my leadership training...*
>
> Pamela Melroy

She also did astronomy research with Wellesley Professor Richard French and MIT Professor James Elliot. Her master's thesis at MIT involved analysis of the atmosphere of Neptune by observing the occultation of stars by the planet.

Melroy has combat experience flying the KC-10 tanker in the Persian Gulf War and has test pilot experience supporting the development of the C-17 cargo aircraft. She has flown more than 5,000 hours in 45 different aircraft. Before she lands Atlantis on the STS-120 mission, she will have completed several hundred practice landings in the Shuttle Training Aircraft.

In one of her most challenging assignments, Melroy led the team that reconstructed the crew module of Space Shuttle Columbia following the accident that destroyed the shuttle during re-entry in 2003. "The emotional dimension was immense," Melroy said. "All of the people who worked for me were under immense emotional stress."

Pamela Melroy

Melroy's STS-120 crew will begin simulator training at the Johnson Space Center in Houston once the STS-115 mission is completed. "Training for a space mission is very intense. You are essentially cutting out a part of your life and handing it to the American people as a sacrifice for flying in space ... and then the only way out of it is to actually fly in space," Melroy said.

A total of 27 MIT-trained astronauts and payload specialists have flown 63 missions into space. However, only four MIT-trained astronauts have commanded space missions. Melroy will become the fifth.

Two faculty members win Pioneer Awards

Elizabeth Thomson
News Office

Two MIT faculty are among 13 scientists nationwide who received 2006 Pioneer Awards Sept. 19 from the National Institutes of Health for their "highly innovative research."

Professors Arup K. Chakraborty and James L. Sherley will each receive $2.5 million over five years.

Now in its third year, the Pioneer Award is a key component of the NIH Roadmap for Medical Research. The program supports exceptionally creative scientists who take highly innovative approaches to major challenges in biomedical research.

"The 2006 Pioneer Award recipients are a diverse group of forward-thinking scientists whose work could transform medical research," said Dr. Elias A. Zerhouni, director of the NIH. "The awards will give them the intellectual freedom to pursue exciting new research directions and opportunities in a range of scientific areas, from computational biology to immunology, stem cell biology, nanotechnology and drug development."

Chakraborty, the Robert T. Haslam Professor of Chemical Engineering, Chemistry and Biological Engineering, is working to "combine the application of theoretical methods rooted in statistical physics and engineering with experiments to determine principles governing the emergence of autoimmune diseases," according to the NIH.

Sherley, an associate professor of biological engineering affiliated with the Center for Cancer Research, is working "to develop routine methods for the production of human adult stem cells from liver, pancreas, hair follicles and bone marrow."

The NIH selected the 2006 Pioneer Award recipients through a special application and evaluation process. After NIH staff determined the eligibility of each of the 465 applicants, distinguished experts from the scientific community identified the 25 most highly competitive individuals. Outside experts then interviewed the 25 finalists.

The advisory committee to the director of the NIH performed the final review and made recommendations to Zerhouni.

"In addition to supporting outstanding research, the Pioneer Award is an innovation in its own right. It is one way we are exploring funding unconventional ideas that are promising but might not fare well in the traditional peer review system," Zerhouni said.

More information on the Pioneer Award is available at nihroadmap.nih.gov/pioneer.

Leading MIT scientists join effort to mentor youth

Deborah Halber
News Office Correspondent

A new international alliance of eminent scientists, including several at MIT, is working to pair young people with mentors to bolster the understanding and appreciation of molecular science.

Molecular Frontiers, a new nonprofit based in Cambridge, Mass., is the brainchild of Swedish physical chemist Bengt Nordén, former chair of the Nobel committee for chemistry.

Earlier this year, Shuguang Zhang, associate director of the Center for Biomedical Engineering (CBE), and others at MIT became catalysts with Nordén to launch the idea into a high-energy reaction.

Zhang is on the group's governing board. Three others from MIT serve on the group's 24-member scientific advisory board: Susan Lindquist, professor of biology and member of the Whitehead Institute for Biomedical Research; Nobel laureate Richard R. Schrock, the F.G. Keyes Professor of Chemistry; and Jackie Ying, former professor of chemical engineering.

The organization, which plans to hold biannual forums, will award $500 prizes, computers, medals and diplomas each year to 20 boys and 20 girls, age 15 and younger, for submitting the best question about molecular science. The goal is to engage students who did not have a strong prior interest in science and to stimulate them to ask questions that may lead to experimental breakthroughs in scientific inquiries.

Molecular Frontiers will center many of its activities around the World Wide Web, with virtual clubs and opportunities for children from elementary through secondary school to connect with individual researchers and graduate students who have expertise in the field a student addresses in his or her question.

"The main impact we hope for is to engage young people and stimulate them to think in scientific terms, and stimulate them to think that very simple scientific thinking helps in everyday life," Nordén said during a recent visit to MIT. "Increased attention to and interest in science will lead to a heightened consciousness about the importance of science that will propagate out into society."

"We focused on the molecule because the molecule is a common denominator of so many things," Nordén said. "We're hoping that bringing all these things together will nucleate and lead to new ways of thinking."

By connecting with young people, Molecular Frontiers also hopes to convey the importance of scientific reasoning to parents and teachers. With the help of MIT CBE postdoctoral associates Andreas Mershin and Liselotte Kaiser, MIT students Christopher Love, Brian Cook and Swedish visiting student Hanna Eriksson are creating a Molecular Frontiers Club to launch a local effort.

Nordén and Zhang recently introduced Molecular Frontiers at international scientific meetings in Hungary and Poland; Zhang also will make a presentation about the group Dec. 5 to the Knight Science Journalism Fellows at MIT.

For more information, visit www.molecularfrontiers.org.

FLYING

Continued from Page 1

four whirling blades instead of one—each a little smaller than a seagull. It also includes an indoor positioning system, as well as several miniature autonomous ground vehicles that the UAVs can track from the air.

Each UAV is networked with a PC. The setup allows a single operator to command the entire system, flying multiple UAVs simultaneously. Moreover, it requires no piloting skills; software flies the vehicles from takeoff to landing.

The vehicles in MIT's test platform are inexpensive, off-the-shelf gadgets; they can be easily repaired or replaced with a new vehicle, just as might happen in a real-world scenario involving numerous small UAVs on a long-term mission. The researchers can thus experiment constantly without concern for mishaps with expensive equipment.

"In this project, the larger system is what does the useful thing; the vehicle becomes just a cog in the wheel," said Mario Valenti, a Ph.D. candidate in electrical engineering and computer science (EECS) who works on the project with Brett Bethke, a Ph.D. candidate in aeronautics and astronautics, and Daniel Dale, a M.Eng. candidate in EECS.

Valenti, Bethke, Dale and colleagues operate the platform as often as possible, trying out different tasks, testing the system's response to sudden changes in mission (such as the appearance of new targets or the loss of a UAV) and coordinating with the autonomous ground vehicles. The laboratory provides a dynamic, real-time environment—a room with walls, furniture, equipment and other obstacles. The researchers analyze the performance of the test platform over time, using the resulting information to maximize the control system's ability to anticipate and recover from system failures.

PHOTO / DONNA COVENEY

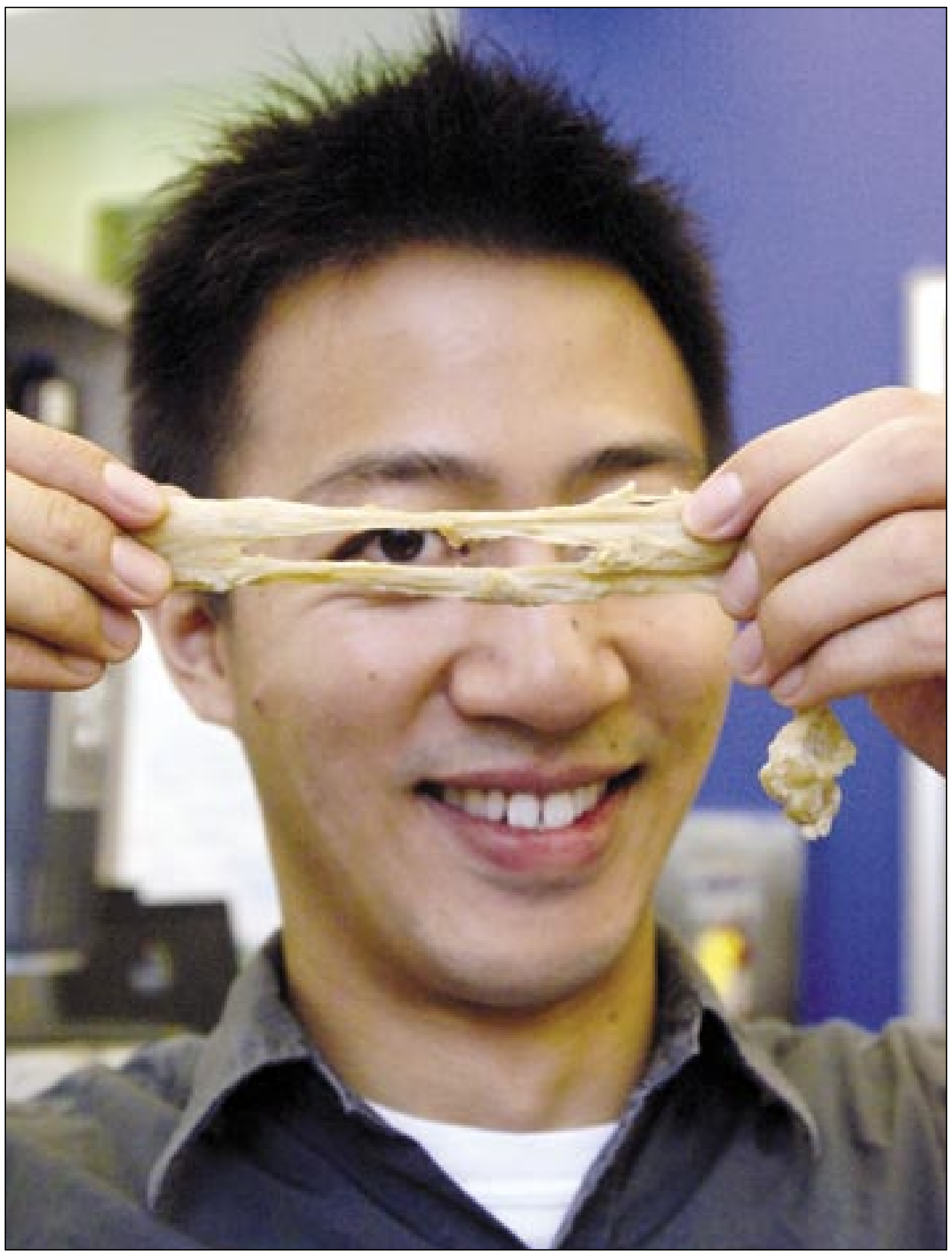
Jonathan How, a professor in aeronautics and astronautics, joins graduate students Brett Bethke, center, and Mario Valenti, right, in demonstrating their 'hands-off' technique of simultaneously controlling multiple fully autonomous flying vehicles.

The team has also designed an automatic docking station that allows the UAVs to recharge their batteries when they are running low. When the aircraft finish "refueling," they can then return to assist in ongoing flight operations.

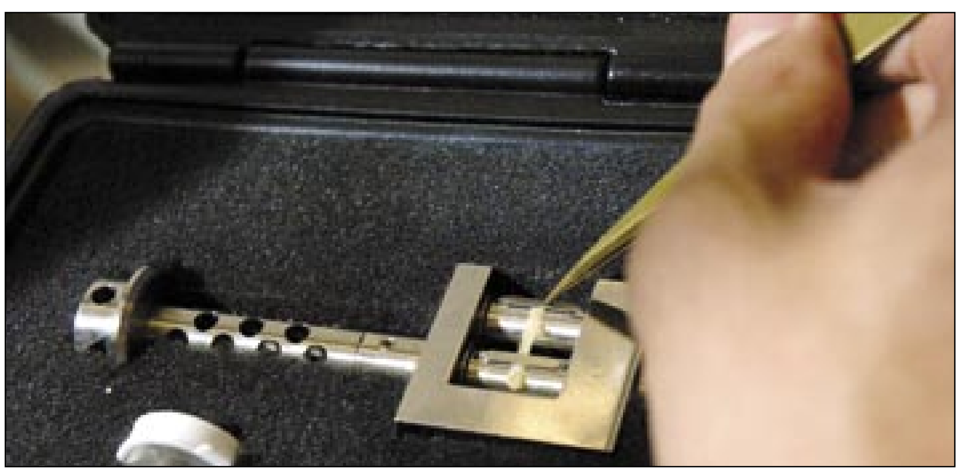
In addition, the team recently achieved a milestone in autonomous flight: landing on a moving surface. Using "monocular vision," one of the quadrotors successfully landed on a moving vehicle—a remote-controlled lab cart. A video camera fastened to the UAV uses a visual "target" to determine in real time the vehicle's distance relative to the landing platform. The ground station then uses this information to compute commands that allow the UAV to land on the moving platform. This technology could enable UAVs to land on ships at sea or on Humvees moving across terrain.

Other contributors to the project include Professor Daniela Pucci de Farias of mechanical engineering; Glenn Tournier (S.M. 2006); and Professor Eric Feron of the Georgia Institute of Technology. The work is sponsored by Boeing Phantom Works in Seattle.

Videos and more information about the project can be found at vertol.mit.edu.



Trevor Ng, above, demonstrates the stretchy properties of dough.



A sample of dough used in Ng's lab. PHOTOS / **DONNA COVENEY**

Student makes lots of dough all in the name of research

Deborah Halber
News Office Correspondent

Trevor Shen Kuan Ng rolls dough. He also stretches it like Silly Putty, twirls it like taffy and flattens it into rectangles like wide fettuccine.

Ng, an MIT mechanical engineering graduate student, is getting an education in dough. His Ph.D. thesis concerns the mechanical properties of matter—in this case, dough—and how it behaves when subjected to forces. In engineering-speak, this is called rheology, and it provides valuable information for commercial bakeries that need accurate, repeatable techniques for measuring the properties of dough to ensure the tastiest product.

Ng's work is part of the non-Newtonian fluid dynamics research group headed by Gareth H. McKinley, professor of mechanical engineering.

Non-Newtonian fluids are unusual materials. Their viscosity, or slipperiness, changes with the amount of strain applied to them. Many non-Newtonian fluids have microscopic structures that affect how they react when poked or prodded, and how fast they move when they flow. Picture peanut butter or mayonnaise dripping from a tap—they would not behave like water. Some non-Newtonian fluids such as polymers bounce like a ball if dropped but flow smoothly if placed on a surface.

McKinley's research group looks at DNA, saliva, tree sap and okra, a natural polymer used as a food thickener for thousands of years. Snail slime and such oddities as magnetic fluids also are investigated.

Ng's work area in a corner of the Hatsopoulos Microfluids Laboratory contains a variety of dough-manipulating devices. To measure torque, or turning properties, the mixograph twists the dough around metal pins the way saltwater taffy is spun in a candy shop; the filament stretcher pulls the dough until it snaps.

To conduct experiments, Ng works with small samples of flour ground from grains newly developed by farmers and food engineers. He painstakingly records how the resulting dough is treated and how it reacts to manipulation, because different blends of flour, water and additives can result in drastically different dough. Atmospheric conditions and time of day also can affect the product's elasticity and rise.

Getting the dough to stay put can be a chore. "It sticks to pretty much everything other than the things you want it to stick to," Ng said.

Ng wasn't always cut out for dough. He completed a master's degree in aeronautical engineering from Cambridge University in England and arrived at the Gas Turbine Laboratory at MIT with the goal of designing airplane engines. Airplane engines are designed with air flow in mind, and Ng made the switch to "fluid mechanics of a different sort," he said, when he heard McKinley needed a dough man. Working with dough, he said, sounded like something "different and fun."

The research also has a serious side. For millennia, bakers have developed a feel for dough as they kneaded it. But this homespun approach isn't good enough for large commercial operations, which need numbers representing a material's properties during the manufacturing process, Ng said.

The secret life of dough

Ng helps define those properties while seeking a deeper understanding of the microstructure of dough.

Gluten gives dough its distinctive elastic behavior. To engineers, gluten is a nanoscale bio-macromolecule, one of the largest protein compounds on earth. These proteins form an entangled matrix whose quality, shape and distribution within the dough are intrinsically linked to its bread-making qualities.

"The texture of bread—the chewiness and mouth feel—is dependent on the dough you start with," Ng said. "The airiness of the bread, or, from a commercial point of view, the amount of air they sell you, is directly related to the ability of the dough to resist rupture during the deformation process as it rises. When bread is in the oven, air bubbles within the dough expand. At some point they break, and the bread stops expanding."

Wonder Bread, Ng said, is "a very airy product."

Ng doesn't usually eat his experiments because the laboratory dough is covered with silicone oil to keep it from drying out. But since starting this line of research in 2003, Ng has become a home baker. When he bakes bread, he brings a bit of the dough in for testing. White bread, he said, is his favorite.

Ng's work is funded by Kraft Foods.

MIT laser method unveils ultrafast photochemical reactions

Anne Trafton
News Office

MIT researchers have made a fundamental advance in understanding how different environments affect chemical reactions by devising a novel way to observe ultrafast photochemical reactions—reactions induced by a pulse of laser light—in crystals.

The new MIT experiments show that the reaction dynamics, including whether the product molecules remain or recombine to reform the original compound, depend with exquisite sensitivity on the local "cage" environment formed by neighboring molecules in the crystal. Cage effects of this sort play crucial roles in many natural and industrial chemical processes.

The method they have developed allows them to observe other light-induced changes in solids, including those used to burn CDs and DVDs. For some materials, these transitions may be reversible, allowing information to be both written and erased.

"This is a very active area of research for both fundamental and practical reasons," said Keith Nelson, MIT professor of chemistry and leader of the team. "What we're able to see, in a simple and direct way, is how different local environments around the reacting species lead to extremely different dynamics and different outcomes."

The work was published in the Aug. 31 online issue of Science. Nelson's co-author on the paper is Peter Poulin, a former graduate student in his lab.

In their experiments, the researchers studied one simple reaction in different crystalline environments. When I_3^-, a chain of three iodine molecules with a negative charge, is struck with a pulse of ultraviolet light, the chain splits into two fragments—one of one iodine atom and one of two iodine atoms. However, what happens to the products after the initial splitting is wholly dependent on the environment in which the reaction occurs, Nelson and Poulin found.

The researchers staged the reaction in three different crystals—one with a round, open cavity in which the separated products could move freely; another where the products were constrained to move within a two-dimensional plane; and another where the products could move in only one dimension, through a linear channel.

In all three crystals, a pulse of light splits the I_3^- molecule into two fragments almost instantly. But the researchers focused their attention on what happens in the picoseconds (one-millionth of one-millionth of a second) after the initial reaction.

In the crystal with a round, open cavity, the two fragments remain separate, exactly as they would if the reaction occurred in a liquid environment.

"The separate fragments aren't really interacting with each other on a fast time scale," Nelson said.

In contrast, in the more constrained environments of the other two crystals, the two fragments spent some time apart, then abruptly reformed. That suggests that the fragments flew apart but then bounced off the crystal walls and reattached to each other, Nelson said.

"They split up, move apart, crash into the neighboring molecules that form their 'cages,' bounce back, recombine and it's all over," he said. "The entire 'dance' is almost perfectly synchronized among millions of molecules throughout the irradiated region of the crystal."

Conducting such experiments in a crystalline environment proved much more technically challenging than studying reactions in liquids, as is normally done. In liquids, researchers can measure what is happening by firing an initial "excitation" pulse that sets off the reaction, then a "probe" pulse that monitors progress at a particular delay time. The measurement is repeated many times with different probe delays to get data for each point in time. Reaction products can be conveniently replaced with fresh material in between repetitions of the measurement by flowing a stream of reactants in the liquid.

However, the experiments in a crystal cannot be repeated over and over because the reaction products accumulate and cannot be flowed away. In fact, after just a single laser shot, the irradiated region of a crystal was visibly discolored due to the presence of the products.

Instead of repeating the measurement many times, the researchers used only one excitation pulse, then 400 different probe pulses, all arriving with different delays. The probe pulses were formed from one pulse which was passed through a glass echelon (stairstep structure) so that different parts of the beam went through different thicknesses of glass and therefore were delayed by different amounts. That way, all of the necessary data could be gathered from a single measurement.

This allows the effects of the surroundings on reaction dynamics to be studied incisively, unlike in liquids where the reactants have widely varying local environments that give rise to very different dynamics.

"The effects we observed in the different crystals surely occur all the time in liquids and in partially ordered systems like biological media, but directly observing them and comparing them to simple models is normally impossible," according to Nelson.

"What we did is develop a way to get all of the time-dependent data in one shot of the laser," Nelson said. "The method allows us to study ultrafast chemical and structural change even in materials that are permanently altered or destroyed in the measurement. Materials subjected to high-pressure shock waves or other extreme conditions are also in our sights."

The research was partly funded by the Office of Naval Research.

'AltWheels' presents cars of the future

Deborah Halber
News Office Correspondent

They looked incongruous as they pulled past the Chevrolets and Toyotas in East lot–an antique Stanley Steamer, a yellow-striped city bus, a motorcycle with a passenger seat made from a diner's counter stool, a tanker with a bucolic scene painted on the side and dozens more. In they rolled, horns honking amid the occasional deep "ooooh-gah" of the steam car's Klaxon.

The AltWheels caravan of 46 environmentally friendly vehicles had arrived at MIT's Stata Center amphitheater.

AltWheels—the second New England event of its kind—is an all-volunteer event designed to raise public awareness of commercially available vehicles that provide alternatives to the gasoline-powered automobile.

"Even though the price of fuel dropped 20 cents, there's a need for this," MIT Chancellor Phillip L. Clay told the crowd of drivers, inventors and curious onlookers. "With Ford and others, MIT works hard with industry to advance fuel and energy research. This caravan represents the work of many at MIT."

John Heywood, director of the MIT Sloan Automotive Laboratory, said he's been involved in the automotive field "a long time, but it's never been this lively and exciting."

As the Hood blimp circled overhead, a crowd milled around the vehicles. There was the Moonbeam. A tiny three-wheeled contraption built from secondhand motorcycle parts, the Moonbeam gets up to 100 mpg. Retired electrical engineer David K. Nergaard drove his circa-1890 Stanley Steamer, a steam-powered vehicle that attracted a covey of MIT students who peered at its parts as they puzzled out its principles.

Our environmental problems, Heywood said, boil down to this: "There's too many of us, we use too much stuff and we use it in damaging ways." The range of alternatives to typical gas-guzzling vehicles is now wide enough that "We can drive small and light," Heywood said. "We can use less stuff and use it less damagingly."

The caravan was escorted by an environmentally friendly state police cruiser from the Larz Anderson Auto Museum in Brookline, Mass., to MIT. For more information, see www.altwheels.org/caravan.html.

PHOTO / DONNA COVENEY

Environmentally friendly vehicles lined up outside the Stata Center for AltWheels, an event held Sept. 21 to raise public awareness of alternatives to gasoline-powered cars.

Energy experts side with 'Truth'

Deborah Halber
News Office Correspondent

Al Gore would be pleased to hear that "An Inconvenient Truth," his documentary on global climate change, passed the MIT test. Ernest J. Moniz, director of the MIT Energy Initiative, and Peter H. Stone, professor of climate dynamics at the MIT Center for Global Change Science, declared that Gore did "a fine job framing the problem."

Moniz and Stone led a discussion of the film Friday following a screening sponsored by MIT International Science and Technology Initiatives (MISTI), the Laboratory for Energy and the Environment (LFEE) and the Lecture Series Committee.

Moniz, the Cecil and Ida Green Professor of Physics and Engineering Systems and co-director of LFEE, said that Gore made a "powerful case: we currently have the knowledge and technology to turn back the trend and reduce carbon emissions to the pre-'70s level."

The film is an expanded version of a slide show Gore has been presenting to audiences around the world.

In the film, Gore said he naively expected that numbers alone would convince his fellow politicians of the need to take immediate action. When this did not happen, he took his show on the road: showing images of dissolving glaciers, previously snow-capped mountains turning brown and huge inland lakes drying up. He shows the correlation between upward trends in temperature and carbon dioxide emissions, and warns that suddenly introducing large volumes of fresh water into the oceans could have dramatic effects on sea levels and weather patterns.

Stone, who has worked in the climate field for 30 years, said the hundreds of students who packed Room 26-100 to see the film formed the largest audience he has ever seen drawn to the "small field" of climatology. Gore is "basically right," Stone said, "although he didn't say too much about how fast things may or may not happen."

Moniz said he is "somewhat optimistic that political realities are changing very rapidly. The oil companies are suddenly putting a lot of money on the table for biofuels; moving toward carbon-free electricity is very interesting for those who make electricity. You see the business structures beginning to change. Industry sees risk, but it also sees the potential for new markets."

Moniz said that the technology exists today to bring about significant change in the coming decades. With energy options from MIT and elsewhere, and with some political will, "we can in fact meet that challenge even though it is quite hard. What has been lacking is the sense of urgency and the will to change."

Manson Benedict, 98, chemist on Manhattan Project, dies

Manson Benedict, an Institute Professor Emeritus who worked on the Manhattan Project, died Sept. 18 at his home in Naples, Fla. He was 98.

Benedict was well known for his pioneering role in nuclear engineering. He developed the gaseous diffusion method for separating the isotopes of uranium and supervised the engineering and process development of the K-25 plant in Oak Ridge, Tenn., where fissionable material for the atomic bomb was produced.

Manson Benedict

He received many awards for his work on the Manhattan Project during World War II, and for his later career as a scientist, educator, and public servant, which focused on nuclear power and other peaceful uses of atomic energy.

In 1951 he was invited to be MIT's first professor of nuclear engineering in the Department of Chemical Engineering. The Department of Nuclear Engineering was established on July 1, 1958, with Benedict as the first department head.

From 1958 to 1968, Benedict was a member and chair of the Advisory Committee of the Atomic Energy Commission, appointed by Presidents Eisenhower and Kennedy.

Benedict won many awards, including the William H. Walker award in 1947, the Perkin Research Medal in 1966, the Robert E. Wilson Award in 1968, the Enrico Fermi Award in 1972, and the National Medal of Science from President Gerald Ford in 1975.

The Wilson Award citation said of Benedict, "He has served education, industry and government with quiet and unwavering dedication."

Born Oct. 9, 1907, in Lake Linden, Mich., he received a B.S. from Cornell University in chemistry and a Ph.D. from MIT in physical chemistry. While at MIT, he met his wife, Marjorie (Allen) Benedict, who also earned a Ph.D. in chemistry. His wife died in 1995 after 59 years of marriage.

Benedict is survived by two daughters, Marjorie Cohn of Arlington, Mass., and Mary Sauer of Naperville, Ill., and Naples, Fla.; three grandchildren and four great-grandchildren.

The Manson Benedict Fellowship fund was established in Nov. 1983.

A memorial symposium in his honor will be held at MIT at a date to be announced later.

OBITUARIES

George Robinson

George Y. Robinson, a retired MIT researcher, died Aug. 13. He was 82.

Robinson earned engineering degrees from Tufts in 1949 and from RPI in 1952. He was also an Army veteran of World War II and earned the Purple Heart and Silver Star.

He is survived by his wife, Doris L. (Foster) Robinson; a son, Dana Robinson; a daughter, Jane L. Robinson; and a brother, Paul Robinson.

Donations may be made to Emerson Hospital North 6, 133 ORNAC, Concord 01742.

Claudia Hagman

Claudia P. (D'Onofrio) Hagman, a retired MIT employee in the audit division, died June 25. She was 88.

She worked at MIT for 39 years.

The wife of the late Olof Hagman, she is survived by three daughters, Sandra L. Baker of Watertown, Debrah A. McGonagle of Norfolk and Donna M. Fucillo of Winthrop; a brother, T. Thomas D'Onofrio of Florida; four grandchildren; one great-grandchild; and many nieces and nephews.

Donations may be made to the ALS Association, 7 Lincoln St., Wakefield 01880, or to Healthcare Dimensions Hospice, 48 Woerd Ave., Suite 102, Waltham 02453-3826.

FACULTY

Continued from Page 3

research centers.

MIT has eight years of educational and research experience working with Singapore through the Singapore-MIT Alliance (SMA).

Individuals raised questions about whether funding from the Singaporean government constitutes earmarked research funds; whether a center that takes faculty away from the Cambridge campus would prove divisive to the MIT community; and how MIT graduate students would adjust to working outside the United States.

Hockfield, Provost L. Rafael Reif, Associate Provost and Vice President for Research Claude Canizares and Dean of Engineering Thomas Magnanti responded to these questions by pointing out new opportunities for MIT faculty, students and researchers to conduct research in Singapore. They also noted MIT's significant prior experience with Singapore through SMA. Fully funded new endowed chairs are being planned to support the extra activities created by the center. Reif added that the plans for the center are evolving and discussions at forums such as the faculty meeting provide useful input as the legal, financial and intellectual property agreements for the center are formulated in the coming months.

Engineering Systems Division

Five years after the creation of the Engineering Systems Division (ESD), Ahmed F. Ghoniem, professor of mechanical engineering, headed a committee that looked at systems research and education at MIT.

ESD involves multiple traditional disciplines and departments in the development of educational and research programs at the interface of management, social sciences and engineering. The 26 ESD faculty hold dual appointments and work within all five schools "to develop an integrative approach to engineering systems and explore the changing roles and relationships between universities, industry and government," Ghoniem said.

The program administers five master's degrees and one Ph.D. degree program.

Ghoniem and other faculty who spoke at the meeting agreed that an integrative and interdisciplinary systems approach is "extremely important" in the practice of engineering today and is a key feature of a comprehensive MIT education. Dean Magnanti said that the Internet and highways are examples of systems engineering.

While the ESD degree program is "healthy and popular, and the ESD leadership is to be praised for its energy and mentorship" and ESD has established a presence outside of MIT, Ghoniem said the committee—after interviewing more than 50 faculty, students and staff and reviewing more than 1,000 documents over seven months—suggested that ESD is "not well-recognized within MIT." The committee also suggested that ESD would benefit from focusing on "specific problems, new tools and methodologies, and a common core curriculum."

MIT should continue to diffuse more systems knowledge and approaches into the undergraduate curriculum and ESD should focus on developing an intellectual identity around a tight core of big problems such as energy, national security, climate change, water and transportation, Ghoniem said. "Interesting problems are magnets for students," he said.

The committee recommended expanding ESD research into developing fundamental system knowledge, tools and methodologies; engaging School of Engineering departments to enhance systems engineering research and teaching; and "engaging more dynamically and extensively with the social science community."

Institute Professor Joel Moses, acting director of ESD, said that ESD was already working on implementing changes suggested by the committee.

Misconduct review

Associate Provost Canizares reported that 16 factors were responsible for the delay in a misconduct inquiry involving Lincoln Laboratory that took, according to a faculty committee he headed, more than three years too long.

Canizares's ad hoc committee was asked to review MIT procedures following an instance of alleged misconduct. The committee completed its report in May (the report is available at web.mit.edu/provost/reports.html) and found that there were 16 factors responsible for the long delay. The committee, while finding that MIT's misconduct policies are "fundamentally sound," presented 12 findings and six recommendations, two involving MIT policy and four related to practices, that could "avoid a recurrence" of such a lengthy investigation, Canizares said.

"The matter in question is very complex and was affected by a multiplicity of factors that compounded one another," Canizares said.

The fact that documents in the case were classified, while important, was not the most significant factor in the delay. The committee estimated that the complicating factors added three to four years to the misconduct proceeding, he noted.

The allegations of fraud applied to a classified technical report assessing software for a missile defense system. The report was completed in January 1999 by a government team with two staff members from Lincoln Laboratory. The committee did not review whether the misconduct itself occurred.

The committee's two recommendations specified the need for written charge in such investigations and the need to "clarify the threshold" of the investigation, Canizares said.

Maki building launches new era for MIT Media Lab

MIT announced yesterday (Sept. 26) that it will break ground in spring 2007 for a new Media Lab designed by Pritzker Prize-winning Japanese architect Fumihiko Maki. The expansion marks a new era of innovation for the Media Lab, which has become legendary for inventions that have ignited the digital revolution, are redefining the potential for creative expression, and, in the future, will push the boundaries of human augmentation.

This milestone signals MIT's commitment to expanding the highly interdisciplinary, often unconventional research that has become the Media Lab's trademark. The 163,000-square-foot, six-story building will feature an open, atelier-style adaptable architecture specifically designed to provide the flexibility to respond to emerging research priorities. High levels of transparency throughout the building's interior will make ongoing research visible, encouraging connections and collaboration among researchers.

Together with the existing Wiesner Building, designed by MIT alumnus I.M. Pei (B.Arch. 1940), the expanded facility will also house the List Visual Arts Center, the School of Architecture and Planning's Design Lab and Center for Advanced Visual Studies, the Department of Architecture's Visual Arts Program, and MIT's Program in Comparative Media Studies. Another key component of the building will be the Okawa Center for Future Children, established at the Media Lab in 1998 through a $27 million donation from Isao Okawa, the late chairman of CSK Corp. and SEGA Enterprises.

Frank Moss, director of the Media Lab, hails the Maki-designed building as an exceptional environment for advancing the lab's unique brand of creativity and research. "An essential ingredient in the lab's distinctive approach to 'open innovation' has been its exploitation of open physical spaces," says Moss. "The abundance of such spaces in the new building will be a perfect setting for expanding our research agenda into exciting new realms such as robots that learn from people, and bionics, for taking ideas beyond the demo stage to working prototypes, and finally for strengthening our ties with corporate sponsors."

"I am thrilled to see a signature Maki building going up on the MIT campus, and especially pleased that it will be associated with our school," says Adèle Naudé Santos, dean of MIT's School of Architecture and Planning, which includes the Media Lab. "Fumihiko Maki is known for spatially inventive, beautifully proportioned buildings where every detail is carefully designed. His work has a timeless elegance and durability that will be very appropriate for this campus. The sequence of spatially connected labs and atria will foster the synergetic, collective research and teaching activities that are redefining the relationship between design and technology to improve the quality of human lives and the societies in which we live."

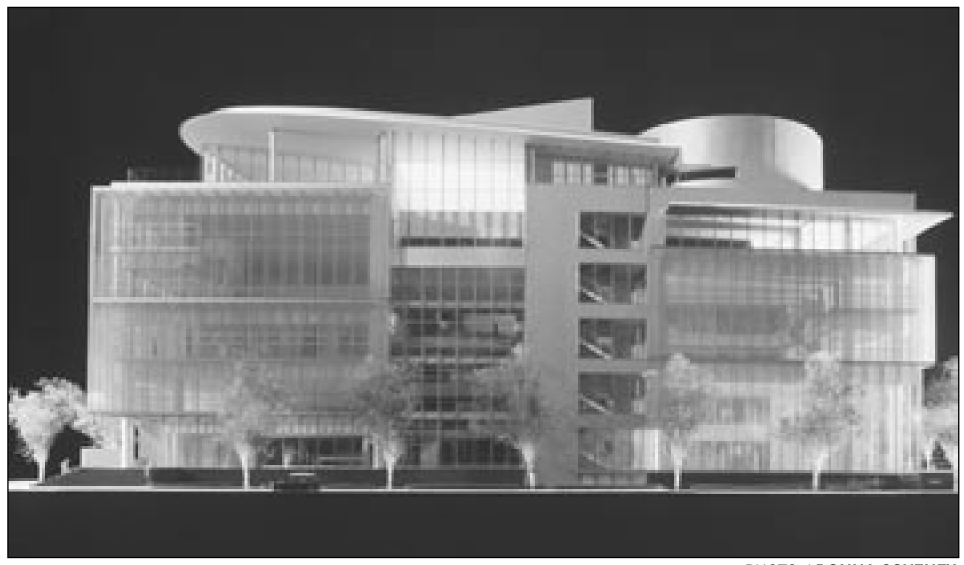


PHOTO / DONNA COVENEY

This model shows the south side of the new Media Lab. Work will get under way this spring on the building designed by Fumihiko Maki.

Susan Hockfield, president of MIT, sees the new building as an important addition to the Institute, and one that will foster interdisciplinary collaboration across campus. "We believe that the work underway at the Media Lab is integral to MIT's mission and closely ties in with our focus on energy, health sciences and technological innovation," says Hockfield. "This magnificent building will also create an inviting, open space that will help to solidify our campus as a community while fostering social and intellectual interaction."

The executive architectural firm for the project is Leers Weinzapfel Associates.

PHOTO COURTESY / JUPITER STRING QUARTET

The Jupiter String Quartet will perform with MIT violist Marcus Thompson on Sunday, Oct. 1, in Kresge Auditorium, as part of a concert series commemorating the 250th anniversary of Mozart's birth.

Thompson, Jupiter Quartet to celebrate Mozart

Concerts commemorate 250th anniversary of Mozart's birth

Lynn Heinemann
Office of the Arts

Internationally acclaimed violist Marcus Thompson will perform at MIT this year with three of the world's top string ensembles, beginning with the Jupiter String Quartet on Sunday, Oct. 1, at 3 p.m. in Kresge Auditorium. The events mark the second of a two-year series of concerts at MIT commemorating the 250th anniversary of Mozart's birth.

Marcus Thompson

Thompson, the Robert R. Taylor Professor of Music at MIT, has appeared as a soloist, a recitalist, and in chamber music series throughout the Americas, Europe and the Far East.

In June 2005 he made his debut as soloist with the Boston Pops for MIT's Tech Night at Pops. He launched the Mozart birthday celebration series in the 2005-06 season, performing Mozart quintets with the St. Petersburg String Quartet, the Endellion String Quartet and the Biava String Quartet.

"The Jupiter String Quartet's tone quality is pleasing, their equilibrium secure, and their intonation superb," according to The Boston Globe.

The quartet captured first prize in the eighth Banff International String Quartet Competition in 2004, as well as the Szekely Prize for the best performance of a Beethoven quartet. Other honors include the grand prize at the 2004 Fischoff National Chamber Music Competition, resulting in tours of the United States and Italy.

Born and raised in the Bronx, Thompson earned the 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 violist in the Boston Chamber Music Society.

The Jupiter Quartet will also perform Beethoven's Quartet Op. 18, no. 1, and Shostakovich's Quartet No. 3 during the Oct. 1 concert.

The Mozart birthday series will conclude with the Vogler Quartet on Nov. 3 and the Audubon String Quartet on Feb. 3.

For more information, call x3-2826.

SHASS appointments announced

Deborah Fitzgerald, interim dean of the School of Humanities, Arts and Social Sciences, is pleased to announce new appointments to chairs in the school:

Agustin Rayo, associate professor in the Department of Linguistics and Philosophy, has been appointed to the Ford Foundation Career Development Professorship. Professor Rayo received his Ph.D. at MIT in 2000 and joined the faculty in 2005 as associate professor of philosophy. His areas of interest include philosophical logic, philosophy of language and the philosophy of mathematics.

This professorship was established by the Ford Foundation to encourage research and scholarship in the areas represented in the School of Humanities, Arts and Social Sciences.

Jonathan Rodden, associate professor in the Department of Political Science, has been appointed to a Ford Foundation International Professorship in Political Science. Professor Rodden received his Ph.D. at Yale University in 2000 and joined MIT immediately as assistant professor. His areas of interest include comparative and international political economy, public finance and the European Union, and economic and political geography.

This professorship was established to encourage research and scholarship in the international aspects of such areas as political science, economics, history, management and urban studies.

AWARDS AND HONORS

Two MIT professors have been chosen as recipients for 2007 awards from the American Chemical Society (ACS).

Institute Professor Robert Langer will receive the ACS Award in the Chemistry of Materials, sponsored by the E.I. du Pont de Nemours & Company.

Christopher Cummins, professor of chemistry, has been selected for the F. Albert Cotton Award in Synthetic Inorganic Chemistry, sponsored by the F. Albert Cotton Endowment Fund.

The award recipients will be honored at an awards ceremony on March 27, 2007, held in conjunction with the ACS meeting in Chicago.

MIT's **alumni relations program** has earned a 2006 Silver Award in Alumni Relations from the CASE Circle of Excellence Awards Program for Alumni Relations, Advancement Services, Communications and Marketing, and Fund Raising. CASE (Council for Advancement and Support of Education) Excellence Awards recognize professional commitment to institutional advancement.

Two MIT scientists have been chosen for Damon Runyon postdoctoral fellowships, which are awarded to outstanding young scientists conducting research exploring cancer causes, mechanisms, therapies and prevention.

Frauke Drees of the Department of Biology will study the "role of SSeCKS in Mena-driven tumor cell invasion."

Monte Winslow of the Center for Cancer Research will study "identification and functional characterization of genes required for invasion and metastasis by analysis of clonally related primary and secondary tumors." The fellowships last for three years.

CAVS staffer finds herself on Lost Highway

MIT affiliates among planners of art experience

Deborah Halber
News Office Correspondent

Soon after Meg Rotzel arrived in Ljubljana, Slovenia, this past July, she met up with 25 strangers at an art gallery, and they all set out to spend the next three days together—as fellow travelers on the Lost Highway Expedition.

The expedition, which ran from July 30 to Aug. 24 in the Western Balkans, drew some 300 people to what its organizers called "a massive intelligent swarm" of individuals, groups and institutions from the United States, Europe and elsewhere. The expedition was loosely centered around art, architecture and culture.

Rotzel, curatorial associate for MIT's Center for Advanced Visual Studies (CAVS), became intrigued by the ambitious project when she worked with some of the event's planners at CAVS.

Three of the eight organizers have MIT connections: Marjetica Potrc is a 2004 CAVS fellow; Azra Aksamija is a 2005-2006 CAVS graduate affiliate from Sarajevo; and Kyong Park is a 2006 CAVS visiting artist. The founders began the project by building connections with regional artists and architects, then set up a web site to attract others.

Rotzel joined the expedition for two weeks, traveling with various groups along the former Yugoslavia's unfinished "Highway of Brotherhood and Unity." Begun in the 1960s, the road was designed to connect Ljubljana, Zagreb, Belgrade and Skopje as part of a massive voluntary campaign by former Yugoslav leader Josip Broz Tito to facilitate trade and join nations.

Now, its ideology lost, the road looks like any highway. It runs through Albania, Bosnia and Herzegovina, Croatia, Macedonia, Serbia and Montenegro—most of which were once part of Yugoslavia, now fractured into pieces.

The Lost Highway Project thus illustrates the first theme in a larger project called Europe Lost and Found. That project will follow three major themes over the next few years: "Balkanization" (2006-2007), "Europeanization" (2007-2008) and "Map the Future" (2008-2009).

The highway—and the expedition—began in Ljubljana and wound through Zagreb, Novi Sad, Belgrade, Skopje, Pristina, Tirana, Podgorica, Pristina and Sarajevo. Each city hosted two days of events, which included guided tours, presentations, forums, workshops, discussions, exhibitions, radio shows and picnics.

Other events were organized at the last minute by travelers and locals alike. Some participants created art on the spot. Rotzel, who kept an illustrated travel diary, took photos and video footage of her experience. She said she was amazed by the success of the self-organizing events.

Rotzel gathers artists together for performance and publication-based art, so she knows firsthand the challenge of making art events click for diverse audiences. The expedition's goal, as she saw it, was "to think about cultural production in each city by reading the architecture and the projects of artists like a map. Each city was a different experience.

"Autonomy and collaboration had an equal hand in the trip, which made a deep impression on me," she said.

The Lost Highway Expedition was a collaboration between the Centrala Foundation for Future Cities and the School of Missing Studies, a network for experimental study of cities marked by or currently undergoing abrupt transition.

Rotzel received a grant from the MIT Office of the Arts to cover her travel costs, and her trip photos, video and other documentation are now on display in CAVS's front gallery, N52-390. On Oct. 25-26, members of the expedition will lead programs at CAVS.

According to expedition organizers, the event was meant to "generate new projects, new artworks, new networks, new architecture and new politics based on experience and knowledge found along the highway." Projects developed from the expedition will lead to exhibitions, publications and symposia of "Europe Lost and Found" in Ljubljana and Stuttgart, Germany, in 2007.

PHOTO / MEG ROTZEL

Architecture graduate student Azra Aksamija and organizers of the Lost Highway Expedition are interviewed by fellow travelers in front of Kuda.org in Novi Sad, Serbia.

PHOTOS COURTESY / OFFICE OF THE ARTS

Glass pumpkins are due to sprout again on the Kresge Oval. The annual Glass Lab sale will take place Sept. 30.

Great Glass Pumpkin Patch to sprout Sept. 29-30

Lynn Heinemann
Office of the Arts

The Kresge Oval will once again be transformed into a giant pumpkin patch as MIT's Glass Lab holds its annual sale of glass pumpkins on Sept. 30. Now in its sixth year, the Great Glass Pumpkin Patch will offer more than 1,200 one-of-a-kind, hand-blown glass pumpkins and gourds created by students and instructors in the lab.

Visitors will have a chance to view—but not purchase—the pumpkins at an opening preview reception on Friday, Sept. 29, from 5 to 8 p.m. on the lawn outside Kresge Auditorium. The sale on Saturday, Sept. 30, takes place between 10 a.m. and 5 p.m. (Rain date is Sunday, Oct. 1.)

The blown glass pumpkins come in assorted colors and styles and sell for $20 to $200 each. The sales often earn up to $70,000 to benefit the lab and keep it in operation throughout the year.

The pumpkins are all handmade by small teams of volunteers who work year-round to prepare for the sale. Often, the teams can create 30 to 60 pumpkins in one four-hour shift. "Their work is very much like a dance," said technical instructor and glass artist Peter Houk, director of the MIT Glass Lab.

Since its founding over 30 years ago, more and more members of the MIT community have taken advantage of the opportunity to learn the art of glassblowing. Some of them get hooked, said Houk. MIT engineering graduates have left the field of engineering to become glass artists, he said. "It does not happen often, but it does happen," said Houk. "Some people just really find their calling here."

The glassblowing courses offered in the fall and spring semesters and during IAP are so popular, in fact, that participants are selected by lottery. More than 100 students, staff and faculty members fill Room 6-120 during the lottery meetings in hopes of winning a chance to participate, said Houk. This year's lottery meeting will be held on Monday, Oct. 2. "There are so many people, we just can't allow everyone in," Houk said.

—Sasha Brown contributed to this article

Real Time Rome project debut at Venice Biennale

Real Time Rome, a pioneering MIT project that promises to usher in a new era of urban mapmaking, had its worldwide debut at the Venice Biennale, a prestigious biannual exhibition of architecture and urban studies that runs until Nov. 19.

Real Time Rome features seven large animations, projected on transparent plexiglass screens, each showing a different aspect of Roman life in real time. The project uses an unprecedented amount of data gathered from cell phones and other wireless technologies to illustrate what ubiquitous connectivity in an urban environment looks like.

These real-time visualizations illustrate the dynamics of the contemporary city—the patterns of people and transportation systems as well as the social usage of streets and neighborhoods—creating an entirely new view of daily life in Rome.

"In today's world, wireless mobile communications devices are creating new dimensions of interconnectedness between people, places and urban infrastructures," said project director Carlo Ratti, director of the SENSEable City Lab at MIT. "The goal of Real Time Rome is to use this connectivity to observe and interpret the life of a city, ultimately fostering a deeper understanding of how cities function."

One screen shows traffic congestion around the city, while another screen shows the exact movements of all the city's buses and taxis; another is able to track Romans celebrating major citywide events. Additional screens show how tourists use urban spaces.

Ratti's team obtains its data anonymously from cell phones, GPS devices on buses and taxis, and other wireless mobile devices, using advanced algorithms developed by Telecom Italia, the principal sponsor of the project.

"The exhibit will hopefully trigger many more urban studies that take advantage of the already existing data on mobile phones and transportation systems, in order to create a deeper understanding of how cities are being used," said project curator Andres Sevtsuk, a graduate student in urban studies and planning.

Real Time Rome is produced by MIT's SENSEable City Lab, which studies the impact of new technologies on cities.