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PHOTO / DONNA COVENEY

### A moment of peace

Bioengineering sophomore Samantha Lau reads outside Stata on a beautiful late October day.

## Sloan alum Bruce Gordon speaks of accountability, activism

Sarah Foote  
MIT Sloan

As the first guest speaker this fall in the MIT Sloan School of Management's Innovative Leader Series, former NAACP leader and telecom industry veteran Bruce Gordon told audience members that accountability and activism were his own personal keys to success.

Gordon began his career working at a regional telephone company in 1968 and spent the next 35 years navigating the string of mergers that gave rise to Verizon Communications. When he retired from Verizon in 2003, he was chief of Verizon's biggest unit, retail markets. In 2005, he became president of the National Association for the Advancement of Colored People. During his tenure at the civil rights organization, he increased membership and associates by more than 100,000.

After being introduced at the forum by David Schmittlein, MIT Sloan's new dean, Gordon, who was a Sloan fellow in 1998, spoke about the beginning of his career at the telephone company, which he referred to by its old nickname, Ma Bell. "It was one company back then. We gave you all the choices you wanted, as long as they were products we had," he said with a smile.

Over the next several decades, Gordon saw the company move from wired communications to wireless. Meanwhile, middle management went from being almost exclusively male and white to a composition that included 15 percent minorities and 40 percent women.

"Throughout this change, I learned a few things. I learned that change is guaranteed. Whatever you see today will be gone tomorrow, and those who succeed are the ones that embrace change and don't reject it," he said. "You cannot predict the future, no matter how smart you are or how grand your imagination might be. You haven't a clue as to what your space will look like, even just five years from now."

Gordon explained that he learned a lot in a compressed amount of time during his 19 months with the NAACP. He mentioned that he often found himself quoting Dickens: "It was the best of times, it was the worst of times." He quickly realized that the disparity between the "haves" and the "have-nots" in America is growing. Gordon went on to tell students that it was a privilege for them to be at MIT Sloan and he hoped that when they graduate and enter the work force that they would remember the have-nots.

"My two experiences, in telecom and at the NAACP, have shaped my thinking. In all of that, I have two words for you: accountability and activism," Gordon said. He went on to explain that accountability is tantamount to individual power and challenged students to become more involved.

"When I realized that everything in front of me I could hold myself accountable for—and did not have available the option to blame someone else, to say that there was nothing I could do about it, and just wait and hope that someone else would solve the problem—it changed

my approach to my work and my life—to everything," he said.

Gordon said accountability is fundamental to bringing about change and noted that one of his regrets at the NAACP was his inability to change the thinking of a 21st-century organization away from that of "victim." He said he wanted the organization to move toward accountable think-



PHOTO / SARAH FOOTE

Bruce Gordon

ing so members could try to fix concerns and problems on their own.

Activism, Gordon said, is easy: Either you're engaged or you're not. He asked students, "Are you willing to get involved? If you choose to take on the spectator role, then you are being unaccountable and nothing will happen. If you choose to become an activist, then you can make a big difference. In your career, if you choose to be an accountable activist, I can almost assure you of a successful path and progress."

Gordon said he felt that one of the most underused powers in the country is the executive suite. While at the telephone company, he wanted to become an executive because he wanted to have the power to affect change and policy. At the NAACP, Gordon would often speak to CEOs and ask them to write the president and both houses of Congress about public policies in the hope of changing things for the better.

"It makes sense to me that a corporate leader would weigh in on issues such as immigration. It's a major issue of our day. They should weigh in on this, not because it affects their work force, but because it affects the health and welfare of the country," he said.

Gordon closed his talk with a direct message to MIT Sloan students: "You have the intention to leave this place and go on with your lives and do something meaningful. I would encourage you to think about your individual capacity to effect change in this country, if not this world.

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## Cask from the past

### Team IDs ancient cargo from DNA

David Chandler  
News Office

For the first time, researchers have identified DNA from inside ceramic containers in an ancient shipwreck on the seafloor, making it possible to determine what the ship's cargo was even though there was no visible trace of it.

The findings, by a team from MIT, the Woods Hole Oceanographic Institution (WHOI) and Lund University in Sweden, are being reported in an upcoming issue of the *Journal of Archeological Science*.

By scraping samples from inside two

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PHOTO COURTESY / CHIOS SHIPWRECK SURVEY

Ceramic amphoras discovered on the ocean floor may contain DNA that can be used to discover the contents of the ancient containers.

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Professor acquires new title—Baron of Langley—to go with his castle.

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PHOTO / DONNA COVENEY

### These roots run deep

Former MIT Vice President and Secretary of the Corporation Kathryn Willmore, left, at the Oct. 25 dedication of a garden in her name. At right is the garden's designer, Elena Saporta. The garden is located within the existing President's Garden.

## Big MIT contingent at Society for Neuroscience meeting

Deborah Halber  
News Office Correspondent

MIT's excellence in brain research will be showcased next week in San Diego as Institute scientists give five of the 24 invited talks at the annual meeting of the Society for Neuroscience.

"This is an extremely high representation from one institution," said Mriganka Sur, chair of the Department of Brain and Cognitive Sciences and one of the MIT speakers.

The Society for Neuroscience is the world's largest organization of scientists devoted to studying the brain. Some 30,000 people are expected to attend the group's annual conference.

One of the five MIT researchers, H. Sebastian Seung, professor of computational neuroscience, will give the Presidential Special Lecture on "The Once and Future Science of Neural Networks." In his talk, Seung will describe a revolutionary new way to create a nanoscale-level map of the brain's axon and dendrite "wires" based on actual human brain tissue. This cutting-edge field, called computational neuroanatomy, is expected to confirm or deny long-held basic assumptions about how the brain works.

Seung's laboratory is one of a handful in the world working on a new initiative

called "the connectome," which seeks to translate three-dimensional images of the brain at nanoscale resolution into a circuit diagram of all the brain's neurons and synaptic connections.

Current models of the human brain revolve around the belief that synapses' connections determine brain function and that synaptic plasticity underlies learning and memory. But now, "we have seen tantalizing hints that these basic ideas are at least partially true, as well as examples where they fall short," said Seung, who also is a Howard Hughes Medical Institute (HHMI) investigator. "The advent of high-throughput methods for gathering neurophysiological and neuroanatomical data will transform our ability to test the foundations of neural network theory."

The other MIT speakers and their topics are:

Mark F. Bear, Picower Professor of Neuroscience, director of the Picower Institute for Learning and Memory and HHMI investigator, will speak on "Modification of Cerebral Cortex by Experience." More than four decades of research on how synapses are formed, strengthened, weakened and lost under the influence of sensory experience have culminated in a deep understanding of the mechanisms for this synaptic plasticity. The knowl-

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## Seven named AAAS fellows

Elizabeth Thomson  
News Office

The American Association for the Advancement of Science (AAAS) has awarded the distinction of fellow to 471 members, including seven MIT faculty members.

Fellows are recognized for their efforts toward advancing science applications that are deemed scientifically or socially distinguished. New fellows will be presented with an official certificate and the society's gold and blue (representing science and engineering, respectively) rosette pin on Feb. 16 at the 2008 annual meeting in Boston. The following MIT faculty are new AAAS fellows:

**Emery N. Brown**, a professor in the Harvard-MIT Division of Health Sciences and Technology and in the Department of Brain and Cognitive Sciences, was cited for "fundamental contributions to statistical modeling of dynamic biological phenomena, especially involving circadian rhythms, functional imaging signals and neuronal spike trains." Brown is also affiliated with Massachusetts General Hospital.

**Jeffrey P. Freidberg**, a professor in the Department of Nuclear Science and Engineering and the Plasma Science and Fusion Center, was named a fellow for "distinguished contributions to research and teaching in the areas of theoretical plasma physics and magnetohydrodynamics as applied to problems in magnetic fusion."

**Klavs F. Jensen**, the Warren K. Lewis Professor of Chemical Engineering and Materials Science and Engineering, was cited for "the elegant use of detailed sim-

ulations of reactive systems to gain new insight into the underlying basic physical and chemical rate processes." Jensen is also head of the Department of Chemical Engineering.

**Daniel G. Nocera**, the Henry Dreyfus Professor of Energy in the Department of Chemistry, was named for "distinguished contributions to the development of renewable energy at the molecular level, with emphasis on the splitting of water with solar light."

**Leona D. Samson**, the Ellison American Cancer Society Professor, was cited for "distinguished contributions to cancer prevention and treatment, particularly for elucidating ways in which cells, tissues and animals respond to carcinogenic and chemotherapeutic agents." Samson is also a professor of toxicology and biological engineering in the Department of Biological Engineering, and is director of the Center for Environmental Health Sciences.

**Joseph M. Sussman, JR** East Professor of Civil and Environmental Engineering and Engineering Systems, was cited for "contributions to understanding large, complex engineering systems with emphasis on transportation, freight and traveler systems, and for pioneering work in transportation systems education."

**Maria T. Zuber**, the Earle Griswold Professor of Geophysics and Planetary Science, was named a fellow for "outstanding research contributions and scientific leadership in the geophysical studies of Earth and the solid planets." Zuber is also head of the Department of Earth, Atmospheric and Planetary Sciences, and director of the Earth and Planetary Geodynamics Group.

### AWARDS AND HONORS

Institute Professor **Mildred Dresselhaus** has been named winner of the 2008 Oliver E. Buckley Condensed Matter Prize from the American Physical Society.

Dresselhaus, who will receive \$10,000 for the prize, was cited "for pioneering contributions to the understanding of electronic properties of materials, especially novel forms of carbon."



Mildred Dresselhaus

The prize was endowed in 1952 by AT&T Bell Laboratories (now Bell Laboratories, Lucent Technologies) to recognize and encourage outstanding theoretical or experimental contributions to condensed matter physics. It is named in memory of Oliver E. Buckley, an influential president of Bell Labs.

**Galyna Dobrovolska**, a senior majoring in math, has been chosen as co-winner of the Alice T. Schafer Prize for Undergraduate Women in Mathematics. She will receive an award of \$750, to be presented by the Association for Women in Mathematics (AWM) at their Jan. 7 meeting in San Diego. The last MIT winner of the Schafer Prize was Ruth Britto-Pacumio, in 1995.

In their letter announcing the award, AWM judges wrote, "Dobrovolska has distinguished herself through her impressive and original mathematical research. Her research is focused in algebra and would be considered broad even for a mathematician much further along in their career."

On Nov. 16, **Cardinal Warde**, professor of electrical engineering, will receive the Caribbean American Heritage Award for Excellence in Science and Technology. Since its inception, the Caribbean American Heritage Awards has sought to recognize immigrants and sons and daughters of immigrants from the Caribbean who by their work have helped build America.

Warde is considered one of the world's leading experts on materials, devices and systems for optical information processing.

**Lita Nelsen**, director of the Technology Licensing Office at MIT, has been chosen by the Massachusetts Society for Medical Research (MSMR) as a 2007 Biomedical Research Leader. She was recognized by the MSMR board of directors for the depth of her contributions to biomedical research in the state and the entire region. Nelsen's award cites "Her immeasurable contribution to the vitality of biomedical research in Massachusetts and beyond."

The Technology Licensing Office, where Nelsen has worked since 1986, manages over 500 new inventions per year from MIT, the Whitehead Institute and Lincoln Laboratory. Typically, they negotiate more than 100 licenses and start up more than 20 new companies per year.

**Steve Ross** has been chosen as this year's recipient of the Jean-Jacques Laffont Prize. This prize, created in 2005 by the City of Toulouse in partnership with Institut d'Economie Industrielle, honors an economist whose work combines theoretical and applied aspects of economics. Professor Ross is best known as the inventor of the widely applied Arbitrage Pricing Theory, an approach to determining asset prices.

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*Dear Colleagues:*

Shortly after finalizing the following letter, I received the shocking news, which has now been publicly reported, of the attack on one of our students in Next House earlier this week. Our support teams for students responded promptly and have remained deeply engaged. I have asked Chancellor Phil Clay to conduct a thorough review of security measures in our residence halls, as the safety of our students and community is of the utmost importance. I am heartened by the progress our student has shown in his recovery, and I wish him a quick return to full participation in our community.

—Susan Hockfield



**Susan Hockfield**

## To Members of the MIT Community:

With the new semester well under way, I write to update you on some recent activities on campus, and to provide a short “State of the Institute,” for those who may not have attended that event at the beginning of the month.

### New Beginnings

The academic year began with the wonderful burst of energy our new students bring to campus each fall semester. As I walked through the residence halls welcoming new students and their parents to campus, I recalled my “freshman year” at MIT, now almost three years ago. Like so many members of the Class of 2011, I had some difficulty navigating the numerical nomenclature along the infinite corridor, had many new professors to meet, and was impatient to gain a familiarity with the Institute’s people and traditions. Since then, my respect and admiration for MIT have grown exponentially. I’ve also figured out the numbering of the Bosworth buildings.

MIT has a stellar history of contributions to engineering and science, but also to the humanities and social sciences, business, architecture and the arts. Today’s Institute builds on the success of our predecessors, and our pace of discovery has accelerated rapidly. In the last three years alone, MIT researchers have designed a “stackable car” that could revolutionize urban planning; created a new form of matter, winning a heated race among physicists; engineered yeast that can speed the production of the biofuel ethanol; and developed an award-winning show for NOVA that has educated millions of people about the origins of the cosmos, to cite only a few examples of our work. The extraordinary brilliance and productivity of our faculty, students and staff make these—and many more—contributions to humanity possible. In recognition of their achievements, three members of the MIT community were awarded the nation’s highest science and technology honors in July. Institute Professor Robert Langer and Lester Wolfe Professor of Physics Emeritus Daniel Kleppner won the National Medal of Science, bringing to 47 the number of MIT scientists to win the medal, and President Emeritus Charles Vest joined four engineers and inventors from MIT who have previously won the National Medal of Technology.

We opened the year with our first MIT Community Picnic on Killian Court. Well over 5,000 people attended the picnic, and the positive responses reminded me of the importance of informal opportunities to bring us together as a community.

I hope many of you enjoyed the first of its kind multiday science festival last April. Spearheaded by John Durant and the MIT Museum, the Cambridge Science Festival took place at sites throughout the city and our campus. The festival attracted more than 15,000 adults and children and represented a wonderful collaboration between MIT, the City of Cambridge and its library and public schools, Harvard University, the Museum of Science and WGBH public television and radio. The program featured the world’s largest model of the human genome and included more than 150 events celebrating science and technology in a city world-famous for discovery and invention. Many of the programs, exhibitions, activities and performances involved MIT alumni and students who generously volunteered their time and talent. Planning is already under way for an even more expansive Cambridge Science Festival for 2008.

In addition to these new events we have preserved and expanded traditional gatherings that bind us with past generations of MIT graduates. More than 3,400 alumni and guests returned to campus in June for Tech Reunions 2007, a record reunion attendance for the Institute. They enjoyed close to 140 events, including the 110th annual Tech Night at the Pops, the annual Reunion Row and Technology Day presentations on energy. Encouraged by the Administrative Advisory Council II (AACII), in early October we returned to the tradition of holding a State of the Institute Forum. Open to the entire community, the forum provided a venue for senior Institute leaders to share our goals and to hear from the community in a question and answer period.

### New Faces

Each fall the campus comes alive with the excitement of arriving freshmen and new graduate students who bring vitality and a renewed sense of discovery to MIT. This year’s freshman class will graduate in 2011, an important year in the Institute’s history—our sesquicentennial (or 150th) anniversary. This class comes to MIT through an exceedingly competitive admissions cycle, with applications for admission increasing 9 percent over the previous year, to 12,445. A record 69 percent (1,069) of the 12.3 percent of students admitted chose to enroll. The Class of 2011 includes 46 percent women and 22.2 percent students from underrepresented groups. The new class also reflects great international diversity, hailing from 58 countries.

Our graduate students make critical contributions to our integrated mission of education and research. This September we welcomed almost 2,000 new graduate students to the Institute. The Graduate Students Office (GSO) continues its longstanding support for its community with a new pilot program for Graduate Community Fellows. The Fellows will strengthen the experience of our graduate students by working on a range of projects including: addressing issues confronting international and women students; diversity initiatives; and the Graduate Student Life Grants program.

Over the course of the last semester and the summer, several individuals have joined the Institute’s academic and administrative leadership. Most recently, we announced the following appointments: Wesley Harris, Charles Stark Draper Professor of Aeronautics and Astronautics and current head of the Department

of Aeronautics and Astronautics, and Barbara Liskov, Ford Professor of Engineering in the Department of Electrical Engineering and Computer Science, as Associate Provosts for Faculty Equity; Marc Kastner, the Donner Professor of Science, as Dean of the School of Science; Steven Lerman, the Class of 1922 Distinguished Professor of Civil and Environmental Engineering, as the Institute’s Dean for Graduate Students; Subra Suresh, the Ford Professor of Engineering in the Department of Materials Science and Engineering, as Dean of the School of Engineering; and David Schmittlein, from the University of Pennsylvania’s Wharton School, joined MIT on Oct. 15 as the John C Head III Dean of the MIT Sloan School of Management. I thank Steven Eppinger, General Motors Leaders for Manufacturing Professor of Management and a professor of engineering systems in MIT’s Engineering Systems Division, for serving as interim dean of Sloan during the search process. In addition, Deborah Loeb Bohren, former executive vice president at the Washington, D.C., public affairs firm of Powell Tate, has joined us as Vice President for External Affairs.

### New Places

With MIT’s extraordinary intellectual resources we have a responsibility to turn our attention to matters of global importance. We enjoy astonishing breadth and depth of expertise among the members of the MIT community, and when our collaborative efforts focus on the world’s most complex problems, I am filled with great optimism that we will make progress on many of these challenges in our lifetimes. To this end we have established a new International Advisory Committee (IAC), co-chaired by Associate Provost Philip Khoury and Claude Canizares, Vice President for Research and Associate Provost, to help develop strategies in countries and regions that call increasingly on MIT’s international efforts. One of the first such areas is India, which I will visit in November to meet with many of our alumni and leaders of industry to discuss important trends and to explore opportunities for collaboration.

Several international ventures are well under way. Here, I will highlight one, the Legatum Center for Development and Entrepreneurship. The center will provide fellowship support for aspiring entrepreneurs to spend two years at MIT acquiring the knowledge and skills required for successful business development and civic leadership in developing nations around the world. Graduate students enrolled in programs across the campus will be eligible for Legatum Fellowships.

With so much activity, it is difficult to keep track of our news and progress. One way to learn about the Institute’s international activities is to visit the new GLOBAL MIT web site (<http://global.mit.edu>), which serves as a compendium of MIT international activities in research and education, and also provides information about internship and community service opportunities. The searchable database allows users both inside and outside of MIT to learn about the full range of MIT’s international engagement.

### New Intellectual Spaces

As many of you know, few topics affect so much of the world, and require such collaborative action and wisdom for a solution, as the challenges of energy and the environment. Since its official launch a year ago, the MIT Energy Initiative (MITEI) has worked to bring the Institute’s researchers together with results-oriented industry partners and government officials to transform the world’s energy marketplace. There is no shortage of interest and enthusiasm for our efforts: 15 percent of our faculty have authored or co-authored white papers for MITEI, and there are literally hundreds of student activities with energy and environment as their focus. Earlier this month we announced more than \$50 million in new support for MITEI from several inaugural industry research partners including BP, Ford Motor Company, Ormat Technology, and an individual, Mr. Phil Rettger, an entrepreneur in solar energy. In addition to funding research projects ranging from coal conversion to geothermal technology, these partnerships will support more than 100 student energy fellowships over the next five years and will provide funds for seed grants for innovative projects. More news on projects and partnerships will follow in the weeks and months ahead.

Earlier this month we announced that David H. Koch (S.B. 1962, S.M. 1963) has committed \$100 million to establish the David H. Koch Institute for Integrative Cancer Research, which will leverage MIT’s dual strengths in engineering and the life sciences to address some of the most intractable puzzles in understanding and curing cancer. We also announced the creation of the Novartis-MIT Center for Continuous Manufacturing, a partnership that brings together the industrial expertise of Novartis with innovative science and engineering from MIT’s Departments of Chemical Engineering and Chemistry to transform the pharmaceutical manufacturing process.

### Securing the Resources for Tomorrow

The prudent stewardship of our resources and the generosity of our donors are integral to the Institute achieving its priorities.

The new financial foundation for MIT’s future, rolled out with the departments, labs and centers by the provost and executive vice president last year, will allow us to embark in new directions by liberating unrestricted funds for investment in our human capital and physical infrastructure. This year’s 22.1 per-

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# MIT's 'electronic nose' could detect hazards

Anne Trafton  
News Office

A tiny "electronic nose" that MIT researchers have engineered with a novel inkjet printing method could be used to detect hazards including carbon monoxide, harmful industrial solvents and explosives.

Led by MIT professor Harry Tuller, the researchers have devised a way to print thin sensor films onto a microchip, a process that could eventually allow for mass production of highly sensitive gas detectors.

"Mass production would be an enormous breakthrough for this kind of gas sensing technology," said Tuller, a professor in the Department of Materials Science and Engineering (MSE), who is presenting the research at the Composites at Lake Louise Conference in Alberta, Canada, on Oct. 30.

The prototype sensor, created by Tuller, postdoctoral fellow Kathy Sahner and graduate student Woo Chul Jung, members of MIT's Electroceramics Group in MSE, consists of thin layers of hollow spheres made of the ceramic material barium carbonate, which can detect a range of gases. Using a specialized inkjet print head, tiny droplets of barium carbonate or other gas-sensitive materials can be rapidly deposited onto a surface, in any pattern the researchers design.

The miniature, low-cost detector could be used in a variety of settings, from an industrial workplace to an air-conditioning system to a car's exhaust system, according to Tuller. "There are many reasons why it's important to monitor our chemical environment," he said.

For a sensor to be useful, it must be able to distinguish between gases. For example, a sensor at an airport would need to know the difference between a toxic chemical and perfume, Tuller said. To achieve this, sensors should have an array of films that each respond differently to different gases. This is similar to the way the human sense of smell works, Tuller explained.

"The way we distinguish between coffee's and fish's odor is not that we have one sensor designed to detect coffee and one designed to detect fish, but our nose

contains arrays of sensors sensitive to various chemicals. Over time, we train ourselves to know that a certain distribution of vapors corresponds to coffee," he said.

In previous work designed to detect nitrogen oxide (NO<sub>x</sub>) emissions from diesel exhaust, the researchers created sensors consisting of flat, thin layers of barium carbonate deposited on quartz chips. However, the films were not sensitive enough, and the team decided they needed more porous films with a larger surface area.

To create more texture, they applied the barium carbonate to a layer of microspheres, hollow balls less than a micrometer in diameter made of a plastic polymer. When the microspheres are burned away, a textured, highly porous layer of gas-sensitive film is left behind.

The resulting film, tens of nanometers (billionths of a meter) thick, is much more sensitive than flat films because it allows the gas to readily permeate through the film and interact with a much larger active surface area.

At first, the researchers used a pipette to deposit the barium carbonate and micro-

spheres. However, this process proved time-consuming and difficult to control.

To improve production efficiency, the researchers took advantage of a programmable Hewlett-Packard inkjet print head located in the MIT Laboratory of Organic Optics and Electronics. The inkjet print head, like that in a regular inkjet printer, can deposit materials very quickly and controllably. The special gas-sensitive "inks" used in this work were optimized for printing by Amy Leung, an MIT sophomore in chemical engineering.

This allows the researchers to rapidly produce many small, identical chips containing geometrically well-defined gas-sensing films with micrometer dimensions. Patterns of different gas-sensitive inks, just as in a color printer, can be easily generated to form arrays with very little ink required per sensor.

In future studies, the team hopes to create large arrays of gas-sensitive films with controlled three-dimensional shapes and morphologies.

The research is funded by the National Science Foundation.

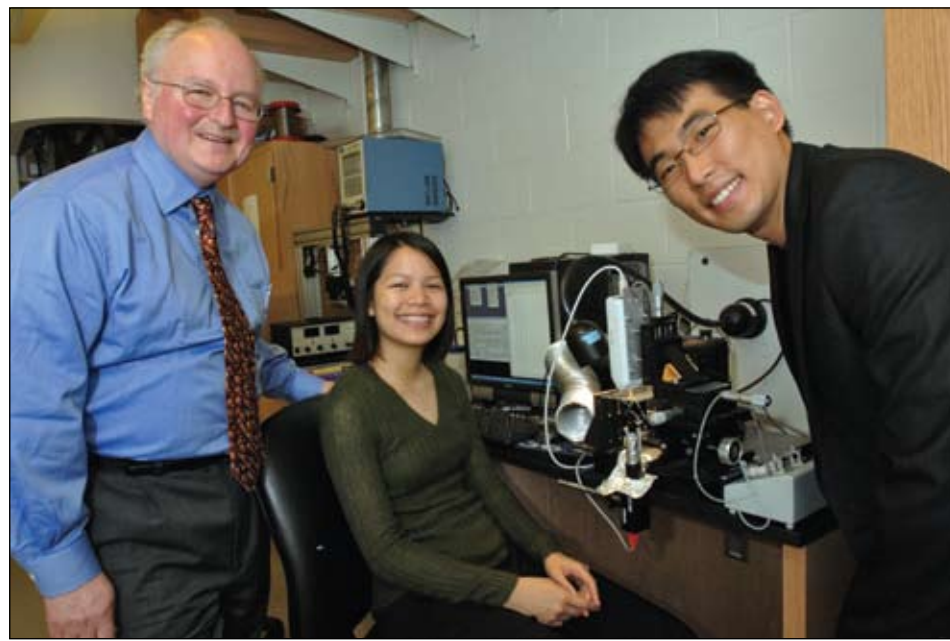


PHOTO / DONNA COVENEY

Professor Harry Tuller, left, leads a team that has found a way to print useful devices, like gas sensors, from inkjet printers. At far right is Woochul Jung, graduate student in material science and engineering, and at center is Amy Leung, a sophomore in chemical engineering; between them is the printing device.

## CARGO

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of the containers, called amphoras, the researchers were able to obtain DNA sequences that identified the contents of one as olive oil and oregano. The other probably contained wine, and the researchers are conducting further analyses to confirm this.

Brendan Foley, a lecturer in MIT's Program in Science, Technology and Society (STS) and a researcher at WHOI, and Maria Hansson, a biologist at WHOI and at Lund University in Sweden, found the DNA evidence in the remains of a 2,400-year-old shipwreck that lies 70 meters deep near the Greek island of Chios in the Aegean Sea.

Foley, along with David Mindell, MIT's

Frances and David Dibner Professor of the History of Engineering and Manufacturing and director of STS, led an expedition in 2005 that explored the wreck and recovered the amphoras.

Many archeologists specialize in the study of amphoras, which were the cargo containers of the ancient world, used for shipping all kinds of liquid or semi-liquid goods. But the study of these containers can be frustrating, Foley said, because after centuries on the seafloor, the contents have usually been washed away and archeologists are "just left with empty bottles."

The new research points the way toward analyzing hundreds of containers, which could "tell us what was being traded, and something about the total agricultural production of a country," Foley said.

Such analysis of ancient crops could even yield insights into the climate of that period.

The discovery of DNA from olive oil and oregano in one amphora came as a surprise, Foley said, because Chios was well-known in the ancient world as a major exporter of highly prized wines, and archeologists had assumed that amphoras from a ship in

that area would have been carrying wine.

The other amphora from which Foley and Hansson were able to extract DNA may indeed have contained wine, although that is not yet certain. The short fragments of DNA they found may have come from pistachios or from resins used to coat the insides of amphoras that carried wine. Analysis continues, using present-day samples of plants from the island to pin down the identity.

Their method could be used to identify most plant products that were being shipped, Foley said, but probably not fish products. While these may have sometimes been carried in amphoras, they would be too hard to identify because of contamination in the marine environment.

Foley and Hansson also studied amphoras from a different shipwreck, a few centuries younger, but found nothing. Foley thinks that's because the second site was much more severely disturbed by weather and currents. "It was badly degraded, smashed up, churned up," he said. It remains to be seen whether the technique also could be used on amphoras that have been stored in museums for many years.

The method could provide new insights into life in ancient Greece and other seafaring civilizations, Foley said. "Imagine if you were asked to analyze the American economy just by looking at the empty shells of 40-foot shipping containers," he said. "You could say something, but not much."

Foley and Hansson have applied for a grant to go back and study a few dozen more amphoras next year, in order to further develop the technique.

The work was supported by the Royal Physiographic Society in Lund, Sweden, WHOI and several private sponsors.

# Team models a cornucopia of Earth-sized planets

In the Star Wars movies, fictional planets are covered with forests, oceans, deserts and volcanoes. But new models from a team of MIT, NASA and Carnegie Institution scientists begin to describe an even wider range of Earth-size planets that astronomers might actually be able to find in the near future.



Sara Seager

Sara Seager, the Ellen Swallow Richards Associate Professor in the Department of Earth, Atmospheric and Planetary Sciences, and colleagues have created models for 14 different types of solid planets that might exist in our galaxy. The 14 types have various compositions, and the team calculated how large each planet would be for a given mass. Some are pure water ice, carbon, iron, silicate, carbon monoxide and silicon carbide; others are mixtures of these various compounds.

A paper on the work appeared in the Oct. 20 issue of the *Astrophysical Journal*.

"We're thinking seriously about the different kinds of roughly Earth-size planets that might be out there, like George Lucas, but for real," said Marc Kuchner of NASA's Goddard Space Flight Center.

The team took a different approach from previous studies. Rather than assume that planets around other stars are scaled-up or scaled-down versions of the planets in our solar system, they considered all types of planets that might be possible, given what astronomers know about the composition of protoplanetary disks around young stars.

"We have learned that extrasolar giant planets often differ tremendously from the worlds in our solar system, so we let our imaginations run wild and tried to cover all the bases with our models of smaller planets," said Kuchner. "We can make educated guesses about where these different kinds of planets might be found. For example, carbon planets and carbon-monoxide planets might favor evolved stars such as white dwarfs and pulsars, or they might form in carbon-rich disks like the one around the star Beta Pictoris. But ultimately, we need observations to give us the answers."

The team calculated how gravity would compress planets of varying compositions. The resulting computer models predict a planet's diameter for a given composition and mass. For example, a 1-Earth-mass planet made of pure water will be about 9,500 miles across, whereas an iron planet with the same mass will be only about 3,000 miles in diameter. For comparison, Earth, which is made mostly of silicates, is 7,926 miles across at its equator.

Some of the results were expected, such as the fact that pure water planets (similar to the moons of the outer planets in our solar system, which consist mostly of water ice) were the least dense of the solid planets, while pure iron planets were the densest. But there were some surprises. The team discovered that no matter what material a planet is made of, the mass-diameter relationship follows a similar pattern.

"All materials compress in a similar way because of the structure of solids," explained Seager. "If you squeeze a rock, nothing much happens until you reach some critical pressure, then it crushes. Planets behave the same way, but they react at different pressures depending on the composition. This is a big step forward in our fundamental understanding of planets."

For more information, please visit [www.nasa.gov/centers/goddard/news/topstory/2007/earth-sized\\_planets.html](http://www.nasa.gov/centers/goddard/news/topstory/2007/earth-sized_planets.html).



PHOTO / BRENDAN FOLEY

Brendan Foley, left, and David Mindell study DNA in amphoras aboard a Greek research vessel.

# MIT: Human-generated ozone will damage crops

Could reduce production by more than 10 percent by 2100

Nancy Stauffer  
MIT Energy Initiative

A novel MIT study concludes that increasing levels of ozone due to the growing use of fossil fuels will damage global vegetation, resulting in serious costs to the world's economy.

The analysis, reported in the November issue of *Energy Policy*, focused on how three environmental changes (increases in temperature, carbon dioxide and ozone) associated with human activity will affect crops, pastures and forests.

The research shows that increases in temperature and in carbon dioxide may actually benefit vegetation, especially in northern temperate regions. However, those benefits may be more than offset by the detrimental effects of increases in ozone, notably on crops. Ozone is a form of oxygen that is an atmospheric pollutant at ground level.

The economic cost of the damage will be moderated by changes in land use and by agricultural trade, with some regions more able to adapt than others. But the overall economic consequences will be considerable. According to the analysis, if nothing is done, by 2100 the global value of crop production will fall by 10 to 12 percent.

"Even assuming that best-practice technology for controlling ozone is adopted worldwide, we see rapidly rising ozone concentrations in the coming decades," said John M. Reilly, associate director of the MIT Joint Program on the Science and Policy of Global Change. "That result is both surprising and worrisome."

While others have looked at how changes in climate and in carbon dioxide concentrations may affect vegetation, Reilly and colleagues added to that mix changes in tropospheric ozone. Moreover, they looked at the combined impact of all three environmental "stressors" at once. (Changes in ecosystems and human health and other impacts of potential concern are outside the scope of this study.)

They performed their analysis using the MIT Integrated Global Systems Model,

which combines linked state-of-the-art economic, climate and agricultural computer models to project emissions of greenhouse gases and ozone precursors based on human activity and natural systems.

## Expected and unexpected findings

Results for the impacts of climate change and rising carbon dioxide concentrations (assuming business as usual, with no emissions restrictions) brought few surprises. For example, the estimated carbon dioxide and temperature increases would benefit vegetation in much of the world.

The effects of ozone are decidedly different.

Without emissions restrictions, growing fuel combustion worldwide will push global average ozone up 50 percent by 2100. That increase will have a disproportionately large impact on vegetation because ozone concentrations in many locations will rise above the critical level where adverse effects are observed in plants and ecosystems.

Crops are hardest hit. Model predictions show that ozone levels tend to be highest in regions where crops are grown. In addition, crops are particularly sensitive to ozone, in part because they are fertilized. "When crops are fertilized, their stomata open up, and they suck in more air. And the more air they suck in, the more ozone damage occurs," said Reilly. "It's a little like going out and exercising really hard on a high-ozone day."

What is the net effect of the three environmental changes? Without emissions restrictions, yields from forests and pastures decline slightly or even increase because of the climate and carbon dioxide effects. But crop yields fall by nearly 40 percent worldwide.

However, those yield losses do not translate directly into economic losses. According to the economic model, the world adapts by allocating more land to crops. That adaptation, however, comes at a cost. The use of additional resources brings a global economic loss of 10-12 percent of the total value of crop production.

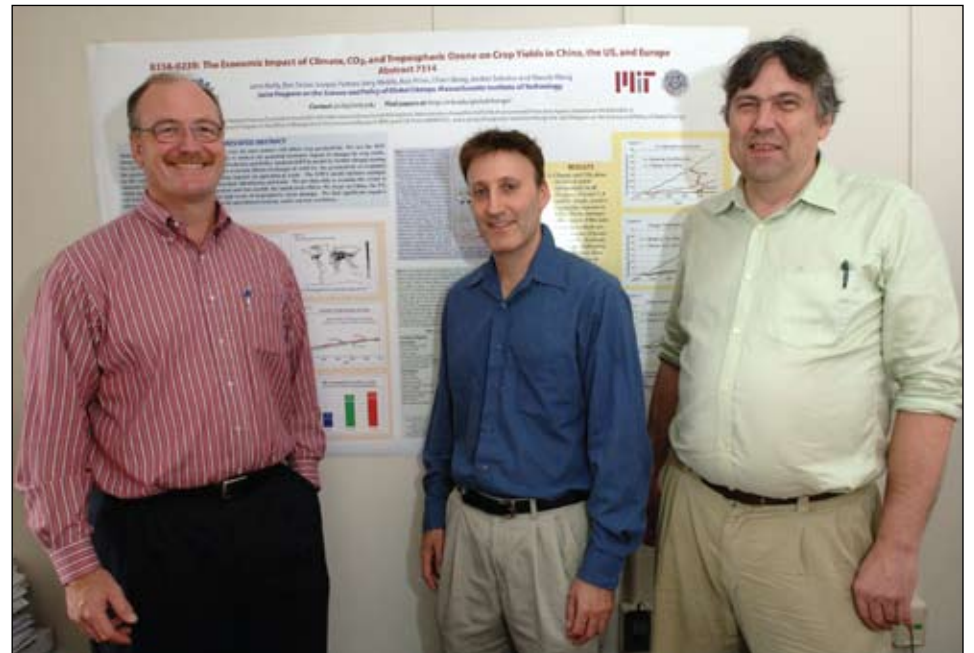


PHOTO / DONNA COVENEY

John Reilly, left, associate director of the MIT Joint Program on the Science and Policy of Global Change, Ben Felzer, center, and David Kicklighter, right, from the Marine Biological Laboratory Ecosystems Center at Woods Hole. Reilly leads a team that is showing the global economic effects of changes in crops, forests and pastures due to climate change.

## The regional view

Global estimates do not tell the whole story, however, as regional impacts vary significantly.

For example, northern temperate regions generally benefit from climate change because higher temperatures extend their growing season. However, the crop losses associated with high ozone concentrations will be significant. In contrast, the tropics, already warm, do not benefit from further warming, but they are not as hard hit by ozone damage because ozone-precursor emissions are lower in the tropics.

The net result: regions such as the United States, China and Europe would need to import food, and supplying those imports would be a benefit to tropical countries.

Reilly warns that the study's climate projections may be overly optimistic. The researchers are now incorporating

a more realistic climate simulation into their analysis.

Reilly's colleagues are from MIT and the Marine Biological Laboratory. The research was supported by the Department of Energy, the Environmental Protection Agency, the National Science Foundation, NASA, the National Oceanographic and Atmospheric Administration and the MIT Joint Program on the Science and Policy of Global Change.

It is part of the MIT Energy Initiative (MITEI), an Institute-wide initiative designed to help transform the global energy system to meet the challenges of the future. MITEI includes research, education, campus energy management and outreach activities, an interdisciplinary approach that covers all areas of energy supply and demand, security and environmental impact. For more information, please visit [web.mit.edu/mitei](http://web.mit.edu/mitei).

# Cancer cells enlist adult stem cells to promote metastasis

Alyssa Kneller  
Whitehead Institute

Everyone knows that tumors are packed with cancer cells, but many normal cells live among these deviants. The normal cells form a structural framework called the stroma, which was once thought to resemble passive scaffolding. But a growing body of research suggests that cancer cells actively recruit normal cells from local and distant sites to the scaffolding, where they release signals that help the tumor thrive.

Beginning in 1999, several labs increased primary tumor growth by mixing fibroblasts (cells that contribute to the formation of connective tissue and the stroma of tumors) with cancer cells. This was the first proof that

stromal fibroblasts actively foster the growth of cancer cells. Stated differently, cancer cells can co-opt normal cells to serve their own insidious purposes.

"This study provides the first direct evidence that a cancer cell's metastatic powers are not necessarily intrinsic to the cell itself," says Whitehead Institute member Robert Weinberg. "Rather, they might be influenced by the signals the cancer cell experiences from stromal cells in the context of the primary tumor."

Working with a different type of normal stromal cell, Weinberg's lab has now managed to facilitate metastasis—the spread of cancer cells from the primary tumor to distant sites. Postdoctoral researcher Antoine Karnoub has compelling evidence that some breast cancer cells recruit normal adult stem cells from bone marrow and force them to secrete a protein that fosters cancer cell movement and invasion. His results appeared online in *Nature* on Oct. 4.

"This study provides the first direct evidence that a cancer cell's metastatic powers are not necessarily intrinsic to the cell itself," says Weinberg, who is also an MIT professor of biology. "Rather, they might be influenced by the signals the cancer cell experiences from stromal cells in the context of the primary tumor."

The conscripts that confer these metastatic powers are mesenchymal stem cells (MSCs), which ordinarily generate bone, muscle, cartilage and fat. MSCs also play a critical role in healing wounds. Skin your knee, for example, and your body sends an emergency signal that prompts MSCs to leave their home in the bone marrow and travel to the site of the trauma. Here they help to reduce inflammation, form scar tissue and seal the wound.

"Sites of tumor formation are much like open wounds," Karnoub explains. "MSCs might very well home to those sites to aid with the healing process. Once there, they may get entangled with the tumor cells and actually help them grow."

To investigate this idea, he combined

MSCs from a human hip with human breast cancer cells, implanted the mixture into the backs of mice and studied the growth of the resulting "mixed" tumors. As a control, he implanted cancer cells without MSCs into mice. To Karnoub's disappointment, both groups' tumors grew to the same size and at the same speed.

Probing further, he found that while the first group's tumors metastasized, the second group's, for the most part, did not. Karnoub repeated this experiment with several other lines of human breast cancer cells and found others that demonstrated similar properties.

How did these lines of cancer cells acquire the dangerous ability to invade distant tissues?

Karnoub next examined the proteins made by the cells. He discovered that MSCs ramp up their production of a key protein called CCL5 in the presence of cancer cells, churning out about 60 times the normal amount. CCL5 is known to affect cell movement, and its levels are elevated in the blood of patients with advanced breast cancer. Could the cancer cells be "educating" the MSCs, instructing them to make CCL5, thereby promoting metastasis?

Karnoub tested this hypothesis by coaxing weakly metastatic breast cancer cells to produce lots of CCL5 in the absence of MSCs. These cells acquired the ability to move and migrate to distant tissues, confirming CCL5's key role in MSC-mediated metastasis.

Tissue samples from patients provide clinical relevance. Researchers at Brigham and Women's Hospital and Dana-Farber Cancer Institute examined CCL5 expression in tumor stroma taken from breast cancer patients with invasive and noninvasive forms of the disease. High CCL5 levels correlated with invasive tumors and poor prognosis.

"MSC recruitment and CCL5 production could be responsible for metastasis in a significant subset of breast cancer patients, which has implications for diagnosing and treating the disease," Karnoub asserts. "This protein sheds light on how breast cancers mine the body's own resources to progress."

It also offers a promising therapeutic target. Karnoub was able to halt metastatic spread in the mice with mixed tumors by simply blocking CCL5 signaling.

This research is funded by the Breast Cancer Research Foundation, the Ludwig Trust, the Susan G. Komen Breast Cancer Foundation, the Dana-Farber/Harvard Cancer Center Specialized Program of Research Excellence in Breast Cancer and the National Institutes of Health.

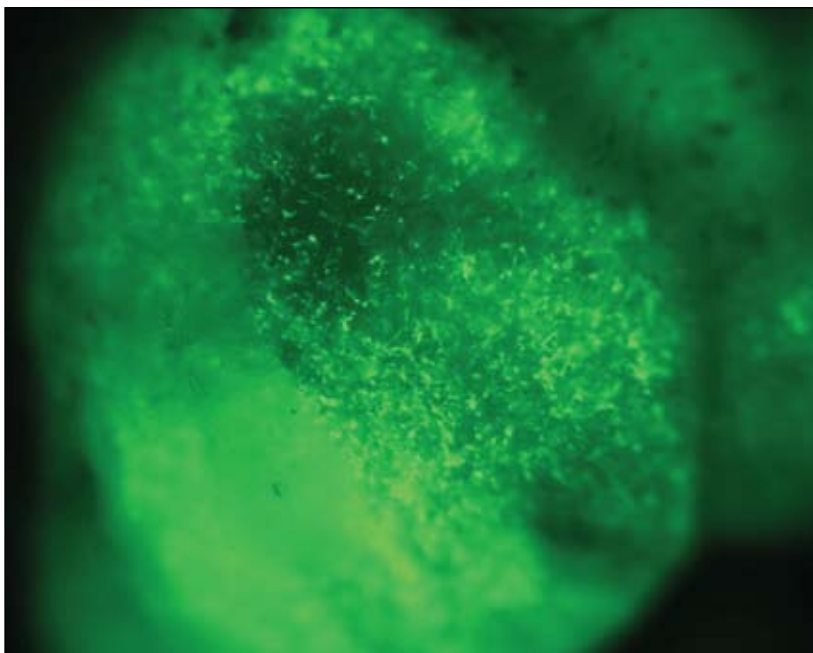


IMAGE / ANTOINE KARNOUB

Green fluorescent mesenchymal stem cells in a primary tumor. These cells may be responsible for metastasis in a significant subset of breast cancer patients.

## MIT hosts first ever Elevator Pitch Contest

Matt McDonald  
M.B.A. 2008

Noisemakers, air horns and a raucous audience helped launch the first annual MIT Elevator Pitch Contest on Oct. 13, with entrepreneurs from across the country pitching their ideas to judging panels of venture capitalists looking for the next big thing.

An elevator pitch, so called because it can be delivered in the time span of an elevator ride, is a brief overview of an idea for a product, service or project. More than 170 contestants from 12 different schools were given 60 seconds to pitch their idea, and winners were chosen representing different fields of innovation, including health care and life sciences, Internet and communications, products and services, energy/green technologies and development.

The winners included several members of the MIT and MIT Sloan community, with MIT sophomore Jessica Laviolette collecting the grand prize of \$2,500 with a pitch on automotive production. "Painting an automobile is the most expensive and time-consuming portion of the car manufacturing process. Our patent-pending method takes one-tenth the time and one-twentieth the cost of current paint-drying technology used today," she said.

Other notable pitches for innovation included noise-canceling windows for city-dwellers, an Internet search engine for children and a noninvasive imaging device to help detect skin cancer.

"The Elevator Pitch Contest is a brand-new addition to the \$100K Entrepreneurship Competition series that allows up-and-coming entrepreneurs throughout America to test their ideas with passion," said Jeff Sabados, lead organizer of this year's annual business plan competition at MIT. "Conceivably, a participant could win \$2,500 in 60 seconds. That's an hourly wage of \$150,000, which isn't bad for an afternoon."

Elevator Pitch Contest winners included Manish Bhardwaj, MIT EECS; Stephen Boyer, MIT SDM; Hattie Chung, MIT; Jessica Laviolette, MIT Undergrad—grand prize winner; Albert Park, MIT; Andrea Scharfin, MIT Sloan; Matt Thomson, MIT Sloan; Ryan Tseng, MIT Sloan; Sabine Volkmer, MIT; and Patrick Zeitouni, MIT Sloan.

## GORDON

Continued from Page 1

Acknowledge the fact that there are some in America who have, and many in America who don't. The disparities that result from those two communities affect your life directly and you have an opportunity to have an impact on theirs. And to pass on that opportunity, to me, would be a huge missed opportunity," he said.

After a brief question-and-answer session, Gordon was greeted by a few of his former professors. He later attended a private lunch with 15 MIT Sloan students who had previously contacted the Office of External Relations about the opportunity.

Gordon now serves on the boards of CBS and Tyco International, and was previously on the boards of the Southern Company, Best Foods, Office Depot and Infinity Broadcasting. While at Verizon, he was inducted into the Advertising Hall of Fame. Gordon has been named as one the 100 most influential black American leaders by *Ebony* magazine and is ranked sixth by *Fortune* magazine on its list of the most powerful black executives.

The dean's Innovative Leader Series is cosponsored by the MIT Leadership Center and the MIT Sloan Office of External Relations. It brings to campus some of the most influential and innovative leaders from the public and private sectors to share lessons learned from their experiences leading some of the world's most significant and innovative organizations. For more information on the series, visit [mitsloan.mit.edu/corporate/dils.php](http://mitsloan.mit.edu/corporate/dils.php).



PHOTO / JACQUELINE A. TAYLOR (EAPS)

### It worked before ...

In 2004, faculty, students and staff in MIT's Green Building created a 21-story tribute to the hometown team for the first two games of the World Series, which the Red Sox won before going on to seal the championship. Hoping to inspire the same results, students in Earth, Atmospheric and Planetary Sciences lit up the building last week as the Sox played the Colorado Rockies across the Charles River. Professor Maria Zuber sought out graduate student Mike Krawczynski to head up a team of students to illuminate the sign. The team had to contend with broken blinds, but had no trouble working with lab inhabitants to keep their lights on. The outcome? Boston won the first two games and went on to sweep the series—just as before.

## HOCKFIELD

Continued from Page 3

cent endowment return will add further financial strength to our education and research priorities for both today's and tomorrow's scholars.

I would like to acknowledge the success of the Institute's staff in Resource Development and the Alumni Fund, who set new fundraising records this year. The Alumni Fund had more donor participation and more dollars donated than ever before, with more than 33,300 alumni contributing almost \$42 million. Three classes (1927, 1962 and 1972) set new reunion giving records and the Class of 2007 also set a new Senior Gift record (surpassing the record set by 2006) with 52 percent of the class participating. Opportunities for collaboration between the Alumni Association and Resource Development will amplify through the upcoming move of both offices to 600 Memorial Drive later in the year.

Deep expertise in multiple disciplines, combined with a desire and drive to collaborate, is a hallmark of MIT. There has never been a more important time, or a more promising moment, to invest in scientific research, and we are enormously grateful to all who have contributed to furthering our mission.

### The Year Ahead

The rapid pace of activity over the last few months creates momentum for the academic year ahead. Significant progress has been made in the new initiative on faculty race issues since the spring. The Race Initiative, charged by the provost, released a preliminary report this sum-

mer, "Initiative for Investigation of Race Matters and Underrepresented Minority Faculty at MIT," that provides a framework for the next steps in this important initiative. I know the MIT community shares my commitment to strengthening the representation and improving the experiences of our minority faculty, staff and students.

I also look forward to the transformations of our physical landscape in the months ahead. Establishing a model for state-of-the-art infrastructure in the Boston Buildings, we dedicated the Green Center and the renovations for Physics, Material Sciences and Engineering and the Spectroscopy Lab this month. Meanwhile, construction has begun for the Media Lab extension that will provide much needed space for the School of Architecture and Planning. Both of these projects will bring people together in new ways to do great things in spaces that foster collaboration across campus. Work on the new building for the MIT Sloan School also began this summer, which includes excavation for an underground garage that will accommodate 425 vehicles. When complete, the new facility will give MIT Sloan vastly improved space for contemporary teaching and research.

In our enthusiasm to celebrate all things new, we must also pause to remember our traditions and history. In the spirit of celebrating the things we hold in common with previous generations, more than 400 staff, students, and alumni gathered on Killian Court in June to witness the re-lighting of the iconic Great Dome of Building 10, made possible by a generous contribution from an anonymous

donor. This transformation of the Cambridge skyline marks a return to tradition last observed over three decades ago, but with an important innovation: The new lighting system incorporates energy-saving fixtures, making it possible to light the entire dome using the same amount of electricity needed to run two hairdryers. Members of the Class of 2011 will walk many of the same halls their predecessors did close to a century ago, and so we must not forget the Institute's accelerating pace of discovery is built upon strong historic foundations.

The trees across the river have started to turn to yellow, and the year's possibilities beckon us. I look forward to our work together.

*Susan Hockfield*

### NEWS YOU CAN USE

#### MIT women invited to apply for fellowship

The MIT Energy Initiative invites applications for the Clare Boothe Luce Postdoctoral Fellowships for Women in Energy at MIT. Support from the Henry Luce Foundation will provide two exceptional women with two-year postdoctoral fellowships for interdisciplinary study focused on energy topics beginning in the fall of 2008. The selected fellows will be top scholars from disciplines in which women are particularly underrepresented. Applications must be received no later than Nov. 9. For more information, please contact Robin Elices at [relices@mit.edu](mailto:relices@mit.edu) or visit [web.mit.edu/mitei/news/clare-fellowship.html#guidelines](http://web.mit.edu/mitei/news/clare-fellowship.html#guidelines).

# MIT's very own baron...

Amy MacMillan  
Sloan Educational Services

Stuart Madnick, the John Norris Maguire Professor of Information Technology, has owned Langley Castle in England since 1985. Earlier this year, he acquired the title associated with the property: Baron of Langley.

Madnick had always wanted to reunite the barony with the castle, which is located in Northumberland, Northeast England, on the Scottish border. Ever since he purchased the 14th-century castle, Madnick's goal has been to continue its restoration and preserve its history. Madnick and his wife, Yvonne, updated the castle and transformed it into an award-winning, luxurious hotel and restaurant. The seven-foot-thick stone walls, as well as the towers and turrets, have remained intact over the centuries, giving an authentic medieval aura to the hotel.

According to Madnick, the barony of Langley dates back about 800 years, and the castle was the center of the barony for many years. The crown seized both

the title and the castle in the 18th century, after the two previous barons were beheaded. The castle remained unoccupied until 1882, when a local historian and sheriff, Cadwallader Bates, bought and restored much of it.

After Madnick purchased Langley, he wondered about the barony title, but for a while no one knew the status. "It was seized 300 years ago, but I wanted to reunite the two pieces," he explains. Although he now finally has the title, Madnick points out that he is not known as "Baron Madnick." He explains that there are two types of titles in England: hereditary titles and manorial titles. Since his title is related to his status as a property-owner, the official title is Stuart Madnick, Baron of Langley.

Madnick lives in the Boston area but runs his business with the help of 50 full- and part-time employees. He visits the castle about three or four times per year to check in on the establishment. He says that the locals seem to have responded favorably to their new baron. "There haven't been any suggestions of a beheading," he says.



PHOTO / STUART MADNICK

Stuart Madnick, Baron of Langley, and his wife, Yvonne, stand before their 14th-century castle in Northumberland, England.

## NEUROSCIENCE

Continued from Page 2

edge ranges from novel insights into the pathophysiology of developmental disorders to new strategies to enhance perceptual learning and recovery from environmental deprivation, he said.

Li-Huei Tsai, Picower Professor of Neuroscience and HHMI investigator, will speak on "Mechanisms Underlying Prevention of Cognitive Decline and Restoration of Memory in Age-Dependent Neurodegenerative Disorders." The number of people with Alzheimer's disease is expected to triple from 5 to 15 million by the year 2050. Age-dependent neurodegeneration and dementia is currently incurable. Tsai's lecture will focus on recent research of cellular mechanisms, including synaptic plasticity, which have provided models for understanding neurodegeneration and memory loss. A particular emphasis will be placed on new strategies to prevent decline or restore memories.

Mriganka Sur, Sherman Fairchild Professor of Neuroscience, will speak on "New Approaches for Revealing Cortical Function: Plasticity and Dynamics of Visual Cortex Networks." Sur will talk about how a range of novel tools, including in vivo high-resolution imaging of neurons, synapses and astrocytes, cell-specific markers and genetically engineered probes, along with new experimental paradigms, are transforming the analysis of cortical networks.

Susan L. Lindquist, professor of biology, member of the Whitehead Institute for Biomedical Research and HHMI investigator, will give the Albert and Ellen Grass Lecture. Proteins begin as long strings that must fold precisely. The misfolding of certain amyloidogenic proteins associated with neuronal cells is responsible for certain neurodegenerative diseases. Surprisingly, she said, similar changes in the folding of other proteins may have beneficial effects in learning and memory. Lindquist's lecture will investigate therapeutic strategies to control the folding of amyloidogenic proteins.

### CLASSIFIED ADS

Members of the MIT community may submit one ad each issue. Ads should be 30 words maximum; they will be edited. Submit by e-mail to [ttads@mit.edu](mailto:ttads@mit.edu) or mail to Classifieds, Rm 11-400. Deadline is noon Wednesday the week before publication.

#### FOR RENT

Watertown/Camb. line: 2BR apt. for rent. Large closets, hardwood floors, updated kitchen, new fridge, breakfast nook, new windows, dishwasher, disposal, washer/dryer, parking. \$1400/month + util. or \$1550/month w/util. Avail. Nov. 1. Larry 617-258-5445 or 617-924-8944.

Sunny 2BR, living, dining, family rooms and country kitchen. Large yard/porch. Bus

connects to Blue line. 15 min. to Cambridge. \$1300/month. No util. or pets. Call Marty 617-455-7697.

#### EVENTS

Holiday crafts fair. Saturday, Nov. 24, 9 a.m. to 3:30 p.m. Free admission, hourly door prizes. Somerville HS field house, 81 Highland Ave. Benefits boys & girls track teams. For info, e-mail [yolanda@yahoo.com](mailto:yolanda@yahoo.com).

#### SERVICES

Personal Chef/Baker. Order your holiday baked goods. Homemade and custom breads, pies, cookies. Call 617-957-0087 or e-mail is on web

site at <http://ChefRoar.com>. References.

#### VEHICLES

1992 Saab 900 hatchback, manual, 148K, one owner, well maintained, runs well, always starts, excellent in snow, plus 4 Michelin snows on rims. \$900 or best offer. Contact [hoffman@media.mit.edu](mailto:hoffman@media.mit.edu) or 617-734-4314.

Partner wanted to share beautiful 1975 Bonanza F33A based at 6B6. Impeccably maintained, complete records, new paint, new panel/radios, engine in excellent condition. Qualified pilots contact Jeff at [n4505s@yahoo.com](mailto:n4505s@yahoo.com) or 339-223-7434.

# 6th Picower-RIKEN Symposium

## New Frontiers in Brain Science: from Molecules to Mind

Sponsored jointly by the Picower Institute and the RIKEN Brain Science Institute of Japan, the Picower-RIKEN Symposium brings together many of the most distinguished and creative neuroscientists from around the world to present their perspective on "New Frontiers in Brain Science: from Molecules to Mind."

## November 8-9, 2007

Thursday, November 8: 9:00am - 6:00pm

Friday, November 9: 9:00am - 5:30pm

LOCATION:

Auditorium (46-3002)  
Simulcast in the Picower Seminar Room (46-3310)  
The Picower Building, MIT  
43 Vassar Street, Cambridge, Massachusetts

Visit <http://web.mit.edu/picower/events/symposium.html> to register (registration is free).

Please contact Yuki Koyama ([ykoyama@mit.edu](mailto:ykoyama@mit.edu)) or Matthew Cooney ([cooney@mit.edu](mailto:cooney@mit.edu)) for additional information.



## Wooden it be nice ...

The MIT Hobby Shop was featured in the October 2007 edition of *American Woodworker* magazine, including colorful photos and Director Ken Stone's written history of the 69-year-old shop. Hobby Shop instructor Hayami Arakawa's ball-and-claw baseball bats, shown above, feature Gothic stylings. Below left, sophomore Zachary-Bjornson Hooper displays the beginnings of a harpsichord, built in part using rare Swiss wood. Below right, Stone shows the model and the full-size table he built using salvaged cherry countertops. The Hobby Shop is located in the basement of 120 Massachusetts Ave., Building W31, on the corner of Vassar Street.

