



## A clean start



PHOTO / DONNA COVENEY

Freshman Kyle Fink of Michigan and compatriots washed cars to benefit Cambridge Cares About AIDS as part of the City Days community service program during Orientation week. Sponsored by the MIT Public Service Center, the program gave many freshmen the opportunity to volunteer for local non-profit agencies. For complete back-to-school coverage, please see page 8.

## MIT unraveling the secrets of dreaded red tide

Anne Trafton  
News Office

In work that could one day help prevent millions of dollars in economic losses for seaside communities, MIT chemists have demonstrated how tiny marine organisms likely produce the red tide toxin that periodically shuts down U.S. beaches and shellfish beds.

Understanding how and why red tides occur could help scientists figure out how to prevent the blooms, which cause significant ecological and economic damage.

In the Aug. 31 cover story of *Science*, the MIT team described an elegant method for synthesizing the lethal components of red tides. The researchers believe their method approximates the synthesis used by algae, a reaction that chemists have tried for decades to replicate, without success.

Understanding how and why red tides occur could help scientists figure out how to prevent the blooms, which cause significant ecological and economic damage. The New England shellfish industry, for example, lost tens of millions of dollars during a 2005 outbreak, and red tide killed 30 endangered manatees off the coast of Florida this spring.



COURTESY / M. GODFREY, NIWA

The dramatic appearance of a red tide algal bloom at Leigh, near Cape Rodney in New Zealand.

The discovery by MIT Associate Professor Timothy Jamison and graduate student Ivan Vilotijevic not only could shed light on how algae known as dinoflagellates generate red tides, but could also help speed up efforts to develop cystic fibrosis drugs from a compound closely related to the toxin.

Red tides, also known as algal blooms, strike unpredictably and poison shellfish, making them dangerous for humans to eat. It is unknown what causes dinoflagellates to produce the red tide toxins, but it may be a defense mechanism, possibly provoked by changes in the tides, temperature shifts or other environmental stresses.

The New England shellfishing industry lost tens of millions of dollars during a 2005 outbreak, and red tide killed 30 endangered manatees off the coast of Florida this spring. One of the primary toxic components of red tide is brevetoxin, a large and complex molecule that is very difficult to synthesize.

Twenty-two years ago, chemist Koji Nakanishi of Columbia University proposed a cascade, or series of chemical steps, that dinoflagellates could use to

## Stroke victim aims to build awareness

Anne Trafton  
News Office

When you are having a stroke, time is of the essence.

That's the lesson Lily Burns, a staff associate in the Office of the Chair of the Faculty, learned after suffering a stroke last year at the age of 33, and now she is trying to share that lesson with others.

This fall, she plans to start speaking at American Heart Association events to help educate people about the signs of stroke and how to respond to them. And on Sept. 15, she will lead 10,000 walkers in a warmup before the 2007 Start! Boston Heart Walk.

Burns, who has been at MIT for six years, also plans to captain a team of about 10 friends and relatives in the six-mile Boston Heart Walk, which starts at the Hatch Shell.

Raising awareness of the dangers of stroke is especially important considering that heart disease and stroke are the No. 1 and No. 3 killers, respectively, in the United States, Burns said.

"When it comes to something like heart attack or stroke, I think it's safe to say everyone knows someone directly or indirectly who's affected, or could be

affected," she said.

Burns was in perfect health until her stroke on July 21 last year. She is trim, doesn't smoke and teaches aerobics classes twice a week. "If it could happen to me, it could happen to anybody," she said.

Burns had just finished teaching an aerobics class and was on her way to lunch with her boyfriend and a friend when she started to have difficulty walking and speaking. Her boyfriend recognized what was happening and immediately took her to the hospital, where doctors realized she had had a stroke. She received treatment within 15 minutes of the stroke and as a result, she was able to recover fairly quickly.

Getting treatment within three hours can reduce long-term disability for the most common type of stroke, according to the American Stroke Association.

"I was very lucky that I didn't have to go to rehab because I was brought to the hospital straightaway and started getting treatment right away," Burns said.

Doctors discovered that a 2.5-centimeter clot had traveled to her head. Further tests revealed that Burns had a small hole in her heart, which she had



PHOTO / DONNA COVENEY

Lily Burns, staff associate in the presidents' office, had a stroke at 33. She has now recovered, but she is determined to write about her experience to offer other young stroke victims a place to turn for information.

See **STROKE**  
Page 6

See **RED TIDE**  
Page 6

### NEWS

#### iHOUSE OPENS

New residence focuses on global leadership.

Page 3

#### HEINZ AWARD

Media Lab's Hugh Herr wins prestigious honor.

Page 7

### RESEARCH

#### BIODEGRADABLE POLYMERS

Materials could point to future of gene therapy.

Page 4

#### LAB ON A CHIP

New microchip automates genetic screening.

Page 4

### PEOPLE

#### MIT SLOAN

Wharton's Schmittlein named new dean.

Page 2

#### FACULTY EQUITY

Liskov, Harris to share leadership position.

Page 2

# Wharton's Schmittlein named new MIT Sloan dean

David C Schmittlein of the University of Pennsylvania's Wharton School has been selected as the next John C Head III Dean of the MIT Sloan School of Management, effective Oct. 15. Provost L. Rafael Reif announced earlier this month.

Schmittlein, who served as Wharton's deputy dean for seven years and as its interim dean this July, is a noted scholar, a widely published author and commentator and an international marketing consultant.

"Dean Schmittlein will be able to hit the ground running when he arrives. He already has deep experience in many of the program areas in which MIT Sloan is active, such as MIT Sloan's collaborations with business schools in China," Reif said, adding that the new dean had overseen similar initiatives with management schools in China and India during his tenure at Wharton.

"I am confident that Dean Schmittlein will continue the MIT Sloan tradition of developing effective, innovative, and principled leaders who improve the world," Reif said.

A native of Northampton, Mass., Schmittlein, 52, described the MIT Sloan appointment as both a homecoming and a great honor.

"No school of management in the world has a greater history of association with ideas that matter and with the kind of thought leadership that can transform both businesses and economies than MIT Sloan," he said.

Schmittlein is well known for his research on the impact of a firm's marketing actions, designing market and survey research, and creating effective communication strategies. His current work focuses on marketing research methods.

Schmittlein joined the Wharton School in 1980 and served as a leading administrator and faculty member for more than 25 years.

He was the founding director of Wharton's interde-

partmental M.B.A. major, managing electronic commerce. He has served as the chair of the marketing department, the vice dean and director of doctoral programs and the co-director of Wharton's Center for Marketing Strategy Research.

Schmittlein currently serves on the international advisory board for Groupe HEC, the leading French business school, and on the academic advisory board for the China Europe International Business School in Shanghai.

As a consultant, he has assisted in the design and analysis of market research for world-class manufacturing and service firms including American Express, AT&T, Bausch & Lomb, Boston Scientific, Ford Motor Company, Gianni Versace S.p.A., Hewlett-Packard, Johnson & Johnson, Lockheed Martin, Pfizer, Revlon, Siebe PLC, the Oakland Raiders, Quaker Oats Co., and Time Warner.

Schmittlein received his B.A. in mathematics from Brown University and a Ph.D. and M.Phil. in business from Columbia University. He is a member of the American Marketing Association, the American Statistical Association, and the Institute for Operations Research and Management Sciences.

In announcing Schmittlein's appointment, Reif praised Howard W. Johnson Professor of Economics and Management Richard Schmalensee, who served as dean of MIT Sloan for nine years.

"Selecting a successor to Dick Schmalensee was a challenge. In his nine-year tenure, he steered the School with vision, strong leadership, and unflagging principle. His legacy will be shaped in part by his vision for a new MIT Sloan building as a centerpiece of MIT's East Campus," Reif said.

Reif thanked Steven Eppinger, current interim dean of MIT Sloan, for his leadership. The provost also expressed gratitude to members of the search committees.



PHOTO COURTESY / MIT SLOAN

David C Schmittlein, an international marketing expert who served as deputy dean of the University of Pennsylvania's Wharton School, has been chosen to lead the MIT Sloan School of Management. His appointment takes effect Oct. 15.

## Liskov, Harris to share new leadership position for faculty equity

Barbara Liskov, Ford Professor of Engineering in the Department of Electrical Engineering and Computer Science, and Wesley Harris, Charles Stark Draper Professor of Aeronautics and Astronautics and currently head of the Department of Aeronautics and Astronautics, have

been selected to share the Office of Associate Provost for Faculty Equity, Provost L. Rafael Reif announced on Sept. 7.

As associate provosts for faculty equity and as members of Academic Council, Liskov and Harris will focus

on faculty diversity and gender issues across the Institute, including the recruitment, retention, promotion and career development of minority and women faculty.

President Susan Hockfield and Reif created the new Office of the Associate Provost for Faculty Equity a year ago to build on the efforts of the Faculty Diversity Council and to provide a strengthened, central MIT focus for matters related to faculty diversity and equity.

In making the announcement, Reif invited the MIT community to join him in thanking and congratulating Liskov and Harris as they take on the new joint appointment.

"I am confident that the Institute will benefit greatly from their experience and leadership in these areas, and very much

look forward to working with them in these new capacities," Reif said.

Liskov's appointment took effect July 1, 2007. Harris' appointment will take effect Feb. 16, 2008, when he is scheduled to step down as department head.

Reif carefully considered the goals of faculty equity as they relate both to women faculty and to minority faculty since the new senior leadership position was established a year ago, he said.

"While recognizing that issues related to gender and race share many of the same fundamental concerns, such as optimizing the recruitment and retention of the most talented faculty, I believe that MIT's engagement of these important issues at this point in time will be best served by the joint appointment of Professors Liskov and Harris," he said.

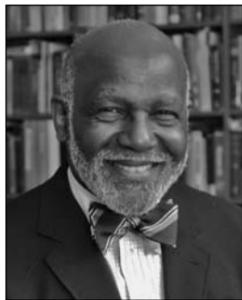
Both Liskov and Harris have been MIT faculty members for over 30 years, and each has served in leadership roles at the department and Institute levels.

In the announcement, Reif thanked Harris for the distinction and integrity of his leadership of the Department of Aeronautics and Astronautics.

Dean of Engineering Subra Suresh will be announcing shortly a faculty search committee to identify potential candidates for department head of aeronautics and astronautics, Reif said.



Barbara Liskov



Wesley Harris

### STAFF ANNOUNCEMENTS



Mark Jarzombek

#### Jarzombek appointed associate dean of architecture

Mark Jarzombek, professor of the history and theory of architecture, has been named associate dean of the School of Architecture and Planning. He succeeds Diane Davis, professor of political sociology.

Jarzombek (Ph.D. 1986) previously served as chair of diversity outreach efforts for the department of architecture.

In his new role, a two-year appointment, he will focus on developing a strategy for the school's diversity outreach efforts and on consolidating the school's arts offerings and integrating those offerings into MIT's larger academic community.

#### Barnhart named associate dean for School of Engineering

Cynthia Barnhart, co-director of the MIT Operations Research Center, has been named associate dean for academic affairs for the School of Engineering.

Barnhart, who holds appointments in the Department of Civil and Environmental Engineering and the Engineering Systems Division, assumed her new role Sept. 1.

"I know we will all benefit from her wisdom and her perspective, and I look forward to working closely with her,"



Cynthia Barnhart



Beth Balmuth Raffeld

School of Engineering Dean Subra Suresh said.

Barnhart holds a bachelor's degree in civil engineering from the University of Vermont and a master's degree in transportation and Ph.D. in transportation/civil engineering, both from MIT. She joined the MIT faculty in 1992.

She will replace Philip J. Solondz Professor of Engineering, and Professor of Mechanical and Ocean Engineering Dick Yue, whose tenure as associate dean of engineering will conclude in December.

#### Raffeld named senior director of philanthropic partnerships

Beth Balmuth Raffeld, formerly senior vice president for advancement for the Museum of Science, Boston, has been appointed senior director of philanthropic partnerships in the MIT Office of Resource Development.

A seasoned development professional with extensive college and university experience, Raffeld assumed her new role Sept. 1.

In addition to her work at the Museum of Science, Raffeld has served as associate vice president and dean for development for Harvard University's Faculty of Arts and Sciences, director of development and principal gifts for Williams College, and vice president for development for Combined Jewish Philanthropies of Boston.

### HOW TO REACH US

#### News Office

Telephone: 617-253-2700  
E-mail: [newsoffice@mit.edu](mailto:newsoffice@mit.edu)  
<http://web.mit.edu/newsoffice>

#### Office of the Arts

<http://web.mit.edu/arts>



Printed on recycled paper

#### News Office Staff

Executive Director ..... Pamela Dumas Serfes  
News Manager ..... Greg Frost  
Director, Media Relations ..... Patti Richards  
Senior Science and  
Engineering Editor ..... Elizabeth Thomson  
Assistant Director/Photojournalist ..... Donna Coveney  
Web Developer/Editor ..... Lisa Damtoft  
Operations/Financial Administrator ..... Myles Crowley  
Administrative Assistant II ..... Mary Anne Hansen  
Administrative Assistant II ..... Patti Foley  
Writers ..... Anne Trafton, Sarah Wright

Tech Talk is published by the News Office on Wednesdays during term time except for most Monday holiday weeks. See Production Schedule at <http://web.mit.edu/news-office/techtalk-info.html>. The News Office is in Room 11-400, Massachusetts Institute of Technology, 77 Massachusetts Ave., Cambridge, MA 02139-4307.

**Postmaster:** Send address changes to Mail Services, Building WW15, Massachusetts Institute of Technology, 77 Massachusetts Ave., Cambridge, MA 02139-4307.

Subscribers may call 617-252-1550 or send e-mail to [mailsvc@mit.edu](mailto:mailsvc@mit.edu).

Tech Talk is distributed free to faculty and staff offices and residence halls. It is also available free in the News Office and the Information Center.

Domestic mail subscriptions are \$25 per year, nonrefundable. Checks should be made payable to MIT and mailed to Business Manager, Room 11-400, MIT, 77 Massachusetts Ave., Cambridge, MA 02139-4307.

Periodical postage paid at Boston, MA.

# iHouse: MIT's newest living-learning community

## Residence for students focused on global leadership opens its doors

Sarah H. Wright  
News Office

The trajectory of innovation at MIT went outside the lab this year with the grand opening of the International House for Global Leadership, or iHouse, on Sept. 4.

The new residence, located within New House, an MIT dormitory at 471 Memorial Drive, is geared toward students committed to international development and global leadership.

Twenty-one students from countries including Peru, Rwanda, Tanzania, India and the U.S. will occupy iHouse this year, supporting one another's international interests and attending courses and talks on development.

Like many innovations at MIT, the new living-learning group began with an individual vision and was produced with the support and collaboration of Institute faculty, staff and alumni.

It all started when Raja Bobbili, now a senior in electrical engineering and computer science, had the idea to launch a living community with a global purpose back in 2005.

"I envisioned a house that would develop leaders, develop a strong community and create a positive impact in the world," Bobbili said.

"By learning in iHouse, students will understand other countries' problems and have the skills to act on those problems. By living there, they will support each other with the same kind of kinship ties that exist in other areas of MIT," he said.

Faculty, administrators and alumni got involved right away, with guidance and leadership from New House housemasters Sandra and Wesley Harris, professor of aeronautics and astronautics.

Bish Sanyal, Ford International Professor of Urban Development and Plan-

ning and chair of the faculty, focused on the learning component of the initiative, offering a seminar on international development to iHouse residents.

Sanyal, who also directs the Special Program for Urban and Regional Stud-

Development Group (IDG) within urban studies and planning, will also support iHouse's learning side with courses and lectures.

Sally Susnowitz, Director of the MIT Public Service Center, described iHouse

collaboration with people living down the hall is bound to expand conceptual, communication, and leadership capacities," Susnowitz said.

MIT alumni also support iHouse. The 484 Phi Alpha Foundation, which funds public service projects at MIT and in Cambridge's Area 4, has donated \$50,000 over two years to iHouse for staffing, speakers, stipends and grants.

Carl King (SB 1965), head of the 484 Foundation's Gift Committee, was inspired to support iHouse when he heard student presentations on such projects as turning corncocks into charcoal to make cheap fuel and transforming bicycles into ambulances for communities without access to health care, he said.

"These students were doing things that would create tremendous benefit in the developing world," King said. "The opportunity to assist iHouse was an ideal way for us to continue to focus on MIT and also, spread our wings and go international."

Bobbili acknowledged that iHouse is still a work in progress, full of challenges and promise. But the journey to its grand opening has already provided a pleasant surprise, he said.

"We knew anything was possible. But we never expected we would have so much interest, both within and outside the community," he said, noting that iHouse received the highest number of applications of any cultural house. "Within the house, one just has to visit to see the amount of interest and passion there is already."

In keeping with the principles, even the dinner menu at iHouse will reflect global diversity.

"Pizza will not be standard anymore," Bobbili said. "We hope we can cross boundaries from Chinese, Indian and Thai food to Cambodian, Ethiopian or Mongolian. After all, iHouse is there to be innovative."



PHOTO / DONNA COVENEY

Alum Carl King '65, economics, management sophomore Patricia Lubwama and senior Raja Bobbili chat at the Sept. 4 grand opening of iHouse, a new living and learning center for students committed to international development and global leadership.

ies (SPURS), has encouraged SPURS fellows—mid-career professionals largely from developing countries—to work with iHouse students.

Diane Davis, professor of political sociology and head of the International

as a new model of residential life, one the PSC has supported as part of the Institute-wide International Development Initiative (IDI).

"Living in the context of international issues and actively working on them in

## MIT survey: Americans warming to nuclear power

Americans' icy attitudes toward nuclear power are beginning to thaw, according to an MIT survey released over the summer. The report also found a U.S. public increasingly unhappy with oil and more willing to develop alternative energy sources like wind and solar.

Moreover, the national survey of 1,200 Americans' opinions on different types of energy indicated growing concern about global warming—but an apparent reluctance to pay to fight it.

Professor Stephen Ansolabehere, the MIT political scientist who conducted the survey through Knowledge Networks, a consumer information company, said he hopes that tracking Americans' attitudes toward energy will help policy-makers decide how to chart the United States' energy future.

The report, "Public Attitudes Toward America's Energy Options: Insights for Nuclear Energy," was published by MIT's Center for Advanced Nuclear Energy Systems. Ansolabehere conducted a similar survey in 2002 as part of the MIT study, "The Future of Nuclear Power."

In the five years since the last survey, public preferences have remained fairly stable, but the percentage of people who want to increase nuclear power use has grown from 28 percent to 35 percent. That increase in popularity is likely due to concern over global warming caused by carbon emissions from fossil fuels, Ansolabehere said.

While Americans have some doubts about nuclear power, they are more opposed to oil, which has dipped below nuclear as the least popular fuel source. In the 2007 survey, 74 percent wanted to decrease oil use, compared to 56 percent in 2002.

## Bustani seminars focus on Mideast

The Emile Bustani Middle East Seminar at MIT will celebrate its 22nd anniversary with two lectures this fall on contemporary Middle Eastern affairs. On Sept. 18, Adjunct Professor of International Business Ibrahim A. Warde of the Fletcher School, Tufts University, and contributor to *Le Monde Diplomatique* will speak about "Financing Islamic Terrorism." He is author of a new book, "The Price of Fear: The Truth behind the Financial War on Terror." On Oct. 30 Professor of Anthropology and International Relations Augustus Richard Norton of Boston University will give a lecture entitled "Lebanon's Political Gridlock."

The seminar is funded by the Bustani family of Beirut, Lebanon in memory of the late Emile M. Bustani, who received the SB in civil engineering in 1933. "Mr. Bustani was one of the Middle East's most prominent businessmen and philanthropists until his premature death in 1963. He was the founder and chairman of the Contracting and Trading Co., a leading construction and engineering firm with projects in the Middle East, Africa and the Far East," said Ford International Professor of History and Associate Provost Philip S. Khoury, chair of the Bustani Seminar. The Bustani Middle East Seminar is sponsored by the Center for International Studies and The Technology and Culture Forum.

The Sept. 18 session will take place at 4:30 p.m. in Room E51-345 (Bowen Hall) and the Oct. 30 session will take place at 4:30 p.m. in Room E51-095. Both sessions are open to the public. For further information on the Bustani Middle East Seminar, contact Laurie Scheffler at x3-3121.



PHOTO / DONNA COVENEY

### Here comes the sun

Corey Fucetola, a graduate student in electrical engineering and computer science, gave a tour of Solar7, MIT's entry in this year's US Department of Energy Solar Decathlon, to President Susan Hockfield, center, and her daughter Elizabeth Byrne on Aug. 31.

The annual competition, to be held Oct. 12-20 in Washington, challenges 20 college teams to compete in building and operating efficient solar-powered homes. The Decathlon entries, built on campuses around the country, must be disassembled, transported and re-built on the National Mall, where they will be judged.

MIT's snug 800 square foot passive solar home is under construction on a lot at the corner of Portland and Albany Streets in Cambridge.

The DOE provides each team \$100,000 for the project, but a shortfall in money and labor persists. The team is raffling off a 2008 Toyota Camry to help raise funds, and members are eager for volunteers to work on construction. To help out, contact Diana Husman, dhusman@mit.edu.

# Biodegradable polymers eyed for safe gene therapy

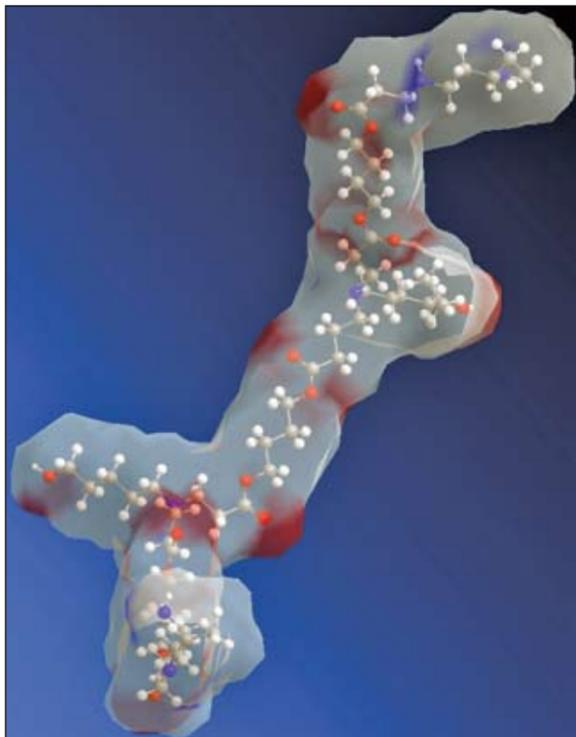


IMAGE / JORDAN GREEN, MIT

Structure of a piece of biodegradable polymer, which could be used to deliver disease-fighting genes. Such materials could circumvent the risks associated with using viruses to carry genes.

Anne Trafton  
News Office

In work that could lead to safe and effective techniques for gene therapy, MIT researchers have found a way to fine-tune the ability of biodegradable polymers to deliver genes.

Gene therapy, which involves inserting new genes into patients' cells to fight diseases like cancer, holds great promise but has yet to realize its full potential, in part because of safety concerns over using viruses to carry the genes.

The new MIT work, published this month in *Advanced Materials*, focuses on creating gene carriers from synthetic, non-viral materials. The team is led by Daniel Anderson, research associate in MIT's Center for Cancer Research.

"What we wanted to do is start with something that's very safe—a biocompatible, degradable polymer—and try to make it more effective, instead of starting with a virus and trying to make it safer," said Jordan Green, a graduate student in biological engineering and co-first author of the paper.

Gregory Zugates, a former graduate student in chemical engineering now at WMR Biomedical, Inc., is also a co-first author of the paper.

Gene therapy has been a field of intense research for nearly 20 years. More than 1,000 gene-therapy clinical trials have been conducted, but to date there are no FDA-approved gene therapies. Most trials use viruses as carriers, or vectors, to deliver genes.

However, there are risks associated with using viruses. As a result, many researchers have been working on developing non-viral methods to deliver therapeutic genes.

The MIT scientists focused on three poly(beta-amino esters), or chains of alternating amine and diacrylate groups, which had shown potential as gene carriers. They

hoped to make the polymers even more efficient by modifying the very ends of the chains.

When mixed together, these polymers can spontaneously assemble with DNA to form nanoparticles. The polymer-DNA nanoparticle can act in some ways like an artificial virus and deliver functional DNA when injected into or near the targeted tissue.

The researchers developed methods to rapidly optimize and test new polymers for their ability to form DNA nanoparticles and deliver DNA. They then chemically modified the very ends of the degradable polymer chains, using a library of different small molecules.

The polymers have already been shown to be safe in mice, and the researchers hope to ultimately run clinical trials with their modified polymers, said Anderson.

Non-viral vectors could prove not only safer than viruses but also more effective in some cases. The polymers can carry a larger DNA payload than viruses, and they may avoid the immune system, which could allow multiple therapeutic applications if needed, said Green.

One promising line of research involves ovarian cancer, where the MIT researchers, in conjunction with Janet Sawicki at the Lankenau Institute for Medical Research, have demonstrated that these polymer-DNA nanoparticles can deliver DNA at high levels to ovarian tumors without harming healthy tissue.

Other MIT authors on the paper are Nathan Tedford, a former graduate student in biological engineering now at Epitome Biosystems; Linda Griffith, professor of biological engineering; Douglas Lauffenberger, head of biological engineering, and Institute Professor Robert Langer. Sawicki and Yu-Hung Huang of the Lankenau Institute are also co-authors.

The research was funded by the National Institutes of Health, the Department of Defense and the National Science Foundation.

# MIT invents 'lab on a chip' to automate whole-animal genetic and drug screens

Anne Trafton  
News Office

Genetic studies on whole animals can now be done dramatically faster using a new microchip developed by engineers at MIT.

The new "lab on a chip" can automatically treat, sort and image small animals like the 1-millimeter *C. elegans* worm, accelerating research and eliminating human error, said Mehmet Yanik, MIT assistant professor of electrical engineering and computer science.

Yanik and his colleagues described their device in the advance online issue of the *Proceedings of the National Academy of Sciences* the week of Aug. 20. "Lab on a chip" technologies are being developed to sort and image individual cells, but this is the first device that can be used to study whole animals.

*C. elegans* is often used in studies designed to identify which genes control which phenotypes, or traits. Researchers traditionally do this by treating them with a mutagen, or by using RNA interference, in which expression of a certain gene is blocked with a small strand of RNA. Such studies normally take months or years to complete. The new chip, which sorts and images worms in milliseconds, dramatically speeds up that process.

"Normally you would treat the animals with the chemicals, look at them under the microscope, one at a time, and then transfer them," Yanik said. "With this chip, we

can completely automate that process."

The tiny worms are flowed inside the chip, immobilized by suction and imaged with a high resolution microscope. Once the phenotype is identified, the animals are routed to the appropriate section of the chip for further screening.

The worms can be treated with mutagen, RNAi or drugs before they enter the chip, or they can be treated directly on the chip, using a new, efficient delivery system that loads chemicals from the wells of a microplate into the chip.

"Our technique allows you to transfer the animals into the chip and treat each one with a different gene silencer or a different drug," Yanik said.

Yanik and his colleagues plan to use the chips to continue their research on neural degeneration and regeneration in *C. elegans*. Yanik and his collaborators had previously demonstrated a high precision femtosecond laser technology to cut axons in living animals and then observe which genes are involved in axon regeneration.

The lead author of the paper is Chris Rohde, a graduate student in electrical engineering and computer science. Other authors of the paper are Matthew Angel, a graduate student in EECS, Fei Zeng, a postdoctoral fellow in the Research Laboratory of Electronics, and Ricardo Gonzalez-Rubio, a graduate student in biological engineering.

The research was funded by MIT's Research Laboratory of Electronics and by the Canadian National Science and Engineering Research Council and the Paul and Daisy Soros Foundation.

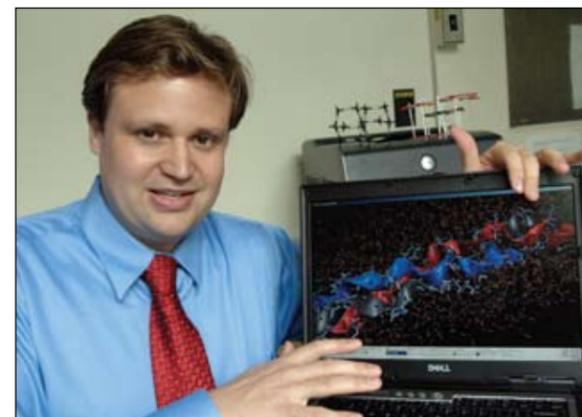


PHOTO / DONNA COVENEY

Professor Markus Buehler reveals the structure of bone on the atomic level. The object on the screen is a triple helical tropocollagen molecule. A tropocollagen molecule is a fundamental building block of bone, next to the nanosized hydroxyapatite chalk-like crystals. In his work he simulates the behavior of the composite of tropocollagen and hydroxyapatite during deformation.

# MIT probes secret of bone's strength

Denise Brehm  
Civil and Environmental Engineering

New research at MIT has revealed for the first time the role of bone's atomistic structure in a toughening mechanism that incorporates two theories previously proposed by researchers eager to understand the secret behind the material's lightweight strength.

Past experimental studies have revealed a number of different mechanisms at different scales of focus, rather than a single theory. The combination mechanism uncovered by the MIT researchers allows for the sacrifice of a small piece of the bone in order to save the whole, helps explain why bone tolerates small cracks, and seems to be adapted specifically to accommodate bone's need for continuous rebuilding from the inside out.

"The newly discovered molecular mechanism unifies controversial attempts of explaining sources of the toughness of bone, because it illustrates that two of the earlier explanations play key roles at the atomistic scale," said the study's author, Esther and Harold E. Edgerton Professor Markus Buehler of MIT's Department of Civil and Environmental Engineering.

"It's quite possible that each scale of bone—from the molecular on up—has its own toughening mechanism," said Buehler. "This hierarchical distribution of toughening may be critical to explaining the intriguing properties of bone and laying the foundation for new materials design that includes the nanostructure as a specific design variable."

The work was funded by a National Science Foundation CAREER award and a grant from the Army Research Office.

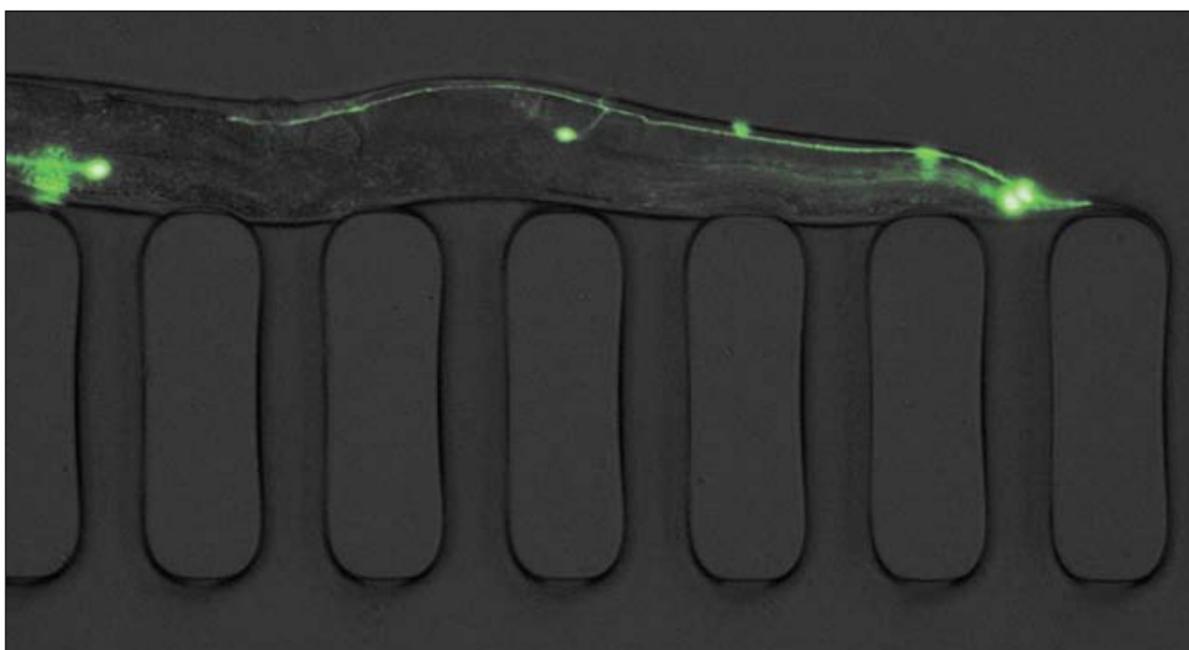


IMAGE COURTESY / MEHMET FATIH YANIK, MIT

This diagram shows the layout of the new microchip that can sort and image small animals such as the *C. elegans* worm. After the worms enter the chip, they are immobilized by suction so they can be imaged. Then they are sorted to the appropriate chamber on the chip.

## Research Digest

### Not so super-cool after all

MIT engineers have shown that nanofluids, which once held promise as a super-coolant, do not have the theoretical cooling capabilities many scientists believed they had.

Nanofluids are suspensions of tiny particles on the nanometer, or billionth of a meter, scale. When nanofluids were first engineered in the early 1990s, experiments showed that their thermal conductivity—a measure of their heat-removing capability—was much higher than expected.

Several new theories were offered in recent years to explain this anomalous behavior. Among them, the “microconvection” theory predicted an astonishing increase of several orders in the thermal conductivity of the fluid just by adding light nanoparticles less than ten nanometers in size.

MIT researchers recently conducted experiments to test the microconvection effect and found that nanofluids in fact do not have the advanced cooling properties ascribed to them. The team reports its findings in the Aug. 31 issue of *Physical Review Letters*.

“We conclude that there is no ‘magic’ in nanofluids, and the early promise of nanofluids as an advanced nanoengineered coolant with superior thermal conductivity remains largely unfulfilled,” said Jacob Eapen, a graduate student in nuclear science and engineering and lead author of the paper.

—Anne Trafton

### Spark-free, fuel-efficient engines

In an advance that could help curb global demand for oil, MIT researchers have demonstrated how ordinary spark-ignition automobile engines can, under certain driving conditions, move into a spark-free operating mode that is more fuel-efficient and just as clean.

The mode-switching capability could appear in production models within a few years, improving fuel economy by several miles per gallon in millions of new cars each year. Over time, that change could cut oil demand in the United States alone by a million barrels a day. Currently, the U.S. consumes more than 20 million barrels of oil a day.

Members of the MIT team, comprising Professor William H. Green, Jr., of the Department of Chemical Engineering, Professor Wai K. Cheng of the Department of Mechanical Engineering, and colleagues in MIT’s Sloan Automotive Laboratory and MIT’s Laboratory for Energy and the Environment, presented their latest results in July at the Japan Society of Automotive Engineers (JSAE)/Society of Automotive Engineers (SAE) 2007 International Fuel and Lubricants Meeting.

—Nancy Stauffer, MIT Energy Initiative

### Ultra-sharp peek at electrons

MIT physicists have developed a technique that allows for the sharpest glimpse ever into the mysterious world of electrons confined in a two-dimensional plane.

The new spectroscopy technique measures electron energy levels with 1,000 times greater resolution than current methods, an advance that has “tremendous power to tell you what the electrons are doing,” said MIT physics professor Ray Ashoori, author of a paper on the work published in the July 12 issue of *Nature*.

Ashoori and postdoctoral associate Oliver Dial took advantage of a quantum phenomenon known as tunneling to create the most detailed image ever of the spectrum of electron energy levels in a two-dimensional system.

Their technique has already revealed some surprising behavior, and the researchers believe it will shed new light on many physical phenomena involving electrons.

Two-dimensional electron systems, in which electrons are walled in from above and below but are free to move in a plane as if they were placed on a sheet of paper, are rarely observed in the natural world. However, they can be created in a laboratory and used, for example, in high-frequency amplifiers found in cell phones.

—Anne Trafton

### Study sees U.S. retirement wealth up sharply by 2040

The average value of Americans’ 401(k) plans will be substantially higher in real terms by the year 2040 even if stock market returns fall short of their historical values, according to new research by a team of economists from MIT, Harvard and Dartmouth.

In a study published last month in the online early edition of the *Proceedings of the National Academy of Sciences*, James Poterba of MIT, Steven Venti of Dartmouth College and David Wise of Harvard University looked at how changes in types of pension plans and in demographic structure will affect the wealth of future retirees.

They found that if the average return on stocks for the next 35 years is three percentage points below its historical value, then the average value of 401(k) plan balances would increase from \$29,700 in 2000 to \$269,000 by 2040. If equity returns continue at their historical level, the average plan balance in 2040 would be even greater: \$452,000 by 2040. All dollar values are measured in constant 2000 prices.

—Greg Frost



PHOTO / DONNA COVENEY

### She makes it look so easy

Professor Dava Newman made headlines around the world this summer after the MIT News Office promoted the sleek new spacesuit she is developing with colleagues in the Department of Aeronautics and Astronautics. Newman and her spandex and nylon BioSuit were featured in more than 50 media outlets, including the CBS Evening News with Katie Couric, National Public Radio’s Science Friday program, USA Today, Time Magazine, India’s Mumbai Mirror, and Panorama, a major Italian magazine.

## DARPA names MIT’s ‘robocar’ an Urban Challenge semifinalist

Heather Manning  
News Office Correspondent

An MIT vehicle that effectively drives itself has been selected as a semifinalist in this year’s DARPA Urban Challenge, a competition for cars and trucks that run without human help. The qualification was announced in August by DARPA, the central research and development organization for the Department of Defense.

The announcement means the MIT vehicle and its team of student and faculty developers will travel to an urban military training facility in Victorville, Calif., in late October to compete against 34 other robotic vehicles from across the country. In the semifinals and the finals in early November, the robots will have to execute simulated military supply missions in a mock urban area while obeying California traffic laws—without any human intervention.

“Our team is delighted to move forward to the next stage of the competition,” said team leader John Leonard, professor of mechanical and ocean engineering at MIT. “I want to express my gratitude to everyone on our team for their tremendous hard work. I also want to thank all our sponsors for their generous support.”

The MIT vehicle uses multiple laser range scanners, high-rate video cameras and automotive radar units to perform autonomous planning and motion control.

In the final Urban Challenge, set for Nov. 3, DARPA will award \$2 million, \$1 million and \$500,000 awards to the top three finishers that complete the course within the six-hour time limit. Unlike the previous two competitions, this challenge will take place in an urban environment with the robotic vehicles required to autonomously operate amongst one another.

In addition to Leonard, key leaders of the MIT team include Professor Jonathan How and Associate Professor Emilio Frazzoli of the MIT Department of Aeronautics and Astronautics, Professor Seth Teller of the MIT Department of Electrical Engineering and Computer Science and Associate Professor David Barrett of Olin College.

The sponsors of Team MIT include the MIT School of Engineering, the MIT Computer Science and Artificial Intelligence Lab, MIT’s Department of Electrical Engineering and Computer Science, the C.S. Draper Laboratory, the Ford-MIT Alliance, Land Rover, Quanta Computer, BAE Systems, MIT Lincoln Laboratory, MIT Information Services and Technology, South Shore Tri-Town Development Corporation, Delphi, Applanix, Mobileye, Nokia and Australia National University.



PHOTO / DONNA COVENEY

MIT’s entry for the 2007 DARPA Urban Challenge is a self-piloted Land Rover LR3. The vehicle and its crew are headed to California next month to compete against 34 other vehicles in the competition’s semifinal round.

# STROKE

Continued from Page 1

not known about before the stroke.

Last December, she underwent successful open heart surgery to repair the hole. Her surgeon, Ralph De La Torre, is a graduate of the Harvard and MIT Division of Health Sciences and Technology and chief of cardiac surgery at Beth Israel Deaconess Medical Center. He developed the technique that he used to operate on her, which allows for open heart surgery without the ribs being cracked open. The procedure is less invasive and leaves a much smaller scar.

After her experience, Burns decided that she wanted to help make other people more aware of the symptoms of a stroke, the need for immediate treatment, and ways to prevent stroke and heart disease.

Only 13 percent of women view heart disease as a health threat, even though it is the No. 1 killer for women, according to the American Heart Association. The AHA recently launched a "Go Red for Women" campaign to educate women about heart disease.

"For women, the symptoms for heart disease are very different than they are for men," said Burns, who will be participating in the "Go Red" campaign.

To learn more about heart disease and stroke, visit the AHA web site at [www.americanheart.org/presenter.jhtml?identifier=1200000](http://www.americanheart.org/presenter.jhtml?identifier=1200000). For more information about the Sept. 15 Boston Heart Walk, go to [www.americanheart.org/presenter.jhtml?identifier=3044965](http://www.americanheart.org/presenter.jhtml?identifier=3044965).

# RED TIDE

Continued from Page 1

produce brevetoxin and other red tide toxins. However, chemists have been unable to demonstrate such a cascade in the laboratory, and many came to believe that the "Nakanishi Hypothesis" would never be proven.

"A lot of people thought that this type of cascade may be impossible," said Jamison. "Because Nakanishi's hypothesis accounts for so much of the complexity in these toxins, it makes a lot of sense, but there hasn't really been any evidence for it since it was first proposed."

Jamison and Vilotijevic's work offers the first evidence that Nakanishi's hypothesis is feasible.

Their work could also help accelerate drug discovery efforts. Brevetoxin, another dinoflagellate product related to the red tide toxins, has shown potential as a powerful treatment for cystic fibrosis (CF). It can also protect against the effects of the toxins.

"Now that we can make these complex molecules quickly, we can hopefully facilitate the search for even better protective agents and even more effective CF therapies," said Jamison.

Until now, synthesizing just a few milligrams of red tide toxin or related compounds, using a non-cascade method, required dozens of person-years of effort.

The new synthesis depends on two critical factors—giving the reaction a jump start and conducting the reaction in water.

Many red tide toxins possess a long chain of six-membered rings. However, the starting materials for the cascades, epoxy alcohols, tend to form five-membered rings. To overcome that, the researchers attached a "template"

## Stroke warning signs:

- Sudden numbness or weakness of the face, arm or leg, especially on one side of the body
- Sudden confusion, trouble speaking or understanding
- Sudden trouble seeing in one or both eyes
- Sudden trouble walking, dizziness, loss of balance or coordination
- Sudden, severe headache with no known cause

(Source: American Stroke Association)

## Heart attack warning signs:

- Chest discomfort. Most heart attacks involve discomfort in the center of the chest that lasts more than a few minutes, or that goes away and comes back. It can feel like uncomfortable pressure, squeezing, fullness or pain.
- Discomfort in other areas of the upper body. Symptoms can include pain or discomfort in one or both arms, the back, neck, jaw or stomach.
- Shortness of breath with or without chest discomfort.
- Other signs may include breaking out in a cold sweat, nausea or lightheadedness.

(Source: American Heart Association)

six-membered ring to one end of the epoxy alcohol. That simple step effectively launches the cascade of reactions that leads to the toxin chain, known as a ladder polyether.

"The trick is to give it a little push in the right direction and get it running smoothly," said Jamison.

The researchers speculate that in dinoflagellates, the initial jump start is provided by an enzyme instead of a template.

Conducting the reaction in water is also key to a successful synthesis. Water is normally considered a poor solvent for organic reactions, so most laboratory reactions are performed in organic solvents. However, when Vilotijevic introduced water into the reaction, he noticed that it proceeded much more quickly and selectively.

Although it could be a coincidence that these cascades work best in water and that dinoflagellates are marine organisms, water may nevertheless be directly involved in the biosynthesis of the toxins or emulating an important part of it, said Jamison. Because of this result, the researchers now believe that organic chemists should routinely try certain reactions in water as well as organic solvents.

The research was funded by the National Institute of General Medical Sciences, Merck Research Laboratories, Boehringer Ingelheim, and MIT.

"This is an elegant piece of work with multiple levels of impact," said John Schwab, who manages organic chemistry research for the National Institute of General Medical Sciences. "Not only will it allow chemists to synthesize this important class of complex molecules much more easily, but it also provides key insights into how nature may make these same molecules. This is terrific bang for the taxpayers' buck!"

## NEWS YOU CAN USE

### MIT 'vendor fair' is back

On Thursday, Sept. 13, members of the MIT community will be able to visit with more than 100 vendors of goods and services at MIT. The vendors will display products like scientific/laboratory equipment, office supplies, temporary help, copier suppliers, computers and furniture, and they will be able to answer any questions.

The fair gives vendors and attendees a chance to discuss how to achieve MIT's supplier-consolidation goal of reducing costs while enhancing the quality of goods and services. It is a great opportunity to meet many of MIT's new partner vendors.

The event will take place under a tent on McDermott Court (outside building 54 and building 18) from 9 a.m.-2 p.m., rain or shine. Refreshments will be available. For more information, call Diane Shea, Director of Procurement, at x3-8370.

### Phone directory deadline is Sept. 14

Human Resources reminds members of the MIT community to verify their personal information for the printed telephone directory by Friday, Sept. 14.

If you have an MIT personal certificate for your computer, go to Employee Self-Service (ESS) at <http://web.mit.edu/sapwebss/> and click the Personal Information tab. Form there, you can update personal information such as name, address—and you can also specify whether you want your home address and phone number included in the directory.

Questions about the directory? Contact your local Telephone Directory Coordinator or Barbara Gilligan in Human Resources at [byg@mit.edu](mailto:byg@mit.edu) or 3-6065.

### Leader to Leader application deadline is Sept. 30

Applications for the 2008 Leader to Leader Program are due Sept. 30.

L2L is a unique leadership development program for leaders from the MIT community. L2L Fellows partner with senior leaders and MIT faculty in a proactive and systematic effort to build MIT's internal leadership capability.

L2L is a twelve-month program, offering both a theoretical leadership framework and hands-on leadership experiences. Working with current senior MIT leaders and faculty, L2L Fellows build skills through conversations, workshops and presentations. L2L Fellows attend these workshops every 5 to 6 weeks.

The program brings employees, senior administrators and faculty together over the course of a year to build MIT's internal leadership capability. Any employee or faculty member may apply. Faculty interested in participating may contact the provost's office. Other employees can apply online at [web.mit.edu/hr/oed/l2l](http://web.mit.edu/hr/oed/l2l). For more information, contact Kimberly Nyce, program administrator, at [knyc@mit.edu](mailto:knyc@mit.edu) or x8-0401.

To learn more about L2L go to: <http://web.mit.edu/hr/oed/l2l/index.html>

### MIT launches Security and Emergency Management Office

MIT launched a Security and Emergency Management Office this summer to coordinate campus security policies and provide assistance with security questions and advice on installing security systems. The office also serves as a formal bridge between the MIT Police and the Environment, Health and Safety Office.

Located in N52, the security office consists of three MIT staff members with extensive experience in security and emergency issues. They are David M. Barber, emergency response specialist; Thomas W. Komola, a former campus police project manager; and Daniel L. Michaud, the former manager of the MIT Card Office. Michaud will continue to administer several of the campus security systems formerly under the control of the Card Office.

The security office reports to John DiFava, the director of security and chief of MIT Police. Its e-mail address is [security-office@mit.edu](mailto:security-office@mit.edu).

### Blood drive next week

MIT's American Red Cross Team and Network will be conducting a blood drive each day next week in La Sala de Puerto Rico on the second floor of the MIT Student Center.

All donors and volunteers will get a free Red Sox blood drive t-shirt and free pizza.

For more information or to make an appointment, visit <http://web.mit.edu/blood-drive/www/>.

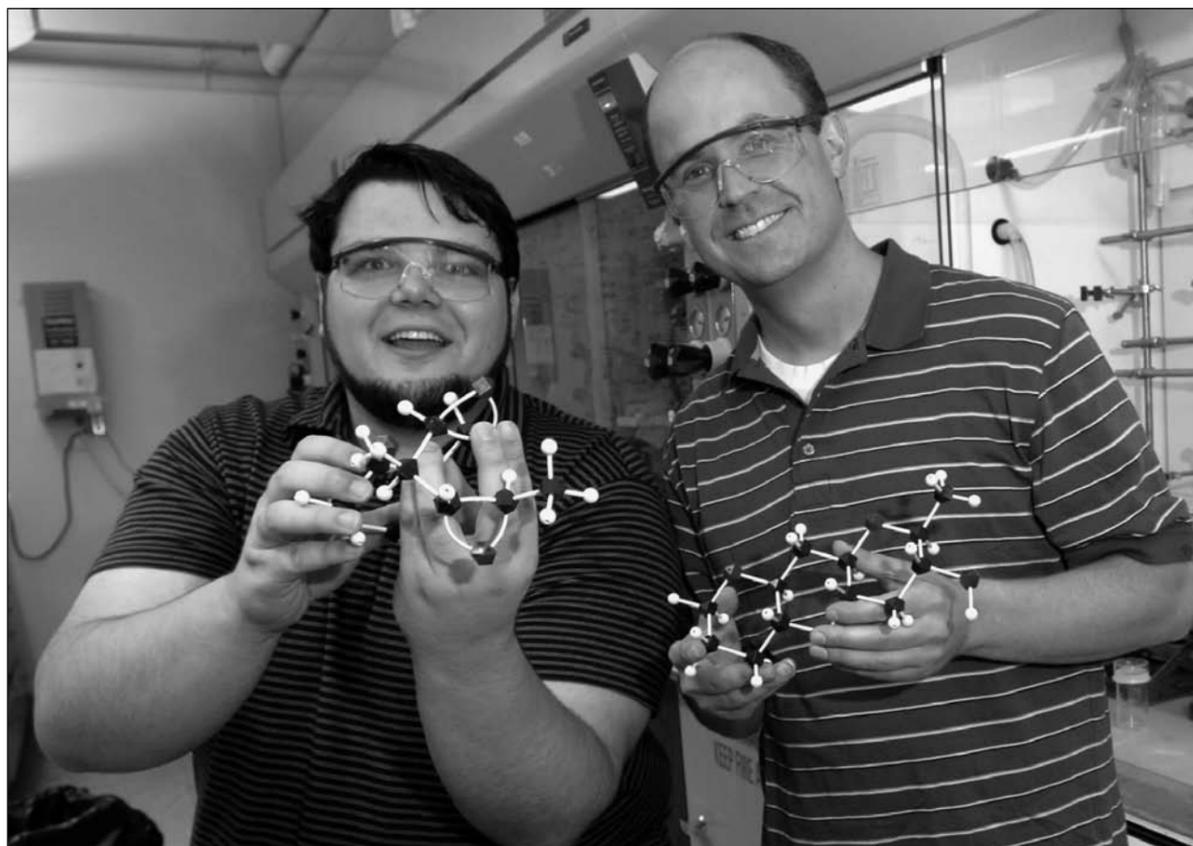


PHOTO / DONNA COVENEY

MIT Professor Tim Jamison, right, and Ivan Vilotijevic, a grad student in chemistry, have discovered how the organisms that cause red tide may synthesize their toxins. They hold models of molecules that, in water, start a cascading reaction that produces the toxins.

## Junot Díaz to read from acclaimed novel

MIT Associate Professor Junot Díaz will read from his critically acclaimed new novel, "The Brief Wondrous Life of Oscar Wao," during an appearance at 6 p.m. today (Sept. 12) at the Brattle Theatre in Cambridge.

Time magazine called Díaz's book "astoundingly great," while book critic Michiko Kakutani of The New York Times described "Oscar Wao" as both a comic portrait of a lovesick second-generation Dominican geek and a harrowing meditation on public and private history.



Junot Díaz

he's fashioned both a big picture window that opens out on the sorrows of Dominican history, and a small, intimate window that reveals one family's life and loves. In doing so, he's written a book that decisively establishes him as one of contemporary fiction's most distinctive and irresistible new voices," she wrote. The high praise for "Oscar Wao" was echoed in Esquire, The Village Voice, and Entertainment Weekly.

Riverhead Press, publisher of "Oscar Wao," is even sending Díaz on the now-rare book tour. Following his reading at the Brattle, he heads out on a 16-city trip that includes Miami, St. Louis, Los Angeles, Dallas, Seattle and New York.

Díaz was born in the Dominican Republic and moved to New Jersey with his parents when he was 6. He received the BA from Rutgers and the MFA from Cornell. He came to MIT in 2003 and teaches in the Program in Writing and Humanistic Studies.

Tickets to the reading are \$5. For more information, call (617) 661-1515.

### ► THIS WEEK IN THE ARTS

In honor of the U.S. Air Force's 60th anniversary, the Air Force is hosting a free concert at Kresge Auditorium at 7 p.m. Sept. 15. The AF Band of Liberty is playing, with Maureen McGovern as a guest star. Tickets to the concert may be picked up in advance between 9:30 a.m.-3:30 p.m. Monday-Friday at W59-114. For more information, contact Kristin D. Hort, assistant professor of aerospace studies, at kdhort@mit.edu.

Mark Harvey, lecturer in Music, will bring his Aardvark Jazz Orchestra to the Broad Institute of MIT and Harvard at 7:30 p.m. Sept. 16 to launch the band's 35th season and to open the 30th John Coltrane Memorial Concert celebration. For more information, visit aardvarkjazz.com.

## MIT releases endowment figures

The Massachusetts Institute of Technology Investment Management Company (MITIMCo) has announced that the Institute's endowment generated a return of 22.1 percent for the fiscal year ending June 30, 2007.

As a result of strong investment performance and gifts, the endowment's assets totaled \$9.98 billion as of June 30, 2007, an increase of \$1.6 billion from the previous year, net of spending. For the past 10 years the Institute's endowment has had an annualized return of 15.3 percent.

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

MITIMCo is a division of the Massachusetts Institute of Technology, created to manage and oversee the investment of the Institute's endowment, retirement plans and operating funds. As of June 30, 2007, MITIMCo had \$14.0 billion of total assets under management.

# Herr wins \$250,000 Heinz Award

Elizabeth Thomson  
News Office

Professor Hugh Herr, a double amputee whose work has led to the development of new prosthetic innovations that merge body and machine, has won the 13th annual Heinz Award for Technology, the Economy and Employment. The award is among the largest individual achievement prizes in the world.

Herr, of the Media Lab, was recognized for "breakthrough innovations in prosthetics and orthotics." He is among six distinguished Americans to receive one of the \$250,000 awards presented in five categories by the Heinz Family Foundation.

Herr is the fifth member of the MIT faculty to receive a Heinz Award. The others are Institute Professor Mildred Dresselhaus, Institute Professor Robert Langer, Institute Professor Mario Molina and Institute Professor John Harbison.

"Everything about Dr. Herr is an expression of the triumph of the human spirit over adversity," said Teresa Heinz, chairman of the Heinz Family Foundation. "His breakthrough advances in rehabilitation technologies are immeasurably improving the quality of life for thousands of people with physical challenges, but for him, every breakthrough is just an invitation to push harder and do more. Accomplished yet modest, determined yet good natured, he approaches his work with great skill and great wonder. Both his life and his inventions demonstrate what an unbeatable combination that is."

With more than 36,000 new amputees in the United States every year—including hundreds of American soldiers who have lost limbs in the War in Iraq and Afghanistan—Herr is helping improve mobility and enhance the quality of life for many physically challenged people around the world. The holder (or co-holder) of numerous patents, including the Computer-Controlled Artificial Knee (commercially available as the Rheo Knee), the Active Ankle-Foot Orthosis, and the world's first Powered Ankle-Foot Prosthesis, he is advancing an emerging field of science that applies the principles of muscle mechanics, neural control and human biomechanics to guide the design of biomimetic robots, human rehabilitation devices and other technologies.

Most recently, Herr and his Biomechanics research group at the Media Lab have developed a robotic ankle-foot prosthesis capable of propelling the wearer forward and varying its stiffness over irregular terrain, successfully mimicking the action of a biological ankle, and, for the first time, providing amputees with a truly humanlike gait. This new ankle is light, flexible, and—most importantly—generates energy for walking beyond that which can be released from a spring alone. "It mimics the elegance of nature," explains Herr, "where a muscle-like robotic assist releases three times the power of conventional prostheses to propel the body upward and forward in walking."

At age 17, Herr lost both legs below the knee in a mountain climbing accident, but returned to the classroom after a few years to earn an undergraduate degree in physics, a master's degree in mechanical engineering from MIT and a Ph.D. in biophysics from Harvard. Today, his work at the Media Lab focuses on human amplification and rehabilitation systems—technologies that interact with human limbs, mimicking biological performance and amplifying function.

Herr predicts that in 5 to 10 years, leg amputees will be able to run faster and move with a lower metabolic rate than people with biological limbs.

"The nature of my work has been

incredibly gratifying, not only by virtue of the impact it has on those of us with physical challenges, but also for its potential impact on the larger population as a whole," Herr said. "This field is still in its infancy, and I have great hope that it can be applied to a broad range of utility—to make healthy bodies better and stronger, to create new forms of mobility and to expand our capacity to perform beyond human limits. My thanks go out to the Heinz Family Foundation for recognizing me—and by extension my many colleagues over the years—with this magnificent honor."

The Heinz Awards will be presented Oct. 22 at a private ceremony in Pittsburgh.

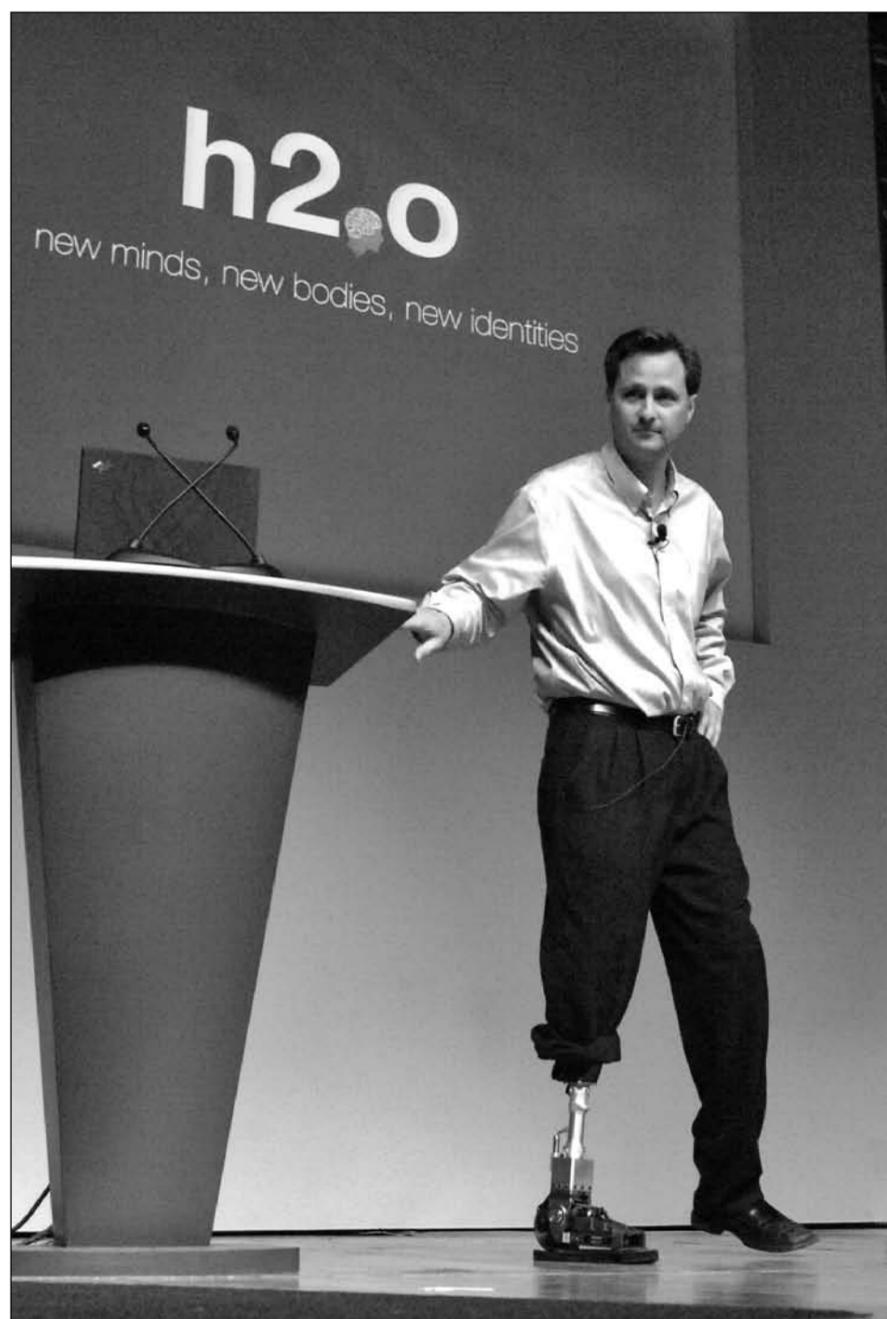


PHOTO / DONNA COVENY

Professor Hugh Herr of the Media Lab is shown here addressing h2.o, a one-day symposium in May 2007 that focused on ushering in a new era in human adaptability.

### 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.

#### VEHICLES

Volvo 2003 XT 70 wagon, 5 doors estate w/ sunroof, platinum green ext., leather seats, fully loaded, 49K mostly highway, one owner, all service records, exc. cond. Blue book value (\$20,870)/BO. Call 617-332-8251 or e-mail [rgunder@mit.edu](mailto:rgunder@mit.edu).

2005 Saab 9-5 Turbo Wagon. 24K miles, 5-speed manual transmission, sunroof, tape & CD player, metallic silver. Exc. cond. Garaged, dealer maintained. \$19,900/BO. Contact Susan at [scsilber@mit.edu](mailto:scsilber@mit.edu).

2005 Dodge Grand Caravan SXT. 36K miles, Sony DVD entertainment system, climate control, CD/FM/AM changer, stow away seats, great condition. \$13,400/BO, call anytime 617-921-4253.

#### FOR SALE

Televisions—Like new, 25" and 19" cable-ready Sony televisions. \$35 and \$60. Will deliver to MIT. Call Lois at x3-2204.

Subwoofer & 2 satellite speakers by Henry Kloss. Cost \$400. Will sell for \$200. Contact [corkin@mit.edu](mailto:corkin@mit.edu) or 617-548-4482.

Free compact armoire and chest of 5 drawers. Stained dark brown. Call Charlie at 781-324-0016.

#### HOUSING

Apartment for rent in Arlington, 2BR + den, HW floors, 1st flr of 2-family. Near T 77&79 bus route, parking in driveway, \$1400, contact Liz at x3-7805.

Belmont: 4-BR home, 2.5 baths, full basement used as lab space, separate office, quiet location, near transportation, central to schools, must see. Owned by MIT professor. Call Antonio Otero at 617-566-9500 or 617-795-0713.

#### VACATION

2,200+ above sea level, 46 private hilltop acres, surrounded by 10,000+ acres State Wildlife Area, fully-equipped cabin/house, scenic views, hiking, fishing & more. Boating & beaches nearby. \$450/week. Call Joe at 617-823-9930.

Aruba: Oct. 20-27: Occidental Allegro Grand (Palm Beachfront), large 1-BR suite w/ LR; 2 balconies; 2 TVs; 2 full baths; full kitchen w/dining area; inc. daily maid service. \$1,500/week (negotiable). Call Maria at x3-8012 or 781-248-3662.

Newly built 3+ BR home at Okemo Mountain Resort Ludlow Vt. Hdwd floors, woodstove, ss kitchen, 3 decks, v. quiet dead end 1 acre lot, all comforts of home. Great place to relax, ski, take in foliage. Call 617-650-7361.

#### MISCELLANEOUS

ChefRoar.com—Personal chef. Affordable gourmet or traditional comfort cuisine professionally prepared in your home. Call 617-957-0087.

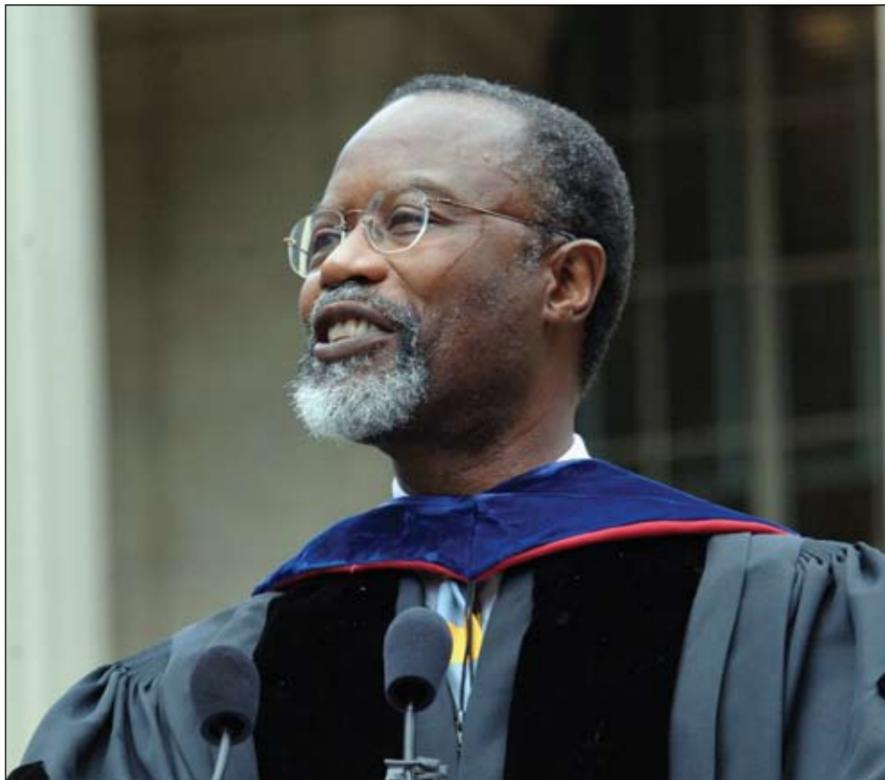


PHOTO / DONNA COVENEY

Chancellor Phillip Clay spoke to incoming freshmen and their families at Freshman Convocation, held on Aug. 26 on Killian Court.



*MIT is where society and science converge. We're counting on you to make our world a better place.*

**Susan Hockfield**

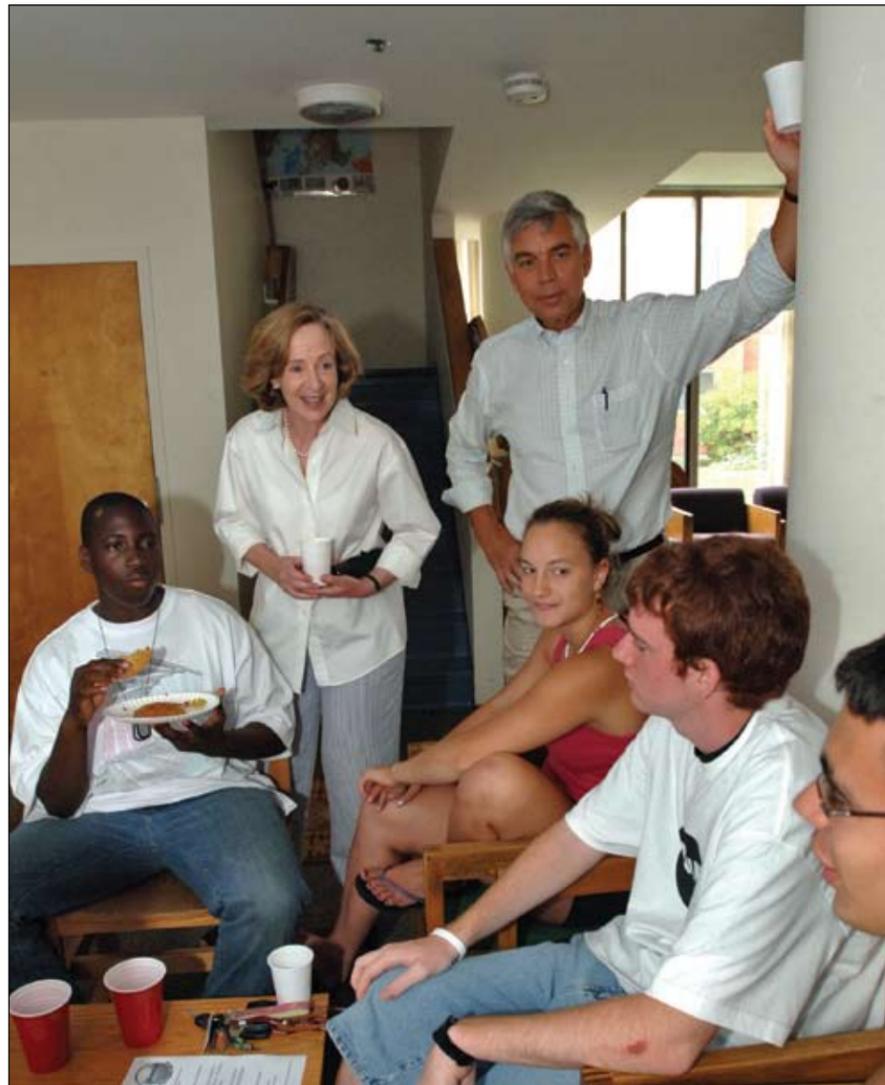


PHOTO / DONNA COVENEY

President Susan Hockfield and husband Dr. Thomas Byrne visited dorms after Convocation on Aug. 26. Here they chat with a group of incoming freshmen at International House. Coco Agbeyibor, of Virginia (originally Togo), President Susan Hockfield, Dr. Thomas Byrne, Kristen Watkins, of Sudbury, Mass., Steven White, of Florida, and Zachary Addison of Worcester, Mass.

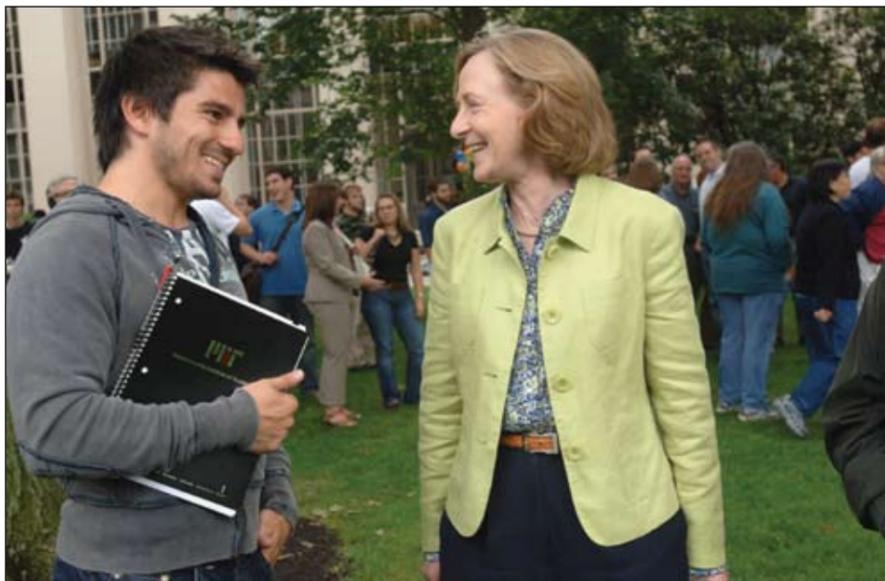


PHOTO / DONNA COVENEY

Graduate student in mechanical engineering Avid Boustani chatted with President Susan Hockfield at the community picnic Sept. 10 on Killian Court.



PHOTO / DONNA COVENEY

Materials science grad student Jenny Lichter was a happy camper as she went through the line with pal Elia Schmueller of Hillel at the community picnic held Sept. 10 on Killian Court.

## Hockfield welcomes MIT's sesquicentennial class

MIT President Susan Hockfield welcomed the Class of 2011 by challenging the incoming first-year students to follow Louis Pasteur's lead in making extraordinary discoveries that enrich people's lives.

Standing at the head of Killian Court during the Aug. 26 Convocation and Welcome, Hockfield formally greeted hundreds of students and their parents with a call to embrace history and invent the future.

"Welcome to the epicenter of science and engineering, of economics and entrepreneurship, of global studies and urban planning and more," Hockfield said. "MIT is where society and science converge. We're counting on you to make our world a better place."

Hockfield noted that the students gathered in the audience were members of what will become MIT's sesquicentennial class. Their graduation in 2011, 150 years after William Barton Rogers founded MIT, will be an important milestone in the Institute's history.

In the same era in which Rogers was laying the foundation for MIT, Hockfield said, Pasteur was making key contributions in the nascent field of experimental biomedicine. But the French scientist was also establishing links between science and industry so that theory could be turned into practice—a tradition that lies at the core of

MIT's mission.

"Pasteur understood that we cannot realize the full promise of science if we do not open avenues for its application to people's lives," Hockfield said. "MIT walks—as you do—in Pasteur's footsteps. That's true in a very practical sense because the work he began continues here."

Hockfield told the incoming students that they had been selected from the largest and most competitive pool of applicants in the Institute's history. Their ranks, she said, include science and math Olympians, winners of the nation's most prestigious academic prizes, world-class musicians, athletes, circus performers and at least one cow breeder.

Chancellor Phillip L. Clay and Dean for Undergraduate Education Daniel Hastings also took turns addressing the audience. Reprising a theme from last year, Clay encouraged students to applaud their parents for helping them on the journey that has led them to MIT.

After the ceremony, Hockfield, Clay and Hastings took part in a receiving line where they personally welcomed new students and their families. Freshman Emily Prentice, 18, of Vienna, Va., was among those who shook hands with the university leaders.

"I went to a challenging high school so I'm excited

about working hard and learning a lot. I'm looking forward to it rather than dreading it," said Prentice, a bioengineering student and one of more than a dozen students from her high school admitted to MIT this year.

Two days after Convocation, hundreds of freshmen turned out to hear Ford International Professor of Political Science Richard J. Samuels give the first official lecture of their MIT careers.

Samuels, director of the Center for International Studies (CIS), invited the new students to take full advantage of MIT's open, multicultural academic community and, at the same time, to participate boldly in its ever-expanding array of hands-on international work experiences.

"I hope that you will avail yourself of the many opportunities MIT provides to make sure that you step boldly and intelligently out into the global marketplace of ideas," he said in the annual faculty keynote lecture, a featured event in MIT's Orientation week.

Samuels (Ph.D. 1980) discussed the roles science and technology play in economic development and how societies differ in the way they approach innovation.

"The central challenge for MIT is to continue to anticipate and to stay 'ahead of the future.' And that future has even less respect for national borders than the past," he said.