



Volume 52, Number 17
Wednesday, February 27, 2008

TechTalk

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



PHOTO / DAVID CLEMENTS, VIA WIKIMEDIA

This foot of a Tokay gecko shows its adhesive pads. The gecko, whose feet enable it to cling tightly while upside down or on vertical surfaces, helped inspire a new medical bandage created by an MIT-led research team.

A 'feet' of bioengineering MIT creates gecko-inspired bandage

Elizabeth Dougherty
Harvard-MIT Division
of Health Sciences

MIT researchers and colleagues have created a waterproof adhesive bandage inspired by gecko lizards that may soon join sutures and staples as a basic operating-room tool for patching up surgical wounds or internal injuries.

Drawing on some of the principles that make gecko feet unique, the surface of the bandage has the same kind of nanoscale hills and valleys that allow the lizards to cling to walls and ceilings. Layered over

this landscape is a thin coating of glue that helps the bandage stick in wet environments, such as heart, bladder or lung tissue. And because the bandage is biodegradable, it dissolves over time and does not have to be removed.

The team is led by MIT Institute Professor Robert Langer and Jeff Karp, an instructor of medicine at Brigham and Women's Hospital and Harvard Medical School. Both are also faculty members at the Harvard-MIT Division of Health Sciences and Technology (HST). Their colleagues include several other researchers from MIT, as well as from the University of Basel, Switzerland. In addition, Jeff Borenstein and David J.D. Carter from Draper Laboratory fabricated the nanomolds involved in the work, and Jay Vacanti and Cathryn Sundback performed all animal

experiments with colleagues at Massachusetts General Hospital.

The work is described in the Feb. 11 online issue of the Proceedings of the National Academy of Sciences.

"There is a big need for a tape-based medical adhesive," said Karp. For instance, a surgical adhesive tape made from this new material could wrap around and reseal the intestine after the removal of a diseased segment or after a gastric bypass procedure. It could also patch a hole caused by an ulcer. Because it can be folded and unfolded, it has a potential application in minimally invasive surgical procedures that are particularly difficult to suture because they are performed through a very small incision.

See **GECKO**

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Celebrating MLK

Much has been done, much work remains, speakers say

Greg Frost
News Office

At the annual breakfast celebration to honor the Rev. Dr. Martin Luther King Jr., hundreds of members of the MIT community listened as speakers echoed a similar theme: Much has been done to realize the slain civil rights leader's vision of equality and opportunity, but much work remains—in America, in Greater Boston and at MIT.

In a speech titled "Diversity and Inclusion: Building a Solution Worthy of MIT," President Susan Hockfield said many MIT administrations, including her own, had made sincere efforts to create the kind of diverse and inclusive community envisioned by King. But such efforts, she said, have "failed to create the serious, meaningful change" that the Institute desires.

"If this were any other kind of problem—an engineering problem, a scientific problem, an unsolved problem in mathematics or a problem of national defense—we would not be satisfied with well-intentioned but only incremental progress," Hockfield said. "We have not yet made our community what it should be, and, to borrow a phrase from Dr. King, we cannot be satisfied until we do. I can tell you plainly: I will not be satisfied until we do."

Hockfield noted that promoting diversity at MIT is more than just a moral obligation: It is central to MIT's responsibility to prepare leaders for an increasingly interconnected world.

"In the end, we cannot be satisfied until, to everyone who earns a place at MIT, we are a community that says not, 'You're lucky to be here,' but rather, 'We're lucky you came,'" she said.

"We need to make diversity work at MIT because it will make us better at what we do: broader and deeper as thinkers; more effective as collaborators; more creative as teachers; more understanding as friends; and wiser, less complacent and more self-aware as human beings," she said.

To that end, Hockfield announced she would convene a Diversity Leadership Congress comprising some 300 academic and administrative leaders at the Institute. The group will serve as a forum where experiences can be shared and where best practices from other organizations



PHOTO / DONNA COVENEY

Freshman Tarick Walton gave a rousing rendition of Martin Luther King's "I Have a Dream" speech at the 34th Annual Dr. Martin Luther King Jr. Celebration breakfast, held at Walker Memorial on Thursday, Feb. 21.

can be considered.

"From this shared understanding, we will develop goals for changing the way we operate, and we will come away with a vivid sense that each of us bears direct responsibility for creating this kind of change," she said, adding that she welcomed suggestions from the community on the goals and objectives of the congress.

The president told the breakfast audience that MIT was fortunate that it was not starting from scratch. Among notable highlights, Hockfield pointed out that the Institute had recently admitted the most diverse freshman class in its history and that a recent study of America's top-ranked colleges and universities by The Journal of Blacks in Higher Education found that MIT had for the first time earned the highest yield for African-American students.

Hockfield also hailed aggressive efforts in the School of Architecture and Planning to attract and support under-

represented talent. She also credited Karl Reid, Steve Lerman and Christopher Jones for their efforts to recruit more underrepresented minority students and to improve their experience here.

Hockfield's message regarding unfulfilled progress on issues of opportunity and inclusiveness was a theme expressed by many of the speakers at the breakfast.

In a passionate, intensely personal address, senior Jamira Cotton questioned whether MIT had created an environment that successfully nurtures the type of education deemed vital by Dr. King—an education that cultivates both intelligence and character.

"I appreciate what MIT has done for me and what I have been able to do for it. But I know there is more to be

See **MLK**

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PEOPLE



CROSSWORD KING

Mathematics professor Kiran Kedlaya girds for annual battle of wits.

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RESEARCH

LIFE ON MARS? ... OR UTAH

MIT students inhabit the Mars Society Desert Research Station in Utah.

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MIT EXPLAINS 1918 PANDEMIC

Researchers pinpoint how avian flu mutated to kill at least 50 million people.

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NEWS

POTERBA TO LEAD NBER

MIT econ head James Poterba is named president and CEO of National Bureau of Economic Research.

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IN THE WORLD: HOT WATER IN LESOTHO

D-Lab designs solar array to provide electrical power and hot water to southern African villages.

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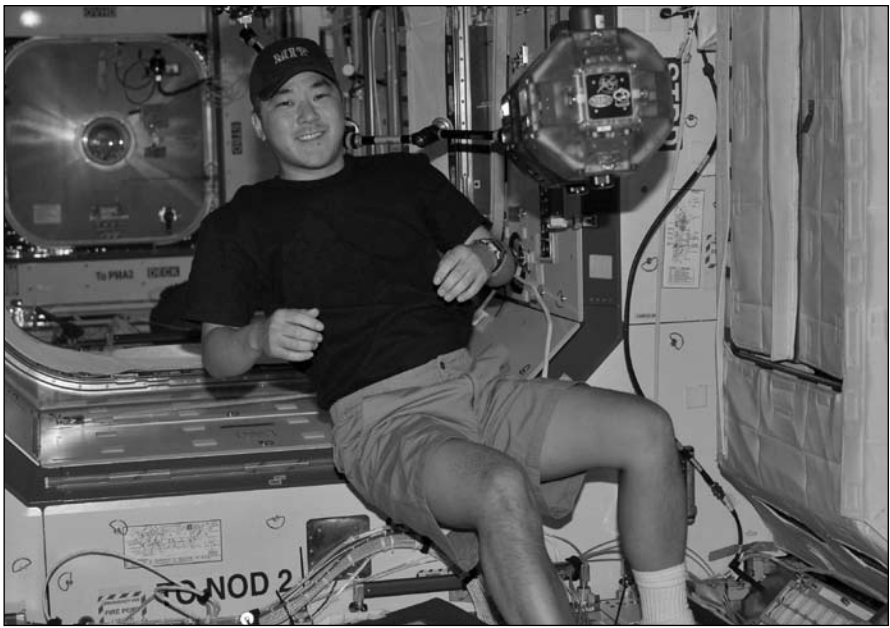


PHOTO COURTESY / NASA

The unbearable lightness of being ... in space

Daniel Tani SB '84, SM '88 returned to the Kennedy Space Center aboard space shuttle Atlantis on Feb. 20. Tani spent 120 days in orbit aboard the International Space Station as a member of the Expedition 16 crew. Tani participated in numerous scientific investigations, including four sessions running SPHERES, which was developed by MIT's Space Systems Laboratory. In this photo, Tani does a check of the SPHERES Beacon/Beacon tester in the Destiny laboratory of the ISS.

AWARDS AND HONORS

Seven junior faculty named Sloan Research Fellows

Seven junior MIT faculty have won 2008 Alfred P. Sloan Foundation Research Fellowships, which are intended to enhance the careers of the very best young faculty members in specified fields of science. Along with faculty at the University of California at Berkeley, MIT professors won more of the two-year, \$50,000 Sloan Fellowship grants this year than individuals at any other school.

MIT faculty among this year's Sloan Research Fellows are **Edward S. Boyden**, Benesse Career Development Assistant Professor of Research in Education; **Mikhail Golosov**, Rudiger Dornbusch Career Development Assistant Professor of Economics; **Manolis Kellis**, Karl R. Van Tassel (1925) Career Development Assistant Professor of Electrical Engineering and Computer Science; **Mohammad Movassaghi**, Firmenich Career Development Assistant Professor of Chemistry; **Aviv Regev**, assistant professor of biology; **Mehmet Fatih Yanik**, assistant professor of electrical engineering; and **Martin W. Zwielerlein**, assistant professor of physics.

The fellowships were established in 1955 to provide support and recognition to early-career scientists and scholars, often in their first appointments to university faculties, who were endeavoring to set up laboratories and establish their independent research projects with little or no outside support. Financial assistance at this crucial point, even in modest amounts, often pays handsome dividends later to society.

"The Sloan Research Fellowships support the work of exceptional young researchers early in their academic careers, and often at pivotal stages in their work," said Sloan Foundation President

Paul L. Joskow, Elizabeth and James Kilian (1926) Professor of Economics and Management.

An MIT student and two recent MIT graduates have been awarded 2008 Gates Cambridge Scholarships. Senior **Talia Gershon**, **Naveen Krishnan** SB '07 and **Ingrid Lawhorn** SB '06 are among 45 students who will study at the University of Cambridge.

Created in 2000 by the Bill & Melinda Gates Foundation, the Gates Cambridge Scholarships are awarded on the basis of intellectual ability, leadership capacity and desire to contribute to society through community service and by applying one's talents and knowledge to improve the lives of others.



Cynthia Barnhart



Melis Anahtar

Cynthia Barnhart has been named president of the Institute for Operations Research and the Management Sciences (INFORMS). Barnhart, a professor of civil and environmental engineering and engineering systems, is co-director of MIT's Operations Research Center and associate dean for academic affairs in the School of Engineering.

A hallmark of her one-year term will be hosting a series of public-policy presentations by prominent politicians, government officials and academics at the INFORMS annual meeting this coming fall. The presentations will show how operations-research analysts approach current challenges in airline congestion and transportation, health care, and energy and the environment.

Recent recipient of a prestigious Rhodes Scholarship and one of Glamour magazine's top 10 college women of 2007, senior **Melis Anahtar** has struck again. She is one of 20 students to be named to USA Today's 2008 All-USA College Academic First Team. USA Today editor Ken Paulson describes the honor as recognizing "academic excellence and community service throughout the country and around the world."

Poterba to lead largest U.S. economic research group

James Poterba, Mitsui Professor of Economics and head of MIT's Department of Economics, has been appointed president and chief executive officer of the National Bureau of Economic Research (NBER), a nonprofit organization dedicated to promoting greater understanding of how the economy works. The group is best known for its role in providing official dates for business cycles in the United States and declaring the start and end dates of U.S. recessions.

The appointment takes effect July 1, 2008. Poterba will succeed Martin Feldstein of Harvard University, who is retiring after leading the NBER for 30 years.

"I am incredibly honored to serve as the next president of the NBER. I look forward to working with the program directors and research affiliates to maintain and enhance the NBER's position as a global leader in producing relevant economic research," Poterba said.

The announcement came as financial markets have been roiled by speculation that the U.S. economy may be entering—or may already be in—a recession. When asked for comment, Poterba told the MIT News Office that there is much talk but no consensus among economic experts—whether at the NBER or elsewhere.

"That reflects a number of conflicting signals on current performance," Poterba said of the lack of agreement on the issue. "Precisely because situations like this are not unusual, the NBER Business Cycle Dating Committee, which is the body that compiles the official historical record of when there have been recessions in the United States, only identifies recessions retrospectively. The committee waits until there is sufficient evidence to make a definitive call. While often disappointing to those who want to know the current state of the economy, this procedure generates a more accurate and reliable record of U.S.

economic performance."

Poterba is an expert on tax policy and financial economics. His recent work examines the effect of taxation on the financial behavior of households, particularly their saving and portfolio decisions. He has been especially interested in the analysis of tax-deferred retirement saving programs such as 401(k) plans, and in the role of annuities in financing retirement consumption.

In addition to his research, teaching and administrative roles at MIT, Poterba is the director of the Public Economics Research Program at NBER and a fellow of the American Academy of Arts and Sciences and the Econometric Society. He has served as a director of the American Finance Association and was a member of the executive committee of the American Economic Association. In 2005, he was a member of the President's Advisory Panel on Federal Tax Reform.

Poterba received a BA in economics from Harvard University and a PhD in economics from Oxford University, where he was a Marshall Scholar. He has been an Alfred P. Sloan Foundation Fellow, a Battery March Fellow, a fellow at the Center for Advanced Study in Behavioral Sciences and a Distinguished Visiting Fellow at the Hoover Institution at Stanford University.

The NBER, which was founded in 1920, has nearly 1,000 research affiliates who are research economists at U.S. universities. Their work focuses on developing new statistical measurements, estimating quantitative models of economic behavior, assessing the effects of public policies on the U.S. economy and projecting the effects of alternative policy proposals. The NBER is based in Cambridge, Mass.

NBER presidential search committee members included leading scholars and researchers from academia and industry.



James Poterba

Last chance to respond to faculty survey

MIT's 2008 Faculty Quality of Life Survey is currently under way. More than half of faculty and instructional staff have already answered the survey. The web survey, sponsored by the Office of the Provost and administered through the Office of Institutional Research, addresses a number of important faculty issues, such as views about the promotion and tenure process, mentoring and departmental climate.

The web survey asks faculty about the work they do, how well it is supported and the ways in which life outside MIT meshes with their work responsibilities. The last survey of this type, administered in 2004, achieved a 73 percent response rate; MIT hopes to exceed that rate this year. A high response rate will maximize the usefulness of the data, permitting analysis at the school and departmental level.

Among other groups on campus, the MIT Initiative on Faculty Race and Diversity will utilize the survey results extensively. The initiative will use the survey to examine the climate for underrepresented minority faculty as well as to analyze the impact of race, gender and ethnicity/cultural

differences on various aspects of faculty life. Targeted reminders have been sent to the minority faculty community encouraging their response to the survey as a critical part of the study.

Although the survey alone is not expected to be completely indicative of the climate and experiences of faculty at MIT, it is anticipated that a great deal of valuable information will be obtained from it, as the survey covers a broad range of questions about faculty life, from teaching to research to outside activities. The initiative will rely on the qualitative interviews with faculty to explore more in-depth questions and issues on race. Two research scholars have been hired to undertake the interviews.

The perspective of each faculty member is unique, so it is crucial to hear from all faculty. MIT recognizes that the survey takes some time to complete, roughly 30-40 minutes. Faculty may start the survey and return to it at a later time. Previously submitted answers will be displayed for faculty to edit if they wish.

Faculty may access the survey by entering their e-mail address here: web.mit.edu/surveys/mitfaculty.

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Printed on recycled paper

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Tech Talk is published by the News Office on Wednesdays during term time except for most Monday holiday weeks. See Production Schedule at web.mit.edu/newsoffice/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.

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.

Trip of a lifetime: MIT hosts next generation of science leaders

Anne Trafton
News Office

It's not every day that high school students get the chance to visit MIT research labs and see concepts that they've learned about in classes come to life.

But that's exactly what happened Thursday, Feb. 14, as high schoolers from around the country descended on MIT as part of the annual meeting of the American Junior Academy of Science (AJAS).

The AJAS meeting was held in conjunction with the annual meeting of the American Association for the Advancement of Science in Boston. Most of the 120 high school students in attendance won their way to Boston through science fair projects, which they presented at a poster session on Friday, Feb. 15.

On Thursday, the students got a taste of life and research at MIT, including lab tours, an afternoon at the MIT Museum and a talk by MIT Biology Professor Eric Lander.

Lander, director of the Broad Institute, offered students a glimpse of cutting-edge research in the field of genomics—something they will not learn about in their biology classes, he said.

"Textbooks always tell you about what we know, but what's interesting is what we don't know," said Lander. "Textbooks don't like to write about what we don't know, because it's hard to test you on it."

Lander told the students that biology is in the midst of a revolution that will transform the field, much as the development of the periodic table of elements transformed the study of chemistry in the 1800s.

The sequencing of the human genome, completed in 2003, is just the first step of that revolution, Lander said. Ongoing projects to map human genetic variation and determine the function of all human genes will open even more doors.

In about 10 or 15 years, scientists will have unprecedented resources and knowledge at their fingertips to help them study how human diseases arise and how to fight them, Lander said.

"The high school students of 2025 are not going to be able to understand what it was like to study biology in the benighted 20th century," he said.

After Lander's talk, students flocked to the front of the Broad Auditorium to ask questions or have their photo taken with him.

"His talk was incredible," said Zach Silver, a student from Pine Crest High School in Fort Lauderdale, Fla.

Students also had the chance to tour about 20 MIT research labs. One group visited the Department of Aeronautics and Astronautics, where they heard from graduate students and postdoctoral researchers working on a variety of projects.

Christy Edwards, a graduate student in aero-astro, demonstrated the microsatellites that MIT students have been developing for several years.

Three of the volleyball-sized satellites are now onboard the International Space Station, where scientists will fine-tune the satellites' performance before they are sent into space on their own. "It's like driver's ed for satellites," Edwards explained.

In the Man-Vehicle Lab, the students got a peek at the lightweight, skintight spacesuit that Professor Dava Newman and her students are designing for future excursions in space.

Sachein Sharma, a sophomore at the Texas Academy of Science, said he enjoyed the tour of MIT's aero-astro projects. "It's very interesting and exciting," he said. "MIT is a great place for that kind of thing."

Sharma won his way to the AJAS conference by design-

ing a new type of blade for a wind turbine. He envisions that someday wind turbines could be used in space, possibly on Mars' surface.

His research advisor, Cathy Bambanek, a chemistry teacher at the Texas Academy of Science, said she was impressed that much of MIT's research seems to be student driven.

"It's amazing," she said. "It seems like the students have a lot of input as far as what kind of projects they would like to work on."

The day at MIT was hosted by biology instructor Mandana Sassanfar and sponsored by the School of Science, School of Engineering, School of Architecture and Planning, Department of Biology and MIT Museum.



PHOTO / MANDANA SASSANFAR

Broad Institute Director and MIT Professor Eric Lander describes the future of biology in an inspirational talk to high school students as part of the annual meeting of the American Junior Academy of Science.

Core curriculum changes discussed at faculty meeting

Anne Trafton
News Office

The faculty heard an update from the committee charged with refining new proposals for MIT's core curriculum at the Feb. 20 faculty meeting.

Robert Redwine, professor of physics, and Charles Stewart, professor of political science, presented a status report from the Educational Subcommittee of the Committee on the Undergraduate Program, which they co-chair.

The subcommittee is reviewing and refining core curriculum changes proposed by the Task Force on the Undergraduate Educational Commons in October 2006.

Later this semester, the subcommittee plans to present its full recommendations to the faculty. The final version of the recommendations will likely be slightly different from what the task force originally proposed, according to Stewart and Redwine.

Revisions are most likely to occur in the task force's proposed changes to the General Institute Requirements (GIRs).

The task force recommended that students take eight required subjects in their first year. Three of these would continue to be prescribed as they are now (single-variable calculus, multivariable calculus and classical mechanics). The remaining five would be selected from a small number of subjects organized into six categories: chemical sciences; computation and engineering; life sciences; mathematics; physical sciences; and project-based experiences. Students would have to take at least one course from five of these six categories.

After the task force made its proposal, some faculty expressed concern that the new freshman core curriculum would no longer prepare students for any major at MIT.

"The feedback was clear that the core content is critical for most of our departments," said Redwine.

The subcommittee wants to ensure that the GIRs continue to prepare students for any major, he said.

Another goal is to make the Humanities, Arts, and Social Sciences requirements more flexible than the origi-

nal task force proposal, to allow first-year students time to study a foreign language or take music classes.

In other business, the Committee on the Undergraduate Program recommended making permanent the option for sophomores to take one "exploratory" course per semester. With the Sophomore Exploratory option, students can elect to convert from Grades to Listener status at any time before registration day of the following semester.

The exploratory option was originally introduced as a five-year experiment and is now in its fifth year. Dennis Freeman, professor of electrical engineering and computer science, who presented the proposal, said that 25 percent to 30 percent of sophomores take an exploratory subject each term. Many of them use the option to explore a minor, a second bachelor's degree or a new major.

The exploratory option is well used and well valued by the students, said Freeman.

However, he noted that many students and their advisors seem to be unaware of the option or confused by it, so plans are in the works to better inform students about it.

The faculty will vote on the motion to make the option permanent at its next meeting.

Stephen Bell, a professor of biology and chair of the Committee on Graduate Programs, and Steven Lerman, dean for graduate students, reported on a proposed option for graduate students to take courses outside of their degree subject with a Pass/D/F grading system.

The option is designed to allow grad students to gain skills in fields related to their major, which will help them with their research, said Lerman. The grading option would only be allowed for classes outside the student's graduate program and Institute requirements, and the units for such courses would not count toward any degrees. In addition, use of this option could be further restricted by individual departments.

The motion will be presented for a vote at the next faculty meeting.

Theresa Stone, executive vice president and treasurer, and Seth Alexander, president of the MIT Investment Management Company, presented an overview of MIT's financial-planning framework and spending policy.

Stone said that MIT has closed a budget gap that

required the use of unrestricted endowment funds in recent years. In 2007, the budget gap was \$65 million, in 2008 it was \$30 million and in 2009 the budget is projected to be balanced.

Alexander reported on a plan for MIT to adopt an endowment-spending rule that will reduce the variability in the annual flow of funds to the operating budget. He noted that the new plan incorporates the Institute's goal of targeting (approximately) a 5 percent spending rate over time to balance current and future needs, so that the endowment will retain its purchasing power to fund MIT's research.

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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 or mail to Classifieds, Rm 11-400. Deadline is noon Wednesday the week before publication.

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2000 Mercedes-Benz C280; low mileage, in good condition. Asking \$10,000 OBO. Car can be viewed in Lexington. Contact Nancy at 781-883-1124.

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The next-best thing to being on Mars

David Chandler
News Office

Last week, two MIT students began living, working and communicating with the outside world as if they were on a mission to Mars. Whenever they go outside their small, round habitat where eight people are spending a two-week “mission,” they don spacesuits and pass through an airlock. When they send e-mail, it takes 20 minutes before the recipient can see it—the time it takes for radio waves to travel to and from the red planet.

They’re not really on Mars, of course—human missions there are not yet even in NASA’s long-term schedule and are not expected to take place for at least two decades. So, in order to begin understanding the logistical, mechanical, scientific and psychological issues that a real crew of Mars explorers will someday face, teams have been practicing the details of Mars exploration in several Mars-base simulators in some of Earth’s most Mars-like places. The most heavily used simulation is the Mars Society Desert Research Station, near Hanksville, Utah, which was built in 2002 by the Mars Society.

Engineering graduate students Zahra Khan and Phillip Cunio, from the Department of Aeronautics and Astronautics, began their stay at the Utah facility on Sunday, Feb. 17. Cunio is working on a project to develop a “smart” carrier to be used for research fieldwork in remote expeditions such as planetary exploration. The footlocker-sized container and its contents are fitted with radio-frequency ID tags, so that it constantly keeps track of its contents and can alert people if supplies are about to run out or if an item has been misplaced. Running out of supplies is not just an inconvenience—on a faraway planetary surface it could be a life-or-death issue.

Khan’s job was concentrating on the logistics of making exploratory trips through the desert to carry out geological and biological research. The team uses all-terrain vehicles to travel around while wearing their simulated spacesuits and then takes soil samples and conducts other tests at various locations. Halfway through the planned two-week mission, Khan cut her stay short when she was unexpectedly called to Amsterdam for a job interview with the European Space Agency.

Although part of the mission’s purpose is to find out about practical issues in working in difficult circumstances, the research itself is also very real. They

have been looking for organisms that live in the hostile, dry and salty desert environment, both to develop techniques for conducting such biological research and to learn about how organisms survive in these somewhat Mars-like conditions.

Both Khan and Cunio would like to be involved in real Mars missions someday. Khan’s research is on entry, descent and landing systems for human missions to Mars. These will require much gentler, more-controlled descents than past missions, such as the Mars rovers that hit the ground at high speed shielded by airbags and then bounced for several minutes before coming to a stop.

Khan says she would like to go to Mars herself, but thinks that with the slow progress of NASA’s plans in that direction, “the odds may not be very good. I think it would be a good idea to send younger people,” and by the time such missions take place that may leave her out.

“I’m an advocate of one-way trips to Mars,” she says, because the logistics of such trips would be far easier without the

requirement for all the fuel needed for a return. For a given spacecraft, she says, you could send six people on a two-way mission or 24 people for a one-way trip. “If you’re going to go there, you might as well not waste the resources.”

Cunio’s research studies the design of self-sustaining life-support systems for Mars colonists, as well as for missions to the moon or other destinations. “We’re studying the commonalities in life support and environmental control systems,” he says, so that planners don’t have to start from scratch in planning missions to different places. “We want to minimize the development costs and risks.”

Anyone interested in following the progress of the Mars-like mission can observe the team in action by way of a set of web cams that display live images inside and outside the habitat, at www.freemars.org/mdrscam. Detailed daily reports on their activities can be found online at www.marsociety.com/mdrs/fs07/crew67 (click on “daily crew reports”).

Cunio is also blogging about his experiences during the mission, mainly as a way of helping to inspire younger students to get interested in space exploration. His blog is at exepsilonmars.blogspot.com. Cunio has made contact with several schools around the United States and Canada, and will participate in real-time question-and-answer sessions with some of the classes during the mission.



PHOTO COURTESY / THE MARS SOCIETY

Crewmembers of an earlier mission at the Mars Society Desert Research Station in Utah set out for an exploratory trip on their all-terrain vehicles, wearing simulated spacesuits.

Bacterial ‘battle for survival’ leads to new antibiotic MIT discovery holds promise for treating stomach ulcers

Anne Trafton
News Office

War may actually be healthy for you (war between two microscopic bugs, that is).

MIT biologists have provoked soil-dwelling bacteria into producing a new type of antibiotic by pitting them against another strain of bacteria in a battle for survival.

The antibiotic holds promise for treatment of *Helicobacter pylori*, which causes stomach ulcers in humans. Also, figuring out the still-murky explanation for how the new antibiotic was produced could help scientists develop strategies for finding other new antibiotics.

The work is reported in the February issue of the *Journal of the American Chemical Society*.

A combination of luck, patience and good detective work contributed to the discovery of the new antibiotic, according to Philip Lessard, research scientist in Professor Anthony Sinskey’s laboratory at MIT.

Sinskey’s lab has been studying *Rhodococcus*, a type of soil-dwelling bacteria, for many years. While sequencing the genome of one *Rhodococcus* species, the researchers noticed that a large number of genes seemed to code for secondary metabolic products, which are compounds such as antibiotics, toxins and pigments.

However, *Rhodococcus* does not normally produce antibiotics. Many bacteria have genes for antibiotics that are only activated when the bacteria are threatened in some way, so the researchers suspected that might be true of *Rhodococcus*.

Kazuhiko Kurosawa, a postdoctoral associate in the Department of Biology, decided to try to provoke the bacteria into synthesizing antibiotics by placing them in stressful environments. He tried turning the temperature up and down, then altered the bacteria’s growth medium, but nothing worked.

Kurosawa then decided to stress the *Rhodococcus* bacteria by forcing them to grow in the presence of competing bacteria, a strain of *Streptomyces*. *Streptomyces* produces an antibiotic that normally kills other bacteria, but in one of the experimental test tubes, *Rhodococcus* started producing its own antibiotic, which wiped out the *Streptomyces*.

The researchers isolated the antibiotic, dubbed it rhodostreptomycin and started testing it to see what else it would kill. It proved effective against many other strains of bacteria, most notably *Helicobacter pylori*. Rhodostreptomycin is a promising candidate to treat *H. pylori* because it can survive in very acidic environments such as the stomach.

The antibiotic turned out to be a type of molecule called an aminoglycoside, composed of peculiar sugars, one of which has a ring structure that has not been seen before. The ring structure could offer chemists a new target for modification, allowing them to synthesize antibiotics that are more effective and/or stable.

“Even if [rhodostreptomycin] is not the best antibiotic, it provides new structures to make chemical derivatives of,” said Lessard. “This may be a starting point for new antibiotics.”

One mystery still to be solved is why *Rhodococcus*

started producing this antibiotic. One theory is that the presence of the competing strain of bacteria caused *Rhodococcus* to “raise the alarm” and turn on new genes.

The version of *Rhodococcus* that produces the antibiotic has a “megaplasmid,” or large segment of extra DNA, that it received from *Streptomyces*. A logical conclusion is that the plasmid carries the gene for rhodostreptomycin, but the researchers have sequenced more than half of the plasmid and found no genes that correlate to the antibiotic.

Another theory is that the plasmid itself served as the “insult” that provoked *Rhodococcus* into producing the antibiotic. Alternatively, it is possible that some kind of interaction of the two bacterial genomes produced the new antibiotic.

“Somehow the genes in the megaplasmid combined with the genes in *Rhodococcus* and together they produced something that neither parent could make alone,” said Lessard.

If scientists could figure out how that happens, they could start to manipulate bacterial genomes in a more methodical fashion to design new antibiotics.

Other authors of the paper are T.G. Sambandan, research scientist in MIT’s Department of Biology, MIT professors Anthony Sinskey of biology and ChoKyun Rha of the Biomaterials Science and Engineering Laboratory, and Ion Ghiviriga and Joanna Barbara of the University of Florida.

The research was funded by the Cambridge-MIT Institute and the Malaysia-MIT Biotechnology Partnership Program.

MIT explains spread of 1918 flu pandemic

Anne Trafton
News Office

MIT researchers have explained why two mutations in the H1N1 avian flu virus allowed the disease to spread during the 1918 pandemic that killed at least 50 million people. The work could help scientists detect and contain a future bird flu outbreak among humans.

The team showed that the 1918 influenza strain developed two mutations in a surface molecule called hemagglutinin (HA). This, in turn, allowed it to bind tightly to receptors in the human upper respiratory tract.



Ram Sasisekharan

This new work could aid researchers in monitoring the HA mutations in the H5N1 avian flu strains currently circulating in Asia. Epidemiologists fear these mutations could enable the virus to jump from birds and spread among humans—a possibility that could trigger millions more deaths than the 1918 pandemic.

Ram Sasisekharan, the Underwood Prescott Professor of Biological Engineering and Health Sciences and Technology, is the senior author of a paper on the work published in the Feb. 18 issue of the *Proceedings of the National Academy of Sciences*.

In January, Sasisekharan and colleagues reported in *Nature Biotechnology* that flu viruses can only bind to human respiratory cells if they match the shape of sugar (or glycan) receptors found on those cells.

The glycan receptors found in the human respiratory

tract are known as alpha 2-6 receptors, and they come in two shapes—one resembling an open umbrella, another resembling a cone. To infect humans, the MIT team found that avian flu viruses must gain the ability to bind to the umbrella-shaped alpha 2-6 receptor.

In the current study, the team discovered that two mutations in HA allow flu viruses to bind tightly or with high affinity to the umbrella-shaped glycan receptors.

“The affinity between the influenza virus HA and the glycan receptors appears to be a critical determinant for viral transmission,” said Sasisekharan.

The researchers used the 1918 influenza virus as a model system to investigate the biochemical basis for hemagglutinin binding to glycans, which leads to viral transmission. They compared the virus that caused the 1918 pandemic (known as SC18) with a strain called NY18, which differs from SC18 by only one amino acid, and also the AV18 strain, which differs from SC18 by two amino acids.

Using ferrets (which are susceptible to human flu strains), researchers had earlier found that, while SC18 transmitted efficiently between ferrets, NY18 is only slightly infectious and AV18 not at all infectious.

These earlier findings correlate with the viruses’ ability to bind to umbrella-shaped alpha 2-6 glycan receptors, demonstrated in the current PNAS study.

NY18, which is only slightly infectious, binds to the umbrella-shaped alpha 2-6 receptors, but not as well as SC18, which is highly infectious.

AV18, which does not infect humans, does not have any affinity for the umbrella-shaped alpha 2-6 receptors and binds only to alpha 2-3 receptors.

Another strain, TX18, binds to alpha 2-6 and alpha 2-3 but, because it binds with high affinity to the umbrella-shaped alpha 2-6 receptors, is much more infectious than NY18.

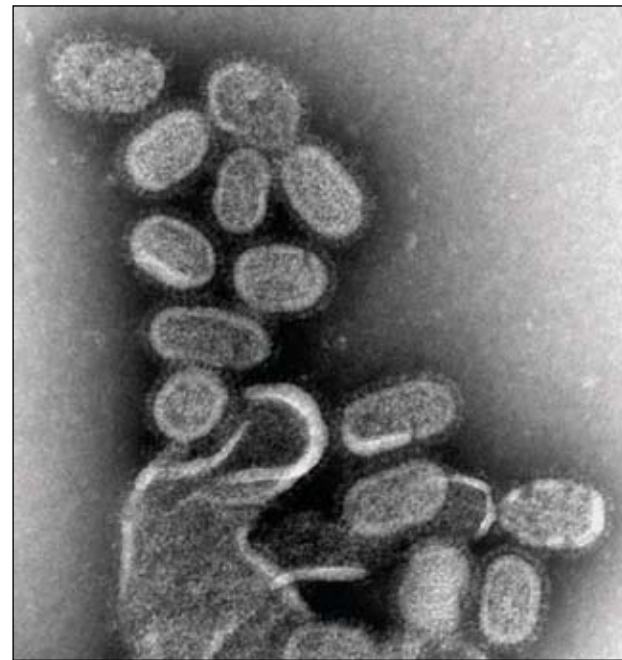


IMAGE COURTESY / CDC / TERENCE TUMPEY, CYNTHIA GOLDSMITH

This transmission electron micrograph shows the 1918 influenza virus, which CDC researchers recreated in 2005.

Researchers from the Centers for Disease Control and Prevention reported on the varying infectiousness of these strains last year, but the PNAS study is the first that explains the exact biochemical reason underlying these differences.

Other authors of the PNAS paper are Aravind Srinivasan and Karthik Viswanathan, postdoctoral associates in MIT’s Department of Biological Engineering (BE); Rahul Raman, research scientist in BE; Aarthi Chandrasekaran, graduate student in BE; S. Raguram, visiting scientist in BE; Viswanathan Sasisekharan, visiting scientist in the Harvard-MIT Division of Health Sciences and Technology; and Terrence Tumpey of the Centers for Disease Control and Prevention.

The research was funded by the National Institute of General Medical Sciences and the Singapore-MIT Alliance for Research and Technology (SMART).

GECKO

Continued from Page 1

Gecko-like dry adhesives have been around since about 2001 but there have been significant challenges to adapt this technology for medical applications given the strict design criteria required. For use in the body, they must be adapted to stick in a wet environment and be constructed from materials customized for medical applications. Such materials must be biocompatible, meaning they do not cause inflammation; biodegradable, meaning they dissolve over time without producing toxins; and elastic, so that they can conform to and stretch with the body’s tissues.

The MIT researchers met these requirements by building their medical adhesive with a “biorubber” invented by

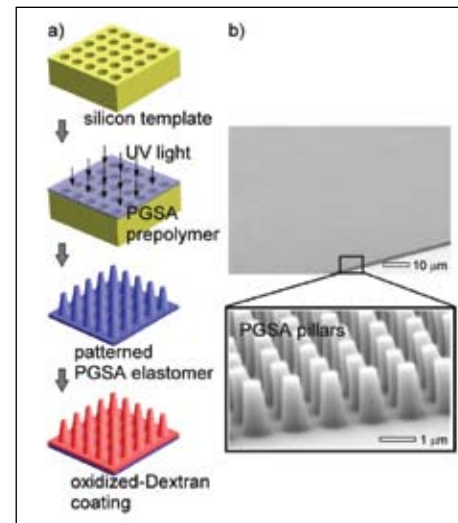
Karp, Langer and others. Using micropatterning technology—the same technology used to create computer chips—the researchers shaped the biorubber into different hill and valley profiles at nanoscale dimensions. After testing them on intestinal tissue taken from pigs, they selected the stickiest profile, one with pillars spaced just wide enough to grip and interlock with the underlying tissue.

Karp then added a very thin layer of a sugar-based glue to create a bond strong enough to attach even to a wet surface. The resulting bandage “is something we never expect to remove,” said Karp. Because of that difference, he continued, “we’re not mimicking the gecko”—which has sticky feet but can still lift them up to walk—“we are inspired by the gecko

to create a patterned interface to enhance the surface area of contact and thus the overall strength of adhesion.”

When tested against the intestinal tissue samples from pigs, the nanopatterned adhesive bonds were twice as strong as unpatterned adhesives. In tests of the new adhesive in living rats, the glue-coated nanopatterned adhesive showed a more than 100 percent increase in adhesive strength compared to the same material without the glue. Moreover, the rats showed only a mild inflammatory response to the adhesive, a minor reaction that does not need to be overcome for clinical use.

Among other advantages, the adhesive could be infused with drugs designed to release as the biorubber degrades. Further, the elasticity and degradation rate



GRAPHICS COURTESY / EDWIN CHAN AND DAVID CARTER

MIT’s gecko-inspired medical adhesive consists of a “biorubber” base patterned to have pillars that are less than a micrometer in diameter and three micrometers in height. Layered on top is a thin coating of a sugar-based glue. Tests in live rats suggest that the adhesive could be an effective operating-room tool for closing surgical wounds.

of the biorubber are tunable, as is the pillared landscape. This means that the new adhesives can be customized to have the right elasticity, resilience and grip for different medical applications.

“This is an exciting example of how nanostructures can be controlled and, in so doing, used to create a new family of adhesives,” said Langer.

Other MIT authors of the paper are co-first authors Alborz Mahdavi, a former MIT lab technician now at the California Institute of Technology; Lino Ferreira, a former MIT postdoctoral fellow now at the University of Coimbra, Portugal; Jason W. Nichol and Edwin P. Chan, HST postdoctoral fellows; HST doctoral student Chris Bettinger; and MIT graduate students Siamrut Patanavanich, Loice Chignozha, Eli B. Joseph, Alex Galakatos and Seungpyo Hong, all from the Department of Chemical Engineering.

The work was funded by the National Institutes of Health, the Materials Research Science and Engineering Center (MRSEC) program of the National Science Foundation, and the MIT-Portugal program.



PHOTO / DONNA COVENEY

Institute Professor Robert Langer and Professor Jeffrey Karp of Harvard-MIT Health, Science and Technology show off their gecko-inspired adhesive.

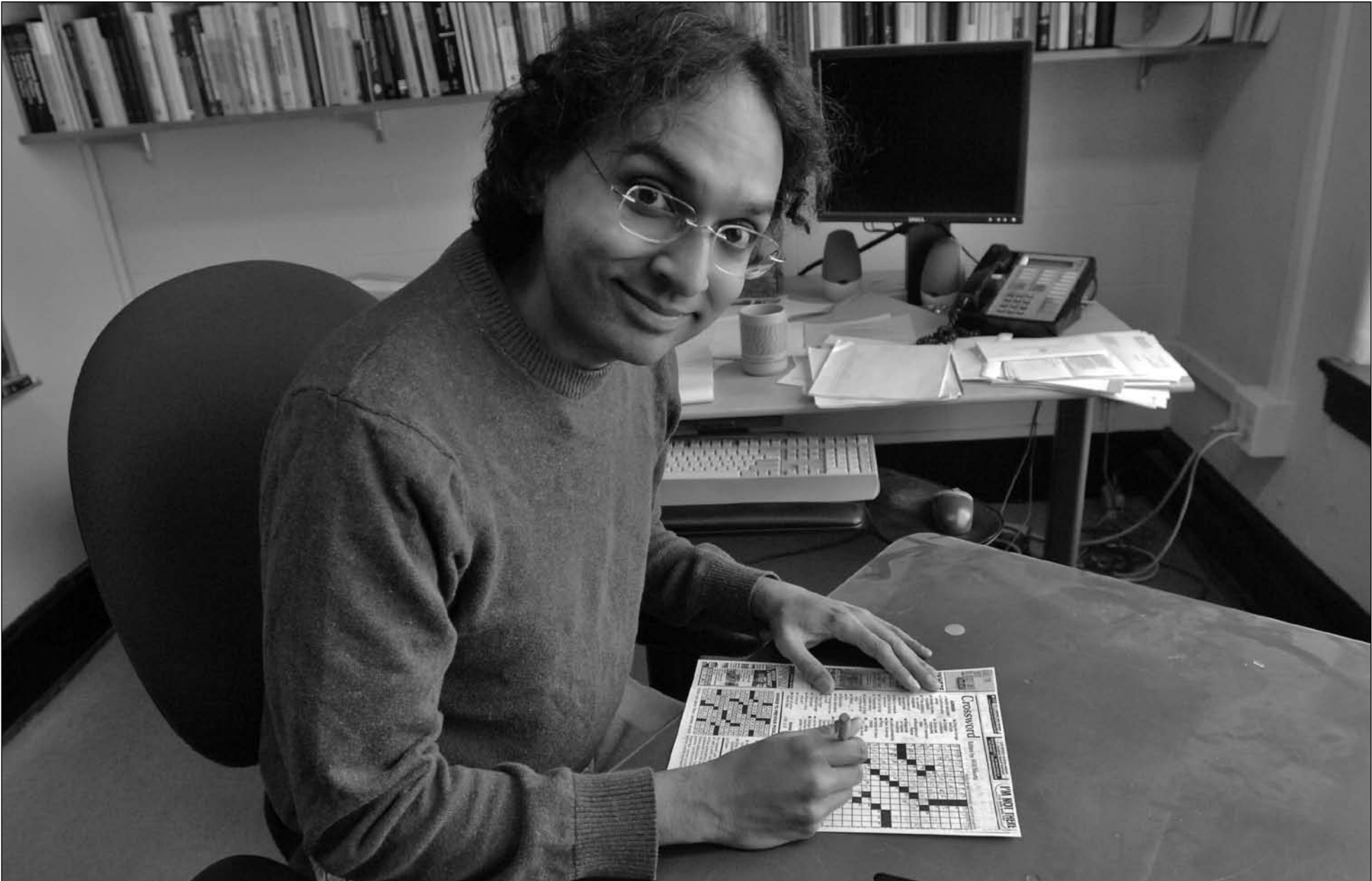


PHOTO / DONNA COVENEY

Math professor and crossword puzzle fiend Kiran Kedlaya works on Friday's New York Times puzzle. He will compete in the American Crossword Puzzle Tournament on March 1.

MIT's crossword king girds for annual battle of wits

Anne Trafton
News Office

A surprising number of crossword puzzle fans have backgrounds in math, computer science or some other technical field. That's certainly the case at MIT, where graduate students in the math department gather most weekday afternoons over tea to tackle The New York Times crossword puzzle.

Teamwork is encouraged, but one person usually stays on the sidelines: associate math professor Kiran Kedlaya, a champion crossword puzzle solver who could likely finish the puzzle by himself in less than 10 minutes.

"They won't let him join, because he's too good," says Michael Sipser, head of the math department.

Kedlaya, one of the top crossword solvers in the United States, is heading to Brooklyn, N.Y., this weekend for his 11th appearance in the American Crossword Puzzle Tournament.

Kedlaya studies number theory and algebraic geometry in his academic life; he enjoys crosswords because they let him combine his math skills with his interest in words and language.

"When I do crosswords, I'm using a part of my brain I don't get to use much in my job," says Kedlaya, who also composes puzzles for MIT's Mystery Hunt, held during IAP.

His best crossword tournament finish was in 2006, when he came in second place. He began doing crossword puzzles seriously in college, then started going to the tournament, made famous in the 2006 documentary "Wordplay," while a grad student at MIT.

Kedlaya finished fourth in 2005, the year the tournament was filmed for "Wordplay," and makes a couple of brief appearances in the movie.

To get ready for the tournament, Kedlaya does two or three crossword puzzles a day, mostly from The New York Times. Practice is critical to improve speed and perform well in the tournament, he says.

"Some people might be naturally good at crosswords, but you don't get to be this fast without training," says Kedlaya.

"There's something similar to athletic training going on here. People are getting into shape, doing their daily puzzles, trying to get psyched up."

The New York Times crossword puzzles, which get more difficult as the week goes on, are the gold standard by which puzzle solvers judge themselves. For a really good solver, Monday's puzzle would take about three minutes, while Friday and Saturday puzzles would take seven to 10 minutes, says Kedlaya. Sunday's puzzle, which is larger, could take eight to 15 minutes.

Unlike Scrabble, another game popular with math-oriented people, crossword puzzles require knowledge of word meanings. Kedlaya suspects that is why they appeal to disparate groups of people like mathematicians and computer scientists, writers and editors, and musicians.

"There seems to be some conflation between math skills, music skills and language skills," he says.

The national tournament draws several hundred people and is the pre-eminent event for crossword puzzle solvers. Competitors solve seven puzzles during the first day of the event, with a 15-minute time limit for each one. The atmosphere can get pretty intense, Kedlaya says.

"It's like taking the SAT," he says. "Everyone is in there working on their paper. Nobody is talking."

The solvers with the top three scores (fastest times and fewest mistakes) compete in the final round, held on the second day. In that round, which Kedlaya reached in 2006, finalists solve the puzzles on large easels at the front of an auditorium, wearing headphones to block out the color commentary broadcast to spectators.

"It is pretty stressful," Kedlaya says. "You're standing in front of a room of more than 500 people, writing on an easel that is sturdy, but not completely sturdy. If you hit it too hard, it shakes."

Teaching in front of a large classroom is excellent practice for this, he says.

For the past three years, 23-year-old Tyler Hinman has won the tournament. However, Kedlaya says he's confident about his own chances going into the tournament this year. "There are a number of solvers that have a shot at the top place, and I'm in that group," he says.

NY Times, Thu, Nov 27, 1997 Kiran S. Kedlaya / Will Shortz

ACROSS

- 1. Radio station supply
- 6. Dismay
- 10. Louis who was guillotined
- 13. Flu ward sound
- 14. "You said it!"
- 15. Regular Cosmo feature
- 16. Betraying, briefly
- 18. Lhasa ____ (dog)
- 19. Colony member
- 20. Strove (for)
- 21. Told (on)
- 23. Advance
- 24. Antigun lobbyist Brady
- 25. Congresswoman Waters
- 28. Respectful
- 31. Commencement
- 32. Wizards
- 33. Prevent
- 34. Four on a four, e.g.
- 35. Tint
- 36. Coffee
- 37. Nationality suffix
- 38. Flapjack places, for short
- 39. Punished, perhaps
- 40. Like some pizzas
- 42. Punish, perhaps
- 43. Speak monotonously
- 44. Soothing instrument
- 45. Knee/ankle connector
- 47. Glow
- 48. "Look here!"
- 51. Eager
- 52. It indicates what's happening, briefly
- 55. Womanizer
- 56. Raison d' ____
- 57. Bud Grace comic strip

1	2	3	4	5	6	7	8	9	10	11	12
13					14				15		
16					17				18		
19				20				21	22		
			23				24				
25	26	27				28				29	30
31					32					33	
34					35				36		
37				38					39		
40			41					42			
			43				44				
45	46					47			48	49	50
51					52	53			54		
55					56			57			
58					59				60		

© 1997, The New York Times

- 58. Unified
- 59. Antique store tag
- 60. Kind of statement

DOWN

- 1. Arp art
- 2. What a model might become
- 3. Barricade, with "in"
- 4. Inner ear
- 5. In the black, like a dry cleaner?
- 6. Sent, in a way
- 7. Within
- 8. Form of Buddhism
- 9. Currier or Ives
- 10. Start playing, briefly
- 11. Tight gripper
- 12. ____ Lacoste
- 15. Mideast nation
- 17. "____ kleine Nachtmusik"
- 22. God shown with a burning torch
- 23. "Fairy tales"
- 24. Utah lilies
- 25. Two-wheeler
- 26. Liqueur flavor
- 27. Two-wheeler, briefly
- 28. "Lord of the Flies" leader
- 29. Object of contemplation?
- 30. Business
- 32. Bullwinkle, for one
- 35. Waters off Hong Kong
- 36. Green shade
- 38. Pop star, say
- 39. Wine orders
- 41. Bluenose
- 42. Lighting specialist, informally?
- 44. Crescents
- 45. Betting game
- 46. Tolstoy hero
- 47. Prefix with culture
- 48. "Yikes!"
- 49. Son, usually
- 50. Farm team
- 53. "____ a Joke, Son" (1947 flick)
- 54. Big inits. in credit reporting

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Kedlaya created this crossword puzzle for The New York Times. See next week's issue of Tech Talk for the answers.

HR @ Your Service



Professional development is critical if employees are to keep growing in their work lives. It is something that a great workplace values and certainly benefits from as these individuals return to the workplace with new experiences and insights.

MIT has relationships with two excellent professional development programs for employees of color—the Partnership Inc. and the YMCA Black Achievers. Participants of these programs are sponsored by Human Resources.

The Partnership's Associates Program trains young professionals to develop their leadership capacity by creating professional and civic opportunities in the early stages of their careers. The Fellows Program trains mid-career professionals to expand their leadership capacity. Several MIT staff members have participated in this program, and Chancellor Phillip Clay is a member of the board of directors. MIT staff members Karina Vielma and Rashmi Tiwari are two of the 2008 awardees, which comes as no surprise when you read about their contributions to the MIT community.

Vielma is an assistant dean in the Office of Minority Education and was nominated by Associate Dean and Director Karl Reid, a 2000 Partnership alumnus. In his nomination letter, Reid described Vielma as a creative and systematic thinker with great empathy for students. Her accomplishments include formalizing the Office of Minority Education's Student Advisory Council, conceiving and designing the office's graduate pipeline Laureates and Leaders Program, and suggesting new minority-student events for campus preview weekend. Vielma says she takes "pride in producing opportunities for undergraduate, underrepresented students in the math, science and engineering fields."

The second Partnership associate, Rashmi Tiwari, is a program coordinator and analyst in the Office of Community Development and Substance Abuse Programs. Associate Dean Daniel Trujillo, a 2007 Partnership alumnus, noted in his nomination letter that Tiwari has played a key role in the strategic planning for assessment and evaluation across the Division of Student Life. Her ability to communicate and practically apply research and evaluation strategies for others is remarkable. In addition, Tiwari creates connections across departments at MIT and functions as a mentor. Tiwari would eventually like to "focus her work on how group membership affects individual behavior, as this topic area would have utility across a wide swath of educational and business areas."

The YMCA Black Achievers Program recognizes black professionals and connects these individuals with YMCA youth. The program aims to promote mentoring relationships and create channels for continued community involvement by business and industry. Awardees are asked to volunteer 40 hours in youth programs over a 10-month period.

Since 1979, numerous MIT faculty and staff have been recognized as Black Achievers. This year's recipient, Marlisha McDaniels, executive assistant in the Institute for Soldier Nanotechnologies, carries on this tradition. Arnold R. Henderson Jr., associate dean and co-director of Student Support Services, nominated McDaniels, who has been at MIT since 1987. McDaniels has consistently served as an invaluable supporter of student, faculty and administrators who have sought to improve the MIT community and make it more inclusive. McDaniels has given 14 years of dedicated support to the Martin Luther King Celebratory Breakfast, which, due to her efforts, is one of the most eagerly anticipated events of the year. She has served as a liaison for student groups and administrators and has worked closely with corporations to help them recognize minority students who are seeking employment. McDaniels notes that it has become "an important part of my life to share what I have learned with others and give back to the community."

Three exceptional MIT employees who are growing and giving back. Think about who you might nominate for next year.

HR @ Your Service is a monthly column from Human Resources.



PHOTO / TALI HATUKA

In one image from the new DUSP exhibit, 'Urban Design and Civil Protest,' a crowd has appropriated a prestigious public space in London as part of a 2007 peace protest. Exhibit creator Tali Hatuka uses visual and other media to explore how urban space is used as an instrument for civil protests. The exhibit opens Feb. 28 in the Compton Gallery.

DUSP show eyes urban design, civil protest

"Urban Design and Civil Protest," a new exhibition conceived as a multimedia laboratory for examining the social and spatial dynamics of protests, will be on view from Feb. 28 to June 9 in the MIT Museum Compton Gallery.

The exhibit, created by visiting architect and urban designer Tali Hatuka, celebrates the 75th anniversary of MIT's Department of Urban Studies and Planning.

Hatuka's study of urban protests

includes a lexicon of their different shapes—they occur in circular, grid and concentric forms—and a code for identifying key moments during protests when the outcome turns to violence. In addition, the voices and faces of people engaged in protest bring the process alive for viewers: A sound installation from various events plays individual and crowd voices in public space; a video screen projects messages, slogans and banners from protests around the world and still photographs capture

singular, intimate moments in a protesting crowd.

The Marie Curie Research Fellow in urban studies and planning, Hatuka received the PhD from Technion, the Israel Institute of Technology. Her research awards include the European Community Marie Curie Fellowship (2005-2008) and a Fulbright Postdoctoral Fellowship (2004-2005).

The Compton Gallery is free and open daily 10:00 a.m. to 5:00 p.m.



MIT in the world

Shedding a bright light on village needs

David Chandler
News Office

Bethel High School is a rural school in the tiny landlocked nation of Lesotho, which was once part of South Africa. The school draws students from many surrounding villages, and they live in dormitories during the school year. Though the winter temperatures often drop well below freezing, students in the dormitories only rarely have access to hot water, and the only power in the school comes from a diesel generator, which runs for about four hours a day to power a small computer lab, thanks to diesel fuel provided by the state.

The girls' dorm, however, now has an extra amenity, thanks to work that some MIT students carried out during an 11-month stay last year. Amy Mueller and Matt Orosz, both graduate students in the Department of Civil and Environmental Engineering, designed and installed a concentrating solar array that provides the girls with plenty of hot water.

The system was built last year at MIT's D-Lab, with a lot of help from the D-Lab students. After initial testing here, just getting the components out to the remote site was quite an effort: the roadless community can only be reached by crossing a wide river on small boats, Mueller explains.

Nearby, in the tiny village of Ha Teboho, another concentrating solar heater that Orosz and Mueller installed near the communal village well also provides hot water on demand. "We can easily boil lots

of water even during freezing weather," Mueller says. But that's just the beginning of their ambitious project.

The two students, along with others at MIT and local co-workers in Lesotho, have formed an organization called Solar Turbine Group International. Their original plan was for the systems to provide electrical power using Rankine-cycle heat-powered engines, with hot water just an extra bonus. But in their work in the field they encountered numerous mechanical problems with the engine, and they decided to return to MIT to work out the bugs under more-controlled laboratory conditions.

"The arrays performed satisfactorily, but the engines did not," says Orosz. To fix the problems, "we figured we could make headway faster in this environment than over there."

In a return visit to Lesotho this summer, they plan to add a more robust version of the generator to the large trough-shaped mirror systems, enabling them to produce enough power to recharge cell phones and batteries.

The initial systems are prototypes, designed to be relatively easy to build from inexpensive materials. The engine system, which works essentially like an air conditioner in reverse, is built largely from off-the-shelf car parts that are readily available near the site and can easily be repaired by local mechanics.

After a bit more experience with actually setting up and operating the systems in the villages, the Solar Turbine Group's plan is for local workers who have been collaborating on the project to take over manufacturing and launch a locally based business to produce the units for installation throughout the country.

"We already built a machine shop there and hired local technicians and engineers," Orosz says. "We've set up the seed of a company" that hopefully will become self-sustaining, he says, providing a useful product and generating local income.

The systems are designed to be competitive with existing solar photovoltaic systems or diesel generators for producing power, and provide the added bonus of hot water. Orosz hopes the systems will ultimately cost 10 percent to 15 percent less than the other systems for power alone.

"If the price is even in the ballpark of photovoltaics, we've won," says Mueller, "because you get lots of hot water as well."

In the World is a new column that explores the ways people from MIT are using technology—from the appropriately simple to the cutting edge—to help meet the needs of local people in places around the planet. If you know of a good example and would like the News Office to write about it, please e-mail dlc1@mit.edu.



PHOTO COURTESY / SOLAR TURBINE GROUP

Villagers in Ha Teboho, in the southern African nation of Lesotho, gather to learn about a new concentrating solar generator and hot water system installed by MIT students.



PHOTOS / DONNA COVENEY

Jamira Cotton, a senior in chemical engineering, and Kenneth Kweku Bota, a graduate student in chemistry, speak at the 34th Annual Dr. Martin Luther King Jr. Celebration breakfast, held at Walker Memorial on Thursday, Feb. 21.

MLK

Continued from Page 1

done,” said Cotton, a chemical engineering student. “Our challenge as a higher institution is to ensure that every student is receiving the best education they need for what they must do.”

Kenneth Kweku Bota, second-year graduate student in the Department of Chemistry and the Whitehead Biomedical Institute, pointed out glaring inequalities between Cambridge’s twin academic towers—MIT and Harvard—and dilapidated public schools across the river in Dorchester, Mattapan and Roxbury.

“Here at MIT, we have literally thousands of books, computers and resources at our immediate disposal. However, no matter how smart and innovative we are in using them, we will not achieve and witness the full spirit of Dr. King unless we begin to commit ourselves to helping those who are less fortunate than we are,” Bota said.

Keynote speaker, Boston community activist and Harvard-MIT Division of Health Sciences and Technology alumnus the Rev. Dr. Ray Hammond, a physician and founding pastor of Bethel African Methodist Episcopal Church in Boston, told the breakfast audience that much had been done to achieve the change envisioned by Dr. King, but much more work remained.

Hammond spoke in detail about ways in which colleges and universities can and must create more diverse and inclusive environments. He cited a model developed by Uri Treisman at the University of California in the late 1970s aimed at reducing the rate of failure among black and

Hispanic students in calculus courses. The model, which involved creating multi-ethnic student workgroups, dramatically improved academic performance among black and Hispanic student participants.

“It’s a model that suggests we are cheating all of our students when we fail to work hard at developing diversity in the research university,” Hammond said.

Hammond, a native of Philadelphia, is well known in the Boston area for his leadership and involvement in community and

“
*We cannot be satisfied
until, to everyone who earns
a place at MIT, we are a
community that says not,
‘You’re lucky to be here,’
but rather, ‘We’re lucky you
came.’*
MIT President Susan Hockfield

youth activities. He is chair and co-founder of the Ten Point Coalition, an ecumenical group of clergy and lay leaders working to prevent violence and mobilize the Greater Boston community on behalf of at-risk youth. He also serves as executive director of Bethel’s Generation Excel program, chair of the Boston Foundation and vice president for membership of the Boy Scouts Minuteman Council in Boston.

Audience members reacted positively to Hockfield’s call for greater change and to her plan for a diversity congress.

Newly appointed Associate Provost for Faculty Equity Wes Harris, Charles Stark Draper Professor of Aeronautics and Astronautics, said Hockfield’s remarks “captured very well where we are today in terms of MIT’s faculty of color” and showed the potential for “substantive change” on matters related to diversity at the Institute.

“I have not seen MIT with this level of activity directed toward—and these are my words—transformational behavior when it comes to faculty of color in my 30-odd years of serving here in this community,” Harris told the MIT News Office.

Paula Hammond, the Bayer Professor of Chemical Engineering and member of a special committee investigating faculty race issues at MIT, said she was very encouraged by Hockfield’s acknowledgment, which she described as a necessary first step toward progress.

Hammond also said she was excited about the president’s proposal to bring together a broad group of leaders from MIT in the form of the Diversity Leadership Congress.

“[The congress] will bring together people from different leadership levels and will make the issue of diversity a key topic of discourse on campus. I really think she is putting this issue at the forefront of the ones we need to tackle at MIT, and this essentially initiates that process,” Hammond told the News Office. “It will become something that we can all unify around and begin to address as core to MIT’s intellectual capital.”

Five win MLK Leadership Awards

Sarah H. Wright
News Office

Five members of the MIT community have won Dr. Martin Luther King Jr. Leadership Awards for 2008 in recognition of service that reflects the late civil rights leader’s ideals and vision.

Winners Zina Queen, administrative assistant in the George R. Harrison Spectroscopy Laboratory, Ali S. Wyne, a senior majoring in management, and Lorlene Hoyt, assistant professor in urban studies and planning, were nominated by colleagues and selected by the MLK Planning Committee.

This year, the MLK Committee also presented MLK Leadership Awards to Physics Professor Michael S. Feld SB ’63, SM ’63, PhD ’67 and former Associate Dean for Undergraduate Education Leo Osgood Jr.

Chancellor Phillip Clay PhD ’75 recognized the winners at the MLK Breakfast Celebration on Feb. 21.

Queen was nominated by her colleagues, including a former MLK Leadership Award winner, for her commitment to fairness for all MIT employees and her willingness to volunteer on committees charged with improving the quality of work life for support staff.

“Receiving the MLK Leadership Award means the world to me,” Queen said. “We live and grow together as a community. When I use those words, I don’t just mean black and white. I’m speaking about diversity with different ethnic backgrounds, diversity of gender and, most of all, diversity here at MIT as an institution of higher learning. Yes, I too have a dream.”

Fellow students cited Wyne, vice president of MIT’s Undergraduate Association and a prolific opinion writer for The Tech, for embodying King’s spirit and qualities of leadership.

Wyne has worked on campus activities to promote awareness of international development and the ethical implications of technology; he is engaged in interfaith dialogue on campus, and he is an organizer of the Global Poverty Initiative, an undergraduate student project, they noted.

For Wyne, celebrating King’s vision means celebrating ordinary and extraordinary people. “The civil rights movement began as a conversation between two ordinary people. Had it not been for thousands who were harassed, beaten and killed, the world may never have known what King’s dream was,” he said.

As director of the MIT@Lawrence program, Hoyt has broadened DUSP students’ opportunities for on-site, practical work in Lawrence, Mass. Nominating materials cited Hoyt’s leadership in working across racial and ethnic lines to bring a wide spectrum of MIT resources to an impoverished community.

“I am honored to accept this award and do so on behalf of the residents and civic leaders in the city of Lawrence as well as countless students, staff and faculty throughout the Institute who are the lifeblood of MIT@Lawrence and the embodiment of Dr. Martin Luther King Jr.’s ideals,” Hoyt said.

The MLK Committee cited Feld and Osgood for their co-leadership of the MLK Committee over the past decade and their instrumental roles in establishing the MLK Visiting Professor program.

Feld, professor of physics and director of the spectroscopy laboratory, is a former chair of MIT’s Equal Opportunity Committee. He began his teaching career at MIT in 1968.

Osgood received BS and MS degrees from Northeastern University in 1970. He came to MIT in 1977, serving as head basketball coach and in various senior leadership roles, including director of the Office of Minority Education, until his retirement.



PHOTO / DONNA COVENEY

MIT alumnus Rev. Dr. Ray Hammond, left, President Susan Hockfield and Dean for Undergraduate Education and Associate Dean and Director of the Office for Minority Education Karl Reid attend the 34th Annual Dr. Martin Luther King Jr. Celebration breakfast at Walker Memorial on Thursday, Feb. 21. Hammond gave the keynote address.