



Volume 53, Number 23
Wednesday, April 29, 2009

TechTalk

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



Growing more sustainable

Postdoctoral associate Luiz Godoy won the first Sustainability at MIT Photo Contest for this image, which he titled "AdMITting Green." Read more about the winning image on page 2.

6 elected to NAS

MIT faculty are among the 90 new members, associates

Six MIT faculty members are among the 72 newly elected members and 18 foreign associates of the National Academy of Sciences in recognition of their distinguished and continuing achievements in original research.

Election to the NAS — a private organization of scientists and engineers dedicated to advancing science and its use for the general welfare — is considered a top honor for those in the science and engineering fields. Established in 1863, the NAS acts as an official advisor to the federal government, upon request, in any matter of science or technology.

The new NAS members from MIT are:

- Tyler Jacks, the David H. Koch Professor of Biology in the Department of Biology, and director of the David H. Koch Institute for Integrative Cancer Research at MIT. Jacks is also a Howard Hughes Medical Institute investigator;
- John Joannopoulos, the Francis Wright David Professor of Physics in the Department of Physics, and director of the Institute for Soldier Nanotechnologies;
- Monty Krieger, the Whitehead Professor of Molecular Genetics in the Department of Biology;

►Please see NAS, PAGE 3

Washington taps MIT for experts, innovation

Moniz named to Obama's science and technology advisory council

MIT Energy Initiative Director Ernest J. Moniz is among the 20 leading U.S. scientists and engineers selected to serve on President Barack Obama's Council of Advisors on Science and Technology (PCAST).

PCAST will advise the president and vice president on science issues and help formulate policy. As announced in December, the group will be co-chaired by John Holdren '65, SM '66, assistant to the president for science and technology and director of the White House Office of Science and Technology Policy; Eric Lander, director of the Broad Institute of MIT and Harvard and one of the principal leaders of the Human Genome Project; and Harold Varmus, president and CEO of Memorial Sloan-Kettering Cancer Center, former head of the National Institutes of Health and a Nobel laureate.

"This council represents leaders from many scientific disciplines who will bring a diversity of experience and views," Obama said in a statement issued Monday, April 27. "I will charge PCAST with advising me about national strategies to nurture and sustain a culture of scientific innovation."

Moniz, the Cecil and Ida Green Professor of Physics and Engineering Systems, is director of the Laboratory for Energy and the Environment



Ernest Moniz

►Please see PCAST, PAGE 2

DOE to establish two Energy Frontier Research Centers at MIT

MIT will be home to two of 46 new multimillion-dollar Energy Frontier Research Centers (EFRCs), the White House announced this week.

The EFRCs, which will pursue advanced scientific research on energy, are being established by the U.S. Department of Energy Office of Science at universities, national laboratories, nonprofit organizations and private firms across the nation.

The EFRC program will provide \$19 million to fund the Center for Excitonics at MIT, which will be directed by Marc A. Baldo, associate professor of electrical engineering and a principal investigator in the Research Laboratory for Electronics. The center aims to understand the transport of charge carriers in synthetic disordered systems, which hold promise as new materials for converting solar energy to electricity and for electrical energy storage.

The EFRC program will also supply \$17.5 million to fund the Solid-State Solar-thermal Energy Conversion Center at MIT, which will be directed by Gang Chen, the Warren and Townley Rohsenow Professor of Mechanical Engineering and director of the Pappalardo Micro and Nano Engineering Laboratories. The center's objective is to create novel solid-state materials for the conversion of sunlight and heat into electricity.

"As global energy demand grows over this century, there is an urgent need to reduce our dependence on fossil fuels and imported oil and curtail greenhouse gas emissions," said U.S. Secretary of Energy Steven Chu. "Meeting this challenge will require significant scientific advances. These Centers will mobilize the enormous talents and skills of our nation's scientific workforce in pursuit of the breakthroughs that are essential to make

►Please see EFRC, PAGE 7

PEOPLE

Back to the future

John Ochsendorf to discuss how looking to the past can help engineers designing for the future.

PAGE 2

RESEARCH & INNOVATION

Knocking down a theory

MIT researchers use genomic tools to show that cilia probably did not originate as a separate organism.

PAGE 4

NEWS

Engineering tops rankings

MIT fared well again in the U.S. News & World Report's rankings of graduate programs.

PAGE 7

Awards & Honors



Sloan faculty appointed as CBO economic advisors

Associate Professor of International Management Kristin Forbes and Simon Johnson, the Ronald A. Kurtz Professor of Entrepreneurship, were recently named economic advisors for the Congressional Budget Office.

CEE web site recognized by Webby Awards

The Department of Civil and Environmental Engineering web site has been named an Official Honoree of the 2009 Webby Awards. The awards are presented each June in New York by the International Academy of Digital Arts & Sciences and are often referred to as the "Academy Awards" of the Internet. Of the nearly 10,000 entries from all 50 states and 60 countries, the judges select five from each category as Official Nominees. The department's site can be viewed at <http://cee.mit.edu/>.

Student photographer earns accolade for image

An image taken by Eric Schmiedl, a senior in the Comparative Media Studies program, will be included as part of a web gallery for American Photography 25, one of the most prestigious photo competitions in the country. Fewer than 1 percent of the 10,000-plus images submitted were chosen for the honor. Schmiedl's image was originally taken for the cover of a student-driven calendar meant to raise money for an Institute scholarship.

Keten receives materials research award

Department of Civil and Environmental Engineering PhD student Sinan Keten won the prestigious Silver Award at the Materials Research Society's (MRS) spring meeting in San Francisco recently. MRS Graduate Student Awards honor and encourage graduate students whose academic achievements and current materials research display a high level of excellence and distinction and who show promise for significant future achievement in materials research.

PCAST: Moniz named to Obama's team

Continued from Page 1

at MIT. His research centers on energy technology and policy, including the future of nuclear power, coal, natural gas and solar energy in a low-carbon world.

Moniz served as under secretary of the Department of Energy (1997-2001) and associate director for science in the White House Office of Science and Technology Policy (1995-1997).

Other members of the council include Maxine Savitz PhD '61, retired general manager of Technology Partnerships at Honeywell Inc., and Shirley Ann Jackson '68, PhD '73, president of Rensselaer Polytechnic Institute and former chair of the U.S. Nuclear Regulatory Commission.

Back to (basics for) the future?

Ochsendorf to discuss intertwining of engineering's past, future

Patrick Gillooly
News Office

Regulation of carbon emissions could pose a significant challenge to the way engineers design products, cities and more, but a solution may be as simple as using archaic building materials such as soil, says MIT Associate Professor John Ochsendorf.

This idea is just one of many that Ochsendorf will explore during the Morison Prize lecture, being held at 2 p.m. on Friday, May 1, in the Bartos Theater. His lecture, titled "Engineering for the Ecological Age: Lessons from History," will examine ways engineers can utilize the past when designing for an environmentally conscious future.

"For thousands of years people were building with soil," says Ochsendorf, the Class of 1942 Associate Professor of Building Technology. "But as engineers today, if you were thinking of building a new building, dirt wouldn't be the first thing that comes to mind. However, in some applications it makes sense."

"If we start to consider the health of the planet as a whole in our designs," he adds, "it may cause us to re-evaluate what we are designing and what is appropriate for a planet that has constrained carbon emissions, for example."

Trained as a civil engineer at Cornell, Princeton and Cambridge, Ochsendorf's research focuses on the safety of historical structures and the design of more sustainable infrastructure. He is a recipient of a Rome Prize and a MacArthur "genius" grant.



PHOTO COURTESY OF THE MACARTHUR FOUNDATION

John Ochsendorf

The lecture is delivered by the winner of the Morison Lecture and Prize in Science, Technology, and Society, which recognizes the accomplishments of an individual who has made major contributions at the interface between science and technology on the one hand and matters of societal concern on the other.

MIT's new faculty work/life web site

MIT faculty members looking for support in the area of work/life balance now have a new resource at their disposal: a single MIT web site that pulls together much of the information that was previously scattered across multiple sites.

The site, <http://web.mit.edu/facultyworklife>, offers information on such matters as health and wellbeing, life outside of MIT, housing and commuting, and retirement and financial planning — specifically for faculty. Created by the Center for Work, Family and Personal Life, the MIT Faculty Work/Life web site is a complement to the Faculty Resources site maintained by the Provost's Office, which focuses on supporting the professional needs of faculty.

The site was made possible by a generous donation from an alumnus; Institute Professor Daniel I.C. Wang '59 designated how the gift should be used.

One of the unique features of the site is "Finding Community," which includes a "Living in Boston" section, with links for black and African-American faculty and their families; Hispanic and Latino faculty and their families; Asian and South Asian faculty and their families; and American Indian faculty and their families. It also highlights resources for lesbian, bisexual, gay and transgender faculty and their families and resources for faculty with disabilities and their families. In addition, there are networking and mentoring links.

Along with providing a gateway to these resources, another goal of the site is to increase both internal and external awareness of the many facets of work/life. It is hoped the site can also serve as a recruiting tool, as it demonstrates that all are



welcome at MIT, and it promotes the value of balancing work and life for MIT faculty. The benefits of doing so are clear, as President Susan Hockfield notes on the site's homepage: "Helping faculty members find a comfortable work/life balance fuels their creativity, fosters their extraordinary teaching and research, and strengthens the MIT community."

Postdoc wins Sustainability at MIT Photo Contest

Postdoctoral associate Luiz Godoy has won the Sustainability at MIT Photo Contest for his image of compact fluorescent light bulbs "growing" in Killian Court.

Godoy, who works in the laboratory of Professor Gerald N. Wogan, the Underwood-Prescott Professor of Toxicology emeritus and professor of chemistry emeritus, said he decided to enter the contest at the recommendation of a friend from the lab. During two consecutive weekends earlier this spring, he spent several hours strolling around MIT seeking sources of inspiration.

The inspiration hit while he was shopping and came across the light bulbs. "I thought, why not use them as a symbol of energy savings and green ideas and combine them with something that

represents MIT — and there's nothing better than the dome itself."

As the contest winner, Godoy takes home an iPod Touch, donated jointly by the MIT Energy Initiative and the Sustainability Program of the EHS Headquarters Office.

The Sustainability at MIT Photo Contest, launched in February, was sponsored by the MIT News Office and by the Campus Energy Task Force of the MIT Energy Initiative.

The contest organizers wish to thank all those who submitted entries, as well as the MIT community members who served as judges: Donna Coveney, Judy Daniels, Jason Dorfman, Peter Fisher, Patti Richards and Malaika Thorne.

The contest was open to all current MIT staff, students and faculty. Judges evaluated entries based on originality, aesthetics and relevance to the topic.

Learn more about the activities of the Campus Energy Task Force at <http://web.mit.edu/mitei/campus>.

HOW TO REACH US

News Office

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

Office of the Arts

web.mit.edu/arts



Printed on recycled paper

News Office Staff

- Writer.....David Chandler
- Assistant Director/PhotojournalistDonna Coveney
- Administrative Assistant IIPatti Foley
- News Manager.....Greg Frost
- Editorial & Production Asst.....Patrick Gillooly
- Web editor.....Melanie Gonick
- Administrative Assistant IIMary Anne Hansen
- Communications Assistant.....Jen Hirsch
- Senior designer.....Rebecca Macri
- Editorial Director.....Nate Nickerson
- Director of Communications, Advisor to the President.....Jason Pontin
- Director, Media RelationsPatti Richards
- Senior Writer.....Stephanie Schorow
- Senior Media Relations Officer, Research News.....Elizabeth Thomson
- Writer.....Anne Traflet

Editor

Greg Frost

Photojournalist

Donna Coveney

Production

Patrick Gillooly

Tech Talk is published by the News Office on Wednesdays during the academic year except for holiday weeks; no July and August issues. 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.



PHOTO / DONNA COVENEY

Institute Professor John Deutch smiles during a symposium held in celebration of his 70th birthday on Thursday, April 16, that featured scientists, academics and government officials who have worked with Deutch throughout his career.

A life of research and service

Symposium marks Deutch's leadership in teaching, administration and government

David Chandler
News Office

Even before he had completed his PhD work at MIT in the early 1960s, Institute Professor John Deutch was already getting calls from Washington asking him to step away from academia and enter government service, says his former thesis advisor Irwin Oppenheim, professor emeritus in the chemistry department.

"While he was writing his thesis, I remember spending most of my time fighting with the Pentagon, they kept saying they needed him," Oppenheim said on Thursday, April 16, after a symposium in celebration of Deutch's 70th birthday that featured several high-profile speakers from government service, academia and industry.

Deutch had attracted the attention of national leaders by doing a study that questioned — "quite correctly," Oppenheim said — the value of the Skybolt missile system then under development, which was cancelled as a result.

Deutch did eventually get called to

Washington service, both in the 1970s and the 1990s, serving four presidents in a variety of posts in the departments of defense and energy and as director of central intelligence — but only after he had already achieved tenure on the MIT faculty.

In addition to his government service and his teaching and research duties, which included 140 published papers in chemistry, Deutch has held important administrative posts at MIT. He served as head of the Department of Chemistry, dean of science, and provost under former President Paul Gray. In 1993, he was selected as an Institute Professor, the highest honor available to professors here.

Speaking at the celebration were longtime friends and colleagues including professor George Whitesides of Harvard, former Secretary of Defense and Secretary of Energy James R. Schlesinger, former Secretary of Defense Harold Brown, former National Security Advisor Brent Scowcroft, former Assistant Secretary of Defense Richard Perle and

former White House Chief of Staff John Podesta, former congressman Phil Sharp, Washington-based lawyer Linda Stutz, and Deutch's son Philip (who described himself as "Deutch 2.0" and whose talk featured a picture of his own two children, or "Deutch 3.0").

Whitesides, a longtime friend and colleague of Deutch, described him as "a person of gravitas" who has significantly helped to shape the course of academic science in this country, from "just working on puzzles, to working on important problems" that affect society.

In addition to several talks, the symposium featured two panel discussions on subjects related to Deutch's government positions: energy and national security.

Deutch himself, commenting at the end of the symposium, referred back to comments Schlesinger made during the energy discussion, talking about the limitations of solar and wind power. "The wind does not blow all the time, and the sun does not shine all the time," Deutch said. "But the wind always blows and the sun always shines on me here at MIT."

LEES to be merged into RLE

The Laboratory for Electromagnetic and Electronic Systems (LEES) will be merged into the Research Laboratory of Electronics (RLE) effective July 1, 2009, as part of a growing emphasis on energy-related research in RLE.

Researchers affiliated with LEES are pioneers in understanding both the theoretical basis of advanced electrical energy applications and the component, circuit and system technologies required to turn such theories into practical realities. They join other faculty in RLE who are pursuing world-leading energy-related initiatives in solar power, molecular electronics, organic and optoelectronic systems, and biologically inspired systems and devices.

RLE Director Jeffrey H. Shapiro, the Julius A. Stratton Professor of Electrical Engineering, said, "LEES researchers provide expertise in efficient electric energy production, distribution, utilization and storage, as well as in electromechanics from the nanoscopic to the macroscopic levels. Thus, their addition to RLE forms a natural fit to the major energy initiatives that our faculty are already leading. Together, these efforts will support MIT's commitment to have a profound impact on the global energy future."

RLE, founded in 1946, was the first of the Institute's great modern interdepartmental academic research centers. Today, RLE is one of MIT's largest such organizations, and among the most diverse MIT laboratories in its scope of intellectual interests.

NAS: Six faculty members named to National Academy of Sciences

Continued from Page 1

- Daniel Nocera, the Henry Dreyfus Professor of Energy and professor of chemistry in the Department of Chemistry;
- Gilbert Strang, professor of mathematics in the Department of Mathematics;
- Timothy Berners-Lee, the 3Com Founders Professor of Engineering in the School of Engineering and the Department of Electrical Engineering and Computer Science. Berners-Lee is also director of the World Wide Web Consortium. Berners-Lee was elected as a foreign associate.

Today's election brings the total active number of NAS members to 2,150, with 404 active, non-voting foreign associates.

The MIT News Office will publish the 2009 Institute Awards issue in print (MIT Tech Talk) and online on June 3 this year. The annual special section lists winners of annual awards, by department, along with photographs where available.

Complete information on how to submit awards is available at <http://web.mit.edu/newsoffice/awards.html>, but please note that the deadline is 5 p.m. on Friday, May 22, in order to be included in the awards issue.

Obituaries

Laszlo Tisza, renowned low-temperature theoretical physicist, 101

Laszlo Tisza, one of the founding fathers of low-temperature physics who taught at MIT for more than 30 years, died on Wednesday, April 15. He was 101.

Born in 1907 in Budapest, Tisza immigrated to the United States in 1941 and joined the MIT faculty. He taught at MIT until 1973, giving courses in theoretical physics, thermodynamics, quantum mechanics and statistical physics.

Tisza became famous for developing a model in 1938 that explained the unusual behavior of liquid helium, which results when helium gas is cooled to within a few degrees of absolute zero. Earlier that year, experiments had shown that below a certain temperature, liquid helium lost all of its viscosity and could flow through narrow channels with a complete absence of friction.

One of Tisza's colleagues, Fritz London, suggested that liquid helium at this temperature was related to a Bose-Einstein Condensate, a phase of matter based on theoretical calculations made by Albert Einstein in 1925, extending earlier work by Satyendra Nath Bose. One characteristic of a BEC is that all of the atoms march together in lockstep, unlike regular fluids in which atoms move around with random velocities.

Tisza went one step further than London, however, theorizing that the liquid helium had become a strange coexistence of two fluids — in short, that the atoms in the liquid were exhibiting both quantum and classical dynamical behavior. This first theory of two-fluid hydrodynamics became Tisza's signature contribution to the field, and had significant impact in subsequent decades as physicists sought to better understand superfluidity in liquid helium.

"He is the last of the founding fathers of our subject," said Professor Emeritus Allan Griffin of the physics department at the University of Toronto. "With London, Tisza was the first person to argue that superfluid helium was a quantum liquid — that it showed visible macroscopic features that could be directly related to quantum theory."



Tisza's first encounter with quantum mechanics was in 1928 when, as a mathematics student in Budapest, he transferred to the University of Göttingen and attended Max Born's course. There, he was delighted to see modern mathematics applied to the physical world and switched his major to physics. Later, Tisza worked in Leipzig under Werner Heisenberg, and, with Teller, wrote his first paper on molecular spectra. The same theme developed into a PhD thesis, submitted in Budapest. Tisza then joined Landau's group in Kharkov and was much influenced by Landau's innovative use of the thermodynamics in quantum systems. In fact, said MIT Department of Physics Head Edmund Bertschinger, Tisza was among the first physicists to pass Landau's famed "Theoretical Minimum" exam — a comprehensive test on theoretical physics that students were expected to pass before they could be admitted to Landau's school. Only a few dozen people ever passed.

Tisza was a fellow of the American Physical Society and the American Academy of Arts and Sciences, and a John Simon Guggenheim fellow. In 1966, he published the highly influential book "Generalized Thermodynamics."

"His wit and warmth will be missed," Bertschinger said of Tisza.

Analysis knocks down theory on origin of cell structure

Genomic tools show cilia probably did not originate as separate organism

David Chandler
News Office

Understanding how living cells originated and evolved into their present forms remains a fundamental research area in biology, one boosted in recent years by the introduction of new tools for genomic analysis. Now, researchers at MIT and Boston University have used such tools to put what they say is “the last nail in the coffin” for one theory about the origin of a basic structure in the cell.

In the process, by illuminating a key step in the initial evolution of a basic structure that still exists in most cells in the human body, it may help researchers understand how some of these components work. These include parts of the neurons that make up our brains, sperm cells that determine fertility, and basic elements of cellular reproduction.

Many biologists have thought that three of the basic structures within the kinds of cells that make up all animals and plants — called eukaryotic cells — started out as separate, independent organisms. Then, at some point, these merged with other primitive cells to produce a symbiotic unit. But new evidence strongly contradicts that origin for one of those structures.

Eukaryotes are cells that have a nucleus within them: a membrane-surrounded kernel at the cell's center that contains its genetic material, DNA. These are the cells that make up virtually all of the complex, multicellular life on Earth, and they differ from the smaller, more primitive prokaryotes (bacteria and archaea), which have no such internal structure and whose DNA floats freely within their outer membranes.

The idea that the eukaryotic cell's nucleus originated as a separate organism, initially greeted with skepticism decades ago, is now a mainstream view though still not universally accepted. The process is known as

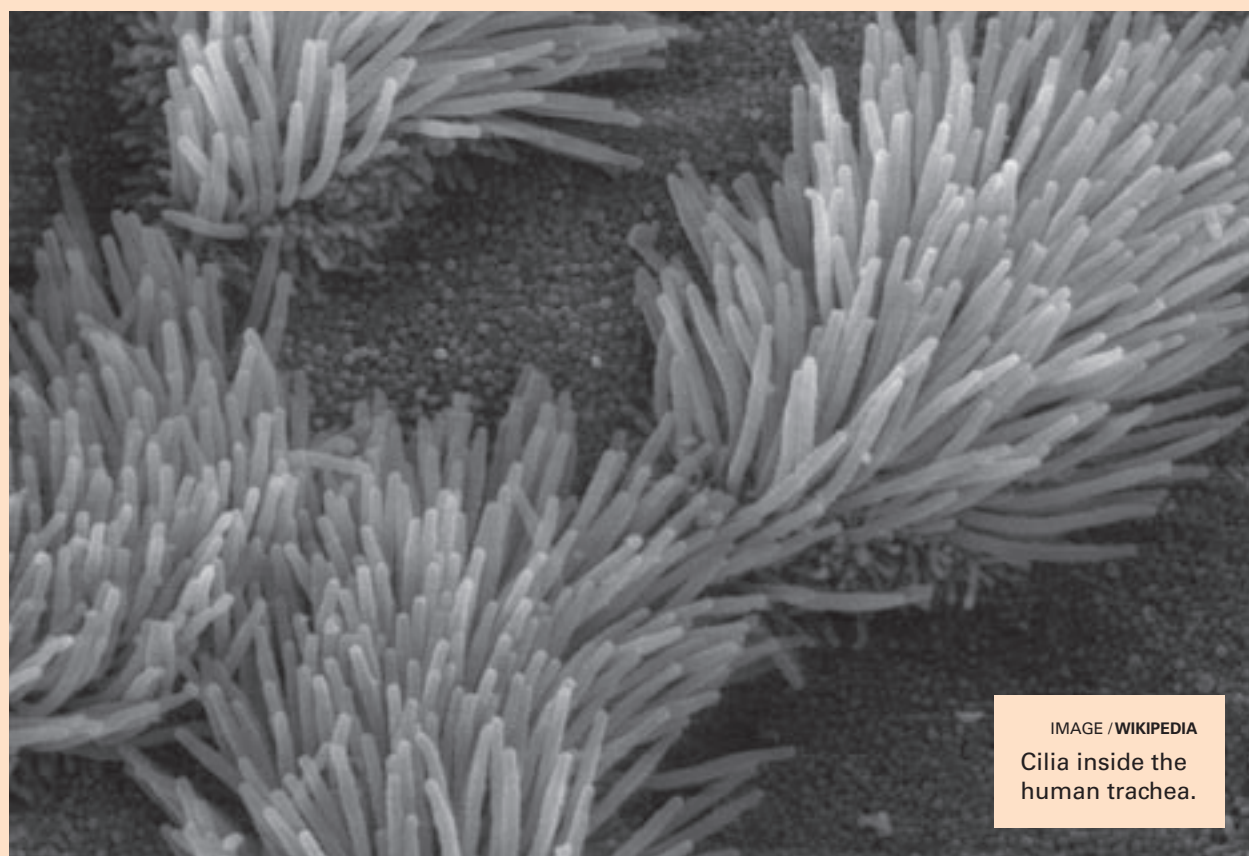


IMAGE / WIKIPEDIA
Cilia inside the human trachea.

endosymbiosis.

Similarly, other structures within such cells — tiny subunits called mitochondria, which produce all of the cell's energy — are now generally believed to have originated as separate organisms. And a third type of structure in eukaryotic cells, called cilia, the tail-like structures that enable them to move or to sense their environment, are also thought by many biologists to be yet another example of endosymbiosis.

But the new analysis by Hyman Hartman, visiting scientist in MIT's Center for Biomedical Engineering, and Temple Smith of Boston University, published in the April issue of the journal *Cell Motility and the Cytoskeleton*, provides strong evidence that this idea cannot be true for the origin of cilia. They found that genes that produce the cilia have unique characteristics that are not present in the kinds of simple cells that would have led to the symbiotic union. That suggests that cilia may have originated earlier, within the evolving cell, through a process that remains to be understood.

In short, these cell structures must not have arisen through mergers and acquisitions, as the other cell components were, but were developed in-house.

The paper describing the new findings was designated a “must read” by the Faculty of 1,000, an online service whose users select what they think are the most

important research papers out of the scientific journals. Linda Amos, a biologist at the Medical Research Council's Laboratory of Molecular Biology in Cambridge, England, said she selected the paper for that recognition “because it suggests a likely route for a crucial step in the evolution of eukaryotes from prokaryotes.”

Amos said others had suggested “that the cilium itself might have once been an independent free-swimming prokaryotic cell that a pre-eukaryote could have taken over in a similar way to the mitochondrion, by engulfing it.” But the new research “makes it much more likely that the cilium with its complicated array of specialized dyneins [proteins] developed gradually within the same cell type that eventually itself became the ancestral eukaryote.”

That development process, Hartman says, may be related to the evolution of mitosis, the process of cell division that is the basis of all plant and animal reproduction, and unraveling its origins could help in understanding this fundamental process.

“It's a big advance,” he says. It provides “evidence for a very long history of something that was there before” the origin of the kind of cells that made all advanced life possible. If this analysis is confirmed, he says, “understanding the cilia is now going to become one of the great projects” for biologists to pursue.

Chemists synthesize fungal compound with anti-cancer activity

Anne Trafton
News Office

Ten years ago, William Fenical of the Scripps Institution of Oceanography isolated from an ocean-living fungus a compound that has since shown the ability to kill cancer cells in the lab. Now, for the first time, MIT chemists have synthesized the compound, an advance that could open the door to new drug treatments for cancer.

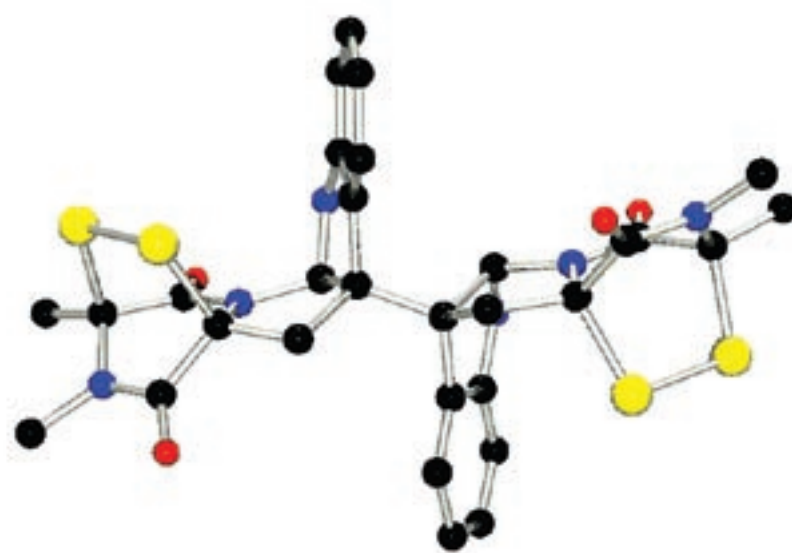
The compound, known as (+)-11,11'-Dideoxyverticillin A, is one of the most structurally complex members of a family of naturally occurring alkaloids.

Mohammad Movassaghi, associate professor of chemistry, graduate student Justin Kim and former postdoctoral associate James Ashenhurst reported the synthesis in the April 10 issue of *Science*.

Their 11-step synthesis, which starts with commercially available amino acids, provides ample quantities of the natural alkaloids and gives access to a wide range of related compounds, enabling thorough biological evaluation of these types of alkaloids as anticancer agents.

“If you want to only rely on the natural substance, you often have to go back to the natural source and extract more material for further study. This is certainly OK if getting to the natural source is easy and if the extraction yield is acceptable,” said Movassaghi. “However, with a chemical synthesis you can rely on commercially available starting material, scale up the synthesis as needed, and make designed derivatives of the compound of interest.”

Movassaghi said his team was drawn to the compound not just for its anti-cancer



GRAPHIC COURTESY OF MOHAMMAD MOVASSAGHI

Structural diagram of (+)-11,11'-Dideoxyverticillin A. MIT chemists recently synthesized the compound, which has shown anti-cancer activity, for the first time.

potential but also for its fascinating chemical structure. The (+)-11,11'-Dideoxyverticillin A molecule has 10 rings and eight stereogenic centers, or carbon atoms that have four different chemical groups attached to them.

“Because of the interesting structures, these compounds provide an ideal arena for exploring and developing new chemistry,” said Movassaghi. “As you try to make the molecule, you become aware of its chemistry and oftentimes it's very informative in terms of its possible mode of action.”

When carbon atoms have four different

groups attached to them, they can take on two possible arrangements, which are mirror images of each other. Producing the correct arrangement for all stereocenters was particularly challenging, said Movassaghi.

As large chemical structures are attached to each carbon, it also becomes more difficult to perform additional reactions at the same carbon atom, because the extra bulk makes the carbon less accessible.

Movassaghi says that while each step of the synthesis was difficult to figure out, the hardest task was designing the overall

order of the synthesis. The molecule has several bonds that are very sensitive to oxidation or cleavage, so each reaction must occur in a precise order that will not expose those bonds to degradation.

“Justin and James had the solutions to each of the independent steps much earlier, but the major challenge was recognizing what would be the optimal sequence for each of these events to occur,” said Movassaghi.

Now that the chemical synthesis has been demonstrated, researchers can tinker with it to produce similar compounds that may also have potential pharmacological activity.

The natural function of (+)-11,11'-Dideoxyverticillin A is not known, but it is likely to be involved in either natural defense or signaling mechanisms — “chemical warfare at the microbial level,” as Movassaghi describes it.

In other words, a colony of fungus might secrete the substances, toxic to competing species, to prevent invaders from stealing the same food and other resources.

“While the natural source may use this compound for defense or signaling, other scientists have shown this compound as having potential for treatment of cancer due to its antiangiogenic activity and efficacy against human breast cancer cell lines,” Movassaghi said.

Movassaghi is an Alfred P. Sloan Research Fellow and a Beckman Young Investigator. The research was supported in part by non-restricted funds from Amgen, AstraZeneca, Boehringer Ingelheim, GlaxoSmithKline, Merck and Lilly.

Making picky proteins

New computer model can design specific protein interactions

Anne Trafton
News Office

Interactions between proteins underlie nearly everything that happens inside a cell — from reading DNA to communicating with the outside world.

Many of those proteins have very similar structures, yet somehow they locate and interact with only their specific partner. For years, scientists have been trying to model and design such interactions, with limited success.

Now, MIT researchers have developed a model, reported in the April 16 issue of *Nature*, that can be used to design new protein interactions and could help scientists create proteins for use in developing new drugs.

“The proteins we design now are not likely to become drugs or therapeutics, but can be used in order to figure out the basic mechanisms of these interactions, which could be extremely valuable,” said Amy Keating, associate professor of biology and senior author of the paper.

Scientists who work in computational protein design, a relatively new field, try to design proteins that perform specific functions. Most of those functions involve binding to partner proteins, so one of the major challenges facing researchers is designing proteins that bind strongly to their intended target but not to other proteins with very similar structures.

In other words, proteins must have both high affinity for their intended targets and high specificity. Current computational design models are reasonably good at maximizing affinity, but are not equipped to introduce specificity, said Keating.

Keating and her team took a new approach to the problem. Their model first comes up with a protein predicted to have high affinity for the target, then runs through several additional iterations to improve predicted specificity.

“What our model does is systematically explore the tradeoffs between binding tightly to the target, and interaction specificity,” said Keating.

The resulting protein may have lower affinity than the original protein, but it will have a better combination of affinity and specificity.

The new protein model is based on a method called cluster expansion, used in materials science to predict how metal atoms form a lattice structure.

Keating’s team adapted the model to predict the binding energy that a given protein will have when folded to a pre-defined structure, based on its amino acid sequence. This offers a rapid shortcut for the usual, very time-consuming method of constructing an atomic model of the protein and then evaluating the energy of its interactions.

“There was a convergence of methods from a variety of different sources that we didn’t foresee that allowed us to solve this longstanding problem,” said Keating.

The MIT team focused on a family of transcription factor proteins known as bZIPs. The proteins activate DNA transcription when they are bound to a partner protein. Using the model, the researchers designed bZIP proteins that successfully bind to their partner not strongly to similar proteins.

The current work took advantage of simplifying properties of the bZIPs. Over the next five to 10 years, models to describe more complex protein interactions will become available. The new computational technique can be applied in conjunction with such models to generate specific designed proteins for diagnostic or therapeutic purposes.

Keating worked with Gevorg Grigoryan, a recent MIT PhD recipient and lead author of the paper, and Aaron Reinke, a current PhD student.

This work was funded by the National Institutes of Health.

Separating the good from the bad

Two-handed microbes point to new method for isolating harmful forms of chemicals

Denise Brehm
Civil and Environmental Engineering

Scientists at MIT and Brown University studying how marine bacteria move recently discovered that a sharp variation in water current segregates right-handed bacteria from their left-handed brethren, impelling the microbes in opposite directions.

This finding and the possibility of quickly and cheaply implementing the segregation of two-handed objects in the laboratory could have a big impact on the pharmaceutical industry, for example, for which the separation of right-handed from left-handed molecules can be crucial to a drug’s safety.

While single-celled bacteria do not have hands, their helical-shaped flagella spiral either clockwise or counter-clockwise, making opposite-turning flagella similar to human hands in that they create mirror images of one another that cannot be superimposed.

This two-handed quality is called chirality, and in a molecule, it can make the difference between healing and harming the human body.

“This discovery could impact our understanding of how water currents affect ocean microbes, particularly with respect to their ability to forage for food, since chiral effects make them drift off-course. But it is also important for several industries that rely upon the ability to separate two-handed molecules,” said Roman Stocker, the Doherty Assistant Professor of Ocean Utilization in the MIT Department of Civil and Environmental Engineering, and a principal investigator of the research.

One of the best-known instances of a chiral molecule causing widespread harm occurred in the 1950s, when the drug thalidomide was given to pregnant women to prevent morning sickness. One naturally occurring form — or isomer — of thalidomide reduces nausea; the other causes birth defects. In another commonly used chiral drug, naproxen, one isomer is analgesic; the other causes liver damage.

Stocker and mechanical engineering graduate student Marcos, along with co-authors Henry Fu and Associate Professor Thomas Powers of Brown University, published their findings in the April 17 issue of *Physical Review Letters*.

In the paper, the researchers describe how they designed a microfluidic environment — a device about the size of an iPod nano that has channels containing water and bacteria — to create a “shear” flow of adjacent layers of water moving at different speeds. In their tests, Stocker and Marcos used a non-motile mutant of the bacterium *Leptospira biflexa*, whose entire body has the shape of a right-handed helix. They injected the *Leptospira* into the center of the microfluidic device and demonstrated that they drift off-course in a direction dictated by their chirality.

But the researchers did much more than observe the microbes under a microscope. In addition to the experimental data they gathered, with their Brown colleagues the MIT researchers also developed a rigorous mathematical model of the process. They are currently implementing this new approach to separate objects at molecular scales.

“The methods currently used to separate chiral molecules are far more expensive and far slower than the microfluidic option. While we still have some way to go to separate actual chiral molecules, we think our work is very promising for the agriculture, food and pharmaceutical industries,” said Marcos.

This work was partially supported by grants from the National Science Foundation.

Innovator Selanikio wins \$100,000 Lemelson-MIT Award for Sustainability

Helped create open-source mobile software tool for public health workers in the developing world

The Lemelson-MIT Program has named Dr. Joel Selanikio, co-creator of an open-source mobile software tool for public health workers in the developing world, as the recipient of the 2009 \$100,000 Lemelson-MIT Award for Sustainability in recognition of his accomplishments in public health and international development.

Selanikio, co-founder of the non-profit organization DataDyne and assistant professor of pediatrics at Georgetown University Hospital in Washington, helped create EpiSurveyor, which aids in disease surveillance and the collection of public health data in developing nations.

The free software package, which can be downloaded onto handheld mobile devices, allows health workers to become fully self-sufficient in programming, designing and deploying health surveys, eliminating the need for costly outside consultants, paper and manual data entry. EpiSurveyor is now the most widely adopted open-source mobile health software in the world.

“Joel’s inventiveness and ability to leverage his unique, multi-discipline background is impressive,” said Theresa Bradley, team leader of the World Bank’s Development Marketplace, whose organization nominated Selanikio for the award. “He is a thought leader in the area of mobile health for developing countries and is dedicated to improving global public health by creating sustainable technologies that are scalable, affordable and practical.”

Selanikio became devoted to improving data collection in public health while working as a U.S. Public Health Service officer at the Centers for Disease Control and Prevention (CDC). He found that existing means of data collection for disease surveillance and immunization programs were inefficient — health



PHOTO COURTESY OF THE LEMELSON-MIT PROGRAM

Dr. Joel Selanikio, winner of the \$100,000 Lemelson-MIT Award for Sustainability.

workers carried hundreds of thousands of sheets of paper to the field, a process that was inconvenient, expensive and environmentally unsound. Moreover, after the paper forms were filled out, the data would need to be manually entered into a computer system for analysis, which could take more than a year; this paper-based system severely hampered the ability for health organizations to evaluate the success of their programs and move quickly in battling disease outbreaks.

With the proliferation of mobile phones and personal digital assistants (PDAs), Selanikio recognized the potential of handheld computers in dramatically improving the data collection process. “I set out to develop software that was extremely simple to use; taking the skills, expertise and capacity that previously came with hiring a consultant and instead, put the necessary tools into the hands of the actual public health officer, nurse or physician,” Selanikio said. “I was deter-

mined to make the software both free and open source, as not to raise barriers to data collection.”

To that end, he co-founded DataDyne in 2003 with technologist Rose Donna, formerly of the American Red Cross. DataDyne’s premier product, EpiSurveyor, has since become the most widely adopted open source mobile health software in the world.

Selanikio will accept the award during the Lemelson-MIT Program’s third annual EurekaFest, a multi-day celebration of the inventive spirit in June.

Applications for the 2010 \$100,000 Lemelson-MIT Award for Sustainability are now available at <http://web.mit.edu/invent/a-award.html>.

Each year, the award recognizes and supports an inventor or innovator whose work enhances economic opportunities and community well-being.

For questions, please contact lemelson_awards@mit.edu.

An urban planner's dream

An interview with DUSP's Judith Layzer

Judith Layzer, the Edward H. (1962) and Joyce Linde Career Development Associate Professor of Environmental Policy in the Department of Urban Studies and Planning, is an expert on how sustainability pressures will drive change in the built environment of the city — and believes those pressures might make some “healthy changes and opportunities” more possible than ever.

Layzer co-directs the Environmental Policy and Planning group's Society, Business and the Environment Project. Her research and teaching focus on the roles of science, values and storytelling in environmental politics, as well as on the effectiveness of different approaches to environmental planning and management.

Q. What would you say is the generally held public definition of sustainability?

A. The conventional definition is the three-legged stool — that social equity, economic development and environmental regeneration all are essential components, and there's that sweet spot in the middle where they all come together. I don't use the three-legged stool. I don't find it useful. My preferred metaphor is the container. That is, our social and economic systems have to operate within the constraints of a healthy, resilient natural system; the natural system is the container for the social and economic systems.

But that definition is not only controversial, it's also antithetical to the way the world is currently organized in terms of how we run our global economy. My view is that we have to consume a whole helluva lot less.

Q. Which sustainability-related pressures do you think are going to have the biggest impact? What's going to cause people to change their behaviors soonest?

A. I think in the United States, it's going to be energy prices. That's pretty clear.

There are a lot of healthy changes and opportunities that will come out of higher energy prices, of course. In cities, there will be a massive shift away from the car. There will be more emphasis on walking, biking, mass transit. The long, car-based commute is on the wane and should be.

All of this is in some ways an urban planner's dream. It's the way we thought people should be living anyway.

Q. What do you think the impediments to addressing sustainability issues are going to be?



PHOTO COURTESY JUDITH LAYZER

Judith Layzer, an associate professor in the Department of Urban Studies and Planning.

A. The single biggest impediment is the fact that none of the things that are limited in our natural system have prices. We don't price carbon, we don't price ecosystem services. If we're really going to do this — I mean if we're really going to do this — then we need to put a price on what's scarce.

Q. Starting with prices on finite natural resources?

A. You have to start there. You say, what is scarce now in the world? And it's not human beings and it's not human-made capital. But what is increasingly, frighteningly scarce is natural capital. And we have barely begun to talk about pricing it.

If I were dictator of the world, the first thing I would do is dramatically reduce the taxes on labor and instead price natural resources and natural capital. That to me would be the single most important thing we could do to put ourselves on a path to sustainability.

Q. Are there ways that companies can begin capitalizing on these trends and accounting for them in their strategic plans?

A. There's great opportunity in innovations that make products simpler. Many studies show that adding bells and whistles to products doesn't actually enhance user experience. People end up ignoring them. I'm a testament to that ... one of the few things I bought this year was this fantastic clothesline. Somebody really figured out how to manufacture it out of relatively benign materials and make it so it will last forever, so it's a really high-quality thing.

And now I don't have to use my dryer. This product has actually simplified my life.

Companies that figure out how to make things in a way that takes into account both the biological stream and the technical stream — a way that considers the life cycle of the product — are going to succeed.

A sustainable economy is not going to be driven by an urge to consume as much ... as possible. It's going to be driven by the urge for less stuff but really good stuff. Good food, good products, things that last.

This really is a different model. And, you know, people aren't going to get rich. But more people will live moderately well and how much better would that be? Who really needs to be rich?

Q. You realize how groovy you're sounding, right?

A. Yeah. But what's so funny is you look at me, and I couldn't be less groovy. I don't fit the model. I don't live in some yurt, as the caricature insists. And most people who feel the way I do don't fit that model, either. It's a silly caricature that was a very effective way of marginalizing environmental concern. It worked very well for a while, but, you know, I think we're done with that.

This article is adapted from “An Urban Planner's Dream” an interview published this month by MIT Sloan Management Review. The complete interview is available at <http://sloanreview.mit.edu/beyond-green/an-urban-planners-dream/>.

New student organization's summit explores global sustainability

Sustainability@MIT
hosts premier event

David Chandler
News Office

MIT's Sustainability Summit, the first of what is expected to be an annual event, was held last week at Walker Hall and garnered a full-house turnout for a series of talks, panel discussions and breakout sessions. The summit capped four days of Earth Week activities on campus, and was the lead achievement of the new student organization called Sustainability@MIT.

The summit, titled “Discovering New Dimensions for Growth,” focused on the growing awareness and need for businesses to incorporate concepts of sustainability in their planning.

“Sustainability is no longer something we just do on a good day,” said Mindy Lubber, president of Ceres, a coalition of investors and environmental leaders, speaking at one of the summit's panel discussions. She said that even in today's difficult economic climate, sustainability now “is essential, it's imperative ... it's a bottom-line financial issue.” For businesses today, integrating sustainable practices into their planning is necessary “not because it feels good, but because there are real costs” to unsustainable business-as-usual practices.



PHOTO / TODD SCHENK

Attendees listen to the speakers at the first Sustainability Summit.

She pointed out that already companies such as DuPont and Walmart have saved tens to hundreds of millions of dollars by adopting more energy-efficient and sustainable practices. “There is a real price to carbon,” she said, and failing to heed the warnings about global climate change could lead to social and economic disaster that “will make the sub-prime meltdown look like child's play.”

Michael Wise, a partner at business consulting firm A.T. Kearney, echoed that sense of the importance of addressing sustainability as an essential business issue. His company analyzed a range of similar companies, some of which had explicitly addressed sustainability in their planning and some had not. “In 16 of the 18 cases that we looked at, the sustainable businesses outperformed their peers,” he said

during the panel discussion.

Sustainability@MIT's co-president Kat Potter, a graduate student in Earth sciences, said, “There definitely seems to be a growing awareness of sustainability, it seems to be something in more people's minds.” As one of the group's projects, it produced a guide to sustainable catering, listing more than a dozen local catering services that either specialize in sustainable catering practices or are willing to accommodate such requests from clients. When people who have hired catering services for campus events received the new guide “they were just so excited about it,” she says.

In order to practice what they preach, said Adam Siegel, a second-year student at the MIT Sloan School of Management who was co-organizer of the summit,

group members worked to make it a “low-waste event,” minimizing paper products both for publicity and for the meeting itself. The posters and programs were printed on recycled paper made from agricultural waste, he says, and the event's caterers used minimal packaging. To further minimize the waste, he said, “We have been relying quite a lot on Internet-based publicity.”

The issue of sustainability is one that has been attracting increasing interest from students in recent years. Siegel said there seems to be particularly strong involvement from students at the Sloan School and the Department of Urban Studies and Planning. “The orientation of those two disciplines is more holistic,” he said. He suggested that's because such thinking is required “to lead an organization, whether a city or a corporation. Managers in the business world, and city planners, have to think at more systemic levels than in pure science or pure engineering.”

Summit co-organizer Catharina Lavers added that, “We are seeing a marked increase in interest in sustainability, beyond the core group of usual suspects. There is a realization and acceptance that sustainability is not just for tree-huggers anymore.”

Siegel said that in organizing this first-ever summit “we've built a strong platform that future leaders of the club will be able to build on and grow” in coming years.

Eight from MIT elected to AAAS

Eight members of the MIT community are among the 210 new Fellows and 19 new Foreign Honorary Members recently elected to the American Academy of Arts and Sciences.

Established in 1780 by founders of the nation, the academy undertakes studies of complex and emerging problems. Current projects focus on science, technology and global security; social policy and American institutions; the humanities and culture; and education. The academy's membership of scholars and practitioners from many disciplines and professions gives it a unique capacity to conduct a wide range of interdisciplinary, long-term policy research.

Since the academy's founding, its fellows have included George Washington and Benjamin Franklin in the eighteenth century, Daniel Webster and Ralph Waldo Emerson in the nineteenth, and Albert Einstein and Winston Churchill in the twentieth. The current membership includes more than 250 Nobel laureates and more than 60 Pulitzer Prize winners.

The academy will welcome this year's new class at its annual induction ceremony in October at its Cambridge, Mass. headquarters.

New members of the American Academy of Arts and Sciences from MIT are:

- Esther Duflo, the Abdul Latif Jameel Professor of Poverty Alleviation and Development Economics;
- Robert Gibbons, the Sloan Distinguished Professor of Organizational Economics and Strategy, MIT Sloan School of Management;
- Bradford Hager, the Cecil and Ida Green Professor of Earth Sciences;
- Nancy Kanwisher, the Ellen Swallow Richards Professor of Cognitive Neuroscience;
- Mehran Kardar, professor of physics;
- Dana Mead, chairman of the MIT Corporation;
- Michael Sipser, professor of mathematics and head of the Department of Mathematics;
- Edwin Lorimer Thomas, the Morris Cohen Professor of Materials Science and Engineering and head of the Department of Materials Science and Engineering.

Engineering first again in U.S. News graduate rankings

MIT's School of Engineering was again ranked No. 1 in U.S. News & World Report's annual evaluation of American graduate school programs, which hit newsstands this week.

The School of Engineering's graduate program has achieved the top score in the U.S. News rankings each year since the rankings were created in 1990.

In addition to having the top U.S. graduate engineering school, MIT placed first in six of 12 engineering specialties — aeronautics and astronautics, chemical, computer, electrical, materials and mechanical engineering. The Institute's nuclear engineering program was ranked second, civil engineering third, biomedical engineering fifth and environmental engineering ninth.

The magazine's criteria for determining overall engineering rankings include peer assessment, recruiter assessment, research activity, faculty resources and student selectivity. For the first time, MIT's School of Engineering received a perfect 5.0 peer assessment score.

In ranking the various specialties, the magazine relies on assessments by department chairs at peer institutions.

In business, the MIT Sloan School of Management was rated the nation's fifth MBA program behind Harvard, Stanford, Northwestern and the University of Pennsylvania. Sloan's specialty programs in information systems, production/operations and supply chain/logistics each ranked first.

The magazine this year updated its rankings of several doctoral programs. The Institute's graduate program in economics tied for first place with Harvard, Princeton and the University of Chicago. MIT earned top honors for its specialties in macroeconomics, microeconomics and public finance.

MIT also saw its graduate program in political science move to ninth place from 10th previously, while psychology advanced to 11th from 12th place. And, for the first time, the Institute's graduate efforts in history earned a nod with a 28th-place ranking (MIT does not offer a pure PhD program in history, but the discipline is part of the Doctoral Program in History, Anthropology, and Science, Technology, and Society (HASTS)).

U.S. News does not issue annual rankings for all doctoral programs but, instead, revisits them every few years. For example, in the most recent rankings for biology doctoral programs (2007), MIT tied for second with Berkeley. In the most recent rankings of doctoral programs in chemistry (2007), MIT was locked in a four-way tie for first with Caltech, Stanford and Berkeley. MIT's graduate physics program is tied for first with Stanford, according to the magazine.

The magazine's annual ranking of U.S. undergraduate schools is due to be published in August.

EFRC: MIT gets two of 46 new federally funded centers

Continued from Page 1

alternative and renewable energy truly viable as large-scale replacements for fossil fuels."

The 46 EFRCs, each to be funded at \$2 million to \$5 million per year for a planned initial five-year period, were selected from a pool of some 260 applications received in response to a solicitation from the U.S. Department of Energy Office of Science in 2008. Selection was based on a rigorous merit review process using outside panels of scientific experts.

Professor Ernest J. Moniz, director of the MIT Energy Initiative, noted, "We at MIT are extremely pleased to have been awarded leadership of two EFRCs and to be named as sub-awardee for four more. The EFRC program provides an unprecedented commitment to the basic research needed for continuing energy technology innovation — built upon an exemplary process that engaged the national scientific community to set priorities."

EFRC researchers will take advantage of new capabilities

in nanotechnology, high-intensity light sources, neutron scattering sources, supercomputing, and other advanced instrumentation, much of it developed with DOE Office of Science support over the past decade. They will use these in an effort to lay the scientific groundwork for fundamental advances in solar energy, biofuels, transportation, energy efficiency, electricity storage and transmission, clean coal and carbon capture and sequestration, and nuclear energy.

Of the 46 EFRCs selected, 31 are led by universities, 12 by DOE national laboratories, two by nonprofit organizations, and one by a corporate research laboratory. Sixteen EFRCs, including that of Professor Baldo, are funded through the American Recovery and Reinvestment Act, with the objective of creating jobs and promoting economic recovery in addition to laying the foundation for future energy technologies. Numerous postdoctoral, graduate student, and technical staff positions will be created for the EFRCs.

Numerous postdoctoral, graduate student, and other positions will be created for the EFRCs.



PHOTO COURTESY OF YASMEEN AL-DAWSARI

From left to right, Yasmeeen Al-Dawsari, Dahlia Alkekha, Lorenz Brown, Danielle Issa, Sami Shalabi, Mostafa El-Sayed, Hussam Busfar, Mohamed Zagho, Iman Kandil at the MIT Arab Students' Organization's Sixth Annual Science and Technology Awards Banquet on Saturday, April 11.

MIT Arab Students Organization honors El-Sayed

The MIT Arab Students' Organization held its sixth annual Science and Technology Awards Banquet on Saturday, April 11, this year honoring Mostafa El-Sayed, Regents Professor in the School of Chemistry and Biochemistry and director of the Laser Dynamics Laboratory at Georgia Institute of Technology.

"The MIT Arab Students' Organization Science and Technology Awards Banquet aims to recognize exceptional Arabs and Arab-Americans who have made noteworthy contribution to the fields of science and technology," said Hussam Busfar, president of the MIT Arab Students' Organization. "These individuals, with their exceptional talent and contributions, make us proud and help to change some of the negative images associated with Arabs in recent years."

In addition to the Lifetime Achievement Award presented to El-Sayed, the event included the presentation of a Young Professional Award to Sami Shalabi, a member of the technical staff at Google; a graduate student award to Haitham Ahmed, an MPH candidate at the Department of Health Policy and Management at the Harvard School of Public Health and an MD candidate at Dartmouth Medical School; and an undergraduate student award to Mohamed Zagho, an undergraduate majoring in physics at The University of Illinois at Urbana-Champaign.

The awards banquet links different generations of Arab and Arab-American science and technology specialists and presents a valuable opportunity for Arab and Arab-American students to interact with accomplished professionals from the community.

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

FOR SALE

2004 gulfstream innsbruck travel trailer. #265-bhs, 26.5', sleeps 8, 2 slide outs, mint cond., 2/30 lb. Propane tanks. Oven, indoor/outdoor shower. Ball hitch, stablizer bars & sway bar. \$17,995.00 or b.o. dicbe@mit.edu / richard 3-8224

REDUCED PRICE: Single Owner 2004 Pontiac Vibe GT(1.8L) Hatchback, Man. Trans., 27,000 mi, Royal White, Ex Cond with New Battery and Brake Pads and an Xm Satellite Radio with a 12 month contract. \$7,450 or Best Offer. Contact Bob, via RvarSpace@alum.mit.edu

2000 Citation 37 ft. trailer w/2-bedrooms (never been on the road). Located in North Reading, Mass. Asking \$13,500 or best offer. Please call Joe at 978-664-4414.

Pure oak desk, computer compatible 24" back-front; horizontal: 48"; with hutch: 58" floor to top. Separate cabinet (wheels) for printer/storage. Asking \$200. Call/fax: 617-436-5663.

HOUSING/RENTALS

Three bedroom sabbatical house in Winchester available 9/1/09 through 6/30/10. Great area, great schools, quiet dead end street. More information at: www.photosbymartin.com/rent2009/. Contact: wierz@mit.edu

Two bedrooms owner occupied two family home, in Stoughton. Off street parking coin operated washer & dryer. Hardwood floors, a must see. Easy access to Rt. 24, 93 & 128 a mile to commuter rail. \$1275 no utilities, available September 1st. First and security deposit. Non smoker mjc4988@yahoo.com

Winchester- 2/3 bedroom, 2 baths, 2nd floor apartment, hardwood floors, off street parking, w/d hook up, storage area available. Call Marie at 508-362-4015. Available 5/1

Vacation on Cape Breton, Nova Scotia. 3 BR oceanfront farmhouse on historic Cabot Trail on 100 acres field and forest. \$725/wk, June-Oct. (Roger, rgmark@mit.edu)

Belmont—Large elegant sunny furnished four bedroom with hardwood floors, dishwasher, disposal, two full baths (one with whirlpool tub), and front loading washer & dryer. Off-street parking and steps to public transportation. Easy commute to MIT. Excellent Belmont Schools. \$3,250/month. Lease. No pets. Available September 1st. Contact 617-710-2724 or stewart@wi.mit.edu.

The Dalai Lama visits MIT this week

The Dalai Lama Center for Ethics and Transformative Values to be dedicated

The Dalai Lama will visit MIT this week to dedicate a new center aimed at promoting ethical behavior and leadership.

The Dalai Lama Center for Ethics and Transformative Values will be housed under MIT's Office of Religious Life. Like other parts of that community, the center will partner with members of the MIT community to explore spiritual, ethical, and religious questions.

Institute Chaplain Robert Randolph, who leads the Office of Religious Life, said he sees the new center working in ways similar to The Technology and Culture Forum at MIT, which is also housed under the Office of Religious Life and has been part of the mosaic of campus spiritual life for decades.

"The Technology and Culture Forum has been raising issues of value and meaning at MIT for more than 40 years, and the Dalai Lama Center will complement that by also looking at the ethical issues that confound and confront us in the 21st century," Randolph said.

MIT is home to 15 chaplains of different faiths, who, while independent of the Institute, are housed under the auspices of the Office of Religious Life. The organizations in the religious community are separate nonprofit organizations.

"They are in MIT but they are not of MIT — and that's the great value," Randolph said of the chaplains. "They are sometimes critics of prevailing views who are willing to raise countervailing notions."

The Rev. Amy McCreath, MIT's Episcopal chaplain, coordinates The Technology and Culture Forum. Created in 1964 by faculty members, the forum sponsors programs that explore the role of science and technology in promoting positive social, environmental and economic changes.

The forum relies extensively on alumni contributions to fund its expenses. The Dalai Lama Center will not receive MIT funding but will depend upon the support of individuals who recognize its potential to contribute to the development of an ethical perspective in tomorrow's leaders.

The center emerged as an idea more than a year ago and has evolved in its vision. For some, the center is strictly religious. For others, the center promises to be a home for dialogue on ethical questions. "The Dalai Lama Center for Ethics and Transformative Values is not an academic center per se, but it will partner with others at MIT to stimulate future generations of enlightened leaders to embrace ethics in their life and work," said the Venerable Tenzin Priyadarshi, MIT's Buddhist chaplain and the director of the Dalai Lama Center.

Priyadarshi noted that the center will sponsor dialogue, programs and deliberations on ethics as part of its mission. The first of these, a conference called "The Human Impact," will culminate with an April 30 talk by the Dalai Lama on "Ethics and Enlightened Leadership." The event is open to ticketholders only.



Mind & Sand

RIGHT: The Venerable Tenzin Priyadarshi, center, MIT's Buddhist chaplain and the director of the Dalai Lama Center, works with two monks on a sand mandala last week. The mandala is a visionary and reflective exercise that hopes to encourage young minds to visualize and meditate about the positive qualities that they would like to see manifested in the world.