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TechTalk

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

Dog genome sequence announced

In work that sheds light on both the genetic similarities between dogs and humans and the genetic differences among dog breeds, an international research team led by scientists at the Broad Institute of MIT and Harvard announced today the completion of a high-quality genome sequence of the domestic dog.

The research will be published in the Dec. 8 issue of *Nature*.

Comparing dog and human DNA reveals key secrets about the regulation of the master genes that control embryonic development. Comparing dog breeds reveals the structure of genetic variation within the species. The researchers' catalog of 2.5 million specific genetic differences across several breeds can now be used to unlock the basis of physical and behavioral differences, as well to find the genetic underpinnings of diseases common to domestic dogs and their human companions.



PHOTO / NATURE

"The incredible physical and behavioral diversity of dogs — from Chihuahuas to Great Danes — is encoded in their genomes," said senior author Eric Lander, director of the Broad Institute and a professor of biology at MIT. The sequencing of that genome "can uniquely help us understand embryonic development, neurobiology, human disease and the basis of evolution," said Lander, who is also a professor of systems biology at Harvard Medical School and a member of the Whitehead Institute for Biomedical Research.

Dogs not only occupy a special place in human hearts, they also sit at a key branch point in the evolutionary tree relative to humans. By tracking evolution's genetic footprints through the dog, human

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Ben Bernanke will speak at Commencement

Sarah H. Wright
News Office

An MIT-educated economist whom President Bush has designated to serve as chairman of the Federal Reserve will be MIT's 140th Commencement speaker on Friday, June 9, 2006, in Killian Court.

Ben S. Bernanke (Ph.D. 1979) currently serves as chairman of the President's Council of Economic Advisors. If approved by the Senate, Bernanke will succeed Alan Greenspan, Fed chairman since 1987, early next year.

In making the announcement, MIT President Susan Hockfield said, "I am very excited that Ben Bernanke will be MIT's Commencement speaker next June. His career, in the academy and in government, has exemplified values that are central to MIT — personal integrity, analytical rigor, an uncompromising drive toward excellence and a commitment to public service — and I can think of no one who can better inspire our new graduates to use their talents to serve the nation and the world."

"Bernanke's presence at the podium will have a special resonance given MIT's role as a well-spring of innovation in today's knowledge-based economy."

Eric Grimson, head of the Department of Electrical Engineering and Computer Science, served as chair of the 2006 Commencement Committee, composed of faculty, students and members of the administration.

Grimson described Bernanke as an "excellent choice as Commencement speaker. As the recently appointed chairman of the Federal Reserve, he serves an extremely important and influential role in the U.S. economy. As an MIT graduate, he provides a wonderful role model to our current students, demonstrating that graduates from MIT can have influential roles outside of the technical arena."

"Indeed, MIT graduates are desperately needed in such roles, using the abilities they gained at MIT as critical and analytic thinkers and problem solvers to influence the broader U.S. community," Grimson said.

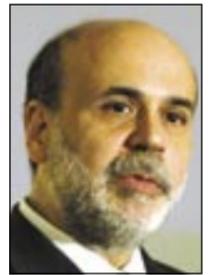
Bernanke, 52, grew up in Dillon, S.C., the same once-segregated town of 6,300 that was home to Kenneth Manning, MIT's Thomas Meloy Professor of Rhetoric and of the History of Science.

Manning encouraged his friend to attend Harvard, where Bernanke received the B.A. in economics in 1974, followed by the Ph.D. in economics from MIT. Bernanke was visiting professor of economics at MIT in 1989, an associate professor of economics at Stanford and a professor and department chair of economics at Princeton from 1996 to 2002.

He joined the Fed's Board of Governors in 2002 and was appointed chief economic advisor this past June. He has developed a reputation for challenging conventional thinking, particularly about transparency and communicativeness for the Fed, which some had regarded as an opaque institution.

For example, Bernanke advocates inflation targeting, a practice in which the central bank sets an explicit goal for inflation and is then held accountable for meeting that goal. The Fed's decision this year to begin providing two-year inflation forecasts has been credited to Bernanke's influence on the Board of Governors.

"You want to release information that helps the market and the public achieve more accurate expectations of future policy and the future state of the economy," Bernanke said in an interview published by the Federal Reserve.



Ben Bernanke

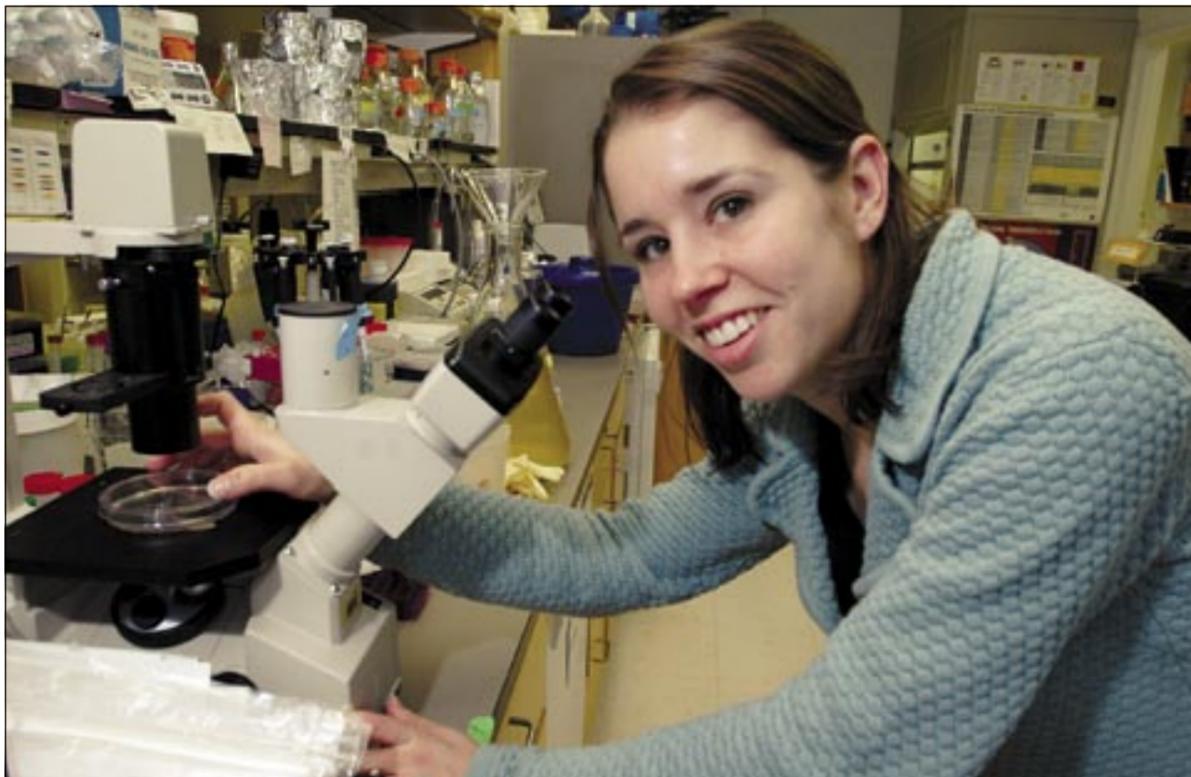


PHOTO / DONNA COVENEY

Graduate student Danielle France works in the lab where she and others examined the phenomenal power of the nano-spring, a fibrous coil grown by a single-cell protozoan.

Researchers test power of cellular engine

David Cameron
Whitehead Institute
and John Fleischman
American Society of Cell Biology

Researchers have known for some time that a long, fibrous coil grown by a single-cell protozoan is, gram for gram, more powerful than a car engine. Now, researchers led by a team at MIT and the Whitehead Institute have found that this coil is far stronger than previously thought. In addition, the researchers have discovered clues to the mechanism behind this microscopic powerhouse.

"These findings are twofold," says Danielle France, a

graduate student in the lab of Whitehead Member Paul Matsudaira, and, along with Matsudaira, a member of MIT's Division of Biological Engineering. "First, they give us an idea of how a cell can manage to generate such enormous force; and second, they provide clues for how engineers might reconstruct these mechanisms for nanoscale devices."

France presented her findings Sunday, Dec. 11, at the 45th annual meeting of the American Society for Cell Biology. Collaborators on the work are from the Marine Biological Laboratory in Woods Hole, Mass., and the University of Illinois, Chicago.

Scientists have known about this nano-spring for

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RESEARCH

GET ENERGIZED

Industry and academia work together at MIT to address the world's energy problems.

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BACK FROM THE DEAD

A new study of the planarian flatworm provides insight into regeneration.

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OLYMPIC MOMENT

MIT Professor Daniel G. Nocera helps carry the Olympic torch to Turin, Italy, for the 2006 Winter Games.

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GUESS WHO WAS HERE

The Abdul Latif Jameel Poverty Action Lab enjoys a brush with stardom.

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Edwin Thomas to head DMSE

Elizabeth A. Thomson
News Office

Edwin L. "Ned" Thomas, the Morris Cohen Professor of Materials Science and Engineering, has been appointed head of the Department of Materials Science and Engineering (DMSE), effective Jan. 16.

"Ned is a noted materials scientist and engineer, with specific expertise in polymer physics and engineering, phase transformations and microstructure, and electron microscopy and X-ray scattering," said Thomas L. Magnanti, dean of the School of Engineering, who announced the appointment.

Among other accomplishments, Thomas "has made important contributions to understanding the structure and properties of block copolymers and to develop-

ing quantitative methods for characterizing the microstructure of polymeric materials," Magnanti said. He has also "developed both new experimental methods and theoretical models to guide valid interpretation of the vast range of microstructures in crystalline, liquid crystalline and non-crystalline polymers," Magnanti said.

Thomas has held several administrative positions at MIT. He is the founding director of the Institute for Soldier Nanotechnologies and previously served as associate head for DMSE and as the director of the Program in Polymer Science and Technology. He came to MIT from the University of Massachusetts, where he founded and served as co-director of the Institute for Interface Science and was head of the Department of Polymer Science and Engineering.

Thomas received a B.S. degree from the University of Massachusetts in 1969

and a Ph.D. from Cornell University in 1974.

In his announcement, Magnanti recognized the "outstanding service" of outgoing head Subra Suresh.

"Under his superb leadership, the department has thrived, especially with the hiring of many exceptional faculty, exciting curricular innovations, and significant space renovations. It has been an enormous pleasure to collaborate with Subra and I very much look forward to working with Ned as well."



Edwin Thomas

David Saxon, former chair of Corporation, dies at 85

Anne Trafton
News Office

David Saxon, physics scholar and former chair of the MIT Corporation, died Dec. 6 at UCLA Medical Center after a long illness. He was 85.

Saxon, who also served as president of the University of California system for eight years, was MIT Corporation chair from 1983 to 1990.

"David Saxon will be long remembered as a loyal friend and dedicated alumnus, and for his wisdom, good nature and wide-ranging knowledge of the issues and challenges in higher education," Dana Mead, chair of the MIT Corporation, wrote in a letter to Corporation members.

Saxon, a native of St. Paul, Minn., earned the S.B. (1941) and Ph.D. (1944) at MIT, where he studied physics.

He joined the faculty of UCLA in 1947, and three years later was one of 31 faculty members dismissed for objecting to the requirement then in place that all faculty sign an oath of loyalty and declare they were not members of the Communist Party. After the California Supreme Court invalidated the loyalty oath requirement, Saxon returned to UCLA in 1952.

At UCLA, Saxon served as dean, vice chancellor and executive vice chancellor before becoming provost in 1974 and president in 1975, a position he held until 1983.

Saxon joined the MIT Corporation in 1977 and became its chair in 1983. He was elected a life member and named honorary chair in 1990, and became life member emeritus in 1995. He served with distinction on the visiting committees for chemistry, physics and sponsored research, and on the membership and corporation development committees.

After leaving MIT, Saxon returned to UCLA as a professor emeritus in physics and astronomy.

"California, and the University of California, have lost a great leader in David Saxon," Robert C. Dynes, University of California president, said in a statement. "David was a passionate believer in the university and, during a period of severe fiscal challenge, a tireless advocate for public higher education and the benefits it conveys to society. He was a man of principle and vision whose outstanding scholarship and thoughtful leadership made a lasting contribution to the university and the state."

He is survived by his wife of 65 years, Shirley; six daughters; and six grandchildren.

Donations may be made to the David Saxon Physics Graduate Fellowship Fund, UCLA Foundation, 10920 Wilshire Blvd., Los Angeles, CA 90024; or to the Braille Institute, 741 N. Vermont Ave., Los Angeles, CA 90029.



David Saxon

AWARDS & HONORS

Two MIT scientists are among the winners of the 2005 World Technology Awards announced on Nov. 15, and two others placed in the top five in their award categories. The awards honor "the most innovative people and organizations in the science and technology world in 2005." MIT Institute Professor **Robert Langer** and former MIT visiting scientist **Andreas Lendlein** won in the health and medicine category. **Daniel Nocera**, the W.M. Keck Professor of Energy and professor of chemistry, was named to the top five in the energy category. **Wolfgang Ketterle**, professor of physics, was placed in the top five in the materials category. The awards were presented by the World Technology Network (WTN), a group of nearly 1,000 individuals and organizations from more than 60 countries, in a ceremony at San Francisco City Hall.

Chancellor **Phillip Clay** was named one of the 100 most important blacks in technology for 2006 by U.S. Black Engineer magazine. The magazine honored individuals whose "stories demonstrate something about the hurdles all minority men and women face, and about the courage it takes to overcome obstacles to rise to the top of professions that do not always welcome new faces."

Michael M. Noga, earth and planetary sciences librarian and collection manager for science at MIT, won the Geoscience Information Society's 2005 Best Paper Award. Noga was honored for his paper examining citation frequencies of conference papers published in earth science periodicals and monographic proceedings, and comparing their usage to that of research articles.

Institute Professor **Robert Langer** was presented the 2005 Von Hippel Award at a ceremony in Boston on Nov. 30. Langer was chosen for the award, the highest honor of the Materials Research Society, for "pioneering accomplishments in the science and applications of biomaterials in drug delivery and tissue engineering, particularly in inventing the use of materials for protein and DNA delivery."

Senior and Army ROTC Cadet **Matthew D. Smith** has met all of the Army requirements and standards to be designated as a Distinguished Military Student. To earn this distinction, a student must possess outstanding leadership qualities and moral character, obtain top third military science course standing, and attain an upper half academic standing at his school.

David M. Rosenberg, senior analyst programmer for Information Services & Technology, was elected vice chairman of the Boston Chapter of the IEEE Computer Society for 2006.



PHOTO / JUSTIN KNIGHT

Brush with Bono

U2 lead singer Bono, third from left, paid a visit to MIT to meet the leaders of the Abdul Latif Jameel Poverty Action Lab in the Department of Economics on Tuesday, Dec. 6, accompanied by staff from the advocacy group Debt, AIDS, Trade, Africa (DATA). He is joined by, from left, Professor Bengt Holmstrom, head of economics; Rachel Glennerster, executive director of the lab; and economics Professor Abhijit Banerjee, one of the lab's directors.

News Office gets interim director

Vice President and Secretary of the Corporation Kathryn Willmore has announced that Pamela Dumas Serfes, director of communications and donor relations in Resource Development, has been named interim director of the MIT News Office effective Dec. 1.

"Pamela had extensive experience in news and communications as director of communications at Randolph-Macon Woman's College prior to coming to MIT," Willmore said in her announcement. Dumas Serfes is also a member of the Communications Operating Group, a senior MIT communications strategy group.



Pamela Dumas Serfes

Dumas Serfes will serve through the academic year, by which time a new director of the News Office is expected to be in place, Willmore said. In the meantime, the three senior staff in the office will continue their responsibilities for the three primary functions of the office: Denise Brehm — critical issues management; Kathryn O'Neill — Tech Talk and the news website; and Patti Richards — public relations strategies.

Dumas Serfes will continue with her responsibilities in resource development, but on a reduced scale during her service as interim director of the News Office. Dumas Serfes can be reached at x3-2703 or pdserfes@mit.edu.

OBITUARIES

Edith Ruina

Edith Ruina, of Cambridge and Wellfleet, former director of MIT's Women in Technology and Science program, died Nov. 27. She was 81.

Ruina worked at MIT for seven years and was the author of "Women in Science and Technology: A Report of an MIT Workshop," published by the MIT Press in 1974, and "How They Lived to Tell," a story of young Jews who survived the Holocaust.

She is survived by her husband, Jack Ruina, MIT professor emeritus of electrical engineering and computer science; a son, Andrew Ruina of Ithaca, N.Y.; two daughters, Ellen Ruina of Washington, D.C., and Rachel Ruina of Bethesda, Md.; and seven grandchildren.

A memorial service will be held in January.

Donations may be made to the Wellfleet Public Library, 55 W. Main St., Wellfleet, MA 02667.

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Page named Whitehead Institute director

The board of directors for the Whitehead Institute for Biomedical Research has announced that Whitehead Member and MIT Professor of Biology David Page has been elected the fourth director of the Institute. Page takes this position following his appointment as interim director, which began in December 2004.

"The Whitehead board and I are delighted that David Page has been elected director of Whitehead," said Alex d'Arbeloff, chair of the Whitehead Institute board of directors. "I have enjoyed working with David since last fall and have found that he has an amazing ability to listen and to lead. I know that David will make significant contributions to the future success of Whitehead, and I look forward to our continued association."

"I can't think of anyone else who I'd rather see leading the Institute at this point in

time," said Susan Lindquist, Whitehead member and director of the Institute from 2001 to 2004. "Not only is David a brilliant scientist, but over the last year he's shown himself to be a leader."

"I believe the two roles of director and scientist enhance one another," said Page. "Keeping my feet planted firmly in the day-to-day life of the lab helps me be a more effective director. And likewise, being director helps me see my lab's work in the context of the Institute's scientific mission. To my mind, the Whitehead Institute is an artist colony extraordinaire. My vision is that in the years ahead we will continue to attract the best



David Page

young minds and provide them a place to realize dreams."

Page's own research will continue to focus on the question of sex determination: How does the difference in genetics between males (who have an X and a Y chromosome) and females (who have two X chromosomes) result in such different development and morphology? This question has vexed scientists for years because it was commonly thought that the Y chromosome was mostly "junk" DNA.

Page, who is also a Howard Hughes Medical Institute investigator, has a reputation as the scientist who gave dignity to the Y chromosome. "I often say that the Y is the Rodney

Dangerfield of the chromosome world," Page has joked. "It gets no respect."

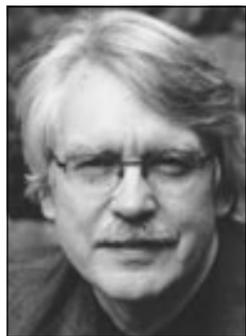
Page and his collaborators surprised the scientific world with two fundamental discoveries about the Y that reversed scientists' opinion of it. First, they discovered that the Y chromosome had quite a few genes and that these genes were required for male fertility.

Second, they found that the Y chromosome had an amazing architecture. Many of its genes are organized in palindromes, long stretches of DNA that read the same forwards and backwards – a chromosomal equivalent of "Madam I'm Adam." If the first "M" on Madam becomes mutated, the chromosome could then fold into a hairpin and the "m" in Adam would then swap the appropriate genetic material. This self-correction mechanism permits the Y chromosome to maintain the integrity of its genes.

Harbison recording nominated for Grammy

A recording of a composition by Institute Professor and Pulitzer Prize-winning composer John Harbison has been nominated for a 2006 Grammy Award.

The 2006 recording of Harbison's "Mottetti di Montale" by Boston-based Collage New Music is a contender in the Best Small Ensemble Performance category, one of 108 Grammy categories.



John Harbison

Released in May on the Koch label, the CD features Collage director David Hoose conducting mezzo-sopranos Janice Felty and Margaret Lattimore and an ensemble of nine players.

"Mottetti" consists of 20 songs based on texts by Eugenio Montale. These are divided into four groups or books (Libri I-IV), the second of which was commissioned by Collage.

"It's shocking and gratifying when the mainstream sits up and takes notice of small groups doing great work outside the glare of publicity," said Daniel Lichtenfeld, executive director of Collage New Music. "It's especially rewarding that our first Grammy nomination comes in connection with John Harbison, whose longtime association with Collage — as composer, conductor and advisor — has been central to the group's success over the past 33 years."

Founded in 1972 and led by David Hoose since 1991, Collage is highly regarded for its performances of works by 20th and 21st century composers. Over the past three decades, Collage has given the first Boston performances of more than 200 works, including 80 world premieres, and frequently features works by MIT composers.

The 48th annual Grammy Awards will be presented in Los Angeles on Wednesday, Feb. 8, and will be broadcast live on CBS.

"This year's nominations truly reflect a dynamic and vibrant community of music makers that includes artists, producers, engineers, songwriters and everyone involved in the creative process," said Neil Portnow, president of The Recording Academy, which awards the Grammy. "As this is the only music award that is voted on by music makers, the Grammy continues to be the preeminent symbol of excellence and achievement as well as the most coveted demonstration of peer-recognition and honor."



PHOTO / ASSOCIATED PRESS

Schrock receives Nobel

MIT Professor Richard R. Schrock, left, receives the Nobel Prize in chemistry from King Carl XVI Gustaf of Sweden, right, during a ceremony at the Concert Hall in Stockholm, Sweden, on Saturday, Dec. 10. Schrock shared the chemistry prize with Robert H. Grubbs and Yves Chauvin of France for 'the development of the metathesis method in organic synthesis.'

Potter, engineer for Apollo, dies at 68

Anne Trafton
News Office

James Potter, a former MIT professor who helped engineer navigation systems for the Apollo missions to the moon, died Dec. 6 at his Winchester home. He was 68.

Potter was known both for his brilliant problem-solving and his compassion for his students, said John Deyst, professor of aeronautics and astronautics.

"I always found him to be just the most kind and understanding person with his students you could imagine," said Deyst, who had Potter as one of his thesis advisors.

In 1962, Potter came up with what became known as the "Potter square root method," which solved a problem that had baffled everyone working on the guidance systems for the Apollo spacecraft.

"Everyone was stumped by the problem," Deyst said. "He went home over the

weekend and came back with the solution and just kind of blew everybody away."

Potter joined the faculty at MIT in 1965, three years after earning his doctorate from MIT in mathematics. He left MIT in 1974 and worked at several private companies before returning to work at Draper Laboratory. In 1993 he launched a consulting firm, Potter Engineering, where he worked on classified intelligence research.

Born in Iowa City, he earned his bachelor's degree at Caltech in 1959.

He is survived by his wife, Barbara A. (Howard) Potter; a son, James N. Potter of Allston; and a daughter, Jennifer M. Potter of Austin, Texas.

A funeral service was held Dec. 9 at the Church of the Redeemer in Woburn, with interment in Wildwood Cemetery in Winchester.

Donations may be made to the Massachusetts General Hospital Pancreatic Cancer Research Fund, 165 Cambridge St., Suite 600, Boston, MA 02114.

Daniel Nocera proudly carries Olympic torch through Rome

Sasha Brown
News Office

It will take more than 10,000 people to carry the Olympic torch to Turin, Italy, for the opening ceremony of the 2006 Winter Olympics on Feb. 10, and MIT Professor Daniel G. Nocera is one of them.

On Dec. 8, the first day of the torch relay, Nocera, the W.M. Keck Professor of Energy and professor of chemistry, carried the torch two miles in Rome starting at 6:15 p.m.

As a runner whose regular route follows the Charles River, the chance to be among the torchbearers was a particular thrill for Nocera.

"Running the torch was certainly a high and different experience. I felt a sense of community and thought about MIT," said Nocera, who ran for Italgas, the Italian energy company and a sponsor of the 2006 Winter Olympic Games. Italgas chose Nocera after he won the 2004 Italgas Prize for Energy and Environment. "Since I was running as a tribute to energy and research — these thoughts were apropos."

Although the road was rain-slick and the torch was heavy, the run was not difficult, said Nocera, who said he was especially motivated by the children cheering along the route.

As a torchbearer, Nocera has joined an important part of Olympic history. According to the official Olympic web site: "The torchbearer is the person that carries the Olympic flame, the highest recognized symbol of the Games, it announces the message, it embodies and spreads its ideals: the union and peace amongst the people, the allegiance, the courage, the fraternity and solidarity."

The flame dates back to ancient Greece, where athletes competed in a relay race passing a torch from one to the other. In 1928, the flame officially returned to burn in an Olympic stadium. Since 1936, the torch has been carried to the opening ceremony by relay. Now, the Olympic torch relay is an essential part of the Olympic tradition.

The flame, held in a small lantern, arrived in Italy on Dec. 7 from Athens, Greece. Italian President Carlo Azeglio Ciampi lit the torch for the first torchbearer at the Piazza del Quirinale in Rome on Dec. 8. From there, the flame will be carried by 10,001 torchbearers across Italy, visiting 140 cities, all of Italy's regions and Slovenia, Austria, Switzerland and France.

The Torino 2006 Olympic torch relay concludes on Feb. 10 in the Stadio Comunale in Turin, when the flame will be used to light the Olympic cauldron at the XX Olympic Winter Games.

The closing ceremony of the Games is scheduled for Feb. 26.

Industry, MIT hunt for energy solutions

Deborah Halber
News Office Correspondent

The automotive, fuel and other energy-related industries weighed in on how MIT can best contribute to solving the world's energy crisis in a two-day workshop sponsored by MIT's Industrial Liaison Program (ILP) on Dec. 6-7.

More than 130 participants from industry and academia came together at the workshop, "Igniting New Ideas for Sustainable Energy," to identify priorities and exchange ideas on how to work together to meet fast-rising energy demands while reducing greenhouse gases.

The group heard an overview of the future of coal-based power in increasingly efficient U.S. plants and in a complex and confusing regulatory environment in China. China is expected to account for half the increase in world coal consumption and carbon emissions over the next 25 years. Workshop participants also heard six MIT researchers describe work on topics ranging from photovoltaics to the use of nanotechnology in energy systems.

Technologist, academic, entrepreneur and long-time MIT supporter Kenan Sahin, founder and CEO of Tiax in Cambridge, Mass., spoke about the critical role of industry in MIT's Energy Research Council (ERC), an Institute-wide initiative

to explore how MIT can use its strength in multidisciplinary research to address the nation's and the world's energy issues.

"Energy now has become all-consuming — the key topic in the environment, security and the economy is energy," Sahin said. "If we can achieve a tight coupling between industry and energy, we have a chance at taming the energy challenge."

ERC co-chair Ernest Moniz, Cecil and Ida Green Professor of Physics and co-director of the Laboratory for Energy and the Environment, said that technology will continue to create new ways to use energy more cleanly and efficiently, but that "how technology is deployed for the public good is very much influenced by policy."

Emil Jacobs, vice president of research and development for ExxonMobil Research and Engineering, said that in 2030, oil, gas and coal will still be the largest sources of energy, with renewable sources such as wind and solar making up only 1 percent of the world's energy supply. The largest increases in population and economic growth, with corresponding increases in energy needs and production, will happen in developing countries such as China. "We'll need 60 percent more energy in 2030 than in 2000," Jacobs said.

Bernhard Escherman, senior vice president and head of the Corporate Research Center of ABB Switzerland, questioned

how the industrialized world will maintain the reliability of electrical supply in spite of aging power plants, people's reluctance to have transmission lines in their back yards and the risks of depending on a central infrastructure that might become a terrorist target.

Workshops led by industry representatives came up with the following ways MIT can contribute:

- MIT can help develop advanced turbines, fuel cells, catalytic reactors and ways to burn coal better and more efficiently. Researchers can design smart energy systems that tell you, for instance, when your driving style is burning more gas or when your tire pressure is low; and home meters that show the dollar amount of energy used.

- MIT can improve existing technologies to increase the efficiency of hybrid vehicles, electric motors, friction materials and engines.

- MIT could provide a "holistic energy plan" that looks not only at supply and demand but also at environment and efficiency through a complex systems approach. MIT can look at the issues in terms of longer time frames than industry.

- MIT can be an "honest broker" to identify key pathways toward new energy policy and technology across a broad range of stakeholders in industry, politics and academia.

NANO

Continued from Page 1

roughly 300 years, ever since Anton van Leeuwenhoek first observed the protozoan, *Vorticella convallaria*, through a handmade microscope. The spring in the unicellular *Vorticella* is a contractile fiber bundle, called the spasmoneme, which runs the length of the stalk.

At rest, the stalk is elongated like a stretched telephone cord. When it contracts, the spasmoneme winds back in a flash, forming a tight coil. To find out how strongly *Vorticella* recoils, France and colleagues used a unique microscope to apply an extra load to the spring. The microscope, developed by Shinya Inoue and colleagues at the Marine Biological Laboratory, uses a spinning platform to increase the centrifugal force exerted on the protozoan.

In the past, researchers have measured the *Vorticella*'s ability to recoil its spring at 40 nano newtons of force and at a speed of 8 centimeters per second. (These measurements, when scaled up to the size of a car engine, prove the *Vorticella* to be the more powerful of the two.) However, when France used the centrifuge microscope, she discovered that the spring was able to recoil at as much as 300 nano newtons of force.

"This is the maximum amount of power we can currently test," France said. "We suspect the coil is even more powerful."

France and colleagues also made an important link between the cellular engine's fuel, calcium, and a major protein component of the stalk. This protein, centrin, belongs to a class of proteins that can be found in organisms ranging from green algae to humans. When the researchers introduced an antibody for the *Vorticella* centrin into the cell, the spring was no longer able to contract, indicating that the cell uses a powerful centrin-based mechanism, one that is unlike other known cellular engines.

"When it comes to creating nano devices, this is a great mechanism for movement," France said. "Rather than requiring electricity, this is a way to generate movement simply from a change in the chemical environment. Here, a simple change in calcium would power this spring." France and colleagues are now developing methods for replicating this mechanism in the lab.

For images of the *Vorticella* spring, and for a movie demonstrating the spring in action, visit www.wi.mit.edu/news/archives/2005/pm_1202_vor.html.

This research was funded by the U.S. Army.

DOG

Continued from Page 1

and mouse genomes, the scientists found that humans share more of their ancestral DNA with dogs than with mice, confirming the utility of dog genetics for understanding human disease.

Most importantly, the comparison revealed the regions of the human genome that are most highly preserved across mammals. Roughly 5 percent of the human genome has been well preserved by evolution over the past 100 million years. The researchers discovered that the most highly conserved of these sequences are not randomly distributed throughout the genome. Instead, they are crowded around just a tiny fraction (about 1 percent) of the genes that encode crucial regulatory proteins involved in development (such as transcription factors or axon guidance receptors).

"The clustering of regulatory sequences is incredibly interesting," said Kerstin Lindblad-Toh, first author of the Nature paper and co-director of the genome sequencing and analysis program at Broad. "It means that a small subset of crucial human genes is under much more elaborate control than we had ever imagined."

More than two years ago Lindblad-Toh, Lander and their colleagues embarked on a two-part project to assemble a complete map of the dog genome. First, they acquired a high-quality DNA sequence from a female boxer named Tasha, covering nearly 99 percent of the dog's genome. Using this information as a genetic "compass," they then sampled the genomes of 10 different dog breeds and other related canine species, including the gray wolf and coyote (see <http://web.mit.edu/newsoffice/2004/dog-genome.html>).

By comparing these dogs, they pinpointed 2.5 million individual genetic differences among breeds, called single nucleotide polymorphisms (SNPs), which serve as recognizable signposts that can be used to locate the genetic contributions to physical and behavioral traits, as well as disease.

The scientists then used the SNP map to reconstruct how intense dog breeding has shaped the genome. They discovered that selective breeding has carried large genomic regions of several million bases of DNA into breeds, creating "haplotype blocks" that are 100 times larger than those seen in the human population. "The huge genomic regions should make it much easier to find the genes responsible for differences in body size, behavior and disease," said Lander. "Such studies will need many fewer markers than for human studies. It should be like hitting the side of



PHOTO / COURTESY OF NATURE

Dogs of different breeds look up at a photo of James Watson and Francis Crick with a model of the structure of DNA. Researchers at the Broad Institute recently announced they have sequenced the dog genome.

a barn."

Breeding programs have not only selected for desired traits, they have also had the unintended consequence of predisposing many dog breeds to genetic diseases, including heart disease, cancer, blindness, cataracts, epilepsy, hip dysplasia and deafness. With the dog genome sequence and the SNP map, scientists around the world now have the tools to identify these disease genes.

Humans suffer from many of the same illnesses as their four-legged friends and even show similar symptoms, but the genetic underpinnings have proved difficult to trace. "The genetic contributions to many common diseases appear to be

easier to uncover in dogs," said Lindblad-Toh. "If so, it is a significant step forward in understanding the roots of genetic disease in both dogs and humans."

For this work, the dog-owner community is an essential collaborator. "We deeply appreciate the generous cooperation of individual dog owners and breeders, breed clubs and veterinary schools in providing blood samples for genetic analysis and disease gene mapping," said Lindblad-Toh. "Without their interest and help we could not be doing this work."

This work was funded in large part by the National Human Genome Research Institute, one of the National Institutes of Health.

Pilot projects get funding

The MIT Center for Environmental Health Sciences, through support from the National Institute of Environmental Health Sciences, has announced its support for six pilot projects, which all began Dec. 1.

Assistant Professor Patrick Doyle of chemical engineering will study "technologies to rapidly scan single genomic DNA molecules." Associate Professor Catherine Drennan of chemistry will focus on "structural studies of the AlkB family of proteins."

Assistant Professor Kimberly Hamad-Schifferli of mechanical engineering will focus her research on "antisense gene regulation with nanoparticle-DNA conjugates." Arlin Rogers, chief of the Comparative Pathology Lab in the Division of Comparative Medicine, will study the "molecular determinants of liver tumorigenesis following combined exposure to aflatoxin B1 and infectious hepatocarcinogens in a mouse model."

Assistant Professor Krystyn Van Vliet of materials science will conduct research on "in vitro platforms to assess mechanically modulated environmental exposure." Kathleen Vandiver, director of the Center for Environmental Health Sciences' community outreach and education program, will create an interactive exhibit called "The Cell Is a Molecular Machine," in a joint effort with the MIT Museum.

Housemasters open window on dorm life

Sasha Brown
News Office

For 30 years, Professor Borivoje "Bora" Mikic of mechanical engineering and his wife, Liba, have had a second family of more than 300 students.

Housemasters since 1976, the Mikics' extended family has included first the students at Senior House and then at Next. All told, the Mikics and their two grown daughters have lived with thousands of MIT undergraduates, opening their homes and lives over the years.

For current residents of Next House, a dinner made by Liba Mikic and served in their in-house residence is a treat. So legendary is her food that it was used as an incentive to collect money for charity this fall. Residents of the most generous Next entry won a dinner made by Liba.

It is these kinds of events that bring a house together and make it a home for students who are often living far from their families, said Bora Mikic, who often plays chess with the students.

It was the students who originally drew the Mikics to the job. "They bring energy, a different perspective, and a whole new culture," he said.

At the end of this academic year, the Mikics will leave Next House. Simmons associate housemasters Muriel Medard and John Simmons will move into the position, leaving a vacancy in Simmons. Additionally, senior lecturer in Chinese Julian Wheatley and his wife, Marjorie Nolan-Wheatley, are planning to leave their East Campus housemaster positions after five years.

Senior faculty members interested in applying for either vacancy should e-mail Associate Dean and Director of Student Life Programs Barbara Baker at bbaker@mit.edu.

For housemasters, many of whom serve five years or more, leaving a post is bittersweet.

There are 11 undergraduate residences and five graduate residences in the housemaster system. In most cases, housemasters come in a team — a senior MIT faculty member with his or her spouse or partner. The East Campus, Simmons, Green and Sidney-Pacific dorms also have



PHOTO / DONNA COVENEY

Genevieve Ricart, a brain and cognitive sciences senior who lives in Next, shares a light moment with housemasters Professor Borivoje 'Bora' Mikic of mechanical engineering, right, and his wife, Liba, left.

associate housemasters — additional faculty members who live there as well.

"The housemaster supports and provides leadership to the house team," Baker said. In an undergraduate dorm, that team includes graduate resident tutors (GRTs) — usually one per floor or entry, a residential life associate, the house manager from the Department of Housing, sometimes an associate housemaster and often the house student leadership.

Housemaster roles and responsibilities vary.

"They are very concerned about student welfare and advocate for student issues and concerns," Baker said. "In addition, housemasters provide support for individual students, including outreach during time of crisis as well as support for student groups, especially the house government."

"Being a housemaster is a way of life and is time consuming," said Professor Munther Dahleh of electrical engineering and computer science. He and his wife, Jinane Abounadi, have been housemasters

in MacGregor for more than five years. "Emergencies don't time themselves around your deadlines," said Dahleh, who has found himself in the emergency room with a student all night, then back in class for an 8 a.m. lecture.

Still, Dahleh said the close bonds he and his family have formed with the students and the satisfaction they get from helping make it well worth it. "It becomes a part of your living style. It really is a wonderful experience."

Since they live in apartments within the dorms, the housemasters' lives become intertwined with the lives of all the residents. For the 350 MacGregor residents, having the Dahlehs' three children around is a treat, Dahleh said.

Much of the Dahlehs' job involves working with the house team to offer guidance to the house government on various policies, giving advice to the GRTs on student issues, and planning social and educational activities for the house, such as dinners, study breaks and off-campus outings.

For housemasters in the graduate residences, life is a little different, said Ann Orlando, who has been housemaster of Ashdown House for five years with her husband, Professor Terry Orlando of electrical engineering and computer science. "People here are extremely serious about their studies," she said. And, there are no GRTs.

But, the relationships developed are just as close. "We are rather sad to see some of our residents graduate and leave," she said.

After 30 years, the Mikics have seen a lot of changes, said Bora Mikic. Their two daughters have grown up and moved away. The physical environment for students has improved. And, they have seen growth in the kinds of programs offered to students both in their social and academic lives.

But through it all, the goal has always been the same. "We wanted to offer an environment that allowed them to relax," he said. "They come full of hope and energy and they leave ready to storm the future."

Grad student-run contest spurs Filipino entrepreneurs

Sasha Brown
News Office

Roughly 1,000 people a day leave the Philippines to work abroad, Neil Ruiz, a Ph.D. candidate in political science, told a small crowd gathered in Wong Auditorium on Thursday, Dec. 8.

The talk, "Uncommon Solutions to Common Problems" highlighted the work that Ruiz and a dedicated team of graduate students have done in the past year with the Philippine Emerging Startups Open (PESO), a technology and innovation-oriented business plan competition modeled after the annual MIT \$50K Entrepreneurship Competition.

"I had the privilege of being exposed to a plethora of opportunities compared to my relatives who were left behind," said Ruiz, whose parents came to the United States before he was born.

In spring 2004, Ruiz applied for a Public Service Center (PSC) summer fellowship. Ruiz's goal was to go to the Philippines and find a way to combat the "brain drain" plaguing the country.

"His aim was to mobilize students at MIT and transform the Filipino climate," Sally Susnowitz, director of the PSC, told the audience. The PSC encouraged Ruiz to use his fellowship to gather other resources, and Susnowitz said she was impressed when he used the time to "get big things started."

In the Philippines and after he returned, Ruiz and other PESO members secured additional funding from academic, business, industry, nonprofit and government agencies all over the Philippines to get the contest off the ground.

The 10 current PESO members at MIT and five partners in the Philippines advertised in and around Filipino colleges and universities hoping to spark some interest in the competition. Their persistence worked, and 2005 marked the first official competition.

More than 70 teams submitted business plans, said Ruiz, who added he was amazed by the response. "We would have been happy with 20 submissions."

Roughly 24 percent of the teams had at least one Ph.D.-level member, said Ruiz. Ideas were submitted in a number of categories including biotech, information technology, process and manufacturing, agriculture and more.

On Dec. 4, in the Philippines, the Ayala Foundation Grand Prize 2005 went to Enhanced Solo, a team that developed a papaya with a cultured resistance to papaya ring spot virus. The virus plagues crops in the Philippines, causing papayas to ripen too quickly, thus limiting papaya production and creating big losses for small farmers. The team developed seedlings with a delayed ripening trait that allows for export.

The winner received 80,000 Philippine pesos, roughly \$1,500, as well as continued help from PESO in developing and marketing its product. Sponsored prizes were awarded in six other categories as well, including the ICCP Venture Partners Best Service Prize, which went to Sanitary Aqua Vendo for developing a water vending machine capable of providing clean water for public restrooms. Poor water quality is responsible for a number of problems in the Philippines.

"PESO is a huge success," said Susnowitz. This past spring, PESO received the PSC's award for best new service project.



PHOTO / DONNA COVENEY

Too cool for school

He's got his shades, he's got his headphones. Clearly this snowman, seen outside Baker House on Friday, Dec. 9, is ready to party.

Flatworms yield insights into mystery of regeneration

If you take a planarian flatworm and chop it in half, something extraordinary happens: One section grows a new head, the other a new tail, and soon you have two new flatworms. Chop it into quarters, or eighths, and you'll see the same thing.

For centuries scientists have puzzled over this biological phenomenon, but only recently have they understood that these creatures are a gold mine for exploring how stem cells regenerate damaged tissue. Now, scientists at MIT, the Whitehead Institute for Biomedical Research and the University of Utah School of Medicine have begun to understand how the planarian flatworm achieves what scientists hope to one day accomplish in the clinic: complete regeneration of damaged tissue.

"This paper is a starting point for investigating the cellular basis of regeneration," says MIT Associate Professor Peter Reddien of biology, lead author on a paper that appeared in the Nov. 25 issue of the journal *Science*. Reddien is also a Whitehead associate member.

The human anatomy is no stranger to regeneration. If you think about all the times you have cut or scraped your hands, it's amazing how intact they are. Even more dramatic is the human liver: Remove a chunk and it grows back. Researchers hope to one day harness the power of stem cells to regenerate, say, heart tissue or pancreatic tissue. But at the moment, regeneration is still one of biology's greatest black boxes.

Enter the planarian flatworm.

One is hard pressed to find in nature a more dramatic example of regeneration. You can cut a planarian slice as small as 1/279th of the animal and it will still turn into a complete adult. And while the planarian anatomy is much simpler than that of higher mammals, the worms still have differentiated tissue such as skin, intestine, musculature and brain. These organs are maintained — and re-created — by planarian neoblasts, a kind of stem cell that shares characteristics with both adult and embryonic stem cells. Like adult stem cells, neoblasts are located in adults with mature tissue. But like embryonic stem cells, they may be capable of turning into

any kind of cell type in the body.

"Planarians have solved exactly what people want to accomplish with regenerative medicine," says Reddien. "This has been worked out by evolution." The question, of course, is how.

In May 2005, Reddien and his then-colleagues at the University of Utah completed the first high-throughput RNA interference screen of planarian genes, with results published in the journal *Developmental Cell*. The researchers painstakingly silenced 1,065 genes one at a time with RNAi techniques and found 204 genes of interest that had corresponding genes in other species, including humans.

One of these genes, called *smewi-2*, stood out. When *smewi-2* was disabled, the flatworm was suddenly unable to regenerate at all, and its body curled into a stationary, irregular position. This raised an obvious question: Exactly how does *smewi-2* control the planarian's ability to regenerate?

As reported in *Science*, the team discovered that *smewi-2* does not regulate the stem cells themselves, but controls cells produced by stem cells.

When a stem cell divides in two, one of the daughter cells is a stem cell, and the other is a cell that can replace a specific type of cell. When *smewi-2* is disabled, however, this second group of cell types can't carry out its function. *Smewi-2* regulates regeneration through overseeing and enabling the reparative activity of these cells. The precise mechanism by which they do this is unclear. Still, this paper marks the first instance in which a planarian gene has been studied at this level of resolution.

"This gives us some answers about how stem cells are controlled in planarians, and it's starting to hit at the basic science of stem cells," says Reddien. "It also has a broader application for understanding the biology of regeneration. We're still at the very beginning of the basic science phase, but this is a good start."

This research was funded by the National Institutes of Health and by the Helen Hay Whitney Foundation. An additional author of this work is from Harvard Medical School.



PHOTOS / DONNA COVENEY

Adele Naude Santos, left, dean of architecture, discusses challenges to building affordable housing on Nov. 21. Diane Davis, professor of political sociology and associate dean of architecture, gives a talk on 'Policing, Security and Public Space in Latin American Cities' on Nov. 28. Both were participating in a lecture series titled 'Myths About America.'

Urban studies shines in series

Sarah H. Wright
News Office

Innovative design practices and recent research in urban security issues were highlighted in a series of talks presented to midcareer international students by the Department of Urban Studies and Planning.

Students in the Special Program for Urban and Regional Studies (SPURS) heard the talks, collectively titled "Myths About America," at luncheon meetings in the Stella Room, 7-338, during the fall term.

Bish Sanyal, professor of urban planning and director of SPURS, described the series as "one among many activities the program organizes for cultivating a more refined understanding of the U.S. — this powerful and intriguing nation — among the international fellows."

Adele Naude Santos, dean of architecture, outlined her working process and discussed challenges to building affordable housing in her talk, "From Design to Built Form," given Nov. 21.

Santos, who began practicing as an architect in her native South Africa, used dramatic photographs of single- and multi-family housing as well as slides of her own drawings to illustrate her concept of "narrative maps" as a tool in her practice.

Narrative maps are essentially the ever-refining "stories" people tell about the built spaces they want, and Santos relies on drawing by hand instead of using a computer to document the articulation and evolution of ideas.

"Drawings are an important tool for teasing out clients' ideas and vision. If you show people a computer drawing, it looks so finite, whereas drawing by hand communicates openness and passion. It articulates the process," she said.

Among Santos' passions, she said, is making apartment buildings generally, and affordable housing units in particular, "feel like houses," and she showed slides of successful projects in Japan and California that began with her literally drawing residents' sight-lines from interior to outside spaces.

An example is Santos' well-known Cali-

fornia project, Franklin La Brea Apartments, a complex designed so that each multilevel unit offers an adult in the second-story kitchen a clear view of children in a ground-level yard.

Diane Davis, professor of political sociology and associate dean of architecture, spoke on "Policing, Security and Public Space in Latin American Cities" on Nov. 28.

Davis focused particularly on the impact of former New York City Mayor Rudy Giuliani's three-day, \$4.3 million trip to Mexico City to "rescue" the downtown from crime with the "zero tolerance" policing method that had worked so well on 42nd Street and in the Bronx.

Downtown Mexico City was a "symbolic locale with both buildings of governance and tourist attractions. It was also filled with small vendors, street children and a lively informal economy. People were fearful of venturing there because of crime," Davis said.

"After 9/11, Giuliani had prestige as an 'urban security consultant,' someone who would reduce crime. But his zero tolerance recommendations — crackdowns on squeegee men, harsh penalties for everything from drug offenses to loitering, graffiti and noise — produced restricted movement, IT-based surveillance and circumscribed use of public space," Davis said.

According to Davis, one myth about New York-style zero tolerance policing is that it can be exported to cities outside the United States to reduce crime. In the case of Mexico City — and Buenos Aires, Caracas and Lima — Giuliani's strategy was used to reduce the presence of the poor in areas slated for urban renewal.

"That's redevelopment in the guise of public security," Davis said.

Other MIT speakers in the SPURS/Humphrey Program were Larry Vale, head of the Department of Urban Studies and Planning; Chancellor Philip Clay; Suzanne Berger, professor of political science and director of MISTI; and Bruce Mazlish, professor emeritus of history.

Founded in 1967 as part of MIT's Department of Urban Studies and Planning, SPURS is a one-year program designed for midcareer professionals from developing countries.

CLASSIFIED ADS

Members of the MIT community may submit one classified ad each issue. Ads can be resubmitted, but not two weeks in a row. 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

Hardwood lumber - cherry. Planed, 5/4 thick. Widths 6-10 inches. Lengths 8-16 ft. \$6.50/ board foot. Call 781-643-0771.

Ladies ice skates fit size 9 shoe. Celebrity boot, Sheffield Club 200 blades. Original price \$160. Worn only 4 times. Best offer. Call Michelle, 617-266-0439 or peterj4@aol.com.

Ariens 5 HP, 2 cycle, single stage snowblower. Electric start, 22" cut. \$275. Contact Chris Lennon at lennon@ll.mit.edu, or 781-981-0584.

HOUSING

Compact studio in South Boston with kitchen, shower. 20 minutes to MIT. \$685/month plus \$28 for utilities. Call 617-268-0880.

West Somerville - 5 room luxury apartment nr bus transportation. 2BR, living room, dining room, kitchen. No pets or smoking. \$1400, utilities not included. Call 617-623-3839.

Everett - 4 BR house for rent. Close to T & all major highways. No utilities, no smoking, no pets. \$1600, avail. immediately. Call 617-389-8842.

Cambridge - Walk to MIT from completely furnished & fully equipped, cozy, safe & quiet 1 BR. Immaculate. Private outdoor deck. Stunning view. \$1200. E-mail johnnatale@verizon.net.

Full shares avail. in Warren, VT ski house, 10 min. drive to Sugarbush South. \$1,000/share for entire season Dec-April. Sleeps 6, wood-burning stove, open living area. Two full bathrooms & large kitchen. Dishwasher & washer/dryer. Seeking singles, couples in their 30's & 40's. Contact Melissa at 617-269-3866, melissam@mit.edu.

Newly constructed 1 BR unit, minutes from jogging trail on the Charles. Adjacent to CambridgeSide Galleria. Ultra modern w/ central A/C, granite countertops, stainless steel appliances, washer/dryer. Call 617-217-1239.



PHOTO / DONNA COVENEY

Right at home

Students in Wendy Jacob's 'Introduction to Visual Arts' class participate in an installation on private space in a public location in Lobby 7 on Friday, Dec. 9. Jessica Sundberg '08, far left, Cassandra Gibbs '08, third from left, and Faith Rogers '07 (fourth from left), are joined by pals, from left, Kristen A. Ayala '08, Mike Yee '08 and Cherelle Walls '07.

NEWS YOU CAN USE

Gallery spots available

Applications to mount an exhibition in the Wiesner Student Art Gallery (second floor, Stratton Student Center) during the spring semester (March 16-May 18) are due Friday, Jan. 27, as part of the gallery's new formal application process. Supporting materials — three or four works that are representative of the exhibit as

a whole, a list of pieces to be shown, and detailed schematics of anything that will need to be built or purchased — are due by Friday, Feb. 10. A committee will review the applications and make decisions on Friday, March 3. Application forms are available at the Student Art Association (Room W20-429) and are downloadable at web.mit.edu/saa/wiesner.html. For more information, call x3-7019.

Postdoc drawn to sketching

When not working with mechanical devices to mimic and echo human actions, Max Berniker is drawing the human form.

Currently a postdoctoral associate in the Media Lab's Biomechatronics Group, Berniker has studied theoretical issues in biological motor control. He's currently working to develop prosthetic devices that

link directly to an amputee's nervous system.

But Berniker discovered another talent at MIT: figure drawing. Although he drew and sketched as a child, he had never taken an art class until he signed up for the life drawing class at the Student Art Association (SAA) seven years ago. Hooked, he's been taking the class ever since.

Now, his first exhibition, "10 Minutes With Max," is on view at the Wiesner Student Art Gallery through Wednesday, Jan. 11. Berniker is presenting 42 charcoal sketches of the human form.

"I like lines," he said in his artist's statement. "Some lines communicate the shape of the figure. Some lines communicate the edge of the figure. Combinations of lines convey tonality. I like lines that communicate all three at once, doing the most possible with the minimum necessary, telling the viewer: this bit of flesh is taut, this bit is soft, this bit is bony."

Each sketch took an average of 10 minutes to draw, Berniker said, explaining the title of the exhibition. None are complete works, he said; each is a compromise between the effort to create an accurate and well-composed rendering and the fear that additions will detract from what is already on paper.

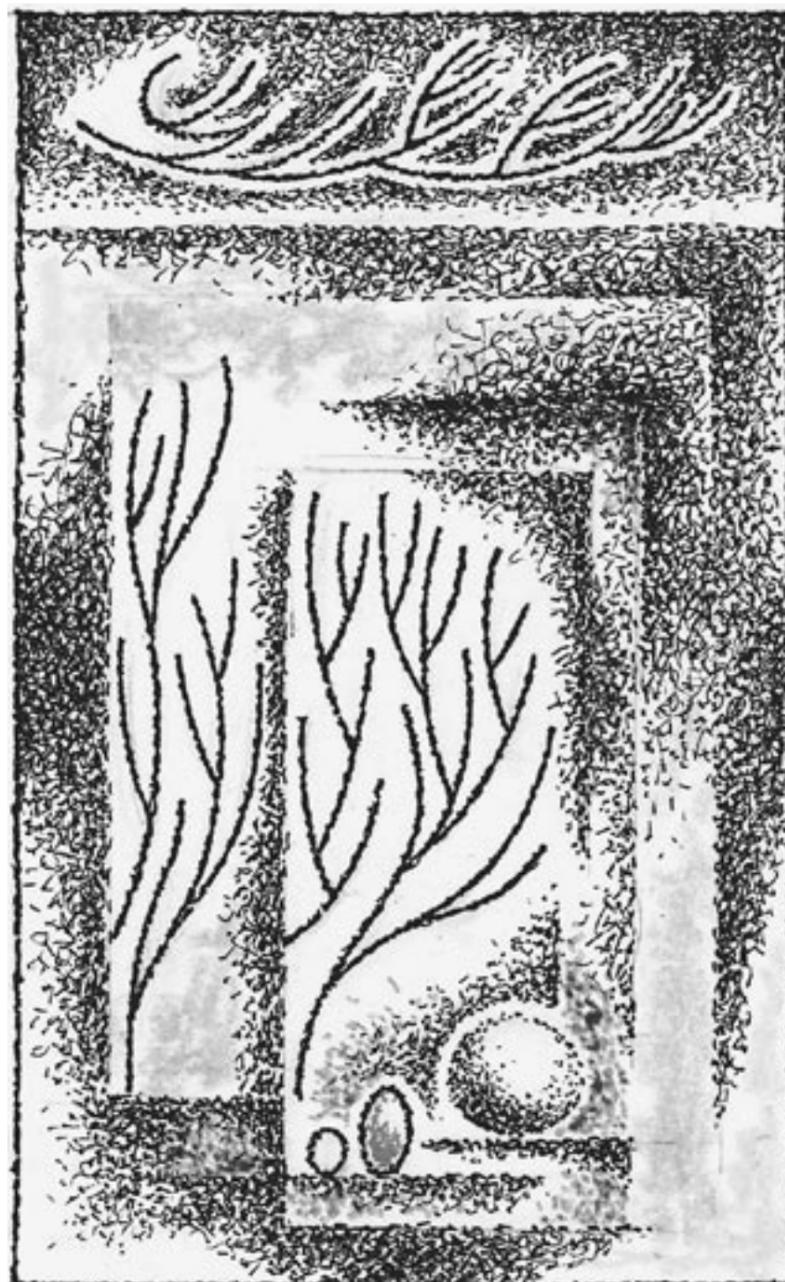
"My proudest achievement is not the whole image, but the occasional event when charcoal meets paper with just the right pressure, speed and arch to justly convey tension in a forearm, the shift of weight onto a leg, or the strain in a twisted torso," he said.

The gallery is located on the second floor of the Stratton Student Center and is open 24 hours a day. For more information, call x3-7019.



IMAGE / MAX BERNIKER

This drawing by postdoctoral associate Max Berniker is part of his first exhibition, '10 Minutes With Max,' now on display at the Wiesner Student Art Gallery on the second floor of the Stratton Student Center. His charcoal sketches will be on view through Jan. 11.



'Pub drawing' by Richard Filipowski is part of a current MIT Museum exhibit.

MIT Museum shows pioneering designs

A new exhibit at the MIT Museum highlights the work of Richard Filipowski, a sculptor of international reputation who taught visual design here for 36 years.

Filipowski, who joined MIT's faculty in 1953, was the first to introduce the teaching methods of the German design philosophy Bauhaus to MIT. He also developed a pioneering course on design theory, leaving a lasting influence on the curriculum of MIT's School of Architecture and Planning.

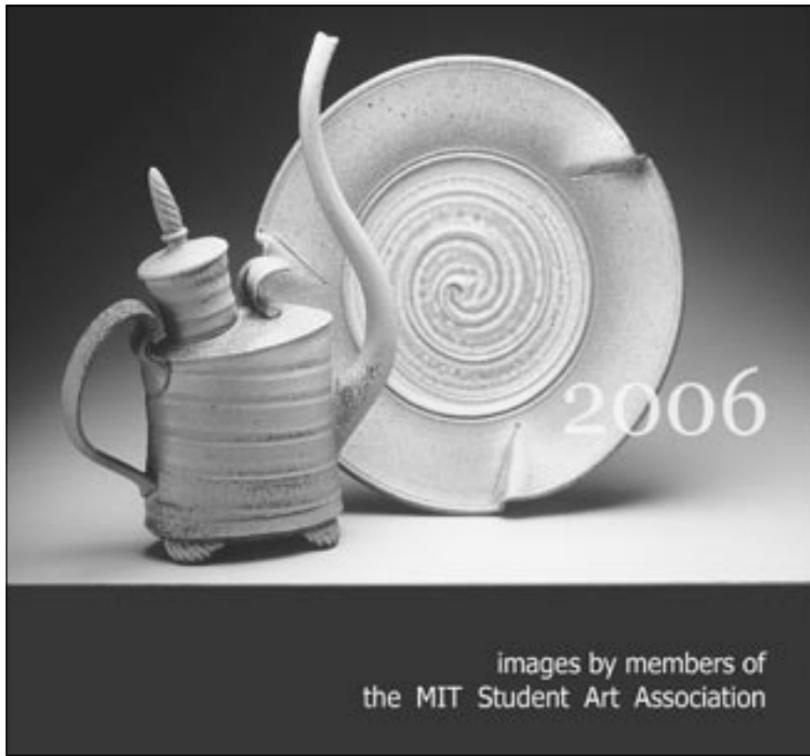
"Finding Form: The Work of Richard Filipowski," currently on view near the entrance of the MIT Museum, focuses on his sculpture and graphic art, demonstrating his influential design curriculum and revealing his pivotal manipulations of form and color.

Filipowski has described his work of "finding form" as a "sustained search for spatial-structural-emo-

tional concepts." Today Filipowski maintains a daily commitment to "finding form," usually preferring to work in colored ink on paper. The exhibition includes a selection from the MIT Museum's Filipowski Collection, including examples of some of his earliest work in sculpture and on paper, and recent work from the artist's collection.

Now in his 80s, Filipowski is still looking ahead. "I don't know what happens next, where the language I have developed ... will lead," he said in an interview with Jon Markowitz Bijur, coordinator of Educational Services at the MIT Museum. "It leads to totally new surprises. The question in my mind is whether I recognize them as they come along. That is ... the mystery of creativity," he said.

"Finding Form: The Art of Richard Filipowski" runs through Friday, Feb. 17. For more information, see web.mit.edu/museum.



images by members of the MIT Student Art Association

IMAGE / DARRELL FINNEGAN

A year of art

The MIT Student Art Association (SAA) has published a 2006 calendar that features images by SAA artists matched to quotations from Shakespeare. The calendars cost \$15, \$12 for students, and may be purchased at the Student Center branch of the MIT Coop. Or, order by e-mailing SAAhelp@mit.edu.

ART NEWS

Music and theater arts lecturer **Mark Harvey** and his Aardvark Jazz Orchestra will present their 33rd annual Christmas concert on Dec. 18 at Emmanuel Church (15 Newbury St., Boston). The ensemble, with vocalists Jerry Edwards, Grace Hughes and senior lecturer Pamela Wood, will perform Duke Ellington's sacred music, including "Almighty God Has Those Angels," "It's Freedom" and "Come Sunday," as well as rarities such as "A Song for Christmas" and the first movement of "Three Black Kings." In addition, Hughes will perform the Aardvark premiere of her award-winning composition, "Pennies on the Ground." Tickets are \$15.

The **List Visual Arts Center** is holding a special holiday sale of approximately 50 different catalogs and brochures from past exhibitions (1985-present). The publications are available for purchase at the gallery

(Building E15) through Sunday, Dec. 18, during regular visiting hours (Tuesday-Thursday from noon-6 p.m. and Fridays from noon-8 p.m.). Prices range from 50 cents to \$5.

Limor Fried (S.B. 2003, M.Eng. 2005) has been named one of four 2005-2006 Research and Development Fellows in Residence at Eyebeam's Open Lab, a new space dedicated to public domain research and design. Eyebeam, located on West 21st Street in New York City, is a not-for-profit arts and technology center dedicated to fostering the creative use of new technologies through research and production initiatives, education programs and exhibitions. Fried is working on "open source" hardware, designing an inexpensive open plug-and-play system for artists, choreographers and musicians to interface electronic sensors with a computer, sequencer or synthesizer. She is also

developing an online course on microcontroller design to learn how to build what she calls simple and fun projects. "I hope to also work on policy, fun toys and maybe dabble in some art too," she said.

Jennifer Allora, who received her degree from the Visual Arts Program in 2003, and her artistic partner, Guillermo Calzadilla, are among the six artists shortlisted for the Guggenheim Museum's 2006 Hugo Boss Prize. A publication featuring the works of the finalists will be published in June, and the winner will be announced in fall 2006. An exhibition of the prize-winning artist's work will be held in early 2007 at the Solomon R. Guggenheim Museum in New York City. Allora and Calzadilla's installation "Download" was recently included in Art Basel Miami Beach, an international art show that took place Dec. 1-4.

MIT EVENT HIGHLIGHTS DECEMBER 14-18

 Science/ Technology	 Performance	 Architecture/ Planning	 Humanities
 Music	 Exhibit	 Reading	 Special Interest
 Business/ Money	 Film	 Sports	 Featured Event



PHOTO / DAVID COCHRAN

Classical flutist Bonnie Cochran will perform at Killian Hall at noon, Dec. 14, as part of the Artist Behind the Desk concert series.

WEDNESDAY
December 14

 **Artist Behind the Desk Concert**
Classical flutist Bonnie Cochran. Noon. Killian Hall. 253-9821.

 **Computation for Design and Optimization Distinguished Speaker Series**
Talk by Aharon Ben-Tal of Technion-Israel Institute of Technology. 4-5 p.m. Room 1-390. 253-3725.

 **MITaly meeting: Italian Christmas**
Traditional Christmas meeting of MITaly, the Italian student association. 6:30-9 p.m. Room W20-208. 667-0281.

 **"Iraq: The Occupation and the Challenges Facing the Antiwar Movement"**
Talks by Chuck Turner, John Harris, Elisabeth Leonard and other local activists. 7-9 p.m. Room 4-270. 447-6360.

THURSDAY
December 15

 **Holiday Craft Fair**
Tech Community Crafters' sale. Dec. 15 and 16. 9 a.m.-5 p.m. Lobby 10.

 **Yoga Class**
Eight-fold yoga practice for body, mind and spirit. 6:30-8:30 p.m. Room 34-302.

FRIDAY
December 16

 **"Theodore Roszak: Working Drawings for the MIT Bell Tower"**
Exhibition includes a selection of 40 preparatory sketches that show sculptor, painter and printmaker Theodore Roszak's many ideas for the MIT Bell Tower. 9 a.m.-5 p.m. Room E52-466. 253-4400.

 **Gallery Talk**
Bill Arning, curator of the List Visual Arts Center, speaks on the List Visual Arts Center exhibition "Christian Jankowski: Everything Fell Together." 6 p.m. List Visual Arts Center (E15). 253-4680.

 **MIT Anime Club Weekly Showing**
The MIT Anime Club shows the best of both recent and classic Japanese animation every Friday. 7 p.m.

SATURDAY
December 17

 **"iSPOTS: Student Perspectives"**
MIT student Chris Waits will be on hand to talk with MIT Museum visitors about the impact of complete wireless coverage on the MIT community and beyond. Noon. 253-4422.

 **Introduction to Self Defense**
Jiu-Jitsu class will cover basic self-defense skills. 3-5 p.m. DuPont wrestling room.

 **hiLaRiUm @ Thirsty Ear Pub**
Performance by the comedy duo The Walsh Brothers of ImprovBoston and Comedy Studio fame. Must be 21+. Proper ID required. 8 p.m. Thirsty Ear Pub. 258-9754.

SUNDAY
December 18

 **Gallery Talk**
Talk by Jane Farver, List Visual Arts Center director, in conjunction with "Christian Jankowski: Everything Fell Together." 2 p.m. List Visual Arts Center (E15). 253-4680.

 **International Folk Dancing**
Every Sunday. 8-11 p.m. Lobdell Dining Hall. 253-FOLK.

Go Online! For complete events listings, see the MIT Events Calendar at: <http://events.mit.edu>.
Go Online! Office of the Arts website at: <http://web.mit.edu/arts/office>.

EDITOR'S CHOICE

"PANDEMIC INFLUENZA"
Talk by Sanford Weiner of MIT's Center for International Studies.
Room E38-615
Noon-1:30 p.m.

MIT CELEBRATES RANDAL PINKETT
Watch MIT alum Pinkett on "The Apprentice" finale and enjoy great desserts with the MIT community.
Kresge Auditorium
9-11 p.m.

CHANTEY SING
Music and chanteys with maritime enthusiasts, professional and amateur singers.
MIT Museum
1-4 p.m.

MIT EVENT HIGHLIGHTS DECEMBER 19-22

MONDAY
December 19

 **"Architecture and Revolution in Cuba: 1959-1969"**
Exhibit focusing on building projects that are little known outside Cuba. 9 a.m.-5 p.m. Room 7-338. 258-9106.

 **Biology Colloquium**
Weekly lecture series. 4-5 p.m. Room 32-123.

 **Karate Practice**
Mondays and Fridays. 6:30-8 p.m. Room W31-225.

 **Introduction to Self Defense**
Jiu-Jitsu class covering basic self-defense skills. First-timers encouraged on Monday and Wednesday. 9-11 p.m. DuPont wrestling room.

TUESDAY
December 20

 **"Critters"**
Short videos by artists who use animal protagonists. 24 hours a day. Media Test Wall, Whitaker Building 56. 253-4400.

 **Astrophysics Colloquium**
Every Tuesday. 4 p.m. Room 37-252.

 **Goodbye Party**
Reception honoring retiring Vice President for Federal Relations John C. Crowley. 4-6 p.m. Walker Memorial.

WEDNESDAY
December 21

 **"The Lightest Bike in the World (At Least for a Little While!)"**
Gallery talk by MIT Museum curators focusing on fascinating items drawn from the museum's extensive collections. Noon-1 p.m. MIT Museum. 253-4444.

 **Israeli Dancing**
8-11 p.m. Student Center 4th floor. 484-3267.

THURSDAY
December 22

 **Yoga Class**
Eight-fold yoga practice for body, mind and spirit. 6:30-8:30 p.m. Room 34-302.

 **Karaoke Night at the Thirsty Ear**
Must be 21+. ID required. 8-11 p.m. The Thirsty Ear Pub.

Professor's digital 'Nature' on display in Paris museum

MIT-based graphic designer, artist and computer scientist John Maeda has his first European solo exhibition at Fondation Cartier Pour l'Art Contemporain in Paris. Known for digital design, Maeda, an associate professor of design and computation in the Media Lab, was one of the first to explore the visual and artistic potential of the computer. Maeda has two series of images on exhibit. "The Nature" consists of seven "motion paintings" representing abstract forms in movement that recall natural phenomena: trees, sky, grass, moon, rain and snow. The second series, "Eye'm Hungry," is composed of six interactive stations designed with children in mind; visitors can use basic

interfaces such as a keyboard, microphone or mouse to make broccoli jump, anchovies swim and french fries sizzle. "Food is something that I've been focusing on for the last couple of years," says Maeda in an interview on the Fondation Cartier's web site (www.fondation.cartier.fr). He chose food in part because of his children, for whom he wanted to explore an accessible topic. Also, Maeda said that after 9/11 he was "so depressed" he wanted to "create work with a lively and joyful spirit close to pop art." The exhibition is on view through Feb. 19. If you can't make it to Paris to see the show, you can still send some e-cards from the exhibit by going to www.maedastudio.com/2005/ecard/.

