Unraveling the heparin mystery

An international team of researchers led by MIT has explained how contaminated batches of the blood-thinner heparin were able to slip past traditional safety screens and kill dozens of patients recently in the United States and Germany.

OSCS can kill—specifically by setting off an allergy-like reaction. The biological effects of the contaminant are outlined in a report also published online last week in the New England Journal of Medicine.

Team of researchers, led by MIT Professor Ram Sasiskehraran, explain how tainted heparin got past safety checks

New MIT study validates hurricane prediction

Hurricanes in some areas, including the North Atlantic, are likely to become more intense as a result of global warming even though the number of such storms worldwide may decline, according to a new study by MIT researchers.

Professor Dara Entekhabi will lead the science team for NASA’s Soil Moisture Active-Passive (SMAP) satellite mission, scheduled to launch in December 2012. A 6-meter deployable mesh antenna on the satellite will gather soil moisture and freeze/thaw data across 1,000 kilometer swaths, creating ribbons of measurements around the globe and completing the cycle every few days.

Mapping Earth’s water cycle

Entekhabi to lead science team for NASA satellite mission

Professor Dara Entekhabi will lead the science team designing a NASA satellite mission to collect global soil moisture measurements and other data seen as key to improving weather, flood and drought forecasts and predictions of agricultural productivity and climate change.

At present, scientists have no network for gathering soil moisture data as they do for rainfall, winds, humidity and temperature. Instead, that data is gathered only at a few scattered points around the world.

“ Soil moisture is the lynchpin of these three cycles through its control on evaporation and plant transpiration. Global monitoring of this variable will allow a new perspective on how these three cycles work and vary together in the Earth system,” said Entekhabi, the Bacardi and Stockholms Water Foundations Professor.

“Additionally, because soil moisture is a state variable that controls both water and energy fluxes at the land surface, we anticipate that assimilation of the global observations will improve the skill in numerical weather prediction, especially for events that are influenced by these fluxes at the base of the atmosphere,” added Entekhabi, who holds joint appointments in MIT’s Department of Civil and Environmental Engineering and the Department of Earth, Atmospheric and Planetary Sciences.

A three-dimensional model of the chemical makeup of the blood-thinner heparin. A contaminant with a very similar structure, which made it hard to detect, caused dozens of deaths.
Edward Lorenz, father of chaos theory and butterfly effect, 90

Edward Lorenz, a meteorologist who tried to explain why it is so hard to make accurate forecasts and wound up unleashing a scientific revolution called chaos theory, died April 16 of cancer at his home in Cambridge. He was 87.

Edward Lorenz A professor at MIT, Lorenz was the first to recognize what is now called chaotic behavior in the mathematical modeling of weather systems. In the early 1960s, Lorenz realized that small differences in a dynamic system such as the atmosphere—or a model of the atmosphere—could trigger vast and often unexpected results.

These observations ultimately led him to formulate what became known as the butterfly effect—a term that grew out of an academic paper he presented in 1972 entitled “Predictability. Does the Flap of a Butterfly’s Wings in Brazil Set Off a Tornado in Texas?”

Lorenz’s early insights marked the beginning of a new field of study that impacted not just the field of mathematics but virtually every branch of science— including biological, physical, and social. In meteorology, it led to the conclusion that it may be fundamentally impossible to predict weather beyond two or three weeks with a reasonable degree of accuracy. Many scientists have since asserted that the 20th century will be remembered for three scientific revolutions—relativity, quantum mechanics and chaos.

By showing that certain deterministic systems have formal unpredictability, Edward Lorenz demonstrated that the mathematical foundation of the Cartesian universe and fomented what some have called the third scientific revolution of the 20th century, following on the heels of relativity and quantum physics,” said Kerry Emanuel, professor of atmospheric science at MIT. "He was also a perfect gentleman, and through his influence, I think, many researchers have come to high regard for his thinking and succeeding generations.

Lorenz was a member of the staff of MIT’s Departments of Meteorology from 1946 to 1975, when he was appointed to the faculty as an associate professor. He was promoted to professor in 1962 and was head of the department from 1977 to 1981. He became an emeritus professor in 1987.

Lorenz, who was elected to the National Academy of Sciences in 1969 and a fellow of the American Academy of Arts and Sciences in 1971, was awarded the Kyoto Prize in 1991.

Funeral arrangements are still being finalized, and a memorial service is being planned at MIT.

Harald A. Enge, retired physics professor, 87

Harald A. Enge, retired professor of electrical engineering at the Laboratory for Nuclear Science, died April 14 of respiratory failure. He was 87.

Enge was director of MIT’s Van de Graaff Research Group for many years and was an acknowledged world leader in the design of magnetic spectrometers for nuclear physics, instruments used to determine the energy spectrum of nuclear particles.

Enge held more than 20 patents for inventions in a wide range of fields, including magnetic and electric optics, accelerators, power supplies and mass separators. He also wrote a popular textbook called “Introduction to Nuclear Physics.”

Theo de Boeuf, professor of electrical engineering and computer science at MIT, said Enge was a giant among the men who pioneered the use of modern computers in nuclear physics research. He worked with Enge on the development of computer-based analysis of data from experiments conducted by the MIT team at CERN (the European Laboratory for Particle Physics) in Geneva, Switzerland.

Lorenz is survived by three children, Nancy, Edward and Cheryl, and four grandchildren.

Funeral arrangements are private.

Martin Fisher, co-founder of the KickStart program, has been awarded the $100,000 Lemelson-MIT Award for Sustainability for his work in developing and marketing technologies—such as a light-emitting diode, or LED, lamp—that is shown using St. Vincent as an example. Fisher called for an interdisciplinary approach across the subdisciplines of the civil and environmental engineering fields to help ensure that engineers implement sustainable solutions.


Lorenz was also an acknowledged world leader in the design of magnetic spectrometers for nuclear physics.
Edwards, at student-run global poverty conference, urges students to make themselves heard

The global problems of climate change, population growth, and severe poverty are so enormous that no one country can solve them alone, former Democratic presidential candidate John Edwards said in one of the opening keynote addresses at a student-organized conference on global poverty.

"We face enormous challenges that literally go to the survival of the planet," Edwards said, adding that the problems are "connected to each other, and connected to all the uncertainty, instability and danger in the world today."

"It is required, absolutely necessary, that we work in a cooperative, coordinated way," the former North Carolina senator added. "That's why we need visionary leadership.

Edwards spoke April 18 at a Kresge Auditorium during the three-day Millennium Campus Conference, which brought together more than 1,400 students from around the country to discuss ways of fighting the problems of poverty in the world. The event was organized by MIT's Global Poverty Initiative, created just a year ago.

Specific things the nation should be doing to alleviate poverty, he said, include universal health care, an increase in the minimum wage, strengthening of the rights of unions, initiatives to help people build assets such as matching savings accounts, and better access to education. "Young people can play such a crucial role" in bringing about such changes, he said.

"We have to develop a political will to take action," he said. "As a student what the most important thing is that young people can do to help achieve this goal, they emphasis/advocacy, making your voice heard. Organize rallies, be part of the movement, support candidates" who are working to improve conditions.

At a news conference following his address, Edwards declined to comment on whether he supported Sen. Barack Obama or Sen. Hillary Clinton for the Democratic presidential nomination. However, in his speech he signaled he had made some kind of decision on the matter, saying "I have a preference."

Edwards has urged all the remaining presidential candidates to create a new cabinet-level anti-poverty position, he said, and both Clinton and Obama have made progress. Meanwhile, Edwards himself will continue to work with the new student group: Organizers announced that he has agreed to join the Global Poverty Initiative's board of advisors.

The other opening keynote was given by the Administrator of the U.S. Agency for International Development, Henrietta Fore. She enthusiastically endorsed the new group's agenda, saying "you've launched a very promising endeavor. I consider this the beginning of a partnership."

USaid oversaw a budget of almost $40 billion in development aid.

"Economic growth is at the heart of any effort to alleviate global poverty," she said. "From the largest cities to the smallest farms, growth lifts families."

"The student group, comprised of chapters on dozens of campuses, was formed to support the United Nations Millennium Development Goals, which include cutting world poverty in half by 2015. "America looks forward to the contributions you all will make," Fore told the students.

Ross named director of MIT CISR

Jeanne Ross will become director of the MIT Center for Information Systems Research with overall responsibility for the center's activities, MIT Sloan School of Management Dean David Schmittlein announced this month.

Peter Well, who has been director since June 2000, will become chairman of MIT CISR and focus on international activities.

MIT CISR was established in 1974 and is currently funded by more than 65 corporate sponsors and patrons. The center undertakes practical research on how firms generate business value from IT, disseminating its findings through research briefings, journal articles, books, workshops and executive education. In 2007, Ziff Davis and PricewaterhouseCoopers described MIT CISR as "the most influential IT academic research center."

Ross has been at MIT CISR since 1993. As director, Ross will oversee the center's research agenda, coordinate research activities, manage U.S.-based sponsor relationships, provide linkages between MIT CISR and Sloan, host sponsor events in the United States and manage the center's business model. She will sustain MIT CISR's research focus on how companies manage IT for business value and increase efforts to make that research accessible to practitioners.

In his new role, Well will lead MIT CISR's international initiatives. As global commerce and operations increase in importance, he will coordinate research on how firms successfully use IT to generate business value globally, focusing particularly on both local responsiveness and global scale.

Check your email for the 2008 Institute Awards issue

Tech Talk will publish the 2008 Institute Awards issue in print and online on June 4 this year. The annual special section lists the names of 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/news-office/awards.html, but please note that the deadline is 5 p.m. on Friday, May 16, in order to be included in the awards issue. Do not submit Infinite Mile Awards or awards from outside organizations.

All text submissions for the awards issue can be made online at the web site listed above, or e-mailed to Patrick Gillooly at gillooly@mit.edu. Any and all photographs are also welcomed and can be e-mailed to Patrick Gillooly at gillooly@mit.edu. Please send them as attachments, in an appropriate format with a resolution of 300 dpi if possible. Please clearly identify the subjects and include the name of the photographer so that we can run any photographs without that information.

Submissions needed for the 2008 Institute Awards issue
**MIT research sheds new light on cell division**

**Method holds promise for treating cancer and infection**

Live-animal nerve regeneration study gets a boost

A MIT team has improved upon its landmark technology reported last year in which the researchers used a fingernail-sized lab-on-a-chip to image, perform surgery, and sort worms to study nerve regeneration.

The team, led by Professor Feth Yanik, MIT assistant professor of electrical engineering and computer science, has developed a technique to isolate the still-awake animals for several minutes with unprecedented stability, which then allowed the researchers to conduct fast, detailed three-dimensional imaging and to perform high-resolution laser nanosurgery on the animals.

The advance, which builds on a technology first reported last year, could ultimately help researchers better understand the genetic underpinnings of regeneration and degeneration in the nervous system—not just in the worm but in more-complex organisms including humans. That, in turn, could help in treatments of neural injuries and diseases such as Parkinson’s and Alzheimer’s.

The latest discovery was reported in the April 2 advanced online issue of the journal Lab on a Chip. The work involves the C. elegans worm, one of the tiniest multicellular organisms known. The worm is considered a key model for investigating a variety of biological phenomena such as aging, fat metabolism and neurological diseases.

“This new technology is allowing us to study the entire genome of the animal in very short periods of time,” Yanik said. “We are currently combining it with genetics and drug screens to study nerve regeneration on these animals.”

**Team develops safe, effective RNA interference technique**

A team of researchers from MIT and Alnylam Pharmaceuticals has developed safe and effective methods to perform RNA interference, a therapy that holds great promise for treating a variety of diseases including cancer and hepatitis.

“RNA interference is a tool that has a lot of people excited, and one reason for the excitement is that we hope it will provide a new method to control almost any gene in your body,” said Daniel Anderson of the David H. Koch Institute for Integrative Cancer Research at MIT and senior author of a paper, published online in Science, that appeared as the cover story in Nature Biotechnology on Sunday.

Scientists see RNA interference (RNAi) as a way to turn off specific disease-causing genes. Despite this potential, researchers studying the technique have been stymied by one major problem: How to deliver RNAi agents to target tissues.

Now, the MIT/Alnylam team has developed a library of new molecules that successfully delivered RNA interference agents in several animals, including mice, rats and cyclopropyl monkeys. The team hopes to test the delivery materials in human clinical trials within the next few years.

RNAi works by disrupting the flow of genetic information from a cell’s nucleus to the protein-building machinery of the cell. Gene expression can be turned on or off by interfering with messenger RNA, which carries that information.

One way to deliver RNAi is to package siRNA (short interfering RNA) inside nanoparticles that can deliver it directly to the target cell.

In previous studies, lipids (fat-soluble molecules such as fats, waxes and cholesterol) have shown promise as RNA delivery agents. However, only a limited number of different lipids have been discovered when those studies were conducted.

Using a new synthesis scheme that allows for high-speed production, the researchers created a huge library of lipid-like molecules called lipodoids. A major advantage of these chemical methods is that they facilitate production of a large variety of different molecules, which could be customized for different RNAi therapies and drug-delivery problems.

The MIT team found several lipodoids that successfully delivered siRNA to the liver, which may provide a therapy for diseases ranging from cancer to viral infection, Anderson said. They also demonstrated that the siRNA could travel to the lungs, where it blocked genes expressed by respiratory syncytial virus that had infected the lungs.

Researchers were also able to deliver siRNA to immune cells called macrophages.

In some cases, the effects of a single RNAi injection lasted up to four weeks. The researchers also showed that they could block two genes at once, raising the possibility of treating diseases that involve multiple genes.

The delivery system also proved effective with another type of RNA interference, which involves delivering short hairpin RNA (very short strands of RNA that help control gene expression).

“For the first time, we’ve got a lot of formulations to choose from,” Anderson said. “In the next five years, we expect to push this technology forward in a number of different clinical and drug-delivery applications.”

The first author of the paper is Akin Akinc, who received a Ph.D in chemical engineering from MIT in 2003 and is now at Alnylam. Andreas Zumbuehl, now at the University of Geneva; MIT students Michel Goldberg, Eleonora Lambian, Valentina Busini, Sergio Bacallado, David Nguyen and Jason Fullam are also authors of the paper.

The research was funded by the National Institutes of Health.
An earthquake’s aftermath

David Chandler
News Office

Last August, Peru was shaken by a devastating magnitude 8 earthquake. In the coastal town of Tamburgero de Mora, not far from the epicenter, about 90 percent of the houses were damaged or destroyed by the quake and very few have yet to be rebuilt. Students and faculty from MIT’s CityScope class visited the town of 5,200 people during this year’s spring break to learn about the devastated city’s needs and how MIT ingenuity might be harnessed to help. They were looking at a whose discussions with residents, and some graduate students from the class will be returning there this summer to carry out plans that they have been developing as the result of the on-site visit.

“Among the projects is developing a community garden, both in order to help meet the food needs of the impoverished town and to help build a sense of community. ‘They get most of the water from other places, when they could very well be self-sufficient,’ he says. Water was less of a problem than they had anticipated, as the city sits near the mouth of a river. Water quality from wells in parts of the city and surroundings, however, might benefit from improved filtration, such as the systems pioneered by MIT sensor lecturer Susan Murcott, Williams says.

Another project the class is looking into is a design for a pedal-powered washing machine, which could be built locally and provide not only better hygiene but a potential new business for local people. Williams plans to major in mechanical engineering, but says this class has already influenced her thinking about what she wants to do with her life. She’s interested in product design and likes the idea of working with MIT’s D-Lab on products that have real social consequences.

“After this, I’m looking at some kind of social justice track, something that can really help,” she says of her experience in Peru. “It really made me want to do something positive for the Third World.”

HEPARIN: MIT researcher and team find contaminant

Continued from Page 1

By Biological Engineering and Health Sciences and Technology at MIT and at the David H. Koch Institute for Integrative Cancer Research at MIT. Heparin, a blood thinner used during kidney dialysis or heart surgery, is normally produced from pig intestines. Scientists say the contaminant heparin came from factories in China that manufacture the drug for Baxter International.

Baxter recalled its heparin in February after dozens of deaths were reported, dating back to November. The tainted heparin has been blamed for 81 U.S. deaths so far, and last week the FDA announced that contaminated batches were also found in 10 other countries. The New England Journal of Medicine study offers the first potential link between the contaminant heparin and the clinical symptoms observed in affected patients. Our findings also suggest that a single dosing could help protect the sensitive chain of heparin, by screening heparin lots for the presence of polyiodinated contaminants. Some have the unintended pharmacological consequences,” said Sasisekharan.

Heparin consists of a long, complex chain of repeating sugar molecules. The contaminant, which is derived from animal cartilage, has a structure very similar to that of heparin and thus cannot be identified with the tests normally used to detect heparin contamination.

It is unclear whether the contaminant got into the heparin during the manufacturing process, or how and where contaminants could have occurred during the process. More investigations are needed to address this issue.

Traditional heparin safety screens test only for contaminants such as protein, lipids or DNA and thus would not detect the presence of sugar chains that do not belong. Sasisekharan has played a key role in developing new technologies for analyzing complex sugars. Using the new technology, the research team was able to detect the presence of the faulty sugars.

In addition to being crucial for public health, identifying the recent impurity in heparin was a chemical triumph,” said Jeremy M. Berg, director of the National Institute of General Medical Science, which supported the work. “The research team accomplished this difficult task by using a unique combination of technologies. This shows what might in the future be used to detect other impurities in pharmaceutical materials.

More than 100 patients have experienced adverse reactions after receiving the tainted heparin, including serious allergic reactions and low blood pressure. The first leads to a dangerous decrease in blood pressure, the second to a serious allergic reaction. In blinded laboratory tests, the contaminated heparin activated the pathological pathways, while normal heparin did not.

Sasisekharan emphasized the remarkable willingness of people to do whatever they could to help solve this problem, unlike anything I’d experienced before. It is extremely satisfying to see how teamwork has resulted in the application of rigorous, peer-reviewed science that helps to keep our medicines safe,” he said.

Sasisekharan expressed his hope that such effective teamwork will extend to other dimensions of public health, in which rigorous team-based science leads not only toward safer drugs, but also toward safer foods and a safer environment.

Researchers from the FDA, Momenta Pharmaceuticals of Cambridge, Mass., Rensselaer Polytechnic Institute and the Institute of Rechere Chimiche e Biochimiche of Milan, Italy, also contributed to the Nature Biotechnology paper.

Researchers from the FDA, Momenta Pharmaceuticals, Virginia-Maryland Regional College of Veterinary Medicine at Virginia Tech, and Brigham and Women’s Hospital contributed to the New England Journal of Medicine paper.
Feynman play ‘QED’ to be performed this week

“QED,” a play that showcases the warmth and genius of Nobel laureate Richard Feynman, will be performed today through Sunday, May 4, as part of the Cambridge Science Festival.

Written by American playwright Peter Pabst, “QED” was inspired by Feynman’s own writings, including his popular science book, “QED: The Strange Story of Light and Matter.” Its title also refers to quantum electrodynamics, the field in which Feynman won the 1965 Nobel Prize, and to “quod erat demonstrandum,” the Latin phrase used in mathematics meaning, “That which was to be demonstrated.”

The play offers a Saturday with Feynman in 1966. Alone in his office at Caltech, he rehearses for his bongo-playing role in a Caltech student production of “South Pacific,” works on a lecture, debates the final report on the Challenger disaster, guides Russian tourists and weighs what to do with the ominous report on the Challenger disaster, and gets dissected by people outside the community.

HURRICANE: New study confirms climate change strengthens storms

Continued from Page 1

weeks before Hurricane Katrina slammed into New Orleans. Emanuel, a professor of atmospheric science in MIT’s Department of Earth, Atmospheric and Planetary Sciences, says the new work shows no clear change in the overall numbers of such storms when run on future climates predicted using global climate models. However, Emanuel says, the new work also raises some questions. "That's very different from the process now, when it's rapidly increasing," Emanuel says. "Another possibility is that the recent hurricane increase is related to the fast pace of increase in temperature. The computer models in this study, he explains, show what happens after the atmosphere has stabilized at new, much higher CO2 concentrations. "That's different from the process now, when it's rapidly changing," he says.

When Fox News called me up, they started from the premise that I'd reversed my position. Other blogs latched onto the fact that I'd changed my position on climate change. There are several possibilities, Emanuel says. "The last 25 years' increase may have little to do with global warming, or the models may have missed something about how nature responds to the increase in carbon dioxide. Other possibilities is that the recent hurricane increase is related to the fast pace of increase in temperature. The computer models in this study, he explains, show what happens after the atmosphere has stabilized at new, much higher CO2 concentrations. "That's different from the process now, when it's rapidly changing," he says.

In addition to measuring soil moisture, the satellite will detect if the surface moisture is frozen. In forests, the freeze/thaw state determines the length of the growing season and the balance between carbon assimilation into biomass and the loss of carbon due to vegetation respiration. The result of this balance can tell scientists if a forest is a net source or net sink of carbon.

One mission obstacle that Entekhabi and team solved last year was integrating the two types of measurements the satellite would gather: passive microwave measurements on a continuous basis, essentially creating a map of global soil surface moisture. A 6-meter deployable mesh antenna on a satellite will gather data across a swath of 1,000 kilometers, creating global maps of measurements around the globe and completing the cycle every few days.

The instruments that will be deployed in SMAP will gather both passive and active low-frequency microwave measurements on a continuous basis, essentially creating a map of global soil surface moisture. A 6-meter deployable mesh antenna on a satellite will gather data across a swath of 1,000 kilometers, creating global maps of measurements around the globe and completing the cycle every few days.
Twenty years ago, a team of MIT students, faculty and alumni succeeded in a project that set a pair of aviation records still standing to this day. On April 23, 1988, a lightweight airplane called Daedalus—completely under human power—flew across the Mediterranean Sea from the Greek island of Crete to just a few meters from the shore of the island of Santorini.

The plane was named for the character in Greek mythology who escaped King Minos of Crete by flying away with the help of wings made of feathers attached to his arms with wax. The modern Daedalus used a set of bicycle pedals and a chain transmission to power a large, slow-moving propeller. Made largely of carbon-fiber composite and Mylar, the plane weighed just 69 pounds.

On its record flight, Daedalus traveled 115 kilometers (about 71.5 miles) across the sea before being buffeted by winds, breaking its tail spar and crashing into the waves just 7 meters offshore from its destination. The pilot (and power plant), champion bicyclist Kanellos Kanellopoulos, swam to shore unbowed, and the wreckage of the craft was sent to the Smithsonian, where it remains in storage. An identical craft used in the initial tests is on display at Boston’s Museum of Science.

The flight set the all-time records for duration (3 hours and 54 minutes) and distance of a human-powered flight, handheld bearing the previous record of just 111 kilometers set by Gossa-mer Altarossa in a crossing of the English Channel in 1979. And in the test flights that included the flight of the craft, including a series of tests at NASAs Dryden Flight Research Center in California’s Mojave Desert, produced information that helped to bring about new technology for high-altitude, long-endurance aircraft, according to NASA. 

David Chandler
News Office

Faculty OK double majors, CMS SB program
Sarah H. Wright
News Office

The faculty voted unanimously to allow double majors and to make Comparative Media Studies a permanent SB program at its April 16 meeting.

They also heard reports from the Committees on Nomina- tions, the Committee on Discipline and the Edgerton Award Committee and a proposal to establish a new Master of Finance degree program.

Jesu del Alamo, Donnor Professor of Electrical Engineering and Computer Science, presented the slate of nominees for chair of the faculty and members of standing faculty committees. Del Alamo’s report prompted a discussion on the value of inclusiveness and transparency in the nominations process.

Professor John Matthews of physics presented the Edgerton Award to Jay Scheib, associate professor of theater. The Edgerton Committee citation described Scheib as possessing the “unique type of excellence associated with Professor Edgerton, capturing the imagination of the wider public with his innovative, experimental approach to theater and embodying all the outstanding qualities we admire at MIT.”

In accepting the award, Scheib said, “It’s inspiring to collaborate here—to move from experimental theater to aeronautics and astronautics. I thank MIT. I’m a little bit flabbergasted.”

In other business, Andrew Lo, Harris and Harris Group Professor and director of the Laboratory for Financial Engineering, presented a proposal to establish a new Master of Finance degree program within the MIT Sloan School of Management.

Lo outlined the proposed 12-month, June-to-June program, emphasizing MIT’s tradition of groundbreaking research in finance and predicting that the Master of Finance program would “change the model of business education.”

Dean David Schmittlein of MIT Sloan endorsed Lo’s proposal: “We need to own the high ground of finance. This program is central to the mission of Sloan and of MIT,” he said.

Professor George Apostolakis of nuclear science and engineering presented the Committee on Discipline’s report of 2006-2007. In summary, plagiarizing from Internet sources is on display at Boston’s Museum of Science.

Photo: NASA

Landmarks gifts LEES, EECs with $4 million gift
A $4 million gift by Emanuel E. Landman ’58, SM ’59, SD ’66 and his wife, Sheila E. Landman, to the Laboratory for Electromagnetics and Electronic Systems (LEES) and the Department of Electrical Engineering and Computer Science (EECS) will provide a new endowed professorship, fellowship support and UROP funds in the fields of power electronics and electric-energy-related engineering.

The Landmans previously established another current development professorship in EECs first held by Associate Professor David Perreault of LEES. Associate professors Karl Berggren and Luca Dianl have been named the current Landman Career Development Professors.

LEES, an interdisciplinary research lab, provides the theoretical basis as well as the component, circuit and systems technologies required to develop advanced electrical energy applications. Private financial support for the work that LEES performs is vital since work the lab does is at the forefront of innovation.

“This generous gift provides us the resources to initiate research into new areas and concepts that are not sufficiently developed to generate sponsored support,” said LEES Director John Kasakian.

Photo: Michael Fierc CPRAM LAB FESTIVAL

It’s Alive!
MIT alum John Dolhun creates ‘Science Comes Alive’ during the Cambridge Science Festival this past weekend. Dolhun worked with a team from the MIT Club of Boston on a standing-room-only demonstration at the festival’s Saturday kickoff at City Hall.

Spring Picnic May 5 to celebrate Benedict
President Susan Hockfield, the Undergraduate Association and the Graduate Student Council are hosting a Spring Picnic on May 5 to celebrate Larry G. Benedict upon his retirement from MIT as dean for student life.

The picnic is open to the MIT community and will run from noon to 1:30 p.m. in Killian Court.

CLASSIFIED ADS

Members of the MIT community may submit one ad each issue. Ads should be 20 words maxi- mum; they will be edited. Send to: email to thadmit.edu or mail to Classifieds, Rm 11-400. Deadline is next Monday the week before publication.

FOR SALE

Medium size white Kenmore microwave oven $45. 4,500 BTU; Frigidaire window air condition- ar $50; Box fan $10 Good working condition. For more info call 617-258-3458 days, 978-835-0270 nights.


Chromcraft square/round 6 pc kitchen set, medium oak finish with laminated wood top 40”x40” plus 16”leaf. Sears/Whit wood chairs w/leaf. Excel- lent condition, pictures available. Paid $1,000 selling $475. lishwh@mit.edu.

Pristine Nikon D200 and 18-200mm f/3.5-4.5 ED-F VR lenses, one year old; extended warranty, condition 10+. like new, $3500 shutter actuations, all accessories, $1,600, call 253-754-01, or seth@eapei.mit.edu.

BREXER, Matt—Sweet house on lake, 15 min- utes to ocean beaches. Sleeps 6, abuts conser- vation forest; Private beach, fireplace, screened porch, separate studio/bedroom in the woods. Some June. July. Aug. $2000/week. E-mail brixer@mit.edu available. $1,200/week. Andy, 617-876-6257

Nantucket rental available Aug. 17 through mid- September. Historic Centre Street ‘cottage’ with big yard and porch. Sleeps 10 (6-3, 1 bed). $3,500/week. Great for multigenerational group. Sandy@orion@alum.mit.edu. 980-361-3242.

BUDAPEST, lovely apartment for rent, $650/ week. Sunny, third floor, two bedrooms, kitchen, bath. Phone, Cable TV, DSL, Mac, printer. Excel- lent location near Opera. Easy access to subway, streetcar. Tom at 617-823-9722, laygtom@yahoo.com.

Belfountain—Large elegant four bedroom, two baths (his/her tubs), hardwood floors, dishwasher, dis- posal, washer, dryer. Parking. Convenient public transportation to downtown Toronto. $275/month furnished. Available in June or July 1 Lease. Call 617-489-2403 or e-mail stewartkw@mit.edu.

Lincoln—Studio apartment for rent in private home. Attractive & very quiet. Separate entrance Parking and utilities included. $1000/mo. Please call 781-258-8988.

Mount Desert Island, Maine—Ocean front sum- mer cabin,. 2BD/1BA w/living/kitchen area; pic- ture win-dows, deck, overlooking water; star- way to beach, new furniture; 1/2 mile to harbor. Bar Harbor. $1,000/week June-Sept. Steve at 253-5767 or chowover@mit.edu.

Craigellachie Beach, Cape Cod—3bdm, 2 bath, fully furnished home. 5 min to beach. Weeks available June and Sept 700wk. Includes free parking at Barnstable beaches. Debbie at 576-278-0158 or duhyani@comcast.net.

WANTED

Flagstones, preferably free and w/in 25 miles of Acton. I can pick up. Ginny Sigia, sigia@mit.edu.
Launching a solar revolution

MIT gets $10M gift from Chesonis Family Foundation to advance solar technologies

Promising to transform solar power from a “hot topic” to an affordable, mainstream energy solution, MIT and the Chesonis Family Foundation last week launched a “solar revolution” with the ultimate aim of making solar energy America’s primary carbon-free fuel.

The Solar Revolution Project (SRP), funded by a $10 million gift from the foundation, will explore new materials and systems that could dramatically accelerate the availability of solar energy. The SRP will complement and interact closely with other large solar projects at MIT, creating one of the largest solar energy clusters at any research university.

The Chesonis gift will allow MIT to explore bold approaches that are essential for transforming the solar industry. Specifically, it will focus on three elements—capture, conversion and storage—that will ultimately make solar power a viable, near-term energy source.

“Solar is thought of as an ultimate energy technology in the distant future. The goal of SRP is to move this timeframe nearer to the present. The SRP will make solar a practical alternative, by committing a 10-year timeframe for establishing the new base of scientific knowledge it will take to draw a market-competitive energy supply from the sun,” said Daniel Nocera, the Henry Dreyfus Professor of Energy and Professor of Chemistry at MIT, who will direct the SRP. “With SRP, think solar and think now. This is the revolution that is implied in the project name.”

Professor Ernest Moniz, director of the MIT Energy Initiative (MITEI), said, “Climate change makes the search for more environmentally benign sources of energy urgent and hugely important. Many experts have concluded that solar energy is a key, if not the key answer to our global energy challenges in the long term.

“The Chesonis investment—large, flexible, empowering of highly creative MIT faculty and students—embodies this conclusion,” Moniz continued. “We applaud the vision, generosity and confidence in MIT that this extraordinary gift demonstrates.”

Most solar research focuses on known materials and systems, but, thus far, these approaches cannot be implemented on a large scale. The SRP will allow researchers to explore entirely new materials and systems that could transform solar power into a viable, widely deployed and affordable source.

A unique feature of the SRP is its flexibility. The gift’s unrestricted funding is aimed at creating a “no holds barred” research environment that will inspire innovations in the field. The SRP will initially support 30 energy fellowships for students on a range of solar-related studies, from the development of novel materials for energy conversion and storage to using solar energy to produce hydrogen fuel from water.

Each fellowship will span five years, which allows for significant continuity and greater impact. The gift from the foundation will also help support an integrated study on the future of solar energy, building on the success of two earlier MIT interdisciplinary reports on the future of coal and of nuclear energy in a carbon-constrained world.

“We are at a breakpoint, both in energy supply and environmental consequences. Solar energy has enormous promise as the ultimate answer to our energy problems,” said Arunas Chesonis, benefactor of the foundation. “Solar energy is widely distributed and the fuel cost for solar power is zero. It is our hope that by investing in the people at MIT and giving them the freedom to take risks in the lab, we will enable them to be true game-changers—advancing the state of the art to a point where solar power is cheaper and more reliable than electricity from coal.”

The foundation will also contribute to the MITEI Energy Seed Fund Program (ESFP), which solicits and funds innovative energy proposals from across the MIT campus. The first round of solicitations for the ESFP (and the related Ignition Grant program for junior faculty) provided close to $2 million to fund 20 outstanding proposals. The Chesonis gift will provide an additional $100,000 to supplement funds from MITEI industry partners.

Other large solar projects at MIT include the Eni-MIT Solar Frontiers Center, the MIT-Fraunhofer Center for Sustainable Energy Systems, the Masdar Foundation solar project and a range of solar research grants to MIT from the U.S. Department of Energy and other federal agencies.

Boost the economy, heal the planet

Governor says Massachusetts can reap benefits from clean energy

Massachusetts Gov. Deval Patrick, making his second appearance at MIT this month, told an enthusiastic crowd at Kresge Auditorium last week—on the 39th anniversary of the first Earth Day—that clean energy has the potential to bring about an economic bonanza for the commonwealth at the same time that it improves the planet’s well-being.

“If we get this right, we will be the customer,” Patrick said of his plans to make Massachusetts a hotbed of both innovation and implementation in solar, wind and other clean-energy technologies.

Patrick said state regulations must be updated to give renewable energy projects a fair shake. At present, he said, there are “built-in biases” that favor fossil fuel. For example, a provision that allows the state to override local objections and permit the construction of new power plants only applies to large plants, and thus almost exclusively affects fossil-fuel plants. “Ironically,” he said, “the only [renewable] plant large enough to be affected by this law is the most controversial—Cape Wind, which I enthusiastically support.”

Despite strong opposition to that offshore wind project from most of Massachusetts’ political leaders, Patrick said that if it does get built, as the nation’s first major offshore wind installation, it would be a powerful symbol of a new direction in energy policy.

A new energy reform bill is now being hammered out in a state legislature conference committee, Patrick said, “will revolutionize energy policy in this state.” One of the reforms he wants to see incorporated in the bill is a restructure of electric utility regulation to promote energy efficiency—“the cleanest energy of all,” he said.

Currently, rate structures “reward our utilities for selling as much as they can,” but that must be changed in order to reap the enormous benefits of efficiency. Changes that policy will be “good news for consumers, and good news for renewable energy,” he said.

In addition, to promote the development of solar energy, Massachusetts has forged “the first alliance of utilities and solar manufacturers in the whole country,” Patrick said. One sign of that alliance is the recent announcement of Evergreen Solar—a manufacturer of solar panels that was a spin-off of MIT research—to triple its manufacturing capacity in the state, creating 1,000 jobs. In addition, state rebates will pay up to 60 percent of homeowners’ costs for installing photovoltaic panels.

“Thanks to places like MIT, with its Energy Initiative, Massachusetts is becoming a center of solar research,” he said. Noting an overall U.S. trend away from manufacturing jobs and toward information-based work, he said that “Clean energy is one knowledge-based technology that produces jobs across the spectrum—from construction trade work to manufacturing, management, academic and research positions.”

Patrick said that while some might find it odd to spend Earth Day talking about the building of a new industry, it will pay off in the long run. “I hope everyone will help us build, right here in Massachusetts, a clean-energy industry that saves the world,” he said, to a resounding standing ovation.