

MIT's
Oldest and Largest
Newspaper



The Weather

Today: Sunny and mild, 72°F (22°C)
Tonight: Clear and cooler, 47°F (8°C)
Tomorrow: Cloudy and cooler, 56°F (13°C)

Details, Page 2

Volume 127, Number 20

Cambridge, Massachusetts 02139

Tuesday, April 24, 2007

Barclay Found Dead After Intensive Search

By Nick Semenkovich
and Angeline Wang
STAFF REPORTERS

A body that washed to shore on Cape Cod last Thursday was identified as MIT student Daniel J. Barclay '07, who had been missing since Sunday, April 8. Barclay was declared a missing person Friday, Apr. 13 and had been the focus of an area-wide search.

The body was found Thursday, Apr. 19, on Scussett Beach located on Cape Cod Bay by a woman who was walking there, according to Michael O'Keefe, district attorney for the Cape and Islands. "There are no signs of foul play," O'Keefe said. "Beyond that, it would be specula-

tion." O'Keefe told the *Boston Globe* that there were no obvious signs of trauma on the body.

An autopsy has been performed, but cause and manner of death have not yet been determined, according to the Office of the Chief Medical Examiner. O'Keefe said the medical examiner is waiting on a toxicology report to determine cause of death. Susan L. Kayton '78, Barclay's mother, identified the body Friday and told the *Globe* that it appeared Barclay had drowned.

Barclay, who was a former *Tech* opinion staff columnist, was found near part of an inflatable raft he purchased at

Barclay, Page 11

Discipline Director Quits To Be Near Home, Family

By Yi Zhou
STAFF REPORTER

Ten months after assuming her role as director of the Office of Student Mediation and Community Standards, Veronica Mendoza '96 will be leaving MIT at the end of May to resume practicing law in California. She is the third person to leave this post in the past four years. The position was redefined last year to exclude the function of risk management.

Mendoza's predecessors, William M. Fischer and Steven J. Tyrell, both stepped down as associate dean for student conduct and risk management after nine and eighteen

months, respectively. They both resigned to pursue other career opportunities, while Mendoza is leaving for personal reasons. "I miss my real home, and, most importantly, my family, and I've decided that I need to be near them" in California, she wrote in an e-mail on Tuesday, April 10.

Mendoza brought a unique perspective to the role, receiving a bachelor's degree in Spanish from the Institute and working in the Admissions Office before pursuing a degree in law. Mendoza's primary responsibilities have been to oversee

Mendoza, Page 12

Motorcycle Crash Kills Student

Thrown From Motorcycle, Senior House Freshman Dies at Hospital

By Nick Semenkovich
ASSOCIATE NEWS EDITOR

Ivan D. Dimitrov '10 died over the weekend from injuries sustained after crashing his motorcycle. Dimitrov, 20, was a Senior House resident and Bulgarian citizen.

According to a press release by the Massachusetts State Police, Dimitrov was traveling on Storrow Drive East at approximately 3:35 a.m. on Saturday, April 21. While attempting to use the Fenway exit ramp, Dimitrov lost control of his 1998 Kawasaki 600 motorcycle. Dimitrov and his motorcycle "came to rest in separate locations" along the guard-

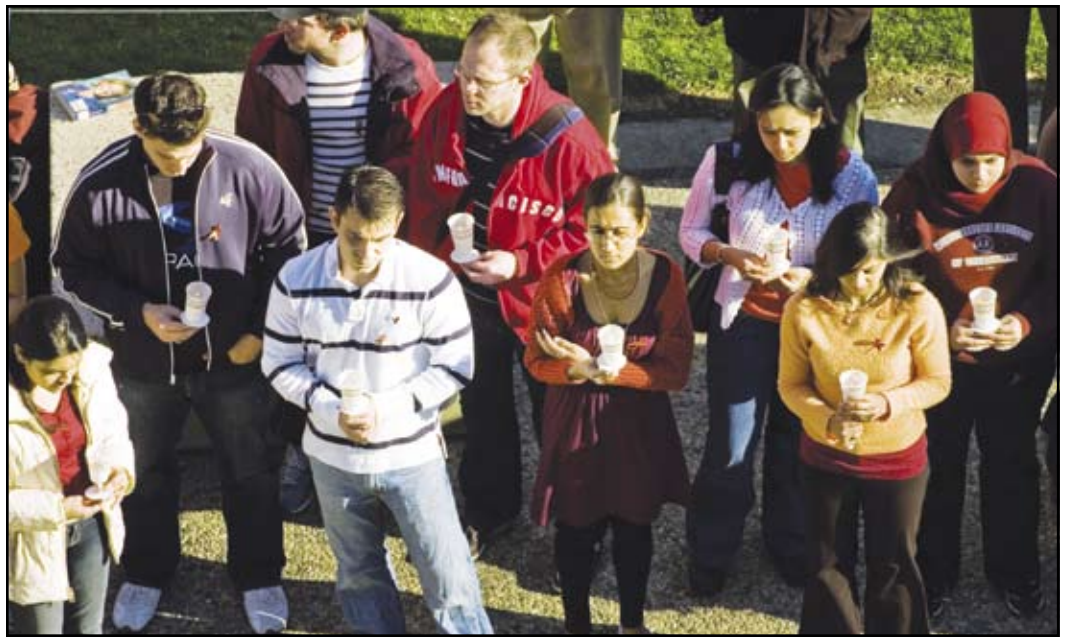
rail, according to the press release. Dimitrov passed away at Brigham and Women's Hospital. There were no other vehicles involved in the accident.

According to a press release from the MIT News Office, Dimitrov was planning to travel to New York City to hear Milko Kalaydzhev, a Bulgarian performer.

A representative from the Public Affairs Office of the Massachusetts State Police said that the State Police Collision Analysis and Reconstruction Section and the State Police Crime Scene Services Section are working on the accident but a full

investigation could take weeks. The Fenway exit ramp was closed for about two and a half hours as the motorcycle recovery and preliminary investigation were underway. The representative also said that police were waiting on toxicology reports to determine if alcohol was involved in the accident. Speed may have been a factor in the accident, according to the press release.

Speaking to the MIT News Office, Dimitrov's roommate Ivan Z. Dimitrov '09 (no relation to the decedent) said that Dimitrov "was a careful driver" and "read all the safety manuals."



RICARDO RAMIREZ—THE TECH

Last Friday several MIT Community members attended a candlelight vigil in memory of the victims of the Virginia Tech shootings. On April 16 Cho Seung-Hui killed 32 people before taking his own life in the deadliest campus shooting in U.S. history.



ERIC D. SCHMIEDL—THE TECH

The camera-helicopter lands on the Mass. Ave bridge during Sunday's filming. The 21 filmmakers used a helicopter-mounted camera extensively, even removing many of the lampposts on the Mass. Ave bridge so that the helicopter could fly closer to the action.

Daniel J. Barclay '07

Daniel J. Barclay '07 was found dead on Friday, April 20 in an apparent boating-related accident. He was 22.

At MIT, Barclay received a bachelor's degree in economics and was finishing his master's thesis in political science, according to a memorial page established by Barclay's family.

"We offer our sympathy, prayers and support to Daniel's family and friends as they grieve the loss of a bright and positive member of the Institute com-



Barclay Obituary, Page 13

Ivan D. Dimitrov '10

Ivan D. Dimitrov '10, a passionate, goal-oriented international student from Sofia, Bulgaria, died on Apr. 21 due to fatal injuries from a motorcycle accident. Dimitrov sustained the injuries in a crash at Storrow Drive in Boston and passed away at the Brigham and Women's Hospital. He was 20.

"He had a very lively spirit," said Dimitar Gatev, a sophomore from Newbury College and a close friend of Dimitrov. "He was a positive person — full of energy and ideas for fun and joy."



Dimitrov, Page 12

In Short

¶ A documentary on Darfur, *Sand & Sorrow*, will be screened on Thursday night at 7–10 p.m. in Room 6-120. There will be a panel discussion with the director and activists after the movie. Free and open to the MIT community.

¶ Dinners for the MacGregor dining pilot will be held on Tuesdays from 6–9 p.m. for the rest of the semester.

Send news information and tips to news@the-tech.mit.edu.

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WORLD & NATION

Breast Cancer Not Linked to Abortion, Study Says

By Nicholas Bakalar
THE NEW YORK TIMES

There is no connection between abortion and an increased risk for breast cancer, scientists reported Monday in a large study.

There has been considerable debate about whether abortion, induced or spontaneous, is linked to breast cancer — a debate that may intensify with last week’s 5-4 Supreme Court ruling, which suggested that an abortion procedure could be banned if it posed a risk to a woman’s health.

The possibility of such a link has been suggested by some retrospective studies — that is, studies that looked for a history of abortion in women who had already been diagnosed with breast cancer.

But such studies are subject to error caused by inaccurate reporting. Because of personal sensitivities and the stigma associated with the operation, healthy women may be reluctant to reveal that they have had an abortion, while those with breast cancer, seeking a cause for their illness, are more likely to report one.

This study, published in The Archives of Internal Medicine, tracked women prospectively to see if those who reported having abortions were more likely to develop breast cancer in the future. They were not.

Loyalties Strain as ’08 Rivals Court New York’s Black Leaders

By Raymond Hernandez
THE NEW YORK TIMES

Only four months ago, the vast majority of black elected officials in New York were expected to support the presidential candidacy of Sen. Hillary Rodham Clinton. But no longer.

In a series of interviews, a significant number of those officials now say they are undecided about whether to back Clinton or one of her main rivals for the Democratic nomination, Sen. Barack Obama of Illinois, the only black politician in the race.

The officials described themselves as impressed with the strength of Obama’s campaign in recent weeks, saying it reflected a grass-roots enthusiasm for Obama that they noticed among black voters in their own districts. And that could signal trouble for Clinton, forcing her to devote precious attention to her home state, where blacks made up 20 percent of the Democratic primary vote in 2004, just as she has had to scramble to keep black support nationwide.

Palestinian Tries to Step Down as Interior Chief

By Isabel Kershner
THE NEW YORK TIMES JERUSALEM

The Palestinian interior minister, Hani al-Qawasmi, submitted his resignation on Monday, five weeks after a unity government was sworn in, but was persuaded to stay on by the prime minister, Ismail Haniya of Hamas, Palestinian officials said.

Qawasmi, a political independent, recently presented a security plan for restoring order in the increasingly anarchic Palestinian territories. His attempted resignation appeared to reflect his own doubts about his chances of success, as well as continuing rivalry within the Palestinian leadership over control of the security services.

“He believes that some of the heads of the security services are not playing fairly with him, and that he was therefore heading for failure,” said Radwan Abu Ayyash, a veteran Fatah official and deputy minister of culture, in a telephone interview from Ramallah in the West Bank.

The Interior Ministry is a particularly delicate post because it is supposed to oversee most of the Palestinian Authority security services, which are largely made up of Fatah loyalists. Hamas has so far rejected demands to disband its own security organization, known as the Executive Force, or fold it into the other security services.

Gonzales’ Testimony Praised By Bush Despite Rep. Criticism

By Jim Rutenberg and Neil A. Lewis
THE NEW YORK TIMES

WASHINGTON

President Bush on Monday said that the congressional testimony of Attorney General Alberto R. Gonzales last week, roundly panned by members of both parties, “in a way increased my confidence in his ability to do the job.”

Speaking during a short question-and-answer session in the Oval Office, Bush said of Gonzales’ performance in front of the Senate Judiciary Committee: “The attorney general went up and gave a very candid assessment, and answered every question he could possibly answer, honestly answer.”

Bush has repeatedly asserted his confidence in Gonzales, a longtime adviser, as criticism has mounted over the dismissals of eight U.S. attorneys.

But his statement on Monday was his first about Gonzales since the attorney general appeared before the committee, and it was at considerable odds with an overwhelmingly critical assessment of his testimony by members of both parties. It indicated that Bush, at least for now, has concluded his attorney general can weather the

challenge to his leadership at the Justice Department, barring any new evidence of wrongdoing.

That challenge had seemed all the more daunting as of Sunday, when Sen. Arlen Specter of Pennsylvania, the ranking Republican on the committee whom both sides view as a barometer of support for Gonzales, appeared on “Fox News Sunday” and said, “The attorney general’s testimony was very, very damaging to his own credibility,” and that his continued tenure was “bad for the Department of Justice.”

But, asked to comment on Bush’s assessment of Gonzales’ testimony on Monday, Specter said in a telephone interview, “I’m not going to get involved in evaluating the president’s decision to retain the attorney general.”

Specter added, “I will continue to work with the attorney general as long as he has that position.”

Several other Republican senators who have been critical of Gonzales, including Jeff Sessions of Alabama, John E. Sununu of New Hampshire and Tom Coburn of Oklahoma, did not respond to requests for comment on Monday.

With many lawmakers working

in their home districts, it was unclear whether their unresponsiveness was a result of busy local schedules or a concerted effort to avoid a running, tit-for-tat debate with the White House over Gonzales’ future.

One senior Republican congressional aide at work in the Capitol on Monday, who requested anonymity to speak candidly, called Bush’s statement that his confidence in Gonzales grew after his testimony “curious.” Another senior Republican aide said: “Was he watching the same hearing as everyone else?”

White House officials on Monday were confronted with questions about whether Bush’s statements of confidence would ultimately be followed by a resignation, with reporters recalling that Bush had pledged support for former Defense Secretary Donald H. Rumsfeld shortly before his ouster. “He’s staying,” the White House spokeswoman, Dana Perino, said during one such exchange Monday morning.

Later, asked if Bush had seen all the testimony, Perino said he had been traveling but had received updates from aides and had seen some of it on television news reports.

Russia Cool to U.S. Request For Cooperation on Missile Defense

By Thom Shanker
THE NEW YORK TIMES

MOSCOW

Defense Secretary Robert M. Gates pressed the Kremlin’s top leaders on Monday to accept a detailed new plan for cooperation on missile defense in Europe that he said would make Russia a full partner in the American effort by sharing information, jointly developing new technology, and even combining the two countries’ defensive radar systems.

The immediate answer from Russia’s new defense minister, Anatoly E. Serdyukov, was a firm statement that the Kremlin had not dropped its strong opposition to American proposals for anti-missile bases in Poland and the Czech Republic.

“The Russian position with respect to this issue remains unchanged,” Serdyukov said in brief comments to reporters. “We do be-

lieve that deploying all the strategic elements of the ballistic missile defenses is a destabilizing factor that may have a great impact upon global and regional security.”

But Gates was just as firmly undeterred as he opened an initiative by the Bush administration over several months to calm Moscow’s complaints about placing American missile defenses in former Soviet states.

The United States says the bases are necessary to defend European allies and American forces based in Europe from a potential Iranian attack. Russia fears that the missile defense system is meant to deter its weapons.

During an evening news conference, Gates said he believed that Serdyukov’s statement had been written before Monday’s meetings. After a full day of talks with a range of senior Kremlin leaders, Gates said he was ending his visit “on a very positive

tone.”

“We made some real headway in clearing up some misunderstanding about the technical characteristics of the system that are of concern to the Russians,” Gates said.

“The key to this is cooperation,” he added. “We would like to have the Russians as partners in this process. We would like to share information with them. We are prepared to colocate radars with them.”

A joint missile defense effort offers “some real opportunity here for both sides,” Gates said. “And that involves a great deal of transparency on our part — and we are prepared to do that.”

In one action growing out of Monday’s talks, the two sides agreed to order a group of Russian and American government and military experts to formally address the Kremlin’s questions and concerns, Gates said.

WEATHER

Cooldown Coming

By Michael J. Ring
STAFF METEOROLOGIST

After a rainy and raw few weeks, the summer-like weather of the past few days has been a most welcome diversion. Yesterday was the first day with above-80°F (27°C) weather in Boston since October 9 of last year. While today will again be mild (though not as warm as yesterday), the second half of the week will be nowhere near as pleasant as the past three days.

The largest meteorological system over the North American continent today is the low pressure system currently centered over the Great Plains. This cyclone will move eastward over the next few days, bringing cloudy weather and several chances of rain to the Northeast later in the week. The best chance of rain in Boston will be overnight Wednesday into Thursday morning, although some lingering showers may affect Friday’s weather as well.

With the cloudier weather and a shift of wind direction in advance of the approaching low, temperatures will be much cooler in the latter half of the week. While we should enjoy temperatures over 70°F (21°C) today, we won’t see temperatures above 60°F (11°C) again until the weekend.

Extended Forecast

Today: Sunny and mild, but not as warm as yesterday. High 72°F (22°C).

Tonight: Clear and cooler. Low 47°F (8°C).

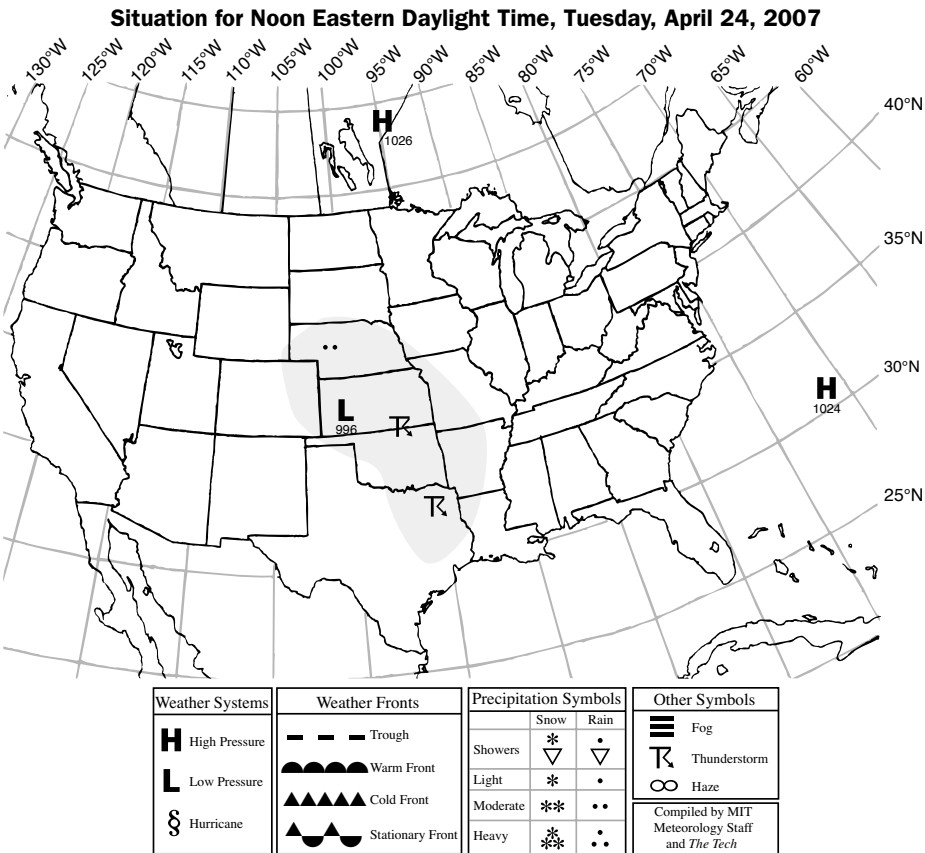
Tomorrow: Cloudy and cooler. High 56°F (13°C).

Tomorrow night: Rain showers likely. Low 46°F (7°C).

Thursday: Cloudy and continued cool. High 53°F (12°C).

Thursday night: Cloudy. Low 44°F (6°C).

Friday: Continued cloudy, with scattered showers. High 55°F (13°C).



Senators Discuss College Attack Prevention Following Massacre

By Michael Luo
THE NEW YORK TIMES

WASHINGTON

Lawmakers began weighing ways Monday to prevent more tragedies on college campuses in a hastily convened Senate hearing a week after the shootings in Virginia. The hearing explored the adequacy of campus' mental health resources, security plans and communications systems.

"We are here to begin a discussion, in the aftermath of Virginia Tech, to make sure that we are doing everything we can to prevent any other campus and any other students and their families from experiencing the nightmare and loss Virginia Tech experienced," said Sen. Joseph I. Lieberman, a Connecticut independent

who is chairman of the Committee on Homeland Security and Governmental Affairs.

Some of the most disturbing testimony came from Russ Federman, director of counseling and psychological services at the University of Virginia.

Federman ticked off a litany of statistics from a recent survey about the extent of mental health problems on campuses. He said that 94 percent of students reported feeling overwhelmed by all they have to do, and that nearly 50 percent reported having felt so depressed it was difficult to function.

In the same survey, 9 percent of students reported seriously considering suicide and 1.3 percent actually attempted suicide. School counsel-

ing centers are struggling to keep up, Federman said.

He cited a study from 1996 that found there was one full-time time clinical staff member for every 1,598 students. In 2006, however, the ratio had fallen to one per 1,697.

"We are not getting ahead of the curve," he said. "If anything, we are beginning to slide behind."

David Ward, president of the American Council on Education, which represents more than 1,800 college presidents, said many campuses were already taking steps to improve security. Ward cited the University of Memphis, which is installing a school-wide intercom system. The University of Iowa is considering a similar system.

Wolfowitz Hires Big-Name Lawyer For World Bank Position Defense

By Steven R. Weisman
THE NEW YORK TIMES

WASHINGTON

Paul D. Wolfowitz, signaling anew that he will fight for his job as World Bank president, has enlisted a prominent lawyer who defended President Bill Clinton against accusations of sexual misconduct to help convince the bank's board that Wolfowitz has done nothing to justify being ousted.

Robert S. Bennett, the lawyer selected by Wolfowitz, said in an interview that before the bank's board acts on charges of ethical lapses, he and Wolfowitz wanted more time to prepare a case showing that the bank president had acted properly on all matters that the board is investigat-

ing.

"I am very worried about the rush to judgment," Bennett said. "We just had a wonderful example of that in the Duke lacrosse case. I have reviewed the essential documents, and I have absolutely no doubt in my mind that Mr. Wolfowitz exercised good faith and that everything he did was in the best interests of the bank."

It was unclear whether Wolfowitz intended to pay his legal fees himself or whether he would seek reimbursement from the bank. His latest sign of apparent determination to keep his job came as the furor over his record continued to spread.

Bank officials said that after several days of canvassing hundreds of em-

ployees, about 25 vice presidents of the bank were preparing to document that the overwhelming majority of the employees favor Wolfowitz's departure.

The vice presidents met with Wolfowitz in the afternoon and some bank officials said that they would present their conclusions about bank sentiment to the board of directors, the 24 representatives of various countries and groups of countries that run the bank's day-to-day affairs in tandem with the president.

The Financial Times reported Monday that the independent agency within the bank that assesses the effectiveness of bank programs concluded last week that "swift changes in management" were needed to restore its credibility.

Candidates in France Focus on Centrist Voters

By Elaine Sciolino
THE NEW YORK TIMES

PARIS

The French presidential race is on — for the vote of the center.

The campaign entered a new phase on Monday, as the winners of the first round, Nicolas Sarkozy on the right and Segolene Royal on the left, began a battle for the 6.8 million voters who chose the path down the middle.

Taken together, the two winners scooped up 57 percent of the vote in the first round on Sunday. But Francois Bayrou, the parliamentary deputy and farmer who heads the centrist Union for French Democracy, came in a strong third with more than 18 percent of the vote, and those votes are up for grabs.

"The voters of the center control the election," said Stephane Rozes, a director of the CSA polling institute. "The challenge is not knowing where they will go."

At a rally in the city of Dijon, in eastern France, on Monday, Sarkozy set aside his law-and-order persona and portrayed himself as "the candidate of openness" whose message was for "all the French people."

"Openness of spirit is being able to take into consideration the positions of others, the ability to think that others might be right," he said.

China Yields to Inquiry On Pet Food

By David Barboza
THE NEW YORK TIMES

BEIJING

China on Monday gave American regulators permission to enter the country to investigate whether Chinese suppliers exported contaminated pet food ingredients to the United States earlier this year, leading to one of the largest pet food recalls in American history.

Representatives of the U.S. Food and Drug Administration had been blocked from entering China, despite growing evidence that the tainted pet food that killed at least 16 cats and dogs and sickened thousands of other animals in the United States originated with Chinese exporters of wheat gluten and other animal feed ingredients.

The FDA confirmed Monday that it has now opened a criminal investigation into the pet food scandal, but the agency did not name the target or say whether any American companies may have intentionally laced animal feed with banned ingredients. On Tuesday, the House Committee on Energy and Commerce is scheduled to hold hearings on how to secure the safety of the country's food supply.

Last Thursday, the FDA expanded its already large pet food recall after it found more evidence that an industrial chemical called melamine had contaminated the supplies of additional pet food makers, including Royal Canin US and C.J. Foods.

The agency, which has already recalled over 60 million packages of pet food, is also investigating imports of rice protein from China.

HARVARD | BUSINESS | SCHOOL

Join us Thursday, April 26, 2007

2007 New Business Opportunities for Science



Commercializing Science and High Technology is a multidisciplinary course at Harvard Business School, comprised of students from the schools of Business, Medicine, Arts and Sciences, Engineering, Law, Government and Public Health.

Student teams from this class will present development plans for early stage science and technology projects based upon innovation from university laboratories, affiliated hospitals, and some local businesses.

The event will be held at the Harvard Business School's Williams Room in Spangler Hall from 4 - 5:30 PM.

E-mail: csht@hbs.edu
Website: www.hbs.edu/units/tom/conferences/csht2007.html

Biotechnology

D. Fisher: "Complete Epigenetics Solution" – A novel technology to determine nucleosome locations in cell and tissue samples for development of novel pharmaceuticals and diagnostics.

C. Mitsiades: "High-Throughput Mixed-Culture Screen" A novel pre-clinical screening tool for analyzing tumor sensitivity to drugs in mixed cell cultures.

D. Mooney: "Controlled Cell Delivery" – Extracellular matrices to recruit, maintain and deliver cell therapies: tissue regeneration/repair to anti-cancer therapy.

G. Verdine: "RiPTides" – Novel oligonucleotide-based therapeutics targeting assembly of telomerase and other medically relevant biological targets.

Vertex Pharmaceuticals Inc.: "Hepatitis C Management" – Changing the patient management paradigm for transformational Hepatitis C virus treatments.

Clean Technology

M. Aziz: "Carbon Neutral Power" –Technology that captures and stores carbon dioxide as solid crystals making traditional power plants climate friendly.

P. Girguis: "Microbial Fuel Cell" – Renewable, zero-pollution, and low cost and maintenance power sources for off-grid applications.

Information Technology

Icosystem Corp.: "The Hunch Engine Platform" – A licensable genetic algorithm for human creativity.

D. Parkes: "Cryptographic Securities Exchange" – Improved method for trading financial instruments that selectively conceals vulnerable trade information.

Medical Device

C. Kennedy: "Drug Discovery - Imaging & Informatics" – Two novel software programs for the automated analysis of neuronal morphologies to enable medical researchers to improve drug discovery.

C. Cutler: "Self-dilating Urethral Catheter" – Balloon-dilating catheter that patients can inflate to treat urethral strictures at home.

G. Gardner: "Pericardial Device" – Pericardial support device for advanced heart failure.

C. Marcus: "Molecular Imaging for MRI" – Using hyperpolarized silicon for molecular imaging.

K. Parker: "Molecular Scalpel" – Re-useable test to provide real-time diagnoses and guide medical treatment decisions with molecular precision.

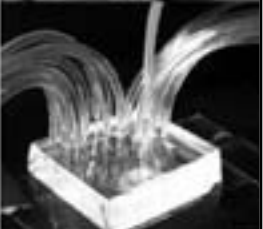
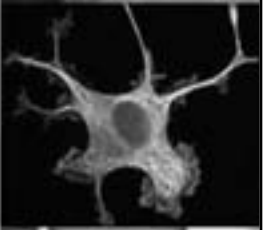
M. Su: "Luminescence-based, Multi-metabolite Monitor" – Point of care device to optimize effective disease management.

A. Tavakkolizadeh: "Transluminal Surgery" – An alternative to laparoscopic surgery using novel technique and innovative medical devices for scarless access to the abdomen.

G. Whitesides: "Patterned Paper Diagnostics" – Low-cost point-of-care analysis of biological fluids: outpatient clinics to less-industrialized regions.

G. Whitesides: "Spectrally Tunable Laser" – Microfluidics technology that broadens the scope of laser-based clinical treatments using wavelength tunable light.

G. Whitesides: "Protein Sensing" – A novel separation technique for proteomic analysis and identification of biomarkers for disease.



OPINION



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The Tech (ISSN 0148-9607) is published on Tuesdays and Fridays during the academic year (except during MIT vacations), Wednesdays during January, and monthly during the summer by The Tech, Room W20-483, 84 Massachusetts Avenue, Cambridge, Mass. 02139. Subscriptions are \$45.00 per year (third class) and \$105.00 (first class). **POSTMASTER:** Please send all address changes to our mailing address: The Tech, P.O. Box 397029, Cambridge, Mass. 02139-7029. **TELEPHONE:** Editorial: (617) 253-1541. Business: (617) 258-8324. Facsimile: (617) 258-8226. *Advertising, subscription, and typesetting rates available.* Entire contents © 2007 *The Tech*. Printed on recycled paper by Charles River Publishing.

Corrections

The April 13 issue of the *The Tech* incorrectly identified Mick Foley's professional wrestling debut as 1991. He began professional wrestling in 1985.



“We’ve decided to keep you on. We can’t run the risk you’ll go back to the Bush administration and work on plans to invade Iran.”



THE SHAPE OF THINGS TO COME

Opinion Policy

Editorials are the official opinion of *The Tech*. They are written by the editorial board, which consists of Chairman Michael McGraw-Herdeg, Editor in Chief Marie Y. Thibault, Managing Editor Austin Chu, Executive Editor Rosa Cao, and Opinion Editors Barun Singh and Aditya Kohli.

Dissents are the opinions of signed members of the editorial board choosing to publish their disagreement with the editorial.

Letters to the editor, columns, and editorial cartoons are written by individuals and represent the opinion of the author, not necessarily that of the newspaper. Electronic submissions are encouraged and should be sent to letters@the-tech.mit.edu. Hard copy submissions should be addressed to The Tech, P.O. Box 397029, Cambridge, Mass. 02139-7029, or sent by interdepartmental mail to Room W20-483. All submissions are due by 4:30 p.m. two days before the date of publication.

Letters, columns, and cartoons must bear the authors' signatures, addresses, and phone numbers. Unsigned letters will not be accepted.

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Guest columns are opinion articles submitted by members of the MIT or local community and have the author's name in italics. Columns without italics are written by *Tech* staff.

To Reach Us

The Tech's telephone number is (617) 253-1541. E-mail is the easiest way to reach any member of our staff. If you are unsure whom to contact, send mail to general@the-tech.mit.edu, and it will be directed to the appropriate person. You can reach the editor in chief by e-mailing eic@the-tech.mit.edu. Please send press releases, requests for coverage, and information about errors that call for correction to news@the-tech.mit.edu. Letters to the editor should be sent to letters@the-tech.mit.edu. The Tech can be found on the World Wide Web at <http://www-tech.mit.edu>.

eco expo

4.25.07

MIT's sustainability exhibition

**undergraduates, graduate students, faculty,
staff and all members of the MIT community
welcome**

organized by Students for Global Sustainability
web.mit.edu/sfgs
web.mit.edu/earthday

support provided by:



MIT
PUBLIC SERVICE CENTER

Event sponsored by



Graduate Students Office
Working Group Recycling Committee

this Wednesday!
Stata Center: TSMC Lobby
5.00 - 7.00 pm

PROOF OF FALSE

by Andrew Spann

I HAVE THIS CLASS THAT I NEVER ATTEND BECAUSE IT'S ALL THE WAY IN THAT SLOAN AREA THAT'S TOO FAR AWAY. I'D RATHER JUST SLEEP.

Well, in the real world some people commute more than an hour each way every single day. I don't see why you are complaining.

I'M LAZY AND WANT TO BE WITHIN WALKING DISTANCE OF EVERYTHING. I REFUSE TO COMMUTE.

THEREFORE, WHEN I GET A JOB IT SHOULD BE NONABELIAN.

PHD

PILED HIGHER AND DEEPER

AAH..!

PHD

PILED HIGHER AND DEEPER

MIKE, THE COMMITTEE WANTS ANOTHER SET OF EXPERIMENTS BEFORE THEY SIGN OFF ON YOUR THESIS.

HMM...

THAT'S A LOT OF WORK. WHAT IF I JUST MENTION IT UNDER "FUTURE WORK"?

NO GO.

REVIEW RELATED WORK AND PRETEND IT APPLIES?

SORRY.

AT THE VERY LEAST, WE'LL ACCEPT APPROXIMATE RESULTS BASED ON SIMULATION.

FINE, BUT I GET TO RE-USE OLD CODE.

SHAKE ON IT?

WHATEVER.

SURE.*

* advisor retains right to terminate agreement at any time.

Crossword Puzzle

Solution, page 11

- ACROSS
- 1 Units of radiation
 - 5 Valli of "The Third Man"
 - 10 Strong desire
 - 14 Screen symbol
 - 15 Diminish
 - 16 Shade of blue
 - 17 Start of Napoleon quote
 - 19 Shuts off
 - 20 Organism requiring oxygen
 - 21 Bobbsey twin
 - 22 Wine character
 - 23 Gets the tab
 - 25 Big name in potato chips
 - 27 Unvarying
 - 30 Part 2 of quote
 - 35 Asserted, formally
 - 36 Show on TV
 - 37 Boyer of baseball
- 38 Over the hill
- 39 Singer Judd
- 42 Hawaiian tuna
- 43 Poker action
- 45 Born as
- 46 Anna of "Nana"
- 47 Part 3 of quote
- 50 D.C. old-timers
- 51 Winglike components
- 52 Fulda tributary
- 54 Type of school
- 57 Recipe abbr.
- 59 Sluggish
- 63 Reindeer herder
- 64 End of quote
- 66 Curved molding
- 67 Creepers
- 68 "The Time Machine" race
- 69 Bambi, for one
- 70 Sea eagles
- 71 Farmer's
- DOWN
- 1 Dove or Moreno
 - 2 Tooth problem
 - 3 Active person
 - 4 Eaves-dropped
 - 5 Passage between buildings
 - 6 Actress Myrna
 - 7 Victor's cry
 - 8 National park in Alaska
 - 9 Where events occur
 - 10 Implement
 - 11 Casino town
 - 12 Gallivants
 - 13 Otherwise
 - 18 Roundball letters
 - 24 Start of a dig?
 - 26 Org. founded in 1858
 - 27 Wear
 - 28 God of Islam
- place?

1	2	3	4	5	6	7	8	9	10	11	12	13
14				15					16			
17				18					19			
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54	55	56			57		58		59		60	61
62					63				64			
65					66				67			
68					69				70			

29 News services

31 Maine college town

32 Pac. pact

33 Waters or Merman

34 Riders' controls

39 Welfare

40 Hawaiian

bird

41 _ to say

44 Red fish

46 Used an aerosol

48 Indigenous

49 Subordinate's affirmative

53 Always, to a bard

54 Trudge

55 Latest fad

56 Fencer's foil

58 Actor Sean

60 Pineapple firm

61 Organic compound

62 Simon or Diamond

65 Victory sign

su | do | ku

© Puzzles by Pappocom

Instructions: Fill in the grid so that each column, row, and 3 by 3 grid contains exactly one of each of the digits 1 through 9. Solution, tips, and computer program at <http://www.sudoku.com>; see also solution, page 11.

Doonesbury

BY GARRY TRUDEAU

Dilbert® by Scott Adams

THE MIT MUSICAL THEATRE GUILD PROUDLY PRESENTS...



**A FUNNY THING HAPPENED
ON THE WAY TO THE
FORVM**

BOOK BY BURT SHEVELOVE AND LARRY GELBART
MUSIC AND LYRICS BY STEPHEN SONDHEIM
ORIGINALLY PRODUCED ON BROADWAY BY HAROLD S. PRINCE

ORIGINALLY PRODUCED ON BROADWAY BY HAROLD S. PRINCE

APRIL 27, 28 AT 8PM

APRIL 29 AT 2PM

MAY 3, 4, 5 AT 8PM

MIT'S KRESGE LITTLE THEATRE
48 MASSACHUSETTS AVENUE
CAMBRIDGE, MA

TICKETS: \$6- MIT/WC STUDENTS, \$9-MIT COMMUNITY, STUDENTS, SENIORS, \$12- GENERAL PUBLIC

[illegible]



Bridge Closing Inconveniences MIT Community



The Harvard Bridge was closed for six hours on Sunday for the filming of a scene from the upcoming movie *21*, about six MIT students who made millions counting cards in casino blackjack games.

(top to bottom, photography by Eric D. Schmiedl)

21 director Robert Luketic stares off into space during the last part of Sunday's filming.

Six hired cars and a motorcycle, used to simulate traffic during filming, wait on the Cambridge side of the bridge.

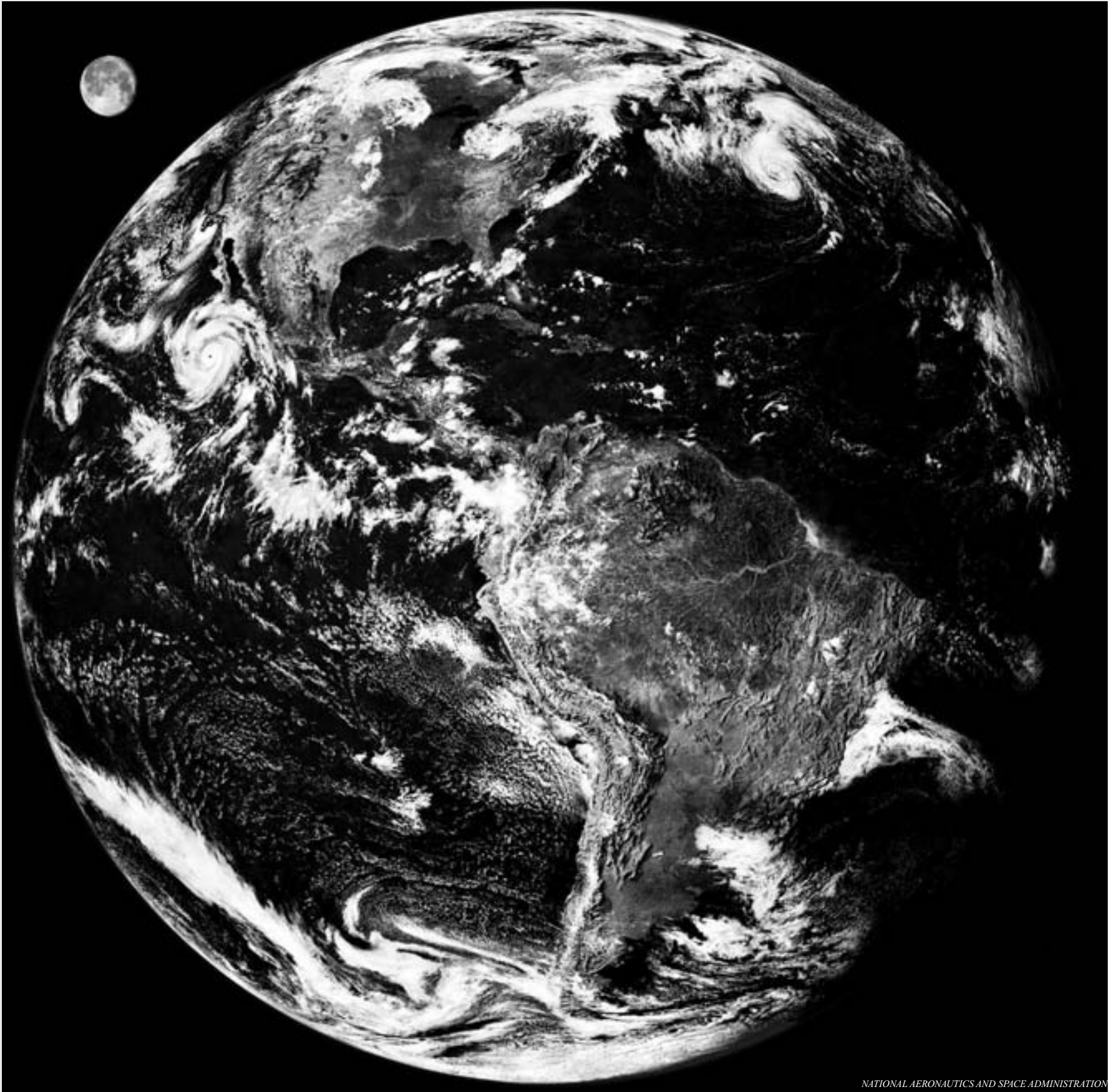
The Department of Conservation and Recreation worked alongside the State Police to keep people off the bridge.

The camera was located at the end of a long truck-mounted boom (attached to the black truck, center).

The bridge closure took place so that the film studio might film the opening scene of *21*, in which the main character (Ben Campbell, riding back across the bridge after a take) rides his bicycle across the bridge.



Earth Week at MIT



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

From the Editor

Dear Reader,

As you may have noticed, MIT is full of people who are highly committed to energy and sustainability issues, from President Susan Hockfield with the Energy Initiative to numerous student groups involved in almost every imaginable aspect of environmentally-conscious action and innovation. Add to that the professors who have made it their business to pursue research related to sustainability issues, and the Facilities staff who oversee MIT’s own energy use, and you begin to get an idea of just how unlikely it would be that we could cover all the worthwhile projects happening on campus.

However, in recognition of Earth Day, and MIT’s celebration of Earth Week, we’ll try to give you a sample of what MIT is up to, thinking globally, acting locally, and bringing that peculiarly MIT mix of focus, determination, and sleep-deprived competence to the challenges at hand. Inside this section is by no means a comprehensive list of actors and projects, but simply what we happened upon when we poked around in busy waters.

An events calendar is on the right. For a more comprehensive overview of the energy communities at MIT, you can visit: <http://sustainability.mit.edu/>.

The EcoExpo page provides abstracts of a number of student activities, all of which will be showcased at the EcoExpo on Thursday night (<http://web.mit.edu/jialanw/www/ecexpo.htm>).

Happy Earth Week!

Rosa Cao
Executive Editor

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Scheduled Earth Week Events

SOURCE: [HTTP://WEB.MIT.EDU/EARTHDAY/](http://web.mit.edu/earthday/)

Saturday, April 21	Launch of Working Green@MIT Web site	All day
	Charles River Cleanup	9:30 a.m. – noon., Meet at Mass. Ave. Bridge (Cambridge Side)
	MIT's Environment, Health, and Safety Office Open House	10 a.m. – 4 p.m., MIT Museum N52-496
	Environmental Health Science: A Closer Look at Environmental Exposures	10 a.m. – 5 p.m., MIT Museum N52-200, Large Conference Room
	Boston Underwater Walking Tour	2–5 p.m., Meet at E51 (Tang Center) lobby
Sunday, April 22	Environmentally Safe Gardening Methods with GreenPort	2:30–5 p.m., Dana Park, Cambridge.
	Angels & Airwaves Concert	4–5:45 p.m., MIT Johnson Athletic Center
	Talk by TERC researcher LuAnn Dahlmann: Cold Enough For You?	6–8 p.m., MIT Museum N52-200, Large Conference Room
Monday, April 23 to Friday, April 27	The Legacy of Bhopal Photo Exhibit: “We Are Not Flowers, We Are Flames!”	MIT Stata Center lobby
Tuesday, April 24	An Inconvenient Truth slideshow	Noon, E25-119, RSVP required
	Boston Underwater Walking Tour	2–5 p.m., Meet at E51 (Tang Center) lobby
	Lecture by Professor William Thilly: Does the Environment Really Affect Your Health?	7–8:30 p.m., MIT State Center, 32-141
Wednesday, April 25	Walking Tour of MIT Green Campus Initiatives	11:30 a.m. – 1:30 p.m., Meet outside on the steps of Stratton Student Center
	Lecture on Uncertainties in Climate Forecasts: Causes, Magnitudes and Policy Implications	4:30 p.m., 32-101
	EcoExpo: MIT's Sustainability Showcase	5–7 p.m., MIT Stata Center TSMC lobby
	Talk by Boston University researchers: Global Warming, Up Close and Local	6–8 p.m., MIT Museum N52-200, Large Conference Room
Thursday, April 26	MIT Earth Day Fair	10 a.m. – 3 p.m., MIT Stata Center lobby
	MIT Solar Decathlon Earth Day Party	5:30–8 p.m., NEXUS Green Building Resource Center, 38 Chauncy St., 7th floor, Boston
	Talk on Plasma and the Environment	5:30–6:30 p.m., NW17-218
Friday, April 27	Garden Walk With MIT Facilities	12–1 p.m., Meet at Information Booth in MIT Stata Center lobby

MIT Energy Council Update

Preparing to Announce External Advisory Committee, Establish Long Term Goals

By Angeline Wang

NEWS EDITOR

Approximately five months after its formation, the MIT Energy Council is gearing up to release a “comprehensive communication for faculty, students, and staff” early next month, according to Ernest J. Moniz, the director of the MIT Energy Initiative.

In the coming weeks, the Energy Council will also likely announce the formation of an external advisory committee made up of members of academia, industry leaders, and government, according to Claude R. Canizares, vice president for research. The external advisory committee will “provide guidance, advice, and direction” to the Council and Canizares, whom the Council reports to, according to a November 2006 MIT News Office article.

The communication, which the Council will discuss at their meeting this week, will be an update for the MIT community on the progress of the Council, which has created a number of task forces that will focus on and coordinate energy research, education, and campus energy management.

According to Economics Professor Paul L. Joskow, a member of the current Energy Council, the work on campus management and sustainability is farthest along. The “Walk the Talk” committee is focused on “developing a program for improving energy efficiency and reducing emissions, especially greenhouse gases on campus,” Joskow said.

The committee, according to Architecture Professor Leon R. Glicksman, a member of the Council and chair of the Walk the Talk task force, is made up of a cross-section of the MIT community, including students, faculty from all five schools, and Theresa M. Stone, executive vice president of the MIT Corporation, among others.

The Walk the Talk task force is working on determining short-term and long-term campus energy management goals for MIT while working with MIT Facilities on making some changes now, said Glicksman.

Those changes, according to Glicksman, include renovations that have been done in the East Campus dormitory parallels that has reduced the amount of steam energy wasted in radiators. Other changes include adding more occupancy sensors which automatically shut off lights when no one is in the room and replacing fluorescent lights so that they are more efficient, Glicksman said.

Glicksman also brought up the Chemistry Department as another example of a change that could help campus energy management and sustainability. According to Glicksman, an undergraduate who was studying energy usage in Building 18 found that almost half of the laboratory fume hoods, which are high air-flow



DAVID TEMPLETON—THE TECH

Professor Ernest J. Moniz, co-chair of MIT's Energy Research Council, gives an overview of the Council's report at the beginning of the Energy Forum on Wednesday, May 3, 2006.

containment areas that vent to the outside, were left open at night.

Based on some simple estimates, Glicksman said, the energy necessary to heat the air in a single fume hood that is left open all the time “is about the energy needed to heat a single family home in Boston.” “The electricity for the fan in one hood is equal to the electricity used in a single family home in Boston,” Glicksman said.

“The Chemistry Department has a very aggressive campaign to get people to keep the hoods closed when they are not using them,” Glicksman continued.

In terms of long term goals, Glicksman said the task force is trying to determine “what goals make sense.” “We really want to set an example for other people,” Glicksman said. The committee is putting together a proposal on what MIT should be doing in 30–40 years in terms of energy efficiency, he continued. This may include expanding the William R. Dickson Cogeneration Plant, which supplies power to a large portion of MIT.

Glicksman and Management Professor Rebecca M. Henderson, another member of the Council, are working to put that proposal together. Glicksman said that it would likely take a couple of years.

Improvements in campus energy requires funding and investment. Glicksman said the task force was looking into setting up a loan fund.

In addition to campus sustainability, the Council has also established a task force to look at education. According to the ERC's May 2006 report, one of the top priorities for this Energy Education task force is to create an energy minor for undergraduates.

Heading the education task force, Biological Engineering Professor Angela M. Belcher said in an interview in February that the task force was being formed at that time and that they would be addressing both undergraduate and graduate education and outreach.

Joskow said that the task force is working on “trying to organize and understand the education programs that we have ... identify where we don't have adequate courses and where there are opportunities to move courses together.”

Additionally, on the educational side of the Initiative, a Web site was formed in January 2006 which listed classes that have a significant focus on energy. The EnergyClasses site (<http://energyclasses.mit.edu/>) highlights graduate and undergraduate classes with a significant focus on energy.

The Council is also working toward setting up a number of symposia each year with speakers such as Sir Nicholas Stern, economist, author of the recently released and much-publicized Stern review on climate change and former senior vice president of the World Bank, Joskow said.

Aside from the Council itself, student en-

ergy and sustainability groups have been involved in the Energy Initiative since it first began. The MIT Energy Club, in September 2005, launched a campus-wide survey, tabulated the results, and submitted it to the ERC, which was collecting information to write what would be the May 2006 energy report.

Similarly, energy conferences and poster presentations over the last two years, as well as this week's various energy activities, were coordinated by students. Glicksman and Canizares specifically brought up the student-led MIT Generator, an event that brought together various student sustainability groups to “generate” ideas on how to improve campus energy management. According to Jason J. Jay G, the first Generator event was held in November, the second in February. Both events had approximately 100 people attend, Jay said.

“We're trying to touch base with students groups, sort of coordinate what we're doing,” Glicksman said.

“The idea is not to over-centralize this, to encourage students to do their own thing, but also to make sure that everyone knows what's going on,” Joskow said.

This type of coordination has the added benefit of getting groups together to invite speakers, some of whom individual groups might not be able to attract or afford, Joskow added. “Clubs bring people to campus to talk about energy and environmental issues. They contribute to the education of everyone on campus.”

“The challenge for students is that students are here for a short time and some of these projects take a long time, so we want to engage students as quickly as we can, as productively as we can,” Joskow said.

First announced by President Susan Hockfield in her inaugural address in May 2005, the MIT Energy Initiative officially began in September 2006 after Hockfield accepted the recommendations of a May 2006 energy report, the culmination of eight months of information gathering by the Energy Research Council (not to be confused with the current Energy Council, which is tasked with implementing the recommendations of the ERC, which concluded its work with the report).

The end result of the Initiative would be the establishment of an inter-departmental laboratory or energy center, Hockfield stated in her September 2006 message to the MIT community. The ERC's report states that this permanent research space should be completed within the next five years.

The latest MIT energy news and Energy Council update can be found at <http://web.mit.edu/erc/>. The May 2006 ERC report is available online at <http://web.mit.edu/erc/docs/erc-report-060502.pdf>.

Conservation Initiatives Funded to \$70 Million

By Thomas C. Palmer Jr.

THE BOSTON GLOBE

Seeking to become the greenest city in the country, Cambridge launched on March 29 a sweeping \$70 million energy efficiency program to conserve energy in virtually every building within city boundaries, reducing emissions that contribute to global warming.

University, commercial, and even residential buildings will receive energy audits over the next five years to pinpoint energy inefficiencies. Property owners will then be offered low- or zero-interest loans to undertake remediation efforts ranging from replacing incandescent light bulbs with compact fluorescents to installing insulated roofs and more efficient heating and cooling systems.

“The notion of a city as a platform on which to build massive energy efficiency is the critical innovation,” said Douglas I. Foy, former Massachusetts secretary of commonwealth development, who is advising Cambridge officials. “Cities are the Saudi Arabia of energy efficiency, a mine of massive efficiency opportunities.”

The program, which energy specialists said is the first of its kind in the nation, was unveiled March 29 morning at an event led by Governor Deval Patrick.

The energy efficiency measures will be financed by loans made from a \$70 million fund, most of which will be raised from private sources by investment bank Bostonia Partners LLC. Large capital improvement costs may be shared by the program and the building owners themselves.

Cambridge officials expect that as the city

demonstrates progress on reducing electricity use they can qualify to receive money from a \$1-billion-a-year fund that the operator of the regional electric power grid collects from users to ensure there are sufficient power supplies in the future.

The Cambridge organizers said the first phase of their efforts will take five to seven years and will target about half of the 23,000 buildings in the city. The goal in that period is to reduce overall electricity use by 10 percent, and during peak hours — roughly 4 to 7 p.m. daily — by 14 percent, to 300 megawatts from 350 megawatts. The average household in Cambridge uses about 4,500 kilowatt-hours of electricity a year, costing about \$800, according to city officials.

To meet future additional energy demands, the cost of saving one kilowatt of electricity through more efficient practices is about one-third of what it would cost to buy that kilowatt from a new power plant, energy specialists say.

The energy specialists who helped organize the effort believe that by reducing consumption within buildings they will also be reducing the emissions that contribute to global warming. If Cambridge meets its goals, the energy specialists said, it will have reduced annual emissions of carbon dioxide by 150,000 tons.

“Seventy percent of emissions come from buildings,” said Robert L. Pratt, senior vice president of the Henry P. Kendall Foundation, which focuses on environmental matters and conceived and helped design the program, and

Solar Panel Plant For a Greener Massachusetts

By Drake Bennett

THE BOSTON GLOBE

Since the beginning of his gubernatorial campaign, Deval Patrick has made clean energy a pet issue. He was the first major candidate to come out in support of the controversial Cape Wind project in Nantucket Sound. And as governor, he has pledged to make Massachusetts “the renewable energy center of the world.”

Just last week, the state announced the largest job gain of the governor's administration: Evergreen Solar Inc. will build a \$150 million plant in Westborough to manufacture solar panels, creating up to 375 jobs.

The entrepreneurs, scientists, venture capitalists, and activists who have thought most about green technology economics welcomed the news, saying they share the governor's optimism about the state's potential as a clean-energy capital.

But some of these same thinkers argue the Evergreen plant does not represent the future of Massachusetts green technology.

With some of the nation's highest electricity rates, Massachusetts has a particular interest in discovering alternatives. And as the home of a world-class collection of research universities and technology firms, it is almost uniquely qualified to develop those alternatives, not only for consumers here, but to feed the fast-growing global demand. Yet Massachusetts is a small state with high labor and housing costs, they argue, and so it must be strategic, concentrating efforts where it is strong — innovation, research and development — and not in areas, like large-scale manufacturing, where it is at a disadvantage.

“Massachusetts's great comparative advantage is in brainpower, not metal-bending,” argued Henry Jacoby, a professor at the Center for Energy and Environmental Policy Research at MIT's Sloan School of Management.

The state, Sahin said, should redouble its efforts to nourish companies — often small to medium-sized ones — involved in what he calls “upstream production,” the research and development of new technologies and the tackling of the sort of fundamental problems that prevent their commercialization.

Battery technology is a prime example — improvements in energy storage capacity would enable intermittent energy sources like wind and sun to better compete with traditional generator fuels like coal and natural gas. Increasingly efficient solar cells is another. Nanotechnology, which holds promise both in the production of biomass fuels and the disposal of toxic chemicals, is a third.

Not everyone agrees, however, that the state is fated to lose out on large-scale green manufacturing, or that it should limit itself to the more esoteric end of the production chain. Ian Bowles, the state's secretary for environmental affairs, agrees that Massachusetts remains a relatively expensive place to put a plant. But manufacturing solar panels, he argues, is very different from making T-shirts or transistor radios. “When these products become true commodities, when you're stamping them out on an automated factory line, I think it's right to say that that's not where we compete well,” he said. “But early or mid-stage manufacturing, you need a skilled, educated workforce for that.”

Getting Started on the Future Today

Jason Jay Talks About the Acuteness of the Energy Problem

By Marie Y. Thibault
EDITOR IN CHIEF

“We recognize it is an incredibly urgent issue ... we don’t have time to do five years of research,” said Jason J. Jay G, as he talked about the challenge of creating a more sustainable future with new technologies and policies. Jay, a doctoral student who has an academic interest in corporate and social responsibility and the study of organizations, said that the challenge of sustainability is “for our generation what getting into space was for our parents.”

Jay is a member of S*, the Sustainability@MIT Student Working Group. The group sent a letter to the MIT Energy Council expressing hope that renewable energy, energy efficiency, and energy demand would be part of the energy question that the Energy Initiative was created to tackle. Students wanted to see MIT “walking the talk,” Jay said.

As new campus expansions, including a Media Lab extension and a new Sloan School of Management building, were announced last fall, there was no mention of “green” buildings, Jay said. And though there were rumors of the creation of an MIT “Walk the Talk” task force, it was coming about “slower than students get

excited about,” Jay said.

So, in fall 2006, Jay helped organize the MIT Generator, which was advertised as “students walking the talk on energy and the environment.” Other people who helped plan the event were Kate W. Parrot G, Elsa A. Olivetti G, Amanda C. Graham, student administrator in the Laboratory for Energy and the Environment, and Steven M. Lanou, deputy director of environmental sustainability in the Environmental Programs office.

Groups all over campus had already been working on separate projects. These groups gave open mike pitches at the Generator, an opportunity to recruit new students and to increase collaboration on different tasks. One such project involves creating an energy map of campus, based on building audits.

As a student activist, Jay said he feels that MIT is very decentralized. The Generator was intended to pull the groups together. This February, a Re-Generator was organized, in order for working groups to show their progress and

to have open time to talk about each project. As a result, a sense of community has developed, he said. There is a student movement and a different sense of coherence around the issue of campus sustainability than there was a year ago, he said.

In the meantime, the Campus Energy Task Force, also known as the Walk the Talk Task Force, was created. Two students, Jay and Ariel

M. Esposito ’09 sit on the committee, which is chaired by Professor Leon R. Glicksman. Esposito is one of the organizers of a campus-wide dormitory electricity competition.

The committee’s goals include setting campus carbon targets by the end of the semester, Jay said.

“I’m in favor of setting more ambitious goals,” Jay said, because picking reachable goals does not create space and impetus for the new and unpredictable. But he added that the task force’s goals, which take what he describes as a more technical, conservative approach, probably work better for the MIT culture.

The coming year should bring results, Jay said, as well as another Generator. The initiatives of the first Generator should “start to bear fruit,” hopefully showing lower energy use and carbon emissions on campus. In addition, student groups will be working to make the idea of sustainability more mainstream and part of the course curriculum, Jay said.

Jay said that a lot of money will be needed to make MIT a shining example of energy conservation and sustainability. Physical infrastructure can costs tens of thousands of dollars, he said, while something like another cogeneration plant would cost millions of dollars. But nationally, the tide has turned in the last year, he said, and sustainability is now an “absolutely essential challenge we have to tackle.”

And as for Jay’s future? As a Boulder, Colorado native who was often “up and about in the mountains,” Jay said he has always felt a connection to nature. And although he is not sure whether he would like to become a professor who does some consulting or a consultant who does some teaching, he said that he knows he will be pulled in the “direction of mobilizing people.”

Man Behind the Scenes

An Interview with Peter Cooper

By Rosa Cao
EXECUTIVE EDITOR

Peter Cooper is the manager of sustainability engineering and utility planning in the Department of Facilities. He has worked closely with student groups on a number of sustainability projects, some of which arose from the Generator events and are currently in progress. He’s the go-to man for everything you never knew you wanted to know about how MIT’s physical plant is run.

Cooper also works on on-campus conservation projects implemented by Facilities. He gave numbers that estimated savings from water reclamation and energy conservation projects at over \$370,000 over the past couple of years. He participates in the decision making process for designing new buildings and looking for ways to make them more efficient, and acts as a liaison in collaborations outside MIT.

In the early ’90s, Cooper worked at a the treatment plant on Deer Island in Boston Harbor. Because energy was so cheap at that time, conservation wasn’t “a driver” for the owners of the plant. But Cooper says that despite the lack of financial incentives, “engineers tend to go straight for the [optimal] solution.”

His work on conservation when he came to MIT “wasn’t a big leap, because doing better environmentally is the same as doing better,” just as a more sophisticated engineer saves energy. Cooper and Walter Henry, director of the Systems Engineering Group, agreed that although energy concerns are once more in the public consciousness, particularly at MIT, the will to change one’s behavior and the seriousness of people’s commitment to conservation were greater during the oil crisis of the ’70s. “When you’re waiting in line for gasoline, you really have time to think hard and deep about energy conservation.”

Cooper and others in Facilities have also made some of their office space available for different student groups to meet and work. They’ve left signs of their activity in the form of diagrams scrawled on the whiteboard walls.

Here Cooper talks about some of the groups that’s he’s interacted with recently (you can see blurbs about some of the student groups in our list on page E4).

The Generator

There’s been a lot more collaboration between Facilities and these student groups in the past year, stemming in part from the Generator event, which really seems to have gotten them moving. Bureaucracy can be pretty intimidating, and so some of it is getting data, or telling them the reality about the quality of the data, it’s trying to help them do what they want to do or something similar, or finding the right people to talk to.

The Green Fund

This would be a revolving loan fund, modeled on similar funds at Harvard and the University of California system. It allows projects to borrow from the loan to implement improvements in the way energy is used, and then the

loan is “paid” back with the money saved by conserving energy. Cooper says that Harvard calculated the return on investment for its green campus loan fund to be about 30 percent, a higher rate of return than even its stellar-performing endowment can provide.

“Something that costs some money, saves some energy, and pays for itself in two-three years ought to be a repeatable process, but it does take a lot of senior management to deal with.”

“At Harvard the fund started at about two, three million dollars, and they doubled it and doubled it again, and now it’s 12 million. That’s enough that you could add several million dollars to a new building project, so that you can buy some energy efficient measure or feature that the building capital budget couldn’t sustain, but it’s a good investment for the university to do.”

“[Theresa M.] Stone is now the permanent EVP [executive vice president], she’s very interested in considering the life-cycle cost of

how we design buildings, and how we do energy conservation projects. It’s hard to get some of these policy initiatives decided upon. But we’re hopeful that we’ll be able to make the case, it’s such an obvious thing ... and

if it’s on the order of two or three million dollars, we can do quite a lot of energy and water conservation measures with that.”

Team-Wind: a group from 5.92

Cooper is also involved in the 5.92 freshman project-based class on sustainability. He’s worked with one group of students to look into potential sites for wind power on campus. While the amount of electricity generated would be relatively modest (the four-foot diameter fans would generate about half a kilowatt each), several could be installed on each building. To find the best sites for the mini-turbines, the group put wind instruments on about eight or nine buildings on campus.

“They [would] build a small wind-turbine that balances right on the edge of a building, so it gets the wind that’s coming up over the edge. There’s a concentrated place maybe about five feet over the front edge of a building, where the wind is coming over much faster than the normal speed. Of course, it’s only making power when the wind is blowing in that direction, but then not having to build a tower, it’s a much cheaper installation. If you had 10 of them, you could get five kilowatts on a building.”

Cambridge Energy Alliance

Cooper is MIT’s representative at the Cambridge Energy Alliance, which includes Harvard and MIT as well as the City of Cambridge. The organization plans to bring about 70 million dollars to promote energy conservation throughout the city, which is quite a new thing. According to the Boston Globe, the new non-profit intends to offer low-interest loans to help property owners throughout the city remediate energy inefficiencies, starting with the largest consumers.

“MIT is about 10 percent of the city’s power consumption: Cambridge is 350 megawatts, and

And Would You Like a Garden With That?

By Diana Husmann

MIT’s new Solar Decathlon Team is currently preparing for the construction of Solar 7, an 800-square-foot completely solar-powered house. The seventh solar-powered house to be built on MIT campus, this house, which will be near Technology Square, will have several unique features, including an interactive energy-monitoring system and the ability to be taken apart and shipped to any new location. It will also participate in an event that none of the other houses have ever attended: the Solar Decathlon Competition held in Washington D.C.

The Solar Decathlon Competition is an international event in which twenty universities, including those of Canada, Germany, Spain, and Puerto Rico, each build their own solar-powered houses for competition against each other on the National Mall in Washington D.C. and hosted by the Department of Energy. Judged for architectural design, marketability, and energy efficiency, these houses must be able to perform the functions of any consumer’s house — including washing dishtowels and hosting dinner-parties. During the two-week competition, six students will remain in the house at all times, leading tours and performing everyday activities like cooking meals and using the Internet. Furthermore, two other students will drive around in their very own electric-powered vehicle, using energy generated solely by the house itself.

MIT’s house was designed by architecture students during a specially-taught class last spring semester. Open and airy, the house has a large, light-filled living room, making a small area feel much bigger. The many windows on every side of the house help save the energy by using as much of the sun’s natural light as possible during the day. Both active solar cells and passive solar heating are used in order to maximize the amount of energy captured from the sun.

As befits an MIT creation, Solar 7 also has a few technological surprises. First and foremost, it was designed to be a smart house. Although every Solar Decathlon house will have temperature sensors and energy monitors

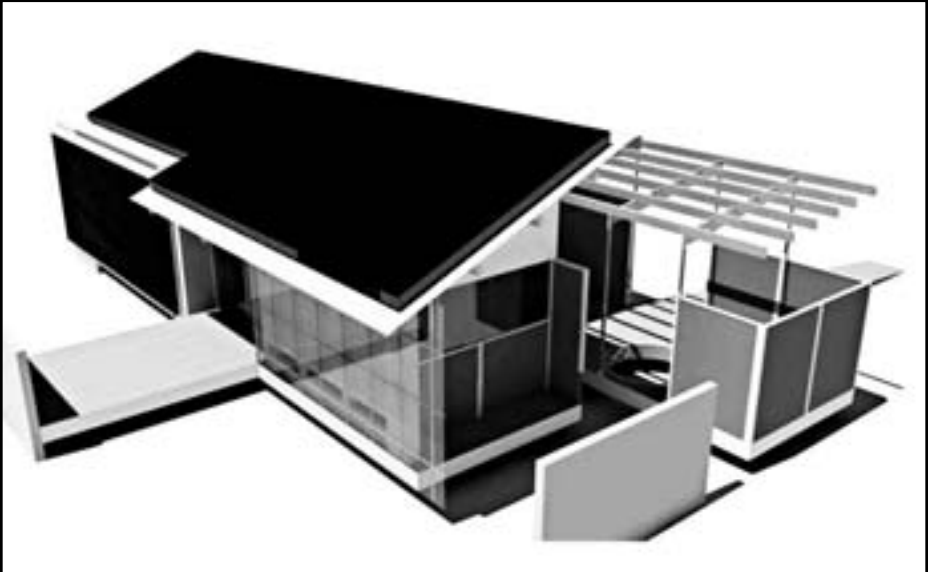
installed for the competition, Solar 7 will be the only house to have these monitors incorporated into its design. At all times, the house will be aware of its total energy use and will be able to selectively shut down certain functions in order to conserve energy. Furthermore, a computer screen will be incorporated into the kitchen countertop, thereby enabling home users to monitor energy usage and turn on or off appliances as necessary.

Although Solar 7’s footprint is just 800 square feet, it will be graced with a large yard, in the form of the National Mall. The space surrounding the house will be a “Solar Sculpture Garden” — a showcase of the different useful and beautiful energy-producing technologies that are available to the public and being researched at MIT. There will be everything from a solar-powered birdbath — for those members of the public who are ready to try out their own solar projects — to energy-producing algae — a new solar power being researched by MIT’s biology department. Over the two weeks when Solar 7 will be open to the public, thousands of people will get a chance to see some of MIT’s technologies up close.

Also, Solar 7 needs to be mobile. Like all of the Solar Decathlon houses, it will be built at its home school before being shipped to Washington D.C. MIT’s Solar Decathlon Team is preparing for this challenge by designing a house that will be pre-fabricated. The pre-fabrication process means that many of the house’s integral systems — the electrical wires, insulation, and plumbing — will be built into the walls before the walls themselves are “snapped” together, resulting in a house that can easily be taken apart and put back together.

Although the actual competition itself is taking place in Washington D.C., there are more than enough opportunities for people here to become involved. The Solar Decathlon Team will be presenting at several energy events. A list of current events, drawings of the house, and descriptions of the competition are posted at <http://web.mit.edu/solardecathlon/>.

Diana I. Husmann ’08 is a member of the Solar Decathlon team.



MIT'S SOLAR DECATHLON WEB SITE: [HTTP://WEB.MIT.EDU/SOLARDECATHLON/INDEX.HTML](http://web.mit.edu/solardecathlon/index.html)

A preview of what MIT’s newest house, Solar 7, will look like.

EcoExpo to Showcase Student Groups

By Joyce Kwan
ASSOCIATE NEWS EDITOR

The first-ever EcoExpo will be held tomorrow, April 25, and will feature posters and displays from nearly 30 student-led groups concerned with environmental issues at MIT. Organized by the Students for Global Sustainability group, EcoExpo seeks “to convey the incredible energy and enthusiasm” at MIT and “to inspire new ideas, new connections, and a strengthened campus commitment to sustainability,” according to the EcoExpo Web site. EcoExpo will be held in the TSMC lobby of the Stata Center, which faces the intersection of Main and Vassar Streets. Below is a sampling of the groups that will be featured at the event.

5.92: Energy, Environment, and Society

5.92 is a freshman project-based class that explores ways to make Cambridge more sustainable. According to Radu Raduta G, a teaching assistant for the class, the three projects being pursued are the “potential for harnessing wind” for energy, the “possibility of using heat from [the] MIT nuclear reactor,” and “assessing renewable energy options at the Cambridge Rindge and Latin High School.” The opportunity of “letting freshmen work on real-world projects” is “empowering for the students,” Raduta said.

Bicycle Ambulances: An Appropriate Technology for Sustainable Development

Jessica Vechakul has designed a bicycle ambulance for Zambia that consists of a two-wheeled trailer carrying a stretcher which may be towed by any bicycle. The relevance of this development pertains to the tragedy that many people die in developing areas because medical care is located too far away. A sustainable solution, the bicycle ambulance requires only local materials for its construction and does not rely on fossil fuels or electricity for operation.

A Sustainable Transportation Plan for MIT

The focus of A Sustainable Transportation Plan for MIT, a Spring 2007 subject, is to propose effective and sustainable parking policies at a large, complex institution like MIT. The class worked on “how to encourage people to drive to campus less often and use mass transportation more often,” said Michael A. Kay G.

Before A Transition to Hydrogen

The objective of the project Before A Transition to Hydrogen is “looking at different vehicle technologies that can bring us to more sustainable transportation in the future,” said Lynette Cheah G. The team is interested in short to medium term solutions that would reduce petroleum and energy use, and greenhouse gas emissions from the transportation sector. This is an “area we can make a big impact on,” Cheah said.

The Business Case for Green Hospitals

The focus of this project is to assess the benefits of environmentally friendly options for hospitals and to educate audiences about those benefits. “We’re trying to develop a tool for health care decision makers so they can evaluate costs and benefits of going green,” said Jessica Harrington G. A business framework to aid hospital chief financial officers to fully grasp aspects of green investments will be presented.

Energymap.mit.edu: A Web site of MIT’s Energy Usage

This is “a project to compute energy data” and “to try to display [it] in a useful manner,” said Steven C. Peters G. More specifically, *energymap.mit.edu* is a Web site designed to display past and current energy consumption patterns of MIT’s buildings. The site will “educate people” and allow “students to get involved with trying to improve campus,” Peters said.

Exploring Conscientious Design in the Developing World: Architectural Considerations for An Environmental Education Center in the Rainforest of Madagascar

This project focuses on the design of a set of exhibition buildings in a national park located along the coast of Madagascar. Intending to become an example of green systems use, the design will incorporate aspects such as community involvement, construction practices, landscape practices, and architectural design in consideration of one another.

Footprinting for the Future: A Mauritius Case Study

Founded by Christopher Cleaver ‘08, the Footprinting for the Future program aims to use the tool of Ecological Footprinting, an indicator of environmental sustainability, to promote sustainability among communities in Mauritius. Initiatives in 12 schools across the island is currently being launched, involving students, aged 14-16, to conduct Ecological Footprinting investigations of their schools. The students then compete for grants to implement projects that aim to reduce their school’s Ecological Footprint.

Greenhouse Gas Reduction Goals At MIT

Composed of a group of students, this group aims “to put pressure on MIT administrators to enact greenhouse gas emission goals,” said Chris J. Lyddy G. MIT has yet to publicly announce any carbon reduction targets, unlike peer institutions such as Yale, Cornell, and the University of California whose targets range between 10% and Carbon Neutrality. The group also focuses on cultivating “dialogue about what goals should be” between students and administrators. It is “important for MIT to take leadership role” on this issue, and this is a “great way to demonstrate we take our science seriously,” Lyddy said.

Just In Time Carbon Footprint

This research group focuses on encouraging the conservation of energy at the personal level. It studies how educating occupants of the energy expenditure and carbon footprint of their homes will affect energy conservation.

Lifthouse — Sustainable Reconstruction in the Bayou

Lifthouse is the result of a group of MIT architecture and planning students working to develop a prototype house for the bayou areas of southern Louisiana, ravaged by Hurricanes Katrina and Rita. According to Zachary B. Lamb G, coordinator of the project, Lifthouse involves low technology, “commonsense,” and traditional building techniques of the region that can be used “by anybody down there.” Students are actively working with local architects and engineers to further develop the prototype.

Students for Global Sustainability

SfGS is a student organization that raises awareness of environmentally friendly practices at MIT. Last year SfGS organized a Zero Waste Party with free organic food and reusable cups and utensils. SfGS is “committed to bridging the gap between sustainable theory and implementation in both micro- and macro-sustainable development and conservation projects,” said Laura K. Meredith, one of the organizers of Zero Waste Party. SfGS is part of the World Student Community for Sustainable Development, which includes eight other universities across the world.

SOURCE: ECOEXPO WEB SITE: [HTTP://WEB.MIT.EDU/JIALANW/WWW/ECOEXPO.HTM](http://web.mit.edu/jlalanw/www/ecoexpo.htm)

Associate News Editor Valery K. Brobbey contributed to the reporting of this article.

Cap and Trade

An Interview with Richard Schmalensee

By Rosa Cao
EXECUTIVE EDITOR

Richard Schmalensee ’65, PhD ’70 is professor of economics and dean of the Sloan School. He is a member of the National Commission on Energy Policy (NCEP), a non-governmental bipartisan group which last week released a set of energy policy recommendations. The recommendations are comprehensive, addressing everything from guidelines for vehicle fuel efficiency to increases in research budgets, to, perhaps most importantly, the creation of a viable national emissions trading scheme. Here Professor Schmalensee talks about some of the issues at stake in controlling emissions, and the challenges that lie ahead for fighting climate change.

The Tech: When did you first realize that climate change would be an important problem?

Richard Schmalensee: In the ’88 campaign, then-candidate Bush said that he was going to use the White House effect to deal with the greenhouse effect. Beginning in 1989, I was on the Council of Economic Advisors, and I was assigned the task of directing an inter-agency group on the economics of climate change. What was striking at that point was how much uncertainty there was about everything. The fundamental physics of the greenhouse effect were clear to everybody, but the magnitude of the effect wasn’t clear, and the role of the oceans wasn’t clear, the role of clouds wasn’t clear, and the damages certainly weren’t clear ... the cost of *doing* something wasn’t clear.

Even now there’s a lot of uncertainty, but there’s only one planet, and do you really want to roll the dice? Not rolling the dice requires global action at a level that we’ve never done, however. There’s never been anything like “reducing global energy use.” So the consequences of not doing something are potentially devastating, [while] the difficulty of doing something is enormous: That’s a big problem.

[Sir Nicholas] Stern talks about how “the sting is in the tail.” So maybe the median change isn’t so bad, but if you look out at that right tail [of the probability distribution], that right tail is really nasty, and there’s mass out there.

TT: So what can we do about it?

RS: This has become a very lively issue in Washington. [The NECP] proposes a “cap-and-trade” scheme, with a rising safety valve price, and a substantial increase in spending for research and development on low-carbon energy technologies, and a range of other policies. But the core is a comprehensive, economy-wide, cap and trade system.

TT: How much of a difference will it make without international participation?

RS: The arithmetic is compelling: Any country, even China, acting by itself won’t do much. The program that we propose looks like it can

be done at a moderate cost to the US economy, but by itself it will have a very small impact on global emissions and certainly on atmospheric concentrations. If fifty years from now, India and China have done nothing, then basically what we and Europe and Japan do won’t matter, because total global emissions need to decline substantially, and that’s going to require fundamental change not just in our economy, but in everybody’s economy.

One thing I think is certain, however: if wealthy countries like ours don’t take some action, it becomes very hard for us to get very poor countries to do something. If 1.3 billion people industrialize and use energy at anything like the level that the US or Europe or Japan uses, the CO₂ game is over, it’s just over. So they cannot become rich the way we became rich.

Their response to that, properly, is, look, you’re telling us we can’t go down the road you went down because you went down it. You put the carbon dioxide into the air! ... and they’re right of course, but that’s what makes it such a hard problem.

We need fundamental changes in the menu of available technologies. We’ve never traveled a low-carbon road from poverty to wealth, and we don’t have one for them to travel, and we’d better find one, and we’d better help them get on it. Low-carbon, attractive technologies are unlikely to emerge first in very poor countries; they have to emerge in rich countries, when carbon is expensive, when research has been devoted to finding ways to have a energy-rich economy that’s not also carbon-rich.

There are lots of things you can do in the short run, like you use energy-efficient lighting, you recycle, and you do all these small things, but fundamentally, in order to solve the problem, we need fundamental changes in technology. Having more people use energy-efficient light bulbs is very good for making us all feel good, but the quantitative impact is tiny.

TT: So the change has to be in technology and not in lifestyle?

RS: Well, they mix. Compare energy use in the US and in Japan: Japan has much lower use per capita, smaller houses, smaller cars. Now suppose we switch to the Japanese lifestyle and continue to grow — then it doesn’t matter! It’s hard for me to imagine a world in which rich people aren’t going to want refrigeration, and the ability to wash their clothes mechanically, and computers and heating and air conditioning ... so yes, you could have cities that are more compact so that you drive less, as in Europe and Japan, you could have more public transportation, but what kills you is *growth*. What kills you is [if] we take emissions down through lifestyle changes by 20 percent over two decades, [and compare it to] how much world energy use

Schmalensee, Page E8

(top to bottom)

Gardner Loulan, mtvU host, talks to the Biodiesel@MIT team on stage.

Angels and Airwaves plays at MIT’s Johnson Athletic Center on Sunday as part of the prize in GE/mtvU’s ecomagination Challenge.

Photography by David Da He



MIT Cogeneration Project Provides Energy Efficiently

For more information on the MIT Cogeneration Project, see <http://cogen.mit.edu/>.

(clockwise from right)

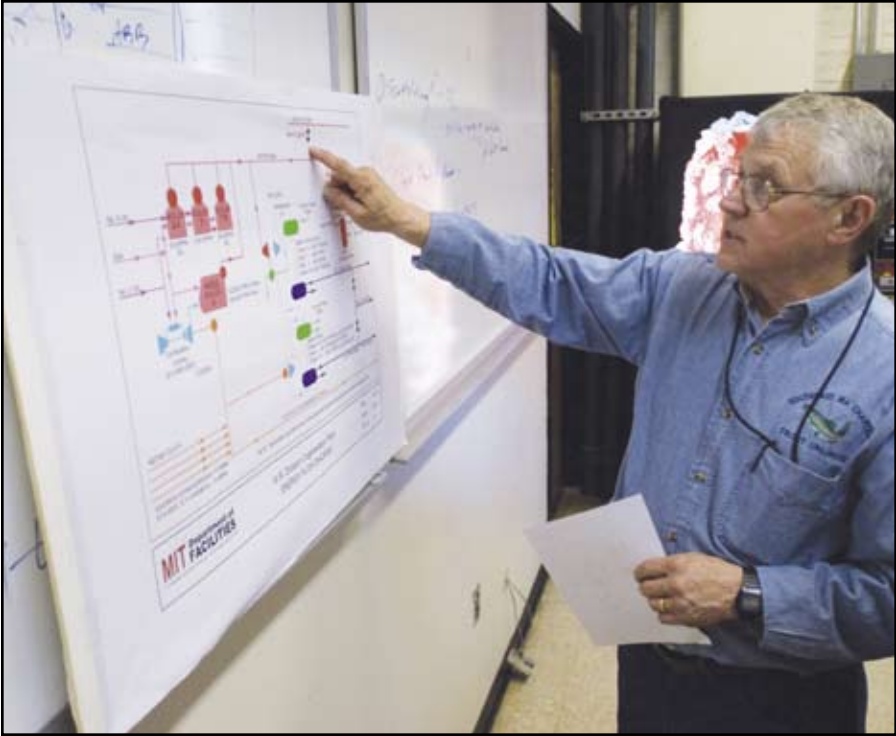
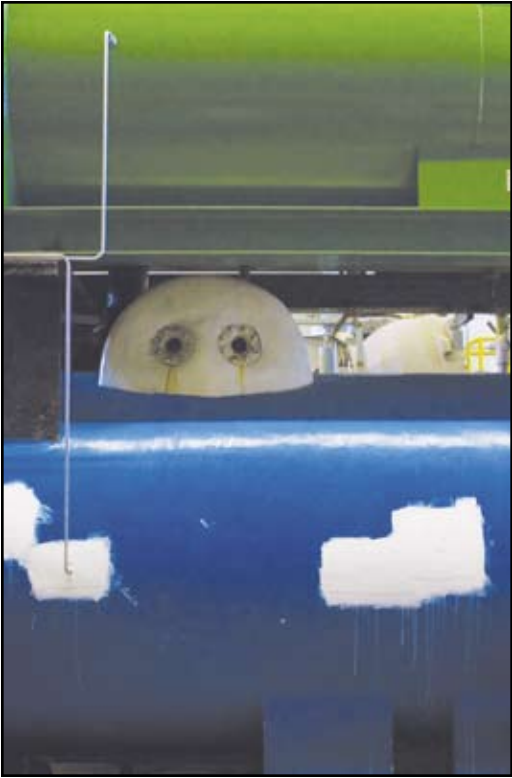
Part of one of the plant's chillers, which use steam to create the campus chilled water supply.

A densely packed maze of pipes and heavy equipment in the plant.

Roger Moore shows off the Combustion Turbine Generator. The turbine is listed as capable of producing 21 megawatts while reducing emissions by 45 percent compared with MIT's previous power generation technology.

Moore describes the physical integration of the plant's inputs and outputs with NStar Electric and Dalkia Steam.

Photography by Eric D. Schmiedl



Perspectives on Earth Week

Stalking Ethanol

Krishna K. Gupta

Take a long look at your nearest ear of corn; its golden hue may not just be a hue. These days, as President Bush and his administration attempt to tackle the energy problem for the United States, fields of corn have become our newest saviors.

But before we all bequeath our land to corn farmers and move to Canada, shouldn't we step back and try to think about ethanol realistically? Unpatriotic though it may be of me, I would argue that investing all this time and energy in corn-based ethanol stunts our drive for solving today's energy problems and conveys the wrong message: that we are unwilling to pursue tenable solutions, preferring instead to preserve the political support of certain states.

By signing the 2005 Energy Policy Act, President Bush mandated the country convert about 7.5 billion gallons, or five percent of its annual gasoline consumption, to renewable fuels instead by 2012. The administration is relying on ethanol for a significant portion of this alternative energy growth and if the current hype is any indication of the near future, ethanol supporters in the capital should be smiling, well, ear to ear. Infrastructure is rapidly being developed across the Midwest to facilitate the production of corn-based ethanol — the total number of ethanol plants jumped from 72 in January 2004 to 113 currently in operation, with another 80 or so in

development.

But why is ethanol so big? First, the industry's been sheltered like a baby. Subsidies are at \$5 to \$7 billion a year, which essentially means we're transferring money from millions of working families to a handful of big businesses. Policies such as a 51 cent per gallon tax credit and a 54 cent per gallon tariff on Brazilian imports also seriously disrupt the market mechanisms at play. It's ironic that Bush can so vehemently argue for free markets in the Western hemisphere, yet defends a barrier against cheaper Brazilian sugar-based ethanol imports. Would you rather import ethanol from Brazil or oil from Venezuela? Consumers and the market should decide which alternative fuel is the best alternative.

Ethanol futures have been volatile over the last year, reflecting market uncertainty over the fuel's true value. Currently the December 2007 futures are trading on the Chicago Board of Trade at \$1.89, having been well over \$2.00 in the recent past. They are heavily dependent on corn prices, which have been steadily rising due to the anticipated increase in demand. The Agriculture Department announced last week that corn acreage will rise 15 percent in the coming year.

Ultimately, the United States doesn't have

the resources to produce corn at the levels that would be necessary to fuel the country: limited land and skyrocketing ethanol demand have already created an upward pressure on corn futures, doubling prices in the past year. Rising corn prices hurt millions of ranchers, animal farmers, and others in the U.S.

Higher corn prices, in turn, affect ethanol costs. Already at about \$1.45 per gallon, or equivalently \$60 a barrel, ethanol's status as a viable alternative fuel is endangered by rising costs. Factor in that it produces about 25 percent less energy than gasoline and ethanol suddenly looks a lot less financially promising.

There are many economists who argue that, all things considered, corn ethanol uses up more energy than it produces. A highly publicized study academic study from Pimentel and Patzek in 2005 argued that even taking into account more efficient production processes, the corn-to-ethanol process consumes about 30 percent more energy than it produces. Although other studies refute this claim, the issue is still being debated in the field. But it's clear that the sign of the net energy balance of corn-based ethanol should not be in question, if we are to pour such vast resources into its future.

But maybe there are social benefits of etha-

nol? Bad news. The production of corn-based ethanol requires several key inputs besides corn, some of which are in short supply in rural America. For example, three gallons of water are used to produce one gallon of ethanol. Not to mention the impact of the smells and sounds of new plants could have on their neighbors. The environment also suffers, because limited land means fewer crop rotations and an increased corn allocation, both of which cause serious soil erosion. Farmers may themselves be hurt if one day another solution supplants ethanol, rendering the infrastructure and increased corn production useless.

There are many alternatives. MIT's *Technology Review* in February described the cellulosic ethanol industry, which is produced using woodchips, switchgrass, and other feedstock. It is more energy efficient than corn ethanol, using less fossil fuel and producing double the ethanol per acre, an especially important concern given limited land. That industry, however, remains inchoate due to severe lack of investment. Private investment has been driven by the corn ethanol hype, even though switchgrass could provide more lucrative returns and greater long-term potential than corn.

Simply put, let's keep our options open. We're moving too quickly with ethanol and the reckless embrace could have serious side effects. America can certainly wean itself from foreign oil, but ethanol may not be able to support the weight of hope resting on it.

The United States doesn't have the resources to produce corn at the levels that would be necessary to fuel the country.

Bad Excuses For Hurting the Earth

Barun Singh

On college campuses across the country, and increasingly among the general population as well, people express outrage and anger over our government's attitudes towards the environment. We rail against big business for its unethical and ecologically damaging practices. Yet, as we try to hold to account the larger-scale institutions that ought to be doing better, we should ask ourselves: are we as individuals doing our share to make things better?

There are varying degrees of action any one of us can take towards the cause of environmental sustainability. Most people may not be willing or able to actively work to improve the larger institutions around us, but we can all examine our own patterns of consumption and waste and attempt to reduce, reuse, and recycle. Recycling provides a particularly valuable context for examining the question of personal accountability, since it requires the least effort among the three options.

The MIT campus boasted a recycling rate of 35 percent (by weight) in 2005, a campus record. Although the trend of increased recycling is a positive one, the amount recycled is still pitifully low in comparison to what we could be doing. Aside from organic matter, almost everything we throw out can be recycled at MIT. Yet day after day trash bins overflow with paper and plastic bottles while the recycling bins right next to them remain unfilled.

Many people claim ignorance of what is

recyclable, while others do not accept the underlying premise that recycling provides any substantial benefit. Ignorance on this topic is a choice at MIT — it takes only a two-minute search on the internet to find that all paper (not contaminated with food), aluminum cans, glass bottles, and all plastics are recyclable on campus. Similarly, any honest attempt to learn the facts about recycling will quickly show that, though there are some exceptions, on the whole it results in tremendous savings of energy and raw materials.

The most common excuses shift responsibility from the individual and to the institution. It is true that the institution has its flaws. For example, not everything placed in recycling bins ends up being recycled. But even an imperfect system is valuable — the cost in convenience of recycling at MIT is infinitesimal, and whatever portion of the recycling is actually processed still provides a net benefit. It is also true that the incremental effect of an individual's actions cannot make up for the inaction of a large organization. But this does not change the fact that the individual's actions still do some good. Furthermore, collective action by individuals can have tremendous impact, such as shifting entire markets towards more sustainable production methods through their purchasing decisions.

It is the same form of reasoning that allows people to justify not participating in the political process, even as they desperately wish for change.

Passing the buck to institutions outside of our immediate control is a common strategy to avoid dealing with important societal responsibilities. It is the same form of reasoning that allows people to justify not participating in the political process, even as they desperately wish for change. Our political system has clear flaws, and people often lament the limited impact of their single voice. Yet, just as is the case

for recycling, failing to participate only serves to break the system further and make things worse. Most people accept this reasoning, yet still choose not to act. What could motivate such behavior?

Accepting personal responsibility requires us to more deeply ac-

cept the difficult truth of the situation being addressed. It is a fact that our way of life is destructive to our environment; this situation can be overwhelming and its solutions are not obvious. Convincing ourselves that we can't do anything about it lets us absolve ourselves of guilt. But by choosing this easy way out, or worse still by following an emotional sense of futility, we act in a way that is at best irresponsible and at worst destructive and cowardly.

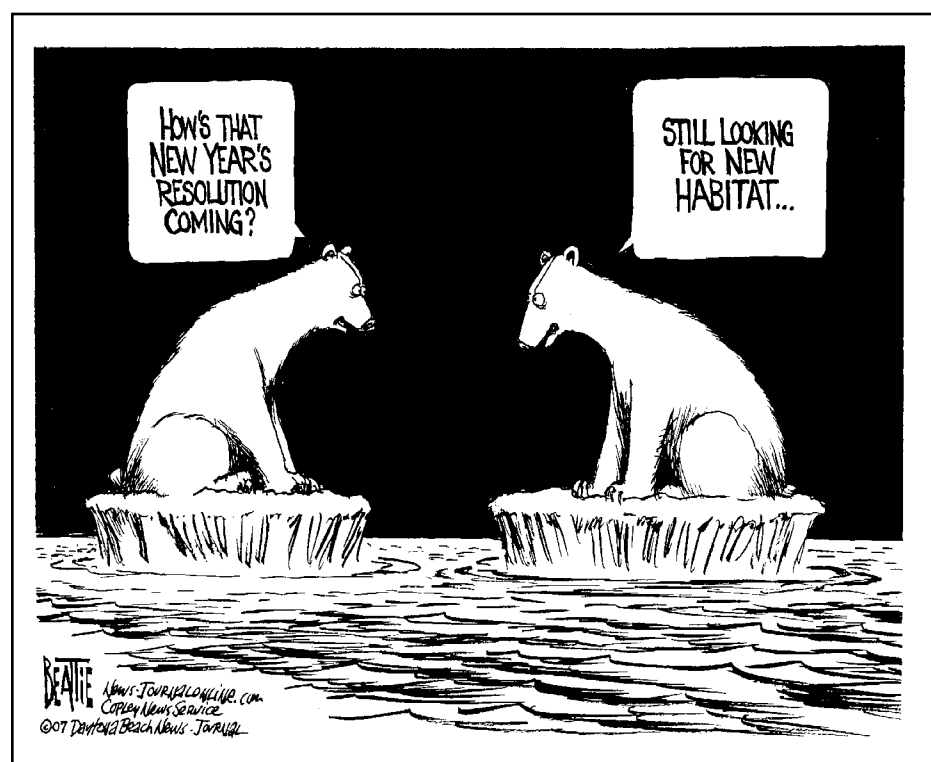
We must also keep in mind, when assessing the role of governments or corporations, that they are ultimately composed of individuals. If a person is unwilling to ask the important

questions of her own actions, is it reasonable to expect her to ask those same questions as a leader of a large institution?

Individuals have the opportunity to address environmental degradation far beyond recycling. We live in one of the most wasteful societies ever, and the larger problem is that every one of us consumes far more than what we need, and we waste even more than we consume. Do you really need your foil-wrapped burrito from Anna's to be put into a paper bag? Or to get five extra napkins only to throw them out unused? Is there any downside to printing double-sided? Does leaving your bedroom light on let you see any better while you sit in your living room? Simply by asking these sorts of questions, an individual can significantly reduce his negative impact on the environment.

We all implicitly place a certain personal value, in terms of time, effort, money, and convenience, on how much we care about any given issue. We are only capable of doing so much, and likely willing to do less. One person may dedicate himself entirely to a cause while another may only be willing to sacrifice the bare minimum. Wherever you fall in this spectrum, the moral imperative we all face is to make such value judgments consciously, and not fall into the trap of assuming that there is nothing we can do. This is our responsibility, both as individuals and as members of society.

Barun Singh is an opinion editor for *The Tech*. He welcomes comments and responses to this article on his web site at <http://barunsingh.com> or to letters@the-tech.mit.edu.



Take the Pledge

Christopher J. Sequeira

Some of the greatest challenges ever faced by humanity, such as climate change, power generation, and access to natural resources now simultaneously loom large on our collective horizon. All of these challenges appear separate on the surface but are actually woven together by human behavior and the impacts of technology.

Addressing the dilemmas of our day requires us to explore how problems connect and act creatively around what roles citizens, governments, and corporations can and will play in solving or exacerbating these problems.

Part of the challenge that faces each of us in thinking about these issues relates to making them personal — how do we use our own talents, time, and daily decisions to positively or negatively impact the outcomes about which we care?

The Pledge is more than a statement to "do no harm."

A Pledge of Social and Environmental Responsibility has been established at MIT as one small step in making these issues more salient in the lives of students: "I pledge to explore and take into account the social and environmental consequences of any job I consider and will try to improve these of any organizations for which I work."

The Pledge is more than a statement to "do no harm." It's a pledge to critically explore throughout one's career just what "harm" is and what one can do to alleviate suffering in the world. It is also a symbol that students can use to remind themselves of their commitments and express these commitments to others.

We encourage all students (whether graduating this year or not) to visit <http://sustainability.mit.edu/Pledge> to learn more and participate as Pledge-takers or Pledge organizers.

Christopher J. Sequeira is a pledge ambassador for the Graduate Pledge Alliance.

What Is to Be Done?

Rosa Cao

In addition to being Earth Day, April 22 is also the birthday of V. I. Lenin, who in 1902 famously took on the old question of how we can create a better world. His answers may no longer resonate, but some criticisms of capitalism seem increasingly relevant as our economic system faces a new challenge in today's environmental exigencies.

To avoid economic disaster, capitalism both requires and desires boundless growth. To avoid natural disaster, society has to find ways to place bounds on the consumption of resources and the distortions imposed on the environment in that consumption. How can we achieve sustainability on a finite planet rapidly filling up with people with our infinite desires? Can we change the way we live or our reasons for living?

I think we can, because to match our boundless desires, we also have an almost limitless capacity for interpretation, re-interpretation, and social suggestibility that can be exercised to direct our yearnings towards sustainable ends. We can and do create value, rather than just finding it. In an ever more sophisticated economy, the value of things is less and less in what they intrinsically are, and more and more in what we think of them as. The value in a six-million dollar painting is not in the canvas and pigment, nor even necessarily in their particular arrangement, but rather, almost entirely in the effect that they have on the viewer. This effect in turn has two components, a physiological one, which (given certain reasonable conditions) is more or less the same across viewers, and an emotional and intellectual one, which

is almost entirely socially constructed. It is the second that gives it most of its value, while all the other attributes form only the substrate. It is the celebrity and history of *the* Mona Lisa that gives it its value above the thousands of replicas. And just look at how much advertising can change our perceptions of something's relative value.

To be sure, there are basics that we will never be able to interpret away, where the substrate is everything. We are still embodied beings, and the liveliest imagination, the strongest social signals, cannot induce me in my right mind to feel full for long when I have no food; nor will I be able to create satisfaction when I am cold without shelter or injured without care. While we at MIT may not suffer these lacks ourselves, they nonetheless represent the primary challenges towards which our material wealth would be most efficiently directed. These are the causes which have the strongest and most urgent claim on our material resources and surplus wealth. But once we have bought our freedom from these basic physical needs, what further use have we for more things or more wealth?

One answer is simple. We need to buy them so that we can drive the economy, so that it can produce more things, and we by participating in it can become rich, which will allow us to buy more things — this is the circular answer that brings us global warming and our heads up against the Malthusian wall of our one planet.

This is the road we have been taking.

The other answer is more hopeful, the one that makes me think we are on the cusp of opportunity on one side even as catastrophe looms on the other.

Instead, what if material wealth served as only the infrastructure of an economy whose real growth sectors lay in intellectual and social goods? We wouldn't have to give up technology, or the conveniences and comforts that give us the freedom to devote our energies to think about these questions. But we could change our priorities and say: No more absurd levels of consumption just because we don't know any other way to live. What we really want is health and education and security and beauty in our lives, not the maximum number of donuts at the minimum possible price.

In fact, these intellectual and social goods are nothing more than what we've always wanted (or at least claimed to want): to understand how the world works (if only so that we can manipulate it), to understand ourselves and each other (ditto), to express ourselves, and yes, to win in the little competitions we run against each other in material and intellectual arenas alike. To do all of these things, we also need to exist in a sustainable balance with our environment, which provides the entirety of the raw materials we need for existence.

An economist might advocate creating public prices for less tangible, hard-to-track goods as the first step to making sure that they are

What if material wealth served as only the infrastructure of an economy whose real growth sectors lay in intellectual and social goods?

Systems Leadership

Elisabeth M. Drake

Almost every human activity requires external sources of energy. Affluent societies are increasingly dependent upon energy to maintain their lifestyles while developing countries require more energy to improve their standards of living. As both population and GDP have grown across the globe, so has energy use: at present people use about ten times as much energy as in the early 1900s, and this amount is projected to double by 2050 and at least triple by 2100. Most of our energy today — about 85 percent globally — comes from fossil fuels. These fossil fuels pose a danger to our society for two primary reasons: there is increasing evidence that their greenhouse gas emissions are closely linked to serious climate changes, and the sources for this energy pose a dangerous threat to our national security. In the face of increasing energy demand, can we face the daunting task of reducing fossil fuel consumption through alternative fuels and conservation?

Almost forty years ago, Professor Emeritus Jay W. Forrester '45 and others explored the limits to global growth, developing a system dynamics model of the world that linked available resources with the anticipated growth in population and economies. Based on the trends at the time, their results indicated that humanity would likely reach and overshoot some global capacity limits around the middle of the 21st century, precipitating a sudden large decline in industrial capacity, food production, and population. These predictions were re-asserted in 1992 when the model was updated and multiple scenarios explored. The warnings of this complex futuristic model seemed unreal at the time, but many of the predictions of the 1972 model have already been borne out in terms of year 2000 statistics regarding population, agricultural/industrial productivity, and waste production. So the model's conclusions about the more distant future may not be totally off-target after all.

Although the Forrester's "Limits to Growth" model paints a grim picture, there is hope. According to the updated model, if we adopt strategies for curtailing population and industrial growth starting around 2015, we can make the upcoming crash much less severe. We may not completely avoid a major mid-century disruption, but the endstate in 2100 could be considerably better than if no action were taken.

Unfortunately, elected officials and businesses operate on short time horizons, with competitive profit and GDP growth as their major criteria for evaluating strategies. Although President Bush has acknowledged that America is "addicted to oil," he and other politicians benefit from the unconstrained economic growth fueled by our energy addiction.

Without careful analysis, cooperation, and especially courageous leadership, change is very unlikely.

Since climate change is a global problem, it will need a global solution of some sort. Individual nations operate through economic, political, and military competition that makes it hard for them to agree on common solutions to global issues. Although nations can come together in the wake of a disaster, climate change is a problem too serious to be remedied by post-disaster fixes. International initiatives — which tend to move at a snail's pace as individual nations worry more about competitiveness and security issues than the primary issue at hand — cannot be relied upon to deal promptly with this kind of problem.

This situation presents a challenge and an opportunity to MIT. MIT has great strengths in technology and systems analysis, and advises global industry leaders on management and strategy issues. Our researchers and alumni

have been integral in creating today's multinational, multicultural supply chains that have helped to grow the global economy and with it the need for long-distance transportation of materials and goods, predicated on past availability of inexpensive fossil fuels. MIT now has the opportunity to play an integral role in creating solutions to problems like increased transportation requirements.

MIT has gathered together academic, business, and governmental leaders for important initiatives in the past, and should take a leadership role again. Many global businesses are already concerned about the impacts of climate change and security on energy prices. With academic research as a source for technological input and systems analysis, visionary leaders of global commerce and communications conglomerates might be willing to come together to develop a strategy to reduce both their future financial risk as well as greenhouse gas emissions. One such strategy might be to phase in new rules constraining future transportation growth through shadow pricing of environmental impacts.

Global industry leadership can change the status quo much faster than the politicians can — and they may benefit from having general agreements on transitional paths that also will reduce their vulnerability to supply and price fluctuations. MIT also has the potential to play a significant role in this endeavor.

Many people within MIT are already thinking about the energy challenge, but now is the time for systems thinkers to catalyze a broader and bolder coalition of leaders — one that considers a new vision and a global plan of action so that we might achieve a more sustainable future that protects both our environment and core social values.

Dare to Imagine: Sustainability at MIT

MIT's historically pioneering spirit is rooted in a deep commitment to create solutions for the problems that challenge our world.

This spirit was evident in the 1940s, when MIT dedicated its resources to improving radar technologies that were instrumental in bringing World War II to a close. In the 1960s, MIT was the innovative force behind pivotal technologies that put a man on the moon. MIT intrepidly sought answers to and achieved success in those tasks that might have previously seemed impossible.

Today, the world faces a different challenge — one for which a single solution cannot be engineered. This challenge spans all nations and peoples, and calls for an unprecedented level of cooperation, integration, and commitment. The task of our generation is to create a sustainable world.

Building a sustainable world is not likely contained in a single brush stroke of ingenuity; the stabilization of humanity's impact on the planet will be the legacy of a vast concerted effort between many hundreds of innovations from many institutions.

MIT can again be a guiding light — our *mens et manus*, mind and hand, can be applied to the greatest sustainability issues the world faces, and by doing so, fulfill MIT's mission to develop in each member of the MIT community "the ability and passion to work wisely, creatively, and effectively for the betterment of human kind."

Many of us continue to struggle with defining sustainability — it is difficult to integrate with one word the broad social, environmental, economic, and technical issues that compose our interactions with and impact on the earth. However, as an Institute, we should not be daunted by the magnitude of this challenge. MIT minds have both defined and overcome some of humanity's greatest challenges. Defining sustainability for MIT is part of the task ahead, and is a crucial part of focusing our efforts.

MIT has already exhibited strong leadership and focus by engaging the world's energy crisis through the Energy Initiative. However, developing sustainable energy solutions is only one part of the broader sustainability challenge.

A social and intellectual movement is emerging from the efforts and infrastructure of the past. Students, faculty and staff from around the Institute have united to respond rapidly to the threat of climate change, and to integrate and combine knowledge, talents, resources, and action towards a solution.

An impromptu Green Room has emerged, with undergraduates and graduates gathering every Wednesday evening to work on a variety of sustainability projects. These projects range from analyzing the environmental footprint of MIT itself to the creation of a sustainability pledge for graduating students. This year, the MIT Generator was born, aimed at mobilizing the talents at MIT to move our community to-

properly valued, and creating a structure that will allow us to build on them. And to some extent, this has already happened. A carbon emissions market seems to be on the horizon for most of the developed world. Someone values the mysterious stuff that somehow leaches into our heads between lectures and problem sets and research projects at MIT at about \$33,400 a year. The cheerful exploitation of intellectual property laws by scientific journals is sucking dry the coffers of science libraries everywhere. And Google's profit margins are thick, while Shaw's Supermarkets' are skinny.

If we can convince ourselves to pursue these projects as ends in and of themselves, rather than as means to more wealth and more stuff, then we have a chance at a truly "new" economy. That then leaves only the problem of how to prevent the market from distorting parts of our lives that we have traditionally held to be priceless, how to balance these new markets even as we attempt to widen them.

Finally, in addition to embracing (and ennobling) the knowledge and service industries, we also have the more difficult choice of turning away from their less sustainable counterparts.

Until we have access to cleaner renewable technologies, we still have to conserve energies. As long as our supply of raw materials is limited, we still need to recycle. And as long as manufacturers and retailers still try to manipulate us into buying things we don't need, or even really want, we have to try to reduce our consumption.

Just as we no longer need a gold standard to justify the value of paper money, nor should we tie ourselves to a pile of stuff in envisioning a desirable future.

wards "walking the talk" on energy and the environment. During Earth Week a multitude of activities will highlight the efforts across MIT. The sampling presented here is by no means complete.

MIT has been engaged in teaching and research activities for many years. There is a rich history of dedicated faculty, staff and student researchers who have impacted sustainability themes and we salute their ground-breaking work and spirit.

Now we call for a broader, unifying vision and commitment to sustainability that touches on all major aspects of MIT life and purpose.

Imagine an MIT where our day-to-day operations set a high standard for energy efficiency and positive environmental impacts. Imagine an MIT where we develop and showcase the best available sustainable technologies, invigorate and harness the collective intelligence of our community with sustainable outcomes at the forefront, demonstrate efficient operations, and empower individual responsibility. Imagine an MIT that isn't stalled by the debate of a globally-accepted definition of "sustainability" but instead sets ourselves to the task of defining it for MIT, within our unique understanding and capabilities. Imagine an MIT that sets a vision that unites and inspires us; a vision that is inclusive, transformational, and worthy of the task ahead. By doing so, **imagine an MIT that rises to the greatest challenge ever faced by human kind** and shows true global leadership — by walking the talk, by collaborating, by innovating, by shaping our futures, and the futures of those generations to come.

MIT's voice and actions echo around the world. The weight of our voice places upon us a profound responsibility, but also offers a thrilling and invigorating opportunity. Let's accept the challenge of making our world a healthier and more sustainable place for all life, starting here at MIT. Each of our contributions can be as simple as attending MIT Earth Week events or asking our professors and colleagues to incorporate sustainability into their classes, or as involved as helping to set Institute policy. Our time is just beginning.

For more information about or to get involved in sustainability efforts at MIT, see <http://sustainability.mit.edu>; you can also e-mail sustainability@mit.edu or any of the signatories below.

Jason J. Jay G (*Walk the Talk*), Kendra D. Johnson '09 (*SAVE*), Jonathan S. Krones '07 (*UA Committee on Campus Sustainability*), Chris J. Lyddy G (*S**), Elsa A. Olivetti G (*S**), Kate W. Parrot G (*Environmental Task Force*), Kara F. Penn G (*S**, *MIT Sloan Sustainability Initiative*), Ari D. Shapiro G (*SfGS*), Stephen V. Samouhos G, Christopher J. Sequeira G (*Graduation Pledge Alliance*), James P. Schwartz G, Jialan Wang G (*SfGS*, *EcoExpo*), Lucille D. Ynosencio G, Bo Zhao '08

Savings and Loans: Cooper Keeps Eye on Energy

Cooper, from Page E3

we peak at 35 megawatts, but 20 of that is from the cogen plant. There are other places [in Cambridge] where combined heat and power would be a good application, so there are some participants who want to use the fund for that, and maybe finding a way so that people can pay it through their electric bill. That requires organization with financial people and with the utility; the City [of Cambridge] folks are very progressive. But the major part will be about regular energy conservation, and getting the word out.”

One of the ways to address inefficiencies is

Dorm Electricity Competition

Rankings as of April 6–13

1. McCormick Hall	6. Senior House
2. Burton-Conner	7. Next House
3. Simmons Hall	8. Bexley Hall
4. MacGregor House	9. East Campus
5. Baker House	10. Random Hall
	11. New House

SOURCE: [HTTP://WEB.MIT.EDU/MIT_ENERGY/PROGRAMS/CAMPUSENERGY/DORM_ELECTRICITY/](http://web.mit.edu/mit_energy/programs/campusenergy/dorm_electricity/)

to expand the use of Combined Heat and Energy (another name for cogeneration). Based on his experience putting the MIT cogeneration plant on the grid, Cooper provides “friendly help and advice,” to those who would like to learn from MIT’s experience. Last week he had a meeting with representatives interested in implementing CHE for Gillette, which currently operates a large factory on Fort Point Channel by South Station in Boston.

Dorm electricity competition

This is a competition to see which of the undergraduate dorms can reduce its energy use the most per student as the result of active conservation measures by its residents. The winning dorm will win \$10,000 from the office of the Dean for Student Life, to be used for retrofits to improve the dorm’s energy efficiency. Cooper worked with the organizers to figure out how to keep track of consumption.

“There are meters in all the buildings, but the data has to be read manually once a week. The hero here is [Utilities Cost Accountant Patricia K. Magner], she actually deals with all that data, and she developed special meter reading sheets, and we had to make sure that some of the confusion of subtracting this read-

ing from that reading was clarified. We worked at getting the data to the students. And of course Housing will enjoy the energy savings.”

New buildings

Cooper is also involved in a solar project for the new graduate dormitory NW35. The plan is to install solar thermal collectors on the roof, providing all the hot water not just for NW35 but for Sidney-Pacific next door as well.

“It won’t heat the building in the winter time, but it’s a pretty significant amount of energy.” The main challenge will be to make sure that it doesn’t slow down construction on the building, which is on a tight schedule to open by Fall 2008.

Thanks to an “integrative” design process that allowed contractors, architects, and the MIT project managers to go through multiple iterations of possible designs and optimize parameters for energy-efficiency, the greenest building on campus will soon be the new Sloan building E62, which is currently under construction and due to open in 2010.

Future directions

Cooper and others in Facilities and the administration are working on the impressively

named Utilities Master Plan, which considers everything from new conservation measures to an expansion of MIT’s 20 megawatt cogeneration plant, which would require a significant capital investment.

“In the Walk the Talk white paper, [produced] for the Energy Research Council, if we could just reduce energy consumption 20 percent by conservation, and if we expanded our steam and electricity capacity using cogeneration [instead of buying the difference from the utility company], we could cut CO2 emissions by about 120,000 tons.”

The trade-off is, “If you spend the least capital, you end up with the most inefficient campus and the highest operating cost. Spend more on buildings and cogeneration, and you have more efficient conversion. But it’s a matter of MIT allocating the capital for that versus for new science buildings — there are a lot of very good things for MIT to spend its capital on.” In terms of seeing immediate returns, “retrofitting old buildings will be the first thing to buy, whereas cogeneration will have a longer payback.”

To find out more about Facilities conservation projects around campus, see <http://web.mit.edu/facilities/environmental/conserve-facts.html>.

Giving the World a Fighting Chance

Schmalensee, from Page E4

will grow just due to economic growth over two decades — it’ll swamp that. So at the end of the day, lifestyle changes — unless we all go back to primitive lives, which is not plausible — lifestyle changes won’t do it.

Unless we’re going to try to say to the bulk of the world’s population, stay poor, don’t use more energy, we’ll cut back a little and we’ll all be fine — that’s not a viable answer. Or, get rich the way we got rich — that’s not a viable answer. We need to find another answer.

TT: Is there a way to separate economic growth from growth in energy consumption?

RS: We’ve become less energy intensive over time — one way to think about that is that it’s the other side of the decline in manufacturing. We’ve also become less carbon-intensive over time because natural gas has to some extent replaced coal. As natural gas becomes more expensive, and as people build more coal-fired generating plants, that may reverse. But for the last 30-40-50 years, we have with current technology had economic growth with a smaller percentage increase in carbon emissions, and you could imagine zero. You could imagine zero.

But remember we need a *decrease* ... at a time when several billion people in India and China are on a path to take them out of poverty, and that path involves burning a lot of fossil fuels, and that path will warm the earth. So there are ways — a lot of nuclear power — but nuclear power is expensive, we all get nervous about it, and so there’s just simply not a quick fix to this.

Burning coal to generate electricity is really cheap ... but breathe the air in Beijing or Shanghai on a bad day. The Chinese have raised several hundred million people out of grinding poverty into comfortable lives — it’s an extraordinary achievement on any historical scale. But the costs are visible in the air, in other forms of pollution, and in the CO2. The Chinese say, well, you want another SUV, we would like this impoverished family to have a decent life ... We do not enter the international negotiations from a strong position — particularly if we do nothing. I think the only way there is a chance that this gets solved and it gets solved over the next century, is if the US takes significant action and again becomes a player in the international negotiations.

TT: What’s the time scale for doing something?

RS: My own bet is that nothing happens until after the presidential election. If you think the next administration — almost no matter who wins the election — is going to be more sympathetic to doing something, then you want to spend time now thinking through some of the complexities — this is not a simple thing to do — and get ready so that right after the election, you can pass something.

If you look at the [effort to reduce acid rain by setting up a national cap and trade system for sulfur dioxide emissions], there was so much earlier thinking during the Reagan administration: what do we have to do to monitor for enforcement, where will we get the data, how will we structure it, what are the legal implications of having a tradeable allowance, so that by the time we elected [the first Bush] administration that wanted to do something, it was pretty quick. It was a very successful program, and I think that’s the reason we’re talking about cap and trade now, and the reason the Europeans

have a cap and trade system.

TT: Have some of the complexities of carbon trading been worked out?

RS: Some. The questions of where do you put the regulations, how do you give the allowances out, are under active discussion now. My view has always been that once you have the machinery in place, you can turn the knobs. What’s wrong with the European system? They gave out too many allowances. Well guess what, you give out fewer next time.

TT: What would a strong price signal be?

RS: There really isn’t anything like that on the table, and it’s just not politically viable now. I’m an economist, so I have to be a believer in strong price signals, [but] I don’t advocate a strong price signal right now, because unless we can engage the whole world, particularly

A quarter percent of GDP ... it’s not going to cause a recession or a return to the Stone Age; it’s a manageable cost.

India and China, we would just be shooting ourselves. They’re mining coal like crazy and you’re telling me you’re going to have Appalachia unemployed?

The cheapest way to reduce carbon emissions, dramatically cheapest, is to reduce them in India and China. It’s to improve fuel efficiency there, rather than at unbelievable cost in Japan, and at high cost in Europe, and still pretty high cost in the US. But I think it’s essential that we in the US start and look down the road to a regime in which we have a global or something approximately global. It’s not clear how we get from here to there, but we need to get something that looks like a high carbon tax, or a very tight cap and trade trading scheme.

The people least able to pay for reducing [emissions] are in developing countries, so there has to be some way across that bridge.

TT: There are systems where you can pay for a reduction there, and have it count here?

RS: We’ve had [offset] systems like that in the U.S. to deal with air pollution particularly in L.A., since probably the 70’s, and they just don’t work well. Either you don’t get the reductions in carbon because they’re so easy to game, or you put in such a heavy regulatory burden that it’s just too expensive to transact. There are some interesting experiments going on, to try to come up with *kinds* of transactions, *kinds* of offsets, that can be handled in a simple but well-monitored way, so that you can actually have a reasonable market, and that might work.

TT: So do you expect your Commission’s recommendations to be followed?

RS: No, it’s a very complex process. It’s very easy in this political climate to propose amazing cuts in CO2 without actually checking feasibility or cost. The cost of our proposal is not trivial, a quarter percent of GDP — and there are only 100 percents, so it’s not nothing. But it’s not going to cause a recession or a return to the Stone Age; it’s a manageable cost. We think some of the other proposals that are much more aggressive have much higher costs.

TT: How significant are the cuts that you are proposing?

RS: I think we proposed to be down 15 percent by 2030, so it’s a reasonably significant cut, given the expectation of substantial economic growth over this period. And also, and this is a very contentious issue, it has a safety valve. It says, if the price of carbon allowances gets above a certain level, the government will issue more allowances.

TT: What about the other way? If they cost too little?

RS: We call for a five-year review, particularly in light of international developments. There are enormous debates about what these things cost. Our solution is, look, those of you who are really pessimistic about technology, rest assured, the cost won’t be more than X. Those of you who are really optimistic about technology, hey, then this will be cheap; you’ll never see the safety valve price; and everybody will be happy. And most environmentalists are technology optimists.

TT: Are you an optimist?

RS: I go back and forth. I’m not an optimist about the likely payoff from large scale government programs to develop technology; I am an optimist about the response to a strong price signal, and I’m an optimist about the ability of basic research to give us what we need in the long term.

TT: Does MIT have a role to play?

RS: I think MIT could potentially play a critical role, globally. Both in the short term, developing [transitional] technologies that have commercial potential, and, more important, in the longer term, by doing the fundamental research that could lead to the kinds of breakthroughs that the world needs. The question is, it’s now 2050, what does the economy look like? It better not look a lot like today’s if we’re going to solve this problem. Getting from today’s economy to a very different energy economy in 50 years is not trivial. We can all bicycle to work, but if we’re going to have air-conditioned homes...

Starting out with a relatively weak price signal, aggressive research, and being prepared to take more drastic action — I’m guardedly optimistic.

Universities Targeted for Reductions

Cambridge, from Page E2

is contributing \$250,000 toward it. “The built environment is where the largest portion of the problem lies.”

Most of Cambridge’s buildings are residential, with around 2,400 others owned by universities and other nonprofits, commercial and industrial landlords, and governments.

According to the Environmental Protection Agency, the burning of fossil fuels and deforestation over the last two centuries have caused an increase in the release of greenhouse gases such as carbon dioxide. Trapped in the atmosphere, those gases have contributed to a slow rise in the planet’s temperature, and some scientists have predicted catastrophic effects if the warming is not slowed.

In Cambridge, officials expect the greatest and quickest savings will come from working with universities and large commercial and industrial properties, which collectively account for 69 percent of the city’s energy consumption. Ultimately, proponents hope that all residential property owners will agree to undertake the recommended improvements.

Participation is voluntary, but a significant element of the project is a campaign to build public enthusiasm, to create peer pressure to get more property owners involved. Toward that end, officials have designed a logo and created a slogan, “Cambridge Energy Alliance: Saving Money & the Planet,” that they hope will be ubiquitous.

“People are going to be saying, if you’re a dry cleaner or a restaurant, ‘Where’s your decal?’ “ said Pratt. “This is basically about innovative financing and building enthusiasm.”

The nonprofit organization, the Cambridge Energy Alliance, will hire energy consultants to work with property owners to determine how to make their buildings more efficient. Improvements could be as simple as beefing up building insulation or adding storm windows, or something as expensive as installing a high-efficiency cogeneration system at a large property, which generates electricity and throws off heat to warm rooms in winter.

Even changing light bulbs can make a difference, specialists say. A compact fluorescent bulb uses about one-fourth the electricity of an incandescent bulb that projects the same amount of light.

MIT RecycleMania 2007 Final Rankings

Single Dormitories	Family Dormitories
1. Edgerton House	1. Westgate Apartments
2. Random Hall	2. Eastgate Apartments
3. Green Hall	
4. The Warehouse	
5. Tang Residence Hall	
6. Next House	
7. Bexley Hall	
8. Simmons Hall	
9. MacGregor House	
10. Sidney-Pacific	
11. Burton-Conner House	
12. McCormick Hall	
13. New House	
14. Baker House	
15. East Campus	
16. Ashdown House	
17. Senior House	

The winners of this year’s MIT RecycleMania are Edgerton House and Westgate Apartments. Prizes will be given out this Thursday at Stata Center’s Amphitheater at 12:45 p.m. This is the third year MIT has participated in RecycleMania.

SOURCE: RECYCLEMANIA WEB SITE: [HTTP://WEB.MIT.EDU/RECYCLEMANIA/](http://web.mit.edu/recyclemania/)

Harvard University Leads Interactive Teaching Method

By Linda K. Wertheimer
THE BOSTON GLOBE

With neon green and purple chairs in tiered rows, the auditorium in Harvard's science center looks like a stadium theater. But the physics professor at the front of the room, Eric Mazur, takes pains not to behave like a sage on the stage.

Rather than lecture, he flashes questions on a movie-sized screen and asks the roughly 125 students to input their answers in hand-held devices. Then, their responses pour into his computer, and he sees an immediate answer to a question that many professors rarely ask: At \$43,655 for tuition, room, and board, are Harvard students getting their money's worth?

Mazur is a pioneer in a growing movement that sees more aggressive evaluation as a way to transform higher education. Professors like Mazur have been experimenting with the idea for a decade. But over the last two years, an increasing number of colleges and universities, including Harvard, have begun using critical thinking and writing tests to see if their students are learning what they should. And now the federal government is pushing to require all colleges to regularly assess students' progress - and reveal the results to the public.

The movement could spur some of the biggest changes to higher education in decades. Proponents say it could dramatically improve teaching and give consumers a new measuring stick - potentially boosting colleges that teach well, and bringing down those that rely on reputation. But the movement, critics say, could also bring the same problems as mandatory testing has to the K-12 world - a culture of "teaching to the test" that would undercut the very idea of a liberal education.

"Should everybody be learning the same thing? Should students at MIT be able to learn the same things as students at Williams, at UMass?" said Jack Wilson, president of the University of Massachusetts System. "Diversity is one of the great things about higher education. I say, 'Vive la difference.'"

This month, the US Department of Education is working with accrediting agencies to design new rules, pushing to require colleges to produce evidence that they're making progress with students and to require accreditors to compare the results of similar schools. Now, many accrediting agencies ask colleges to show how they're measuring students, but not all demand actual data. By Nov. 1, new rules have to be approved, and by July 2008, accrediting agencies must begin implementing the changes. But the effect on colleges, which are accredited every 10 years, would be staggered over time.

The rules are inspired by work of the Commission on the Future of Higher Education, a bipartisan panel convened by Secretary of Education Margaret Spellings. Last fall, the commission called on colleges to do a better job of measuring students' academic growth. The commission, chaired by Houston investment banker Charles Miller, former chair of the University of Texas System Board of Regents, also proposed incentives for colleges and states that collect and publicly report how students do. The government, Miller said, may eventually decide to deny federal funds for research or student aid to a college, even Harvard, if it refused to measure how well its students are doing and reveal results.

"I don't necessarily think a rich powerful university like that should just say, 'Trust me, and we'll do whatever we want,'" said Miller.

Charles W. Eliot, Harvard's president from 1869 to 1909, once quipped that the reason Harvard was known as the nation's greatest storehouse of knowledge was that "the freshmen bring so much in, and the seniors take away so little."

Nearly 100 years later, Harvard and other universities have few ways to prove Eliot wrong.

At Harvard, which often serves as a trendsetter for other universities, the movement has met a mixed reaction. Many professors, and even some students, reject the idea of publishing results of any tests, and fear that a federal requirement would be damaging. Some professors also question the idea of measuring progress when students are spread among many disciplines. But some also express enthusiasm for improving teaching using whatever tools work.

Last fall, interim president Derek Bok paid \$50 each to more than 300 freshmen to take a 90-minute exam that tested their skills in problem-solving and critical thinking. This spring, he's doing the same with seniors, and hopes to see whether freshmen progress in critical thinking and other areas. The test, known as the Collegiate Learning Assessment, was touted by the Spellings commission as one example of what colleges could use. It requires students to analyze background materials and then write a memo or recommendation. Bok also is giving seniors a writing test, created by Harvard, and intends to compare the quality with students' freshman essays and use the results of both tests to show professors where students need deeper instruction.

US Department of Education officials "want to use it to say, 'How

good is Harvard, anyway?'" They want to use it as accountability for parents, students," Bok said. "We want to use it as a formative exercise to help us improve."

The tension over publicizing results will likely intensify. Universities regularly publish data about their entering classes, including average SAT scores and GPAs. But employers and politicians want to know more about graduates. Can they solve complex problems? Can they read critically?

Mazur, who began teaching at Harvard in 1984, said it took him six years to realize he was not doing a good job of reaching students. In 1990, he read an article about a physics professor who quizzed students on their understanding of basic formulas, and the students did poorly. Mazur thought the quiz was "high school stuff" that his Harvard students could handle with aplomb. They did horribly.

After investigating, he realized that the students were solving physics problems by rote. They could not figure out a problem if they had to deviate from a familiar formula. He began adjusting his teaching style. He now rarely lectures and gives students his past year's lecture notes at the beginning of the semester. He asks them to read certain portions each week, and e-mail him about

concepts they do not understand. In class, he poses questions based on the feedback.

"I'm going to have a few questions about flux," he said at a February class as he put a question on a screen.

The students at first work individually and type in an answer. Mazur sees the answers as they come in. "Twenty more seconds," he announces, "and we have no unanimity here. Forty percent of you have the correct answer."

Mazur, who urges students to help one another solve in-class problems, gives traditional exams, but also administers pre- and post-tests to measure students' progress in a semester. He also occasionally gives a critical thinking test.

Students said Mazur is atypical of their professors, many of whom act as if they're in a race to cram in material.

"He takes responsibility that every student learn," said Samantha Parker, a 20-year-old junior.

Mazur has written a book about his teaching and evaluating methods, and professors around the nation have begun to use them in recent years. Roughly 250 colleges, including Harvard, are using a critical thinking test just developed a few years ago. The schools include the University of Texas System, Florida

State University, Duke University, Lesley University in Cambridge, and Wheaton College in Norton.

A task force set up by two national college groups, which represent more than 600 schools, including public ones as well as Cornell and MIT, are evaluating various new options for measuring students' progress. The panel intends to create a voluntary system of accountability to respond to the Spellings commission's recommendations.

Arthur Kleinman, a Harvard professor of medical anthropology, is particularly worried about the effect of more testing and of publicizing the results on higher education. He fears the outcome could be standardization and unhealthy competition.

"We live increasingly in an audit world, in a regulatory world," Kleinman said. "Once you start this, there's no stopping it. It's going to become a part of the culture of higher education."

Lesser-known colleges have everything to gain by revealing results because unlike Harvard, they often take students with mediocre academic records and turn them into great scholars, said Ronald Crutcher, Wheaton's president. The college plans to post results of the critical thinking test and other evaluations on its Web site, aiming the information at prospective students and parents.

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CONAN L. HOM



CHRISTINA KANG—THE TECH

(counter-clockwise from top)
Warm weather made for ideal Saturday afternoon sailing conditions.
Stephanie C. Chan '09 practices on Kresge lawn Sunday.
Katherine R. Hoff '08 works out Monday at the MIT Boat-house.



CONAN L. HOM

Nelnet Discusses Its Malpractices, Plans To Correct Problems

By Sam Dillon
THE NEW YORK TIMES

Nelnet, a major student loan company, offered on Apr. 20 a broad accounting of many often unpublicized relationships it has established with universities and their senior officials, including managing telephone call centers, paying college officials for speaking engagements and giving plane tickets to financial aid officers.

The revelations came in a broad new disclosure statement the lender made in connection with an agreement to contribute \$1 million to educate college borrowers and to abide by a code of conduct governing its relations with colleges.

Nelnet, based in Lincoln, Neb., with \$23.8 billion in student loan assets, forged the agreement with the Nebraska attorney general, Jon Bruning. The company's president, Jeffrey Noordhoek, appeared with Mr. Bruning at a news conference on Apr. 20 to announce it.

The disclosures resulted from a review by Nelnet of its own practices in the student loan industry, begun earlier this year after Andrew M.

Cuomo, New York's attorney general, announced that he was investigating the company, said Ben Kiser, a Nelnet spokesman.

In the news conference in Lincoln, Mr. Bruning characterized any wrongdoing by the company as minimal. "As we looked at the scale of mistakes that have been made in the student lending industry, Nelnet is at the bottom," he said.

But in New York, Mr. Cuomo said, "Our investigation of Nelnet is continuing."

The company announced an end to some of its practices, including a revenue sharing agreement with Western Illinois University under which Nelnet paid the university a percentage of all private college loans that its students took out with Nelnet.

Nelnet also said it had paid a fee, on one occasion, to a university chancellor for giving a speech to an advisory board the company had established. "Nelnet intends to end such payments," the statement said.

On another occasion, Nelnet bought Albany-to-New York plane tickets for two university financial aid officers so they could go to the theater. Mr. Kiser declined to identify the officials or their university affiliation.

Nelnet said it would in the future limit gifts to university employees to \$10.

The company said it would continue to manage telephone call centers for the financial aid offices of seven educational institutions, but its call center operators would now "disclose to all callers that they are Nelnet employees when they answer the phone."

Previously, students seeking financial aid advice could have been left thinking they were speaking to a university official. Earlier this year, Mr. Cuomo wrote a code of conduct governing the relations among universities and lenders, banning revenue-sharing agreements on student loan volume and gifts to senior officials, and forbidding loan company employees from ever identifying themselves as college officials.

He has reached agreements with Citibank and Sallie Mae to abide by the code. Each has paid \$2 million to a fund similar to the one to which Nelnet is contributing. Education Finance Partners, another student loan company that investigators found had paid at least 60 colleges and universities across the country for steering students to its loans, agreed to pay \$2.5 million to Mr. Cuomo's fund.

Mr. Bruning announced yesterday that Nelnet would abide by a similar code of conduct, mostly written by Nelnet officials.

"I would say that we primarily wrote it, but worked with Bruning's office," said Mr. Kiser, the Nelnet spokesman.

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Barclay's Mother Suggests Seeking Help

Barclay, from Page 1

Wal-Mart and a bucket, according to a memorial Web page established by his family. Barclay's family wrote on the memorial page that Daniel "had no experience of the power of a large river," and that they suspect Barclay "wanted to spend Monday exploring a river, but his boat got caught in the current and he was swept out to sea."

Kayton previously told *The Tech* that her son, who was an Eagle Scout, enjoyed adventures and had recently bought a variety of camping gear. "We think he went out to Boston Harbor to find a quiet place to sit and think and get away from it all," Kayton told the *Globe*. "But we will never know ... He did not leave a note."

Kayton also told the *Globe* that college students should look after each other and encourage others to seek counseling if they see someone struggling. "If [students] see a friend who is in some pain ... make them talk about it," Kayton said to the *Globe*. "If they don't want counseling, drag them to counseling."

On the memorial Web page, the Kayton family has offered to help pay for grief counseling for Barclay's friends.

In the *Cape Cod Times*, Paula Kayton, Barclay's grandmother, said that the family did not suspect suicide because Barclay could have used the bucket to bail himself out.

"Our sympathies and condolences go to the family and all of his friends," Barbara A. Baker, the senior associate dean for students, said. "Everybody put their heart and soul into this ... the campus police worked so hard."

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Solution to Crossword

from page 6

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Solution to Sudoku

from page 6

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Friday, April 27 at 8pm

First Church in Cambridge, Congregational, 11 Garden Street, Cambridge

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Aardvark Jazz Orchestra: *Jazz in Film: Ellington & Beyond*

Sunday, April 29 at 3:30pm

Museum of Fine Arts, 465 Huntington Avenue, Boston

Special guest: Ran Blake, piano. In honor of Ellington's birthday, Aardvark offers a unique program of film music composed by Ellington, a Ducal piano tribute, and a rarely screened short film *Date with Duke* featuring the Maestro and animated perfume bottles! Extending this theme, contemporary animated films will be shown with improvisational soundtracks, and original music by Mark Harvey inspired the will round out the festivities.

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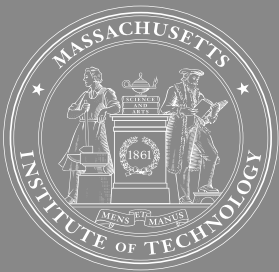
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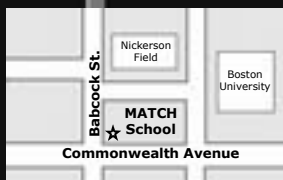
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Mendoza Well Liked By Students, Faculty

No Clear Successor for Discipline Dean Role

Mendoza, from Page 1

student conflict management and discipline functions, including providing support for student judicial panels and the Institute's own judicial process. She worked extensively with students on the Dormitory and Interfraternity Councils, faculty on the Committee of Discipline, and administrators in the Office of Student Life.

"IFC [InterFraternity Council] really enjoyed working with her. She always had an open door and was very helpful with any issues we had," said E. Darryl Walton '09, the judicial chair of the IFC.

"Mendoza has been a wonderful part of MIT for the year she's been here," said Dean for Student Life Larry G. Benedict.

Few decisions have been made regarding the replacement process, though Benedict received Mendoza's resignation about one month ago. A new search committee of students, faculty, and administrators will be formed to select a replacement. Stephen D. Immerman, the senior associate dean for student life, is expected to chair the committee, according to Benedict. Immerman also chaired the committee that selected Mendoza.

When the position was left vacant last year, current administrators filled in the role, including Barbara A. Baker, senior associate dean for students, Daniel Trujillo, associate dean for community development and substance abuse, and Margery Resnick, chair of the committee on discipline.

Dimitrov Remembered By Friends as Caring, Outgoing, and Cheerful

Dimitrov, from Page 1

Iliya T. Tsekov '08 described his friend as "cheerful and happy," always joking around and in high spirits. When Dimitrov moved into Senior House last September, he immediately embraced the close Bulgarian international community.

According to Ivan Z. Dimitrov '09 (no relation to the decedent), a Bulgarian suite mate and high school friend, Dimitrov was very proud of his Bulgarian nationality. As the MIT News Office reported, the two long-time friends both avidly followed Bulgaria's professional soccer team CSKA Sofia as members of the CSKA fan club.

Dimitrov enjoyed his native country's music and planned to travel to New York City on Saturday night to attend a concert by a Bulgarian folk music star Milko Kalaydzhev, according to the MIT News Office.

Tsekov, who was one of Dimitrov's suite mates, wrote in an e-mail to *The Tech* that it was Dimitrov's idea to cover their suite with all sorts of Bulgarian-related decorations, such as flags, barricades, and plastic swords. "He was funny, giving everyone nicknames," Tsekov said.

In addition to his humorous and active personality, Dimitrov was an intelligent young man. "He was very

open-minded and had a very accurate understanding of his classes," Dimitar N. Simeonov '10 said. "He was a smart guy, very good person, and very good friend."

Simeonov attended the international students' orientation last August with Dimitrov. Living next door to Dimitrov in Senior House, Simeonov and Dimitrov became good friends and flew back home together on several occasions.

According to Tsekov, Dimitrov was a very accomplished high school student, winning second place at two International Math Olympiads in Greece and Mexico. With his passion for mathematics and the goal of a management major from MIT, Dimitrov had a long-term goal of making enough money to invest in Bulgaria's competitive math teams.

"He wanted to finish his education here as fast as he [could] so that he [could] return to Bulgaria, become a manager in some company, or make his own," Tsekov said. "He didn't want a lot of money — only enough to enjoy his life and help the Bulgarian math teams."

Dimitrov is survived by his father, Dimitar Dimitrov, his mother, Neli, and younger brother, Dani. A student-arranged memorial service for Dimitrov will be held this Saturday, and the funeral will take place in Sofia.

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Barclay Known as Humorous, Intellectually Curious

Deceased Senior Excelled on Debate Team, Loved Toy Product Development Class, Was Fun to Be Around

Barclay Obituary, from Page 1

munity,” said Kirk D. Kolenbrander, vice president for Institute affairs, as reported by the MIT News Office.

Friends and family have remembered Barclay as smart and personable with a great sense of humor.

“This kid just won awards all over the place,” said Paula Kayton, Barclay’s grandmother, to the *Cape Cod Times*. “He was just a brilliant, brilliant person.”

Barclay’s mother, Susan L. Kayton ’78, told *The Tech* that Barclay was strongly involved with MIT’s Debate Team, spending his weekends debating at colleges throughout the nation.

“He was a very good debater,” said Adam J. Goldstein ’09, president of the debate team, to the *Cape Cod Times*. “He had a good sense of humor. He was always joking around.”

Barclay’s aunt, Betty Kerns, told the *Cape Cod Times* that Barclay

“was the most irreverent in the family. ... I’d always look to Daniel as an example of somebody who could apply himself and do well and maintain a sense of humor,” said Kerns.

In an online memorial, Denise Lanfranchi, house manager for Ashdown House, where Barclay lived, wrote that he had “a delicious sense of humor.”

Richard J. Samuels, Barclay’s freshman advisor, wrote that he was “extremely fond of [Barclay],” and

that Daniel was “a pleasure to know, and a pleasure to work with.”

Barclay’s mother Kayton previously told *The Tech* that her son’s favorite class was Toy Product Development (SP.788). “He said it was his favorite class at all of MIT.”

Barry M. Kudrowitz G, an instructor for SP.778, said Barclay was “really eager” and “interested in everything.” “He showed up for every class,” said Kudrowitz.

As part of the class, groups had

to design toys for six and seven year-olds. Barclay’s group project was a fascinating toy made up of little sea creatures, said Kudrowitz.

According to Institute Chaplain Robert M. Randolph, a memorial service has been tentatively scheduled for 8 p.m. Thursday, April 26 in the chapel, with a reception to follow.

Barclay is survived by his mother, father, Michael Barclay, and sister, Rachel, 19.

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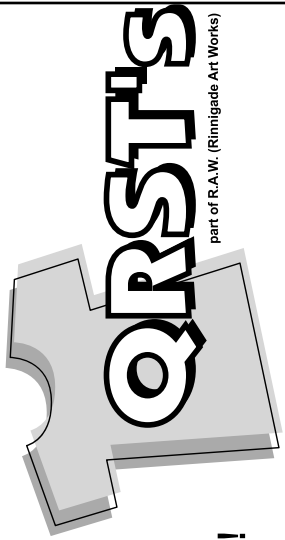
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VA Tech Incident Sparks Discussion Among Colleges, Mass Text-Message Alerts Useful

By Carolyn Y. Johnson
THE BOSTON GLOBE

In the wake of the Virginia Tech attack, administrators at college campuses across the country have been calling on a handful of companies that offer what once seemed like a nonessential: the ability to blast text messages to thousands of people within minutes.

Leaders from Massachusetts public colleges and universities met Monday at the state Board of Higher Education on the need for an emergency text-message alert system at the state's universities and colleges. Boston University officials plan to meet with companies offering mass text message alerts this week. Boston start-up MobileSphere Ltd. was to disclose Tuesday that it would release its new emergency broadcast text message service in May, several weeks ahead of schedule, after a surge of interest from college administrators.

While emergency notifications such as campus-wide e-mails, Web page updates, and auto-dial phone messages are already widely used, administrators say the Virginia Tech tragedy has pushed them to look for a way to reach students anytime and anywhere.

"The advantage of text over e-mail is the students are constantly looking at cellphones," said Jim Shea, director of telecommunications at Boston University. "It's their mode of communication."

BU, like many other universities, had been exploring text messages as a potential communication channel with students for more routine purposes - such as reminders to register for classes. But the mass shooting last week highlighted the need for a means to reach students instantaneously.

"Up until last week, society and large organizations didn't think it was critical to have a solution like this," said Jill Aldort, a senior analyst at the Yankee Group.

The mass text-message alerts on the market or in development serve both emergency purposes and as campus news services. The business model varies: Some companies charge institutions fees; at least one offers a free service supported by advertising. But the basic idea is the same.

Students, faculty, and employees sign up and opt in for text alerts by providing their cellphone numbers. When an emergency situation occurs, administrators at the college

can use a web-based service to send text messages to every phone on the list, reaching people who are sitting in class, walking around on campus, or in mid-commute.

Already, the services have been used in emergency situations. Mobile Campus Inc., based in Austin, Texas, is available on 11 campuses and has used its service to notify students and faculty of everything from a campus closure because of a severe ice storm this year at the University of Texas, Austin, to an emergency closing due to tropical storm Ernesto at University of Central Florida in 2006.

Omnilert LLC, a Leesburg, Va., company that delivers emergency text message alerts for colleges and businesses, already offers a text-messaging alert product, called e2Campus, to 30 universities. Florida A&M University used the service to alert students when a pit bull was loose on campus.

"Today's kids aren't listening to the radio; they're listening to their iPods. They're not watching TV; they're watching YouTube. For a school to think it can update everyone through traditional media is no longer going to work," said Bryan Crum, a spokesman for Omnilert,

who said the company has received 600 e-mails and phone calls from universities and colleges over the past week.

While the emphasis now is on emergency services, the companies also turn the text message into a channel for reaching students who may glaze over when reading e-mails. Students may have the opportunity to opt in to receive sports scores, notification that grades have been posted online, or even advertising featuring local coupons.

The main barriers to text-messaging alerts thus far, the companies said, have been twofold: getting people to sign up for the service, and dealing with university administrators' concerns over the cost of receiving the messages - which are typically 15 cents per message if cellphone users do not subscribe to a text-messaging bundle package.

But last week's attack has erased many of those worries.

"Both of those are moot points at this time," said Gavin Macomber, executive vice president of marketing at MobileSphere. "After this disaster, we started receiving e-mails, phone calls. ... They said, 'Well, we need to have a solution like this in place yesterday.'"

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For Future Regular Seasons, Bulls Need To Knock Off Miami

Basketball, from Page 16

The reason to tune in, however, is that Carmelo and Iverson are finally looking like the duo every Nuggets fan envisioned when the trade happened. They combined to score 61 in game one and were actually passing to each other.

The only thing interesting in the East is the possibility that Chicago beats the Heat. I think the NBA needs this to happen to prevent future teams from sleepwalking through the season and trying to turn it on in the playoffs. So far so good, Bulls up 1-0.

The whole Vince Carter coming back to Toronto thing does not really grab me. For some reason, basketball and Canada don't mix for me. For all those of you thinking, "Steve Nash," my only response is, "shhhh."

What does grab me, more than

anything except Phoenix against Los Angeles, is that Dallas lost their first game to the lowly Warriors, making Golden State 4-0 this season against The Mavs and responsible for 26 percent of their losses.

I don't want to see Dallas win because of the Cuban factor (I actually like him), and that any series involving two of Dallas, San Antonio, and Phoenix will be pure gold. But Golden State's win certainly makes this round more dramatic.

In the end I think Dallas, San Antonio, Phoenix, and Chicago will survive their interesting first round series. From there it is a four team tournament to see who wins the West and has the privilege of sweeping Chicago. My (figurative) money is on Phoenix.

Now we just need ESPN on MIT Cable.



Lindsay C. Todman '08 plays in defense against a Boston University ultimate player on Sunday. Playing at home on the Briggs field, MIT won the game 10-7 and placed fifth in the league, qualifying for the regional tournament.

Five Goals in Five Minutes Crush Hope of Comeback, Seal MIT Win

Lacrosse, from Page 16

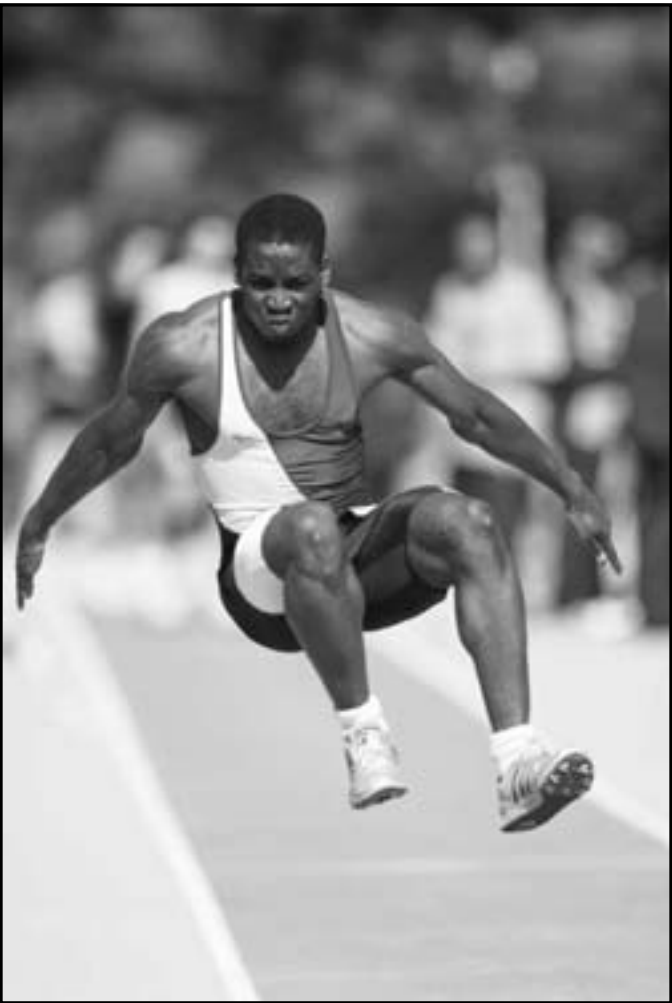
extra-man goal from Flanigan. The Engineers tacked on three goals, including two extra-man strikes, during the final 4:36 for an 8-2 lead at the break. Dylan F. Roden '09 converted a feed from Garvey to start the run, which was followed by two goals from Sorba, the last being set up by Stolmeier.

The Buccaneers continued to attack in the third quarter as Connor Burke connected on a pass from Flanigan at 13:24. MIT countered with four goals in span of five minutes. Brennan P. Sherry '06 sparked

the run as Roden was instrumental in the next two goals. He notched an extra-man score on a pass from Sorba and then set up Garvey for his second goal of the game. Sherry connected on a feed from Stolmeier that raised the score to 12-3. Massachusetts Maritime ended its scoring drought when Brian Burke set up Connor Burke with 6:49 on the clock. The Sherry-Stolmeier connection returned on the ensuing face off, but Matt Fisher answered with his first goal of the season for the Buccaneers. Stolmeier capped the frame with an unassisted extra-man strike that made the score 14-5.

Strathairn picked up a game-high seven groundballs as Zach E. Brewer '07 collected 14 saves for MIT. Mike Chretien led Massachusetts Maritime with five groundballs while Chris Perry and Alex Deveaux shared goaltending responsibilities. Perry recorded eight saves in 45 minutes of action as Deveaux closed out the game with five stops.

Both teams will face Wheaton College in their next game. Massachusetts Maritime will make the trip to Norton, Mass. on Monday, April 23 while MIT will host the Lyons on Wednesday, April 25.



Obinna C. Anyanwu '09 leaps up in the men's triple jump event during Saturday's Coed Invitational track and field meet.

Tech Model Railroad Club 60th Anniversary Open House

Saturday, April 28, 2-5 and 7-10 pm
MIT Room N52-118, Free Admission



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Positions Available Graduate Housing Opportunity

Positions Available for live-in Resident Advisors for MIT's Fraternities, Sororities, and Independent Living Groups. Applications are due by April 30, 2007, and are available online at: <http://web.mit.edu/slp/fsilgs/ra.shtml>

Description: A Resident Advisor is expected to serve as a mentor, guide, and resource for students and to serve as a liaison between the chapter and the Dean's Office. The RA is expected to know and educate FSILG students about MIT policies, applicable Chapter and/or Fraternity/Sorority headquarters policies, and common sense safety practices. Training is provided.

Remuneration: All Resident Assistants receive free room and board. In addition, some organizations may include a small stipend. Each Resident Advisor is furnished with a single room in the chapter facility.

Qualifications: A BA or BS and/or graduate enrollment at an accredited institution are required.

SPORTS

Tennis Wins Ninth Consecutive Regular Season Championship

Mindy Brauer
DAPER STAFF

In a battle of undefeated conference foes, nationally-ranked No. 22 MIT men's tennis registered a 6-3 win over Wheaton College in the NEWMAC regular-season finale for both squads on Saturday. With the victory, the Engineers (11-5, 5-0 NEWMAC) collected their ninth consecutive regular season conference championship in the NEWMAC's nine-year history.

MIT quickly established a 3-0 lead after sweeping the doubles matches. Thomas H. Dohlman '07 and Eric A. Beren '08 posted an 8-4 decision in the top spot as David E. Iba '09 and Peden P. Nichols '09 outlasted Brian Danishevsky and Raymour Radhakrishnan, 8-5. Said E. Francis '06 and Melvin C. Makhni '07 wrapped up play with an 8-3 victory.

The doubles wins proved to be critical as each side registered a trio of singles victories. Dohlman fell to Payum Payman, 3-6, 7-6, 10-8, in the No. 1 slot while Beren coun-

tered with a 6-4, 6-0 win over Danishevsky. In the No. 3 position, Brad Dressler defeated Nichols, 4-6, 7-5, 10-8, as Makhni responded with a 6-3, 6-1 victory. Francis continued the trend with a 7-6, 6-0 decision in the No. 5 spot before Vinith Misra '08 fell, 5-7, 6-0, 10-5.

Both squads earned byes in the opening round of the NEWMAC Tournament which kicks off on Thursday, April 26. MIT will host the semi-final and championship matches beginning at 10:30 a.m. on Saturday, April 28.

Four Series to Watch in 1st Round

By Travis Johnson
SPORTS EDITOR

The NBA playoffs began last weekend, and believe it or not the most interesting time to watch is now. The first round, especially after upsets by Denver and Golden State over two of the top teams in the west, San Antonio and Dallas, will be ab-

normally interesting.

Four of the series grab me, which is way above average for this round, since I'm usually counting down the days until it is over. The first is Phoenix against Kobe Bryant — err, the Lakers. As game one illustrated, Los Angeles can play with Phoenix if Kobe is unconscious, which has been fairly common this year. But even if it is a sweep, every game will be

full of highlights impossible to turn off.

The second is Denver vs. San Antonio. Watching the Spurs is usually about as fun as watching a fundamentally sound meditation contest, but now that Tim Duncan has a feud with the refs there is at least something to watch for.

Basketball, Page 15

Sorba Scores 6 in 14-8 Lacrosse Win

Mindy Brauer
DAPER STAFF

Tyler G. Sorba '07 registered six of MIT's first eight goals as it went on to post a 14-8 victory over Massachusetts Maritime Academy in a Pilgrim Lacrosse League game on Saturday afternoon. Sorba's game-high seven points raised

the Engineers' ledger to 4-6 on the year and 2-4 in the conference.

Sorba opened the scoring by connecting on a feed from Jonathan P. Stolmeier '07 four minutes into the contest. Connor Burke put Massachusetts Maritime on the board by posting the equalizer on the ensuing face off. This was as close as it would get for the Buccaneers as Sorba scored three con-

secutive goals. Ryan W. Ballentine '09 earned a pair of assists while Ebberly G. Strathairn '09 was credited with a helper.

MIT extended its lead to 5-1 just over a minute into the second quarter on a goal by Corey Garvey '10 that was set up by Stolmeier. Massachusetts Maritime countered with an

Lacrosse, Page 15



GHEORGHE CHISTOL—THE TECH

Lock Catriona MacDougall '08 (left) fights for the ball in a line-out against Brandeis with the help of props Amanda J. Maguire '09 and Sarah E. Dee '09. The Rugby in Prom Dresses game is an annual tradition at MIT. Players usually buy the dresses from Garment District or sew them.

UPCOMING HOME EVENTS

Monday, April 23, 2007		
Baseball vs. Bates College		3:30 p.m., Briggs Field
Wednesday, April 25, 2007		
Softball vs. Regis College		4:00 p.m., Briggs Field
Men's Lacrosse vs. Wheaton College		4:00 p.m., Jack Barry Field
Thursday, April 26, 2007		
Baseball vs. TBD		3:30 p.m., Briggs Field

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