MIT's
Oldest and Largest
Newspaper

The Tech
Established 1881

WEATHER, p. 2
FRI: 65°F | 50°F
Mostly sunny
SAT: 62°F | 46°F
Mostly sunny
SUN: 61°F | 43°F
Sunny

Volume 131, Number 46 | tech.mit.edu | Friday, October 21, 2011

JASWANTH MADHAVAN—THE TECH

A look into the future

EmTech conference highlights future tech

By Robert McQueen
NEWS EDITOR

It's now official: the information age will drastically change the world. Emerging technologies converged at MIT this week in a showcase to demonstrate how untapped industries could radically shape our future.

Dozens of companies flocked to MIT's Media Lab last Tuesday and Wednesday for MIT *Technology Review*'s 11th annual Emerging Technologies (EmTech) Conference. Throughout the conference, more than 60 presentations were given, addressing a wide range of topics including selective genetics, open source

EmTech, Page 9

Course 7 head Kaiser picked to run NIGMS

Kaiser will oversee $2bn research budget

By Ethan A. Solomon
EDITOR IN CHIEF

Biology Department Head Chris A. Kaiser PhD '88 has been selected to run the National Institute of General Medical Sciences (NIGMS) beginning next year, the MIT News Office reported on Tuesday. Kaiser will oversee NIGMS's $2 billion budget for funding basic life sciences research.

NIGMS, the fourth largest institute of the National Institutes of Health (NIH), supports over 4,500 research grants in areas like cell biology, biophysics, genetics, physiology, and computational biology. The NIGMS funds research that provides foundations for understanding and curing disease, says Kaiser. Unlike other parts of the NIH, the NIGMS supports researchers at other institutions — like MIT — but does not hire its own.

SOURCE: NIGMS

"Dr. Kaiser has tremendous energy and enthusiasm for research and training — two key components of the NIGMS mission — that make him ideal for this position," said Francis S. Collins, director of the NIH, in a statement on the NIGMS website.

Kaiser, who has been a faculty member since 1991, studies protein folding and intracellular transport using yeast as a model organism. In 1999 , Kaiser was named a MacVicar Fellow in recognition of the 7.03 (Genetics) course he taught from 1992 to 2011.

As head of the NIGMS, Kaiser will take the reins of a large federal research budget amidst economic uncertainty and congressional pressure to cut back on government spending. Basic life sciences research, which is usually not immediately applicable to disease-related research, has come under fire from some conservative groups. Forty-one percent of Tea Party Republicans in the House of Representatives support cutting federal spending for scientific research, according to Pew Research.

"A lot of politicians are trying to take advantage of misconceptions that the public has," said Kaiser about the impor-

NIGMS, Page 8

MISTI, HASS changes in Faculty Newsletter

The September/October Faculty Newsletter (FNL) is out, opening with an editorial calling for the scientific community to speak "more clearly, more loudly, and more effectively" to counteract the "deeply disturbing" scientific skepticism of some presidential candidates.

The newsletter also contains responses to President Susan J. Hockfield's *New York Times* op-ed on "Manufacturing a Recovery" and perspectives on the divide between faculty and administration in higher education. Closer to home, the FNL addresses Institute programs like MISTI and HASS Exploration.

In 2010, MISTI received 112 requests for funding and awarded a total of $903,912 to 46 projects, and decided to expand its faculty seed funds. MISTI also launched the new MIT-Chile program, making Chile MISTI's 11th partner country. The newly established MIT-Chile Seed Fund provides funding for projects through any Chilean institution, with two funds specifically designated for projects at the Pontifical Catholic University of Chile and at Adolfo Ibáñez University.

The HASS Exploration (HEX) program is also entering a new phase, according to Dean for Curriculum and Faculty Support Diana Henderson. The Subcommittee on the HASS Requirement, chaired by Political Science Associate Professor Andrea L. Campbell, is looking to expand its roster of "foundational subjects" that would fulfill HASS requirements, seeking existing subjects and encouraging faculty to create and teach new subjects.

The newsletter also reprinted an article, "Faculty Fallout," by Johns Hopkins University Professor of Political Science Benjamin Ginsberg that originally appeared in the August issue of *The Scientist*. Lambasting the imbalance between faculty and administration in higher education, Ginsberg's statements — such as, "Administrators have taken over U.S. universities, and they're steering institutions of higher learning away from the goal of serving as beacons of knowledge" — serve as a counterpoint to Faculty Chair Samuel M. Allen PhD '75's note, which says that MIT faculty have not been taking full advantage of opportunities to communicate their views to the administration.

—Anne Cai

Riess '92 wins Nobel in physics

Found Universe's expansion is accelerating

By Leo Zhou
ASSOCIATE NEWS EDITOR

On Oct. 4, Adam G. Riess '92 woke up to a 5 a.m. phone call from Sweden. The professor of astronomy and physics at John Hopkins University was told that he had won the 2011 Nobel Prize in physics. Two others shared the prize: Saul Perlmutter of the Lawrence Berkeley National Laboratory, and Brian P. Schmidt of the Australian National University.

Though he didn't know whether he would win the Nobel Prize this year, Riess knew that if he had earned the prize, he would get a phone call that morning. "It was definitely on my mind when I went to sleep the night before," said Riess.

An accomplished cosmologist, Riess has won just about every prestigious prize in his field: the Shaw Prize in Astronomy in 2006, the MacArthur "genius" grant in 2008, and the Einstein Medal earlier this year.

Science at universal proportions

Riess began the work that would win him the Nobel Prize in 1998, when he and Schmidt led a team that observed surprising evidence that the expansion of the universe is accelerating.

At the time, the team, as well as the greater scientific community, believed that the universe's expansion was actually decelerating. Riess and Schmidt used this common assumption and set out to determine the mass of the universe by measuring the luminosity of supernovae and fitting the data to an appropriate cosmological model.

However, their fit yielded a nonsensical negative mass of the universe and a positive acceleration of expansion. To explain these results, the team concluded not only that the universe expansion rate had to be accelerating, but a nonzero cosmological constant in Einstein's theory of general relativity was also needed. This positive constant means that vacuum must have an intrinsic energy density, which generates a pressure in space that should be the cause of the acceleration.

The inclusion of the cosmological constant has been debated before. Einstein originally used the constant to explain what he thought was a static universe. Later, Edwin Hubble discovered that the galaxy was expanding but believed it to be decelerating. This discovery made the cosmological constant zero, and Einstein called his original use of the constant his "biggest blunder." Now, because the expansion of the universe is accelerating, a positive cosmological constant is needed again.

Physics prize, Page 8

IN SHORT

Proposals are due at noon today for PSC Fellowships and Internships. Visit *http://web.mit.edu/mitpsc/whatwedo/internshipsandfellowships/.*

The MIT Police will auction off abandoned bicycles on Oct. 31. The auction will be held at 290 Albany St. (behind Simmons Hall, near Fort Washington Park), with a preview at 11:30 a.m. and bidding beginning at noon.

Sign up for senior portraits with *Technique*, the MIT yearbook, next week. You can schedule an appointment online today at *http://photoappointment.com/.*

The Head of the Charles will take place this Saturday and Sunday along the Charles River. It is the world's second largest two-day rowing event.

Send news information and tips to *news@tech.mit.edu.*

Preserve owner was bitten by big cat, authorities say

The owner of the Ohio wildlife preserve, who authorities say set dozens of lions, tigers, bears, and other animals free, was bitten by one of his large cats, apparently after he fatally shot himself, officials said Thursday. The head wound to the man, Terry Thompson, 62, was "consistent with a tiger bite," Sheriff Matt Lutz of Muskingum County said, referring to results from Thompson's autopsy report.

Officials in Zanesville, where the wildlife preserve is located, said that Tuesday, Thompson cut open the wire cages of the exotic animals he kept on his 73-acre private preserve and left open a gate before killing himself in the driveway of his house.

Of the 56 exotic creatures that fled, 49 were hunted down and killed by sheriff's deputies and other law enforcement officers, and six others were tranquilized and taken to the Columbus Zoo and Aquarium.

The only animal unaccounted for, a monkey, has not been found and was likely eaten by one of the large cats, officials said.

The other dead animals were buried Wednesday in a mass grave on the preserve at the request of Thompson's wife, Marian Thompson, officials said.

Ohio is one of a handful of states that do not have laws regulating the ownership of exotic species.

—Timothy Williams, The New York Times

Senate women could have banner year in 2012 — or not

WASHINGTON — The 2012 elections are likely to mark it the new "year of the woman" in the Senate. 10 women — six of them incumbents — are presumed Democratic Senate nominees this year, and another is seriously considering a run. Republicans have one female senator, Olympia J. Snowe of Maine, up for reelection, and one presumed nominee, Linda Lingle of Hawaii, that state's former governor. Other women in both parties are engaged in primary fights.

It is the greatest number of female incumbents ever up for re-election in the Senate and would be among the highest number of nominees ever, which could add up to a banner year for women in the deliberative — and testosterone-infused — legislative body.

But, with Democrats endangered and Republicans lagging in recruitment of women — one of their own, Kay Bailey Hutchison of Texas, is retiring — it is also possible that in 2012, women could lose ground in the Senate for the first time in a generation.

—Jennifer Steinhauer, The New York Times

US officials deliver warning in Pakistan over extremists

ISLAMABAD — An unusually powerful U.S. delegation arrived here Thursday to deliver the starkest warning yet to Pakistan, according to a senior U.S. official: The United States would act unilaterally if necessary to attack extremist groups that use the country as a haven to kill Americans.

Secretary of State Hillary Rodham Clinton; David H. Petraeus, the new director of the Central Intelligence Agency; and Gen. Martin E. Dempsey, the new chairman of the Joint Chiefs of Staff, planned to push their Pakistani counterparts to make a definitive choice between fighting terrorists or supporting them, the administration official said.

"This is a time for clarity," Clinton declared in Kabul, Afghanistan, where she met President Hamid Karzai before leaving for Islamabad, the Pakistani capital. "No one should be in any way mistaken about allowing this to continue without paying a very big price.

"There's no place to go any longer," Clinton added, referring to Pakistan's leaders, whom the administration has accused of equivocating by supporting the Afghan insurgency.

—Steven Lee Myers, The New York Times

An erratic leader, Gadhafi was brutal to the end

By Neil Macfarquhar
THE NEW YORK TIMES

Moammar Gadhafi, the erratic, provocative dictator who ruled Libya for 42 years, crushing opponents at home while cultivating the wardrobe and looks befitting an aging rock star, met a vengeful and violent death Thursday at the hands of the Libyan forces that drove him from power.

In death, as in life, his circumstances proved startling, with jerky video images showing him captured, bloody, and disheveled, but alive. A separate clip showed his half-naked upper body, with eyes staring vacantly and what appeared to be a gunshot wound to the head, as jubilant fighters fired into the air. In a third video, posted on YouTube, excited fighters hovered around his lifeless-looking body, posing for photographs and yanking his limp head up and down by the hair.

Throughout his rule, Gadhafi, 69, sanctioned spasms of grisly violence and frequent bedlam, even he sought to leverage his nation's immense oil wealth into an outsize role on the world stage.

He embraced a string of titles: "the brother leader," "the guide to the era of the masses," "the king of kings of Africa" and — his most preferred — "the leader of the revolution."

But the labels pinned on him by others tended to stick the most. Former President Ronald Reagan called him "the mad dog of the Middle East." Former President Anwar Sadat of neighboring Egypt pronounced Gadhafi "the crazy Libyan."

Even as his dominion over Libya crumbled with surprising speed, he refused to countenance the fact that most Libyans despised him. He placed blame for the uprising on foreign intervention — a U.N. Security Council resolution intended to defend civilians became the contentious basis for NATO airstrikes on his troops.

"I tell the coward crusaders: I live in a place where you can't get me," he taunted in one of many defiant speeches after the uprising against his rule started in February. "I live in the hearts of millions."

Gadhafi was a 27-year-old junior officer when he led the bloodless coup that deposed Libya's monarch in 1969. Soon afterward, he began styling himself a desert nomad philosopher, publishing from 1976 to 1979 the three volumes of his Green Book, which offered his "third universal theory" to improve on capitalism and socialism. He received dignitaries in his signature sprawling white tent, which he erected wherever he went: Rome, Paris and, after much controversy, New York, in 2009.

Inside, its quilted walls might be printed with traditional motifs like palm trees and camels or embroidered with his own sayings.

Gadhafi declared that his political system of permanent revolution would sweep away capitalism and socialism. But he hedged his bets by financing and arming a cornucopia of violent organizations, including the Irish Republican Army and African guerrilla groups, and he became an international pariah after his government was linked to deadly terrorist attacks, particularly the 1988 bombing of a Pan Am jet over Lockerbie, Scotland, which killed 270 people.

Obama's jobs bill, now piecemeal, nears Senate fight

By Robert Pear
THE NEW YORK TIMES

WASHINGTON — For the second time in 10 days, the Senate moved Thursday toward a showdown over Democratic efforts to take up a jobs bill championed by President Barack Obama.

This time, the bill has been narrowed to provide $35 billion to state and local governments to prevent layoffs of teachers, police officers and firefighters. To offset the cost, the bill would impose a surtax, to take effect in 2013, of 0.5 percent on income in excess of $1 million.

Democrats acknowledged that they were likely to fall short of the 60 votes needed to overcome a Republican filibuster. But they hoped to gain a political edge, by forcing Republicans to vote on this and other discrete parts of broader legislation proposed by Obama to create jobs and revive the economy.

Campaigning for his $447 billion jobs package this week in North Carolina and Virginia, Obama suggested that Republicans could not understand the whole thing all at once, so he said "we're going to chop it up into some bite-sized pieces."

The Senate last week blocked consideration of the larger bill, which included a 5.6 percent surtax on income over $1 million.

Republicans objected to the tax and said the bill would be no more successful than the economic stimulus law Obama signed in February 2009.

Both parties seized on the smaller bill to draw contrasts in advance of the 2012 elections.

Democrats said the bill would save or create jobs for nearly 400,000 teachers and force millionaires to make a small sacrifice for the benefit of the nation.

"The massive layoffs we have had in America today are rooted in the last administration," said the Senate majority leader, Harry Reid, D-Nev. "It is very clear that private sector jobs have been doing fine. It is the public sector jobs where we have lost huge numbers."

The Senate Republican leader, Mitch McConnell of Kentucky, derided the Democrats' proposal as "a government jobs bill." He said it would "impose a permanent tax hike on about 300,000 U.S. business owners and then use the money to bail out cities and states that cannot pay their bills."

McConnell said Democrats' solicitude for government employees was misplaced. "It's the private sector that's been begging for mercy," he said. "It's the private sector that's being crushed by regulators."

WEATHER

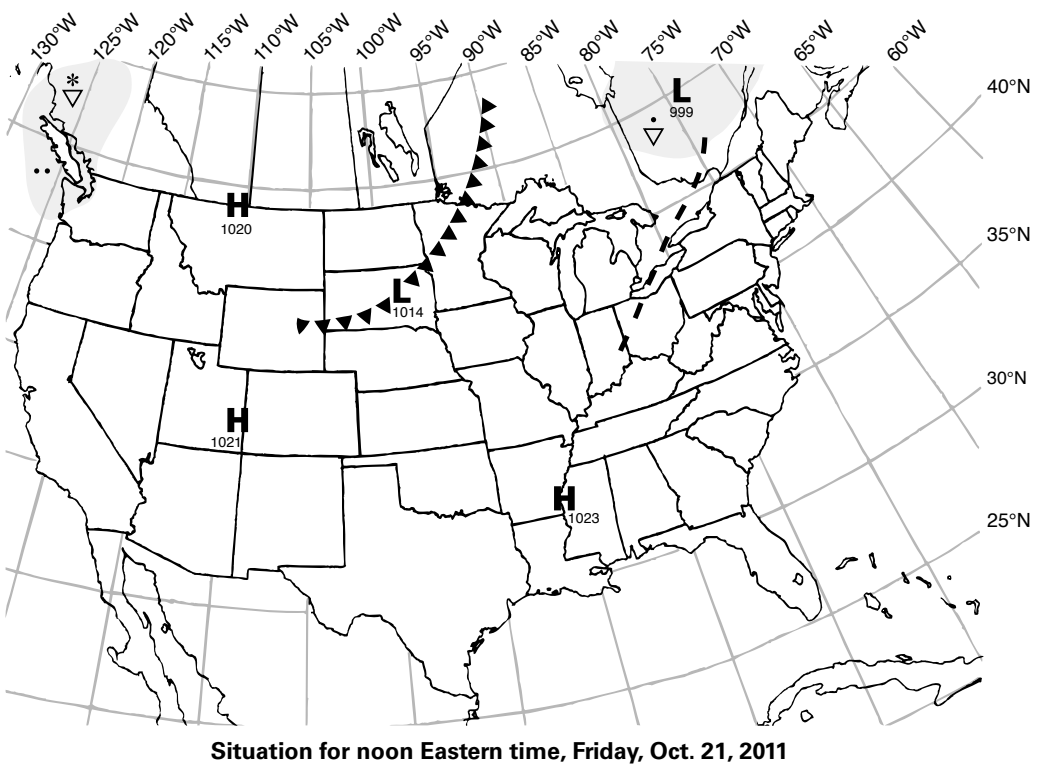
Tranquil weekend weather expected

By Roman Kowch
STAFF METEOROLOGIST

Would the weather last Wednesday or Thursday be your ideal weather for the weekend? Ponchos and umbrellas were common across campus on Wednesday as a tight low pressure system moved north across the Mid-Atlantic states. The system brought heavy rain (1.64" at Logan Airport) and high winds to many areas. Then, as dryer air was pulled in from the South yesterday, the rain departed and the sun popped out. Well, the sunshine should stick around through this weekend, with winds slowly diminishing each day as a broad high pressure approaches from the southwest. Temperatures will also remain normal for this time of year, with highs in the lower 60s (15°C) and lows in the mid 40s (4°C). For the weather enthusiasts, sorry you couldn't see Wednesday's weather again this weekend.

Extended Forecast

Today: Mostly sunny. High 65°F (18°C). W wind at 15–20 mph, gusting to 30 mph at times.
Tonight: Partly cloudy. Low 46°F (8°C). W wind at 10–15 mph.
Tomorrow: Mostly sunny. High 62°F (17°C).
Sunday: Sunny. High near 61°F (16°C). Low near 43°F (6°C). NW wind at 10 mph.
Monday: Mostly cloudy. High near 60°F (16°C). Low near 45°F (7°C).



Situation for noon Eastern time, Friday, Oct. 21, 2011

Governor moves to take fiscal control of Penn. capital

By Sabrina Tavernise
THE NEW YORK TIMES

The fate of Pennsylvania's financially troubled capital city, Harrisburg, took another twist in a long road Thursday, when Gov. Tom Corbett signed a bill permitting him to place the city into receivership.

By signing Senate Bill 1151 into law, Corbett opened the way for him to declare a fiscal emergency in Harrisburg. The governor is aiming to wrest control of the city's finances from local government, which has been stuck in a standoff for months. The City Council has repeatedly rejected efforts by Mayor Linda D. Thompson to impose a financial recovery plan, and last week, it filed a Chapter 9 petition in federal bankruptcy court, a move that Thompson and Corbett immediately declared illegal.

Kelli Roberts, a spokeswoman for the governor, said Corbett planned to file a petition in state court to place the city into receivership but would probably not do so this week.

The city's troubles stem from a failed trash incinerator project that has saddled Harrisburg with $310 million in debt, more than quadruple its annual budget. On Thursday, the city announced it would not have the funds to pay for a holiday parade this year.

City Council members who have opposed Thompson's plans have also fought the bill, saying it robs Harrisburg of self-rule. The members, who are supported by a group of local residents, say Chapter 9, a special bankruptcy statute for municipalities, would give the city more leverage in dealing with its many creditors.

But the state has strongly opposed bankruptcy, in part because it would tarnish the reputation of the capital. It argues that the state has the authority to sort out the city's problems, and the bill signed by Corbett on Thursday would be one of its tools.

At a news conference in Harrisburg, Thompson expressed regret that the state would most likely take over the financial workings of the city. The bill allows one last chance for the city to agree on its own financial rescue plan, and she outlined steps she would take to comply. If that fails, the state will be obliged to step in, she said.

Debt plan is delayed over French-German disagreement

By Jack Ewing, Stephen Castle and Liz Alderman
THE NEW YORK TIMES

FRANKFURT, Germany — The grand plan is on pause.

Germany and France, still at odds over a more forceful response to the sovereign debt crisis, postponed a decision-making summit meeting for several days amid signs that the complexities of European politics may block an all-encompassing resolution.

The meeting planned for this weekend will still be used to examine proposals to strengthen Europe's banks, increase the clout of the euro bailout fund, and better coordinate euro area economic policy, a spokesman for Chancellor Angela Merkel of Germany said.

But a comprehensive plan will not be decided until a second summit meeting, set for no later than Wednesday, the spokesman, Steffen Seibert, said in a statement. The French government issued a nearly identical statement.

The last-minute delay reinforced fears that European leaders were still far from containing a crisis that threatens the world economy.

"The politicians have been trying to solve the crisis, but a consistent effort has been missing," Andreas Dombret, a member of the executive board of Bundesbank, the German central bank, told an audience in Berlin on Thursday. It was an unusually sharp criticism for an official to make about his political counterparts.

Market reaction to the postponement, which was announced after trading in Europe closed, was muted — the Standard & Poor's 500-stock index ended up nearly half a percent.

Turkey deploys thousands of troops against Kurdish rebels

ISTANBUL — Turkey's offensive against Kurdish militants this week is one of its largest military operation in years, with 10,000 troops backed by warplanes pursuing rebels in southeastern Turkey and northern Iraq, the Turkish army said Thursday.

The offensive began only hours after the Kurdistan Workers' Party, or PKK, mounted deadly attacks against the Turkish military, killing 24 soldiers and wounding 18 early Wednesday in Hakkari province.

In all, 22 battalions of elite commando and special-forces troops were operating against the insurgents in five locations, supported by surveillance drones, helicopters and F-16 and F-4 jets, the army said, adding that at least three militants had been killed so far and that explosives and other military equipment had been confiscated.

The Iraqi government and the Kurdish regional administration in northern Iraq have expressed concerns about Turkish crossborder military incursions in the past, but both of them condemned the attacks by the PKK in strong terms and offered to help prevent the group from operating in northern Iraq, according to Turkish news outlets.

Turkey has demanded that the Iraqi Kurds support their efforts to eliminate militant bases around the Qandil Mountains, a rugged section of northern Iraq.

—Sebnem Arsu, The New York Times

China to allow some local governments to issue bonds

SHANGHAI — Amid worries that local governments in China may be running short of cash, Beijing gave approval Thursday to a trial program that will allow the authorities in four regions to issue bonds.

The cities of Shanghai and Shenzhen, in southern China, as well as Zhejiang and Guangdong Provinces — all fast-growing coastal areas — were selected to take part in the program, according to a statement issued by the Ministry of Finance.

The decision comes at a time when the Chinese government is tightening credit in the hopes of taming inflation and a property bubble, and easing growth in the world's second largest economy after the United States.

That policy has begun to sting property developers, local governments that depend on land auctions for income and small- and medium-sized businesses, which often rely on high interest loans from underground banks.

There are also growing concerns that the Chinese banking system may be at risk because many local governments have amassed huge debts over the past three years by using undeveloped land as collateral.

—David Barboza, The New York Times

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 $50.00 per year (third 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.*

GETTING OUT OF THE RED

YouTuber go home

By Keith Yost
STAFF COLUMNIST

Between January 2008 and January 2010, the U.S. private sector shed 9.8 percent of its workforce, either through layoffs or reduction of employee hours. One might have expected the output of the private sector to have declined during the same period, but no — Real Gross Domestic Product remained essentially the same.

What is the way to interpret these statistics? Was there some major technology adoption between 2008 and 2010 that suddenly allowed nine American workers to do the work that formerly took ten to complete? Not that we know of. Was there a major swell of physical or human capital into private industry? The national statistics don't show any such increase.

No, the more likely explanation is that, prior to the recession, at least one in ten American work-hours were spent cruising YouTube or something similarly non-productive. When the recession hit and private enterprise had its feet put to the fire, it finally squared away its long-tolerated dead weight.

There is much talk about the relative efficiency of private versus public entities, and it is generally recognized that U.S. business is more productive than U.S. government. What the "Great Layoff" shows is that this productivity gap is not the consequence of business' organizational DNA being superior to government's, but rather that business benefits from a Darwinian struggle. In fat times, incompetent businesses grow just the same as competent businesses. In the lean times, the weak are eaten.

Government has no competition — the only lean times a government must suffer are those imposed by its own taxpayers. Free from routine purgings, feckless government grows alongside the capable, dragging down the average performance with its ineptitude and absenteeism.

Since the recession began, the federal government has fastidiously avoided any sort of belt-tightening, reasoning that such a fiscal policy would be a disaster for Keynesian demand-boosting efforts. But in the context of federal human resources, this argument is the equivalent of the saying that we should pay people to dig ditches and fill them back in. Were the marginal government worker engaged in productive labor, Keynesian multipliers might be sufficient to justify his continued employment, but just the multipliers alone is a thin gruel.

Thus comes one of the most straightforward proposals to help fix the deficit. Why not press the U.S. government to throw out its chaff just as business did? If private industry saw no reduction in its output even after a 10 percent cut in its workforce and a four-year salary freeze, why couldn't the government pull the same feat?

A 10 percent workforce cut (applied to both contractor and regular labor) and a four-year salary freeze are not small fiscal potatoes. Over a ten-year window, they would produce roughly $500 billion in savings for the federal government. It is rare to find opportunities to cut spending without some commensurate drop in services, but this appears to be one of the federal budget's opportunities for a free lunch.

Action: Cut the federal workforce by 10 percent and freeze salary growth for four years. **10-year savings**: $500 billion.

The road forward for American-Iranian diplomacy

Fighting fire with fire will push Iran to more dangerous extremes

By Nina Sinatra and Keith Yost
STAFF COLUMNISTS

When U.S. Alcohol, Tobacco, and Firearm agents decided to sell guns to Mexican drug cartels as part of some inscrutable scheme to battle the drug trade, it's unlikely they were acting as conspirators in some grand Machiavellian plan to restrict U.S. gun rights or achieve some devious geopolitical goal in Mexico. They embarked foolishly on a doomed adventure of their own choosing, and little else should be read into the events that transpired.

In the same vein, we should avoid reading too closely between the lines on Iran's recent bomb plot against the Saudi ambassador to the U.S. on American soil. Even had it been successful, the outcome would have run counter to Iranian interests. It was executed as poorly as it was conceived, and now, as the FBI tries to discern what exactly happened, the U.S. punditariat is left pondering all sorts of theories as to why the Iranians attempted such a thing.

Assuming the plot was not a false flag operation or other deception, we should apply Occam's razor to the explanations for why it occurred. This is not a bid to encourage us to strike Iran. This is not evidence of a divide between Iran's military, civil, and theocratic leadership. This is not a nuanced diplomatic message or some similarly complex effort. An Iranian planner with poor supervision, low intelligence, and manic hubris, made an error in judgment. That's all.

> **The time we estimated for diplomacy has elapsed: Iran today should be counted as a de facto nuclear power.**

The first two conditions — poor supervision and low intelligence — need no explanation. Governments, by their nature, are stupid creatures, and such traits are endemic. And the latter condition, manic hubris, has a source that is plain as well.

When this paper last commented on the state of Iran's nuclear program (Sept. 14, 2010), we were somewhat optimistic, noting that Iran had experienced setbacks in their program (their number of operating centrifuges had fallen from 4,592 to 3,772 in the previous year). However, we mixed this optimism with an urgent demand for diplomatic or martial action, observing that despite its setbacks, Iran had still managed to increase its separative capacity by 40 percent by becoming more proficient with its remaining centrifuges. Our summary conclusion was that unknown events had bought us time for diplomacy, but not much.

Since our last report, it has been revealed what the cause was for Iran's setback: a powerful cyber-attack on Iran's nuclear facilities. And the time that we estimated for diplomacy has elapsed. Iran today should be counted as a de facto nuclear power.

Between its Natanz and Fordo facilities, Iran has installed approximately 8,500 centrifuges, of which 6,184 are in operation. The average productivity of these centrifuges is approximately 1.1 separable work units (SWU) per centrifuge-year, giving them a yearly separative capacity of roughly 6,800 SWU. They have a 4,543 kg stockpile

Iran, Page 5

CORRECTIONS

A Tuesday article on the Occupy Boston protests spelled Nadeem A. Mazen '06's name incorrectly. It is "Mazen," not "Mazem."

Tuesday's article on Leland Cheung's re-election bid for Cambridge City Council incorrectly reported that Cheung was a former MIT Sloan MBA student. Cheung is a current student, set to graduate this spring.

OPINION POLICY

Editorials are the official opinion of *The Tech*. They are written by the Editorial Board, which consists of Chairman Joseph Maurer, Editor in Chief Ethan A. Solomon, Managing Editor Connor Kirschbaum, Executive Editor Aislyn Schalck, and Opinion Editors Nina Sinatra and Ryan Normandin.

Dissents are the signed opinions of editorial board members 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@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. *The Tech* reserves the right to edit or condense letters; shorter letters will be given higher priority. Once submitted, all letters become property of *The Tech*, and will not be returned. Letters, columns, and cartoons may also be posted on *The Tech*'s Web site and/or printed or published in any other format or medium now known or later that becomes known. *The Tech* makes no commitment to publish all the letters received.

Guest columns are opinion articles submitted by members of the MIT or local community.

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US should directly reengage Iran with diplomacy

Small disagreements will lead to strained relations and could spark an intolerable cold war

Iran, from Page 4

of 3.5 percent enriched uranium dioxide, and 70.8 kg of 20 percent enriched uranium hexafluoride.

What does this mean, all told? It means that Iran has the uranium stockpile and enrichment capabilities to produce 20 kg of 90 percent-enriched uranium in approximately 22 days, and it has the capacity to produce enough material for six weapons within nine-and-a-half months. Depending on Iran's ancillary weapons-making and centrifuge-operating capabilities, the time from a decision to create a nuclear bomb to its actual completion might be marginally longer, giving a delay somewhere between a few days and a couple weeks. But in short, Iran has the capabilities to develop a nuclear weapon faster than our international diplomatic system has time to react, and follow up with the quick development of enough additional weapons to represent a credible deterrent.

The picture six months from now will be even grimmer. In that time, we might expect Iran to bring online an additional 2,000 centrifuges at its Natanz site and further improve its centrifuge productivity to 1.15 SWU per centrifuge-year. Its stockpile of 3.5 percent low-enriched uranium (LEU) will have grown to approximately 5,400 kg. Its stockpile of 20 percent enriched UF6 will have grown to 93 kg. Its separative capacity will be at approximately 9,300 SWU per year. And the time to weapon will be even shorter. To enrich enough material for a single bomb will take them approximately thirteen days, and six bombs worth would take six months.

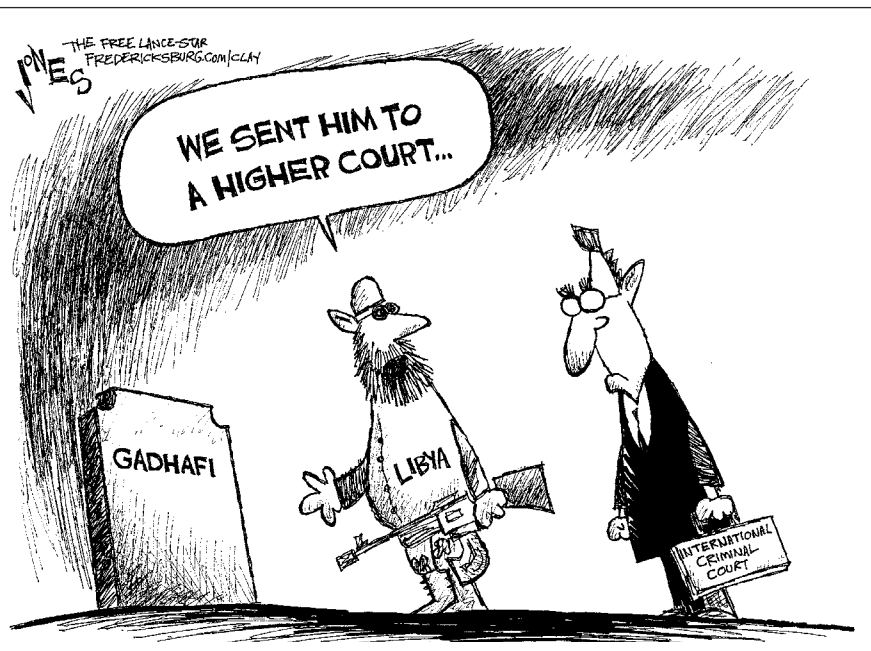
It is prudent to pursue a diplomatic course with Tehran in order to balance nuclearization with moderation. Iran's de facto nuclear status makes direct diplomacy all the more important.

It's not hard to understand why an Iranian planner would think his country immune to American counterattack — such an assessment is not far off the mark. Iran is, for most intents and purposes, a nuclear power. From here on out, military options against the Iranian regime should be considered to have large downside risks.

In light of these facts, it would be prudent to recommend pursuing a diplomatic course with Tehran in order to balance nuclearization with moderation. Iran's de facto nuclear status makes direct diplomacy all the more important. The U.S. should hedge its efforts with a revived engagement of the regime directly; without the option of conversation (albeit a strained one), small disagreements and serious conflict situations alike have the potential to degrade dangerously and quickly. The alternative to establishing diplomatic ties is a cold war with an intolerable risk of conflict.

Last week's assassination attempt on the Saudi ambassador within American territory will push Iranian-American relations to the tensest they've been in years. The situation could lead to unnecessary escalation if not addressed — in particular, it may lead Iran to realize its nuclear potential. While Iranian deployment of nuclear aggression is an unlikely and unwise ploy, an effort should be made to back up the failing containment strategy by establishing at least a tacit rapport.

In short, American policy must both acknowledge the potential of a nuclear Iranian regime, resistant to internal efforts at change. We must prepare for a world in which a belligerent and nuclear Iran is a permanent feature on the international scene. Should sanctions and other measures fail to significantly affect the hard-line officials to which they are targeted (instead, diminishing the quality of life of the Iranian middle- and lower-class), there must be a backup plan. Without a straightforward diplomatic approach, frustration in Washington and Tehran will steadily build, to neither side's benefit. Defusing this tension must be actuated by a cogent and cautious strategy that inevitably begins with communication.



INTERVIEW

A chat with Philip Cohen

MIT Sloan student releases his debut album *Leaving*

By Adisa Kruayatidee
Staff Writer

Sloan student Philip Cohen G has a new project — and with its original melodies, smooth bass, and powerful lyrics, it lies far outside the traditional business realm. *Leaving*, an album of 14 songs written by Cohen, was pre-released last month and is available on his website for free.

Cohen's story has many more facets than just that of an indie musician. A native of the Philadelphia suburbs, Cohen began writing songs when he was 15. Although he has not been continuously composing since then, he has filled his time with various other endeavors. Besides his credits at Sloan, Cohen attended boarding school at Vermont Academy, graduated from the Air Force Academy, and played full-time hockey between high school and college.

Three years ago, Cohen picked up songwriting again, and *Leaving* is the result. Cohen's work initially stemmed from simply playing around on the guitar everyday. Once he found a riff and chord progression he was pleased with, he would add in a melody and lyrics.

> **'The creative process is a sinusoidal curve — sometimes there are big lulls, and you just try to flatten it out.'**
> —*Philip Cohen*
> Student-Musician

Recently, Cohen has had less free time for experimentation — a problem all MIT students can relate with. Fortunately, melodies come more naturally to him now, and he is less reliant on his guitar. "The songwriting process has changed a lot for me. I feel more confident now about putting out a song I feel good about," Cohen said.

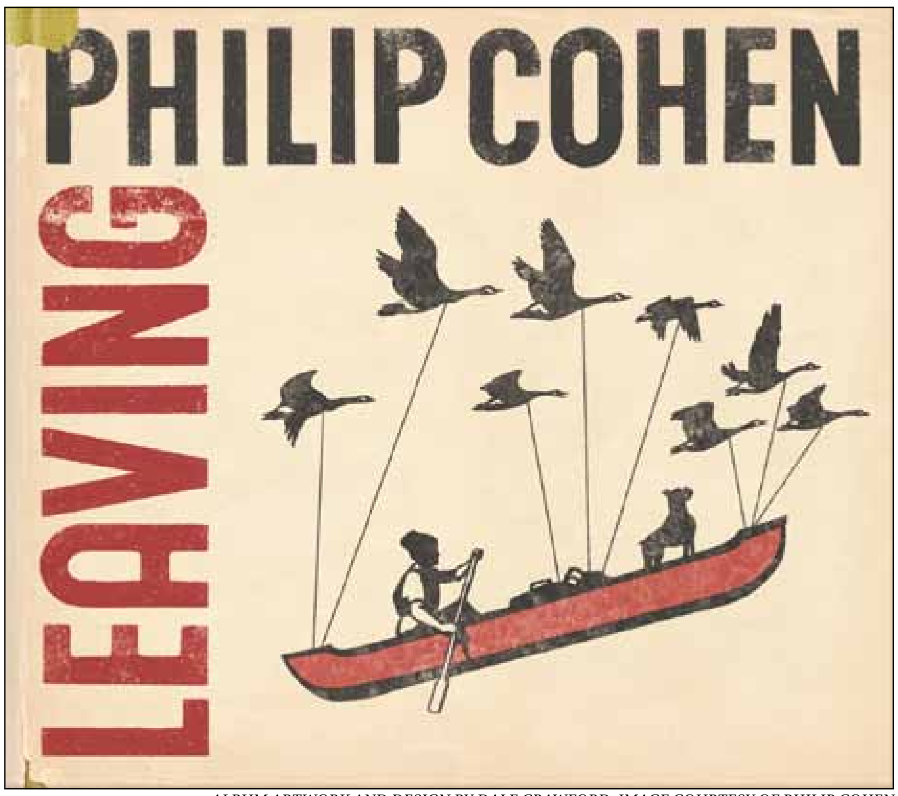
In addition to his personal artistic development, Cohen's music productions have come a long way. Cohen credits much of his progress to his current drummer, Chris Dorsey, who he met at a local block party. Dorsey was a software engineer for Avid, a company which provides music software for large production studios. "He helped move my project from the home recording phase to the studio phase," Cohen said. "Sometimes you just need someone to give you that push, that kick in the butt."

Being a passionate artist does not necessarily mean that producing work is always easy. "The creative process is like a sinusoidal curve — sometimes there are big lulls, and you just try to flatten it out," Cohen remarked (in true and proud nerd fashion). Cohen's songs take between a day and a year to write. His favorite song of the album, "Pawn and Queen," required six months to fine-tune.

For sure, Cohen does not categorize himself or his songs into any specific genre. The process of completing each song is unique, and Cohen is focused mainly on finding the right mesh of music and lyrics. For example, a song like "Pawn and Queen," loaded with meaning in the lyrics, required a non-traditional, more organic approach. "I had this riff in my head, on the low E string — it sounded kind of crappy. I liked that," Cohen said.

True to his roots as an English major, Cohen is more interested in the process of writing lyrics than in musical composition. Before songs, he found ways to express himself through writing short stories and poetry. Inspiration for Cohen's album title actually began with one of his favorite creative writing professors in college, who once commented that all good stories were about love. Meditating on this, Cohen concluded that good stories also involve the idea of leaving, in some form or another. Leaving could be literal or metaphorical: departing from a physical place, or changing and leaving behind the person you were before. After Cohen finished writing his album, he realized this theme was subconsciously woven into all of his songs; some of his personal explorations on the subject included leaving Afghanistan and the military, and the boundary between life and death.

Speaking of leaving places, Cohen already has ambitious plans following his graduation from Sloan. Given his experience managing large teams of people while working for the Air Force, he hopes to launch a consulting firm for mid-size companies, especially military ones, focused on team leadership.



Album artwork and design by Dale Crawford; image courtesy of Philip Cohen
In his debut album *Leaving,* Philip Cohen explores the lyrical qualities of music.

> **Music has always been Cohen's passion. And while he would be thrilled with success in his musical career, he also has many other options.**

In the meantime, amidst his many projects, Cohen has also founded two nonprofits. Like his business plans and his songs, they reflect his interests and passions. Community Ice Project opened and maintained an ice rink in Cohen's neighborhood last winter, and Modern Soldier Poet publishes a biannual journal of writing, illustrations, and musical compositions by military veterans.

Music has always been Cohen's passion, which is why he invests himself in it. And while he would be thrilled with success in his musical career, he also has many other options. Cohen describes himself as "trudging along the path to success in many areas," but by no means does he do so because he wants safety nets. "I'm always looking for a challenge," he said.

And that's one frame of mind he won't be leaving anytime soon.

Philip Cohen will be performing Oct. 25, 8:45 p.m. at T.T. The Bear's Place in Central Square. Visit his website, philipcohenmusic.com, *for more information and upcoming concert dates.*

MOVIE REVIEW

Hey, does this haircut make me look like Voldemort?

Joseph Gordon-Levitt plays an apathetic cancer patient in *50/50*

By Jaimie Chung

50/50 is ultimately a film about friendship through hardship. When Adam (Joseph Gordon-Levitt) learns that he has a malignant tumor, his friend Kyle (Seth Rogen) and new girlfriend Katie (Anna Kendrick) try their best to help Adam deal with his emotional and physical pain. Unfortunately, Kyle isn't the most eloquent character, and only has his mind on gettin' some. Screenwriter Will Reiser depicts this story brilliantly — a story based on his own experience with cancer and his friendship with Seth Rogen.

> **In his big screen debut as a writer, Reiser achieves an impressive feat, making the audience cry from both laughter and sorrow.**

I have to admit I had a hard time imagining the expressive Joseph Gordon-Levitt tone down a performance to play an apathetic cancer patient. After watching his performances as the host on Saturday Night Live and lead in 500 Days of Summer, I was convinced that he could only portray the extremes of the spectrum of emotions. But I was pleasantly surprised by his and Kendrick's authenticity in 50/50. The other actors in the film struggled to bring the same level of veracity that Gordon-Levitt and Kendrick did, but the movie nonetheless succeeded to convey its message.

50/50 owes much to its sharp dialogue. In his big screen debut as a writer, Reiser achieves an impressive feat, making the audience cry from both laughter and sorrow. From the marijuana-laced macaroons to the first sign of raw emotion from Levitt's character — screaming in frustration — 50/50 makes you experience every emotion that a cancer patient could experience. The fact that Resier and Seth Rogen never wanted to make the movie too serious or too sad makes the film all the more genuine.

Surprisingly, Rogen does a mediocre job of essentially playing himself, although this could be due to the fact that he isn't given many weighty lines or scenes. Other mediocrities include the chemistry between Rogen and Levitt and the performance of Bryce Dallas Howard, who plays Adam's despicable girlfriend at the beginning of the film. Not until the romance between Adam and Katie builds is there a believable relationship. Luckily, the witty dialogue carries the film until it reaches this point, keeping the audience interested throughout the whole movie.

This being my first movie review for The Tech, I went to the theatre expecting to take notes on the camera angles, music selection, and transitions. However, most of my notes were direct quotes from the film, like "no one wants to f*** me. I look like Voldemort," and "that's your Make-A-Wish?!" I must include, however, that the abrupt transitions between scenes enhanced the comedic effects of certain scenes and the dramatic effects of others.

> **Joseph Gordon-Levitt's haunting blank stare is broken down little by little as his character experiences elation, despair, and finally anger.**

The most important thing, however, is the message of how an apathetic individual learns how to live life to the fullest. Joseph Gordon-Levitt's haunting blank stare, which prevails throughout most of the movie, is broken down little by little as his character experiences elation, despair, and finally anger. This anger forces him to confront his emotions and his situation, and eventually, he is able to see the value in his life. Any other shortcomings become insignificant as we realize this powerful message.

★★★★☆

50/50

Directed by Jonathan Levine

Starring Joseph Gordon-Levitt, Seth Rogen, and Anna Kendrick

Rated R

Now Playing

My favorite thing about 50/50 was the ending. When the credits started rolling, I sat in complete infatuation with the ensuing scene (which I don't want to spoil for those of you who haven't seen it yet). Although I usually prefer endings that leave the ultimate message of the film up to interpretation, the directness of 50/50's resolution was refreshing, and it left me amazed at Reiser's screenplay, Gordon-Levitt's performance, and how intensely I felt each emotion that Gordon-Levitt conveyed and Reiser experienced.

Born to be pink

Betsey Johnson promotes breast cancer prevention in Boston

Photos by Kathryn Dere

On Saturday, Oct. 15, Betsey Johnson presented her Fall Winter 2011/2012 Ready-to-Wear collection at the Cyclorama at the Boston Center for the Arts. The models strutted down the runway in playful tartans, stripes, and animal prints to "Run the World (Girls)" and "Sweet Caroline" (with the crowd singing along to the latter). After the show, Betsey performed her famous cartwheels and splits across the runway and danced around with the models, who sported bright pink "We can do it!" tanks. The subject hits close to home for Betsey, who is a breast cancer survivor. Proceeds from the night went to the South End Community Health Center, of which her brother Bob (pictured) is president.

—Kathryn Dere

Riess remembers J-lab, Phi Delta Theta at MIT

ANDREA FABRE

Physics Nobel Prize winner Adam G. Riess '92 gives a talk in 10-250 about his research in measuring the rate of expansion of the universe. The auditorium filled in the first three minutes.

Physics prize, from Page 1

These results ignited research in dark energy, a generalized name for the energy source responsible for an accelerating universe. Dark energy is thought to make up about 70 percent of the universe, and is still not well-understood.

Riess says he was responsible for the analysis part of the study, so he was nervous about getting a result that contradicted most of the scientific community's expectations at the time.

"At first, I thought I just made a mistake. Like the many experiences I had with p-sets at MIT, I thought I had simply made a mathematical error," said Riess.

Luckily, Perlmutter's team at Berkeley independently found the same results almost simultaneously — this made it easier for the scientific community to accept the unexpected results so quickly.

Riess's current research consists of finding new techniques for measuring distances in the universe.

Beginning at MIT

Riess made the discovery at the age of 28, within a few years of getting his PhD at Harvard in 1996. "I was really lucky. Just in the right place at the right time," said Riess.

Moving from the suburbs of New Jersey, Riess enrolled at MIT as an undergraduate in 1988, majoring in physics and minoring in history. He chose MIT over Brown, Cornell, and UPenn because he thought MIT would be a good place to do physics, was unique, felt more like a community, and was in an urban setting.

Riess says his time at MIT was probably the most difficult part of his life. "There was definitely a wider gap between what I was capable of and what was expected of me during my time at MIT than any other period of my life," said Riess.

Riess said MIT's quantitative, hands-on education prepared him for his research career. He loved Junior Lab (8.13/8.14), a lab course still required for physics majors. Most of his research is very much like a huge J-Lab experiment, says Riess.

In fact, Riess's first research experience began at MIT. He had a UROP in the Center for Space Research (now known as the Kavli Institute for Astrophysics and Space Research) in his junior year. However, the experience did not excite him about research — Riess thought he didn't have the necessary tools, and the experience wasn't that productive. Nevertheless, he's glad that he stuck with research in graduate school.

While at MIT, Riess was a member of the fraternity Phi Delta Theta and enjoyed living there starting his freshman year. He was able to get help from a few brothers who were also physics majors. Today, he says that his experience in Phi Delta Theta and MIT has definitely helped shape who he has become.

Department of Physics Head Edmund Bertschinger was Riess' 8.05 (Quantum Physics II) professor at MIT. According to Bertschinger, Riess was remarkably diligent, coming frequently to office hours until everything was clear to him. He was impressed by Riess's passion for learning and his involvement in Phi Delta Theta. "I gained a lot of respect for fraternities after seeing his commitment to them and seeing how the fraternity helped Adam organize his life at MIT," said Bertschinger.

Outside of cosmology research, Riess enjoys listening to jazz, rock, and classical music. He's also an avid coin collector and a Baltimore Ravens fan. When he's not too busy taking care of his two children, Riess also likes to read up on history and keep up with politics.

Big move for prof.

Kaiser will miss teaching genetics

NIGMS, from Page 1

tance of basic research. "NIGMS has a particularly difficult subproblem: how do you justify basic research that does not have an immediate disease connection?"

Federal research budgets no longer see the same kind of support from Congress that they enjoyed in the late 1990s and early 2000s, but Kaiser is optimistic.

"NIH is the R&D component that is developing technological know-how for making disease treatment more efficient," he said. Disease research is a "relatively easy" sell to Congress, he added, because the applicability of that research to a robust healthcare system is clear.

And though the connection between disease treatment and the NIGMS's basic research is less clear-cut, said Kaiser, he thinks the public will still support it, noting that scientific advancement is viewed positively in the United States.

Even in movies and TV shows, "whenever MIT is mentioned, it's in a positive context. The technological know-how of America is something that people can connect with even if they don't understand the details," he said.

Kaiser acknowledged that grant money will be "harder and harder" to get — and that federal research budgets probably won't see increases soon — but funding will not dry up.

"It's not as if these endeavors are going to go away," he said.

Kaiser, who start at the NIGMS spring of next year, says he will miss teaching at MIT the most.

"I've taught 7.03 for 20 years. It's a really big part of my life — I love teaching genetics," he said. "I got such a kick out of teaching MIT undergraduates."

Solution to Crossword

from page 10

C	A	P	E	■	F	O	A	L	■	T	R	A	L	A
U	R	A	L	■	L	P	G	A	■	R	O	B	I	N
B	E	N	E	■	O	A	R	S	■	O	N	S	E	T
I	N	E	V	E	R	H	A	T	E	D	A	■	■	■
T	A	L	E	S	E	■	■	S	A	D	■	C	F	O
■	■	■	■	S	T	A	R	■	S	E	T	O	U	T
O	S	A	G	E	■	M	A	N	E	N	O	U	G	H
U	C	L	A	■	T	A	P	E	D	■	A	G	U	E
T	O	G	I	V	E	H	I	M	■	E	T	H	E	R
G	R	A	T	I	S	■	D	O	M	E	■	■	■	■
O	N	E	■	S	L	O	■	■	E	L	A	T	E	S
■	■	■	D	I	A	M	O	N	D	S	B	A	C	K
T	W	E	E	T	■	E	V	E	L	■	A	B	L	E
S	H	A	R	E	■	G	A	L	E	■	F	L	A	W
P	O	U	N	D	■	A	L	L	Y	■	T	A	T	S

Solution to Techdoku

from page 11

2	6	5	3	4	1
6	4	3	1	2	5
1	5	4	2	3	6
4	2	1	5	6	3
3	1	6	4	5	2
5	3	2	6	1	4

Solution to Sudoku

from page 11

1	4	9	5	7	2	3	8	6
6	8	5	3	1	9	2	7	4
7	3	2	6	4	8	5	1	9
4	9	7	1	5	3	6	2	8
5	2	8	7	9	6	4	3	1
3	6	1	2	8	4	9	5	7
9	5	6	8	3	7	1	4	2
8	1	4	9	2	5	7	6	3
2	7	3	4	6	1	8	9	5

Innovators focus on open data platforms

EmTech addresses big data, personalized healthcare, and social technology

EmTech, from Page 1

platforms, cloud technology integration, mobile healthcare, and more.

Steven B. Johnson, author of the best-selling book *Where Good Ideas Come From*, kicked off the conference with a talk that set the central theme of the conference: community innovation. Johnson says that he has been studying the science behind what makes environments innovative for most of his life. What he learned was that while large-market companies like Microsoft and Apple have conquered the technology landscape, they are not hubs of innovation. Instead, the most innovative environments are non-market communities where ideas are continuously shared. "It is more than just a technology space," Johnson said.

This was no secret to the companies present at the conference. Many are already using open data platforms for the purpose of enabling such communities.

Johnson concluded his speech with an important definition of invention: it is a culmination of quick innovations that, through failure, evolve into highly tested and successful platforms for the future. "It's not a miracle, but it is nothing short of miraculous," Johnson said.

Ford is one company working on building an open platform. Dr. K. Venkatesh Prasad, Ford's "What's Next Guy," is designing next generation cars that will provide an open platform for community development of car applications. According to Prasad, he is working on "more than just a car." Modern vehicles are platforms that can be embedded with around 30 sensors, 40 actuators, and up to 80 microprocessors.

One of the next forefronts for automobile development is also cloud connectivity. "[The] industry is at an early stage of creating these reservoirs of data," Prasad said.

For example, by using the sensors within the car, it will soon be possible to detect road potholes all around the world by aggregating the data from travelling vehicles. Such data could be used by city planners to help upkeep roads.

According to Prasad, the opportunities are limitless. By democratizing the technology, new platforms and applications will emerge from cloud connected cars. Prasad envisions a platform in which communities will build apps for cars just like today developers build apps for the iPhone and Android.

EmTech was not all about the big companies, though, attracting a plethora of startups.

Basis, a startup from San Francisco, is working on a product that they hope will revolutionize the mobile health industry. Their product, called the Basis B1 band, will be going on sale later this year as the first continuous heart rate and health tracker. The Basis B1 band passively monitors a user's activity level throughout the day.

"You can't improve things until you start measuring it," said Jef Holove, CEO of Basis. What makes the Basis B1 band different is that it uses optical technology to measure heart rate — a method used in hospitals.

Instead of outputting onto a monitor, however, the Basis B1 Band is connected to the cloud; it will send data that it collects to the cloud where it can later be accessed, analyzed, and reviewed.

According to Holove, continuous monitoring enables people to accurately quantify the amount of exercise they have done throughout the day. "There are things in our everyday life that do contribute [to our health]. You're just not aware of them," Holove said.

Holove says that when he started wearing the device, he became more conscious of his activity level, whether it was going for a run or taking out the trash. By taking all types of exercise into account, the Basis B1 band will allow people to monitor the number of calories burned, sleep patterns, and overall physical activity. According to Holove, even small chores that require physical activity can add up and appear as exercise on the Basis monitor.

Emerging life science

Another central, recurring theme that emerged at EmTech was advancements made in the life sciences industry.

Juan Enriquez, founding director of the Life Science Project at Harvard Business School, challenged the audience with an unnerving question: how many species of human live on Earth today? According to Enriquez, genetic technologies have enabled us to sequence enough human genomes today to find genetic patterns. By investigating such genetic patterns, it will be possible to identify common genetic patterns that may differentiate the human race into separate segments.

Enriquez said that today's technology is getting us closer to answering such questions.

Jonathan Rothberg, founder, CEO, and Chairman of Ion Torrent, invented a technology that aims to democratize and make DNA sequencing a routine part of medicine. Rothberg, who was recently featured in Forbes Magazine, envisions a future in which doctors will own their own DNA sequencing devices. According to *Forbes* magazine, such an industry could "ignite the next $100 billion technology market."

Rothberg's device, the Ion PGM Sequencer, is the fastest-selling DNA sequencer in the world. It is currently on the market for $49,000.

While the device does not sequence the whole genome, it does sequence genes that are believed to be essential for diagnosing critical diseases, including 200 cancer genes. According to Rothberg, the current bottleneck for finding cures to diseases like cancer is finding the correlations between genes and phenotypes. However, Rothberg plans to publish open-source data to enable the community to join in on the effort for finding cures. "Over the next ten years, starting immediately, we will have a more and more comprehensive view of how to treat people and what the outcomes will be. But it will be [...] 20 years before we understand cancer at the same level we understand HIV."

While gene sequencing will provide valuable information for enabling personalized medicine, it will take time to determine when someone should take medicine based on what genes they do and don't express.

Greg Sorenson, former Professor of Radiology at MIT and current CEO of Siemens, is overseeing the development of new MRI scanning technologies, including innovations in cross-sectional scanning. According to Sorenson, cross-sectional technology was ranked by physicians as the number one innovation that they couldn't live without. The technology enables doctors to look inside the body of patients.

During his talk, Sorenson passed around a brain made out of ABS plastic that was constructed using a 3D printer and MRI images. While such technologies are "cool," Sorenson was more concerned about making such technologies profitable.

"I think [the critical challenge of innovation is] figuring out how to take these kind of innovations and translate them into something that really benefits people to the degree that someone will pay for it ... ideas are a dime a dozen," Sorenson said.

Sorenson says there needs to be more innovation in the healthcare system to address inefficiencies. "Much of the costs of our healthcare system are expended on very few people over a short period of time. Something like a third to half of healthcare costs are spent in the last few months of life and on relatively small number of patients."

Other companies are approaching healthcare through the social realm. *Technology Review* Humanitarian of the Year, Paul Wicks, is acting as the R&D Director at the company PatientsLikeMe, which provides an open forum for asking and answering questions about diseases and conditions.

"It's the patients that do all the work," Wicks said. "The energy in the system is created by the links between these people."

New media meets old

Deb K. Roy PhD '99, co-founder and CEO of Bluefin Labs, is using social media in a different context: television. Roy describes the technology they are inventing at Bluefin as the "TV Genome." Bluefin Labs is currently working on a technology that will measure what people watch on TV by analyzing what people are talking about online.

"People talk about what they watch on TV, ... impressions drive social expressions," Roy said.

According to Roy, TV is alive and well. Pundits declared TV to be dead, but Roy says the content of TV has adapted by moving to the internet.

Roy envisions that one day, all TV impressions, or user views, will be semantically labeled and measured. Not only can impressions be measured, but they can also be tracked by how people share them on the internet. According to Roy, in the last 30 days, Bluefin has recorded impressions in 200,000 shows and 2,000,000 advertisements.

JASWANTH MADHAVAN—THE TECH

EmTech attendees heard about technologies which may come to define our world.

Shadman Zafar, Senior VP of Product Development at Verizon, describes how the experience of watching television has become more of an interactive experience through the development of mobile phones. Recently, Verizon released a mobile application that enables the user to control TV media, lighting, security devices, and personal media.

"It's a personal remote control; I got my own, my wife got her own," Zafar said.

Instead of television ads reaching out to viewers, viewers can now pick and choose what they want to watch as a result of the increased interaction.

Overall, the barrier of entry to television watching has dramatically decreased. "The best user experience is the user experience where there is not user experience; it disappears, it gets out of the way," Zafar said.

JASWANTH MADHAVAN—THE TECH

Ann Marie Sastry spoke at EmTech about doubling the range of electric vehicles with solid-state battery systems.

Some of the TR35

EmTech was not only about what technologies currently exist, but also about the technologies that would come to be. *Technology Review* has picked 35 of the top innovators under the age of 35 (also known as the TR35) that will likely change the world in the future. All of them were invited to the conference to give a 4-minute elevator pitch about the technologies they were developing. Their work targets up-and-coming and new industries ranging from ubiquitous computing, to cloud technologies, to personalized healthcare and beyond.

Gert Lanckriet, an associate professor at UC San Diego, is developing a technology that will automate music recommendations — a task that the company Pandora was forced to do manually. Lanckriet's technology, called "Herd it," uses advanced algorithms that intelligently tag music through waveform analysis. Lanckriet envisions a future in which users will not choose music; instead, music will be chosen for users depending on their mood and activity level. The algorithms will decide what you want to hear.

Brian Gerkey, director of Open Source Development at Willow Garage, envisions a future of open-source robotics. Just as open source software has propagated throughout the internet like wildfire, Gerkey wants to spread the availability of tools and software that will enable anyone to build and program their own robots. His company has already started implementing his vision and has released an open-source platform called ROS — it's already being used at institutions like MIT, UC Berkeley, and Stanford.

Jesse Robbins, Opscode founder (and former firefighter) is developing a product that enables small companies to leverage the power of cloud infrastructure in order to scale. The product, called Chef, is an open source platform that is currently used by over 6,000 organizations, including IGN, Admeld, and Cycle Computing.

Umar Saif, who previously worked at MIT's Computer Science and Artificial Intelligence Laboratory, has moved back to his native Pakistan to develop network infrastructures for the "other four billion." He said that today's technologies make assumptions that do not apply to the developing world, including broadband communication and uninterrupted power. Saif could not personally attend EmTech, but he submitted a video in which he briefly outlined his BitMate project, a peer-to-peer system that is compatible with BitTorrent. Currently, it gives service to 30,000 users in 174 countries, and it has brought SMS to Pakistan, which Saif calls "the Twitter of Pakistan."

Dan Berkenstock, co-founder and chief product officer of Skybox Imaging, sees a problem in the current commercial satellite industry: "Satellites are too big for their own good." According to Berkenstock, each satellite costs about a billion dollars to build and launch into space. Satellite imagery is also inefficient — a single satellite can only see a small fraction of the earth's surface at a given time. Despite this, Berkenstock sees an incredible potential for satellite imagery as a big data source. At Skybox Imaging, he is working on reducing the complexity of imaging satellites in order to "dramatically reduce the price point to put these satellites in orbit." Berkenstock also plans to transform the collected data into structured content, making it accessible for broader applications. No satellites are in space yet, but the Skybox team is in the process of building their first.

Pieter Abbeel, assistant professor at UC Berkeley, is teaching robots how to learn. "When a robot sees the world it doesn't see people or chairs, it sees pixels. When a robot acts in the world you can't ask it to throw a ball or pick up a mug, you have to ask it to move its motors around." The technique through which Abbeel teaches robots, called apprenticeship learning, doesn't teach the robots specific tasks. Instead, it teaches them general learning techniques. So far, Abbeel has trained robots how to learn to perform advanced helicopter aerobatics, laundry folding, and the arranging, sorting, and bunching together of socks.

FUNFUNFUNFUNFUNFUNFUN

Dilbert by Scott Adams

[redacted]

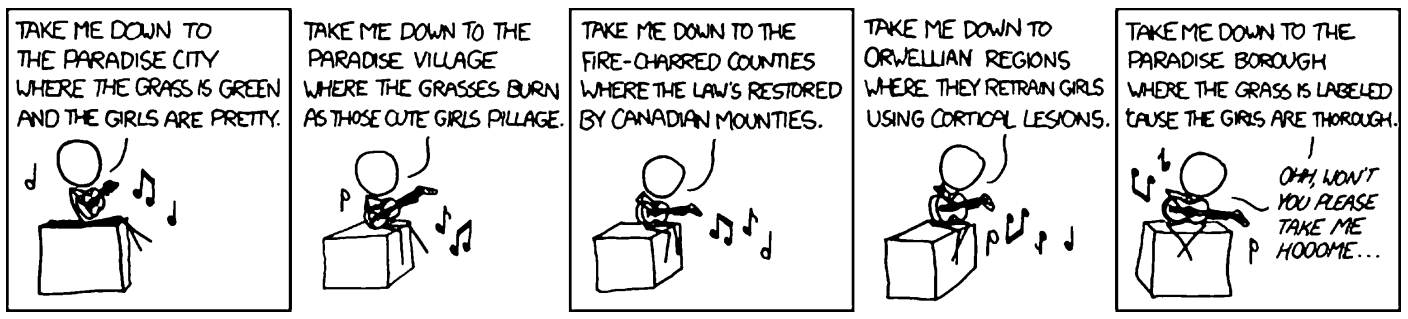
[redacted]

[805] Paradise City

xkcd

A WEBCOMIC OF ROMANCE, SARCASM, MATH, AND LANGUAGE

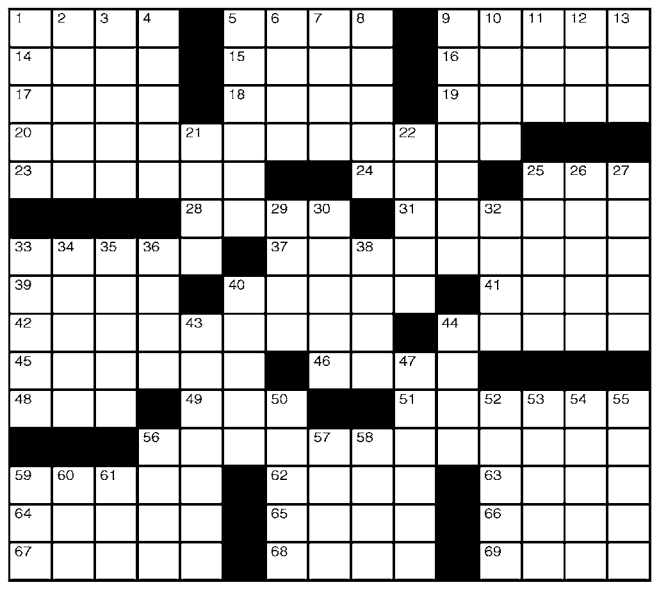
by Randall Munroe



Take me down to the paradise municipality / where the grass is mauve and the girls aren't from this reality.

Crossword Puzzle

Solution, page 8



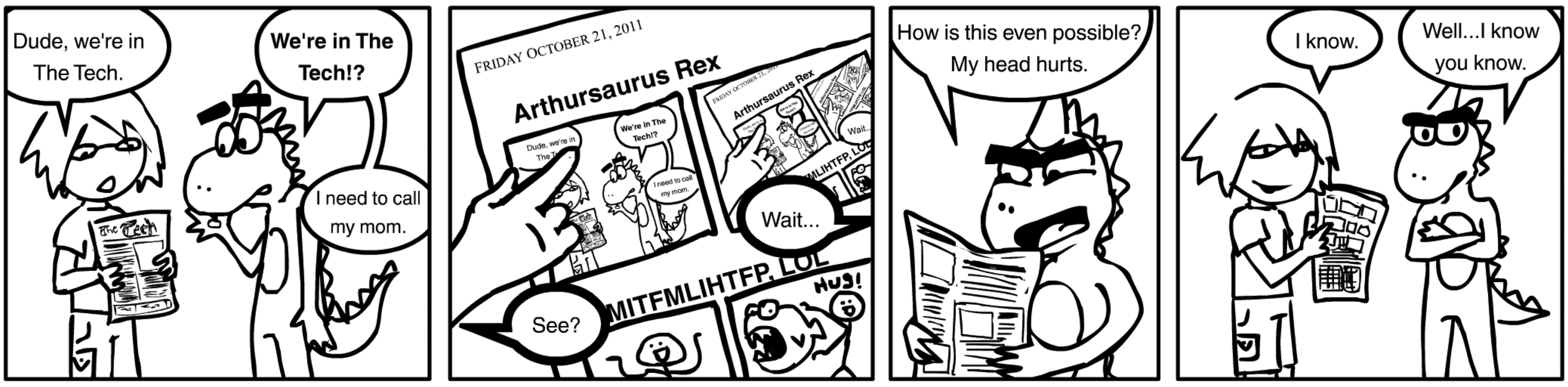
ACROSS

1 Good Hope or May
5 Stable youngster
9 Musical syllables
14 River to the Caspian
15 Sorenstam's org.
16 A Hood
17 Nota __ (note well)
18 Rowboat needs
19 Beginning
20 Start of Zsa Zsa Gabor quip
23 "Honor Thy Father" author
24 Depressed
25 Money-managing exec.
28 Julie Andrews movie
31 Start a trip
33 Missouri feeder
37 Part 2 of quip
39 Bruins' home
40 Recorded for later viewing
41 Chills and fever
42 Part 3 of quip
44 Early anesthetic
45 Complimentary
46 Capitol feature
48 Five before six
49 __-pitch softball
51 Lifts the spirits
56 End of quip
59 Bird call
62 Mr. Knievel
63 Up for the job
64 Stock unit
65 Battering wind
66 Imperfection
67 Hit hard
68 Confederate
69 Makes lace

DOWN

1 Biblical length
2 Boxing venue
3 Jury
4 Ecole attendee
5 Bloom
6 Moonfish
7 Taj Mahal locale
8 Goes on and on
9 Trampled
10 Barrett or Jaffe
11 Tummy muscles
12 Fanciful story
13 Aardvark's morsel
21 Latin I lesson word
22 Relaxed
25 Doctor's request
26 Bach work
27 Survey choice
29 Indian nursemaid
30 Speedy
32 Perfectly
33 Expenditures
34 Contempt
35 Pond buildup
36 Trot or canter
38 Jules Verne captain
40 Inventor Nikola
43 Dropped in
44 Sniggler's pursuit
47 Jumbled assortment
50 Last letter
52 Toward the stern
53 Indian drum
54 Extraordinary brilliance
55 Distorts
56 Laura of "Jurassic Park"
57 Elliptical
58 Jodie Foster film
59 Recipe abbr.
60 What person?
61 The water of Paris

Arthursaurus Rex by Ramya Swamy



Help Desk by Michael Benitez

Sudoku

Solution, page 8

							8	6
	8		3					4
	3			4		5	1	9
	9			5	3	6		
			7		6			
		1	2	8			5	
9	5	6		3			4	
8					5		6	
2	7							

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.

Techdoku

Solution, page 8

9+	90×			20×	
	48×		2×		
	5		6×		2÷
1−			20+		
15×		12×			2
	3		24×		

Instructions: Fill in the grid so that each column and row contains exactly one of each of the numbers 1–6. Follow the mathematical operations for each box.

Who will take the win? Cardinals vs. Rangers

After an exciting season, Rangers take on the St. Louis Cardinals in the World Series

Sports staff

Editor's Note: The Fall Classic. Of the 30 teams to begin the 2011 MLB season, only two are left: the Texas Rangers and the St. Louis Cardinals. After six-and-a-half months of baseball, only seven games remain. As this year's playoffs have already shown, anything can happen in such a short series. (Even, perhaps, the predictions made by the Tech's Sports Staff below). With bragging rights and a dinner on the line, will we be able to shed our reputation for making horribly inaccurate picks?

This World Series matches the "Team of Destiny" against the defending American League Champions. The Cardinals were 10 games behind the Braves at the end of August, and were such a long shot that their run can only be described as miraculous. After dominating their National League playoff opponents, they are not to be taken lightly. They beat the Phillies in 5 thanks to incredibly pitching by Chris Carpenter, and went on to beat the Brewers in 6 by their ability to crank out home runs.

The Rangers came into this postseason much differently. They won their last six games of the regular season to earn home-field advantage, which helped them win Game 6 against the Tigers. Texas showed off some of the most powerful hitters in baseball today with Adrian Beltre, who hit three home runs in one game against the Rays, and Nelson Cruz, who set a postseason record by hitting six home runs and batting in 13 runs in a single series.

Texas relied heavily on their bullpen, which is arguably the deepest bullpen in baseball. For only the second time in postseason history, relievers won all four games. This gives Texas more flexibility if their starters need to be pulled early from a game.

The Cardinals and Rangers are equivalent in almost every area. Both teams have incredible depth in their batting and everyone is a threat to hit a home run. Both struggle with their starting pitchers, but have reliable bullpens. Chris Carpenter is the best pitcher coming into the game but he has been inconsistent in recent starts. C.J. Wilson is the Rangers' ace, but has been unimpressive in the postseason.

Overall, the edge belongs to the Rangers. Beltre and Cruz have shown how potent they can be, and in Game 6 Michael Young's bat was starting to heat up. Albert Pujols is the best hitter coming in, but the Rangers learned how to handle strong hitters after a series against Detroit's Miguel Cabrera.

Expect the Rangers' starting pitcher Wilson to have an excellent series since this is his last series before entering free agency. With the power hitting of the Cardinals, these games will likely show off the Rangers' bullpen that will shut them down.

Expect each game to be close and high-scoring.

Prediction: Rangers in 7

—*Nicholas Myers*

The World Series is going to be a battle of the offenses as the Rangers and the Cardinals are two of the highest scoring teams in baseball this year. That said, the matchup really comes down the performance of Rangers pitcher C.J. Wilson versus that of Cardinals pitcher Chris Carpenter. Wilson and the Rangers bullpen lack the depth of last year's World Series team, and Wilson's postseason performances have been subpar. Wilson has his work cut out for him trying to stop the Cardinals offense, led by big-hitters Pujols and Lance Berkman. On the other hand, the Rangers offense may just score enough points to render worries about Wilson completely moot. In any case, look for some high scoring games this series, and if Wilson can hold his own, look for the Rangers to be holding the trophy by the end. Also, if you know anything about Texas baseball, know that the worse Lance Berkman performs, the happier I will be (*cough*, *cough*, traitor …).

Prediction: Rangers in 7

—*Carlos Greaves*

After falling short of winning it all last year against the San Francisco Giants, the Texas Rangers hope to do better in this year's World Series — and they should. During the regular season, the Rangers posted the best batting average and the second best slugging percentage in baseball. From what they've shown thus far in the playoffs, Texas should not have trouble putting runs on the board, even against a pitcher like Chris Carpenter. If the St. Louis Cardinals want to have a chance at competing against the offensive firepower of Texas, they will need to rely a lot more on some quality pitching from relievers like Octavio Dotel.

On the defensive side, the question is: "How good will the Rangers pitching be against Albert Pujols, Lance Berkman, and Matt Holliday?" These Cardinal sluggers pose problems for the Rangers, especially when hitters like Rafael Furcal get on base and give them RBI opportunities. But watch out for an improved Colby Lewis to break out of his recent slump and a dominant C.J. Wilson, who should now be comfortable with the big stage after going through last year's World Series.

The Cardinals will have home-field advantage, but the Rangers, with their hot bats, will win on the road. It should still be an exciting series marked by close, hard-fought games, but the Rangers will come out on top.

Prediction: Rangers in 6

—*Nidharshan Anandasivam*

Considering that the three other writers are all from Texas and thus may or may not be biased, I'll argue for the Cardinals here. It's true the Rangers were a better team in the regular season while the Cardinals shouldn't really still be playing now, but regular season records don't matter in October (as St. Louis demonstrated five years ago, when they won the World Series after finishing only five games above .500). The Cards seemed hopeless in spring training, when they lost ace Adam Wainwright for the season — but they survived without him. They seemed hopeless in early September, when simulations predicted they had under a two percent chance of even making the playoffs — but they made it. They seemed hopeless in the Divisional Series, when they faced the Phillies and perhaps the best starting rotation in history — but they won. They seemed hopeless in the Championship Series, when they faced a Milwaukee Brewers team that was next to unbeatable at home — but they won two out of the three games at Miller Park to advance again. They're still underdogs to the Rangers, but the Cardinals simply were, and are, the hottest team in the playoffs, and the most motivated.

The Rangers have Nelson Cruz and his six ALCS home runs, as well as a full-time designated hitter. The Cards, however, have three elite power-hitters in Pujols, Holliday, and Berkman; if David Freese, the NLCS MVP, can continue his hot hitting, this offense will be hard to stop.

The Cardinals have home-field advantage, thanks the National League's victory in the All-Star Game in July; they'll also want to make the most of potentially their last games with Albert Pujols in the lineup before he departs in free agency.

Regardless, this Fall Classic should be highly entertaining. Both teams have high-powered offenses and managers willing to make unconventional decisions. Combining these factors with both teams' deep bullpens, perhaps a better prediction for our sports staff is the number of starters who will pitch past the fifth inning …

Prediction: Cardinals in 7

—*David Zhu*

ATHLETE OF THE WEEK: ROBERT A. 'BOBBY' WEBER '13

The Ultimate social glue

Bobby Weber balances frisbee, school, and fun

By Nidharshan Anandasivam
Sports Staff

Robert A. "Bobby" Weber '13, a junior in Course 15, plays cutter for the MIT Men's Ultimate team. Passionate about the sport since his early years, Bobby started an Ultimate frisbee club in his high school and later played on a team that achieved second place at state competitions twice in a row. When he got to MIT, he was taken under the wing of former MIT Ultimate star Isaac T. Entz '11, whom Bobby admires considerably. "If I had to describe our team in two words, it would be Isaac Entz. He is an inspiration to all of us and a true mentor."

Bobby isn't only a player on the team. In fact, he fills many special roles, on the field and off.

"On the frisbee team, I work with Brian [C.] Conn ['13] to set up different social events for our team like team parties or team barbecues. I also help call lines [decide who is playing on what point] and give advice to some of the younger players on the team. Most of what I do is mess around and come up with lots of inside jokes. For instance, I once convinced our coach that two of the players on our team were a couple. That was pretty funny! My most important job on the team is probably that of team wingman. I don't think anyone on the team needs it, but just to make sure I always go out of my way to let all the ladies know about how Isaac Entz single-handedly leads the team to victory, which he generally does," Bobby said.

When asked about life on the team, Bobby said, "I think what I enjoy most about our team is the camaraderie that we have. We all get along really well and you can see that out on the field. The next tournament is at Brown during the first week of November. It will be the first tournament that we actually go to as a whole team so it should go pretty well."

Robert A. "Bobby" Weber '13 (left).

Not hesitating to mention the playfulness of the team, Bobby also remarked, "We have an ongoing competition. After we go out for a tournament every Sunday, we typically go to Olive Garden and see who can eat the most endless pasta. The current leader is Isaac Entz with nine bowls but some people get close."

Bobby practices with the team on Mondays and Thursdays, with team workouts every other day. The rest of his time is typically spent "either doing work or messing around."

"I love playing pranks on people. In particular this one guy messed with my room, so I am replacing the hubcaps on his car with ones I custom made with purple paint and glitter," says Bobby.

Bobby is kept busy with his Ultimate schedule, but he still manages to balance this commitment with his coursework.

"My method of finding a balance is that sports come first and then if I have to stay up late one night or get a bad grade on a test, that is worth it to me," he said.

Outside of class and Ultimate, Bobby also plays intramural sports and likes to hang out with friends. He is also a Google Student Ambassador to MIT.

Along with Course 15, Bobby takes premed courses on the side. "I actually am unsure as to what I want to do in the future, so I am just trying out everything."

Jared Wong

Tevis W. Nichols '12, skipper, prepares for the third Midweek Tech Regatta of the year on Wednesday in tumultuous weather.

UPCOMING HOME EVENTS

Sat., Oct. 22

Crew — Head of the Charles	*9 a.m., Charles River*
Sport Taekwondo — MIT Tournament	*9 a.m., Johnson Track*
Sailing — Oberg Trophy	*9:30 a.m., Charles River*
Women's Soccer vs. Coast Guard	*1 p.m., Steinbrenner Stadium*
Men's Fencing — Alumni Event	*1 p.m., duPont Gym*
Women's Volleyball vs. UMass Boston	*2 p.m., Rockwell Cage*

Sunday, Oct. 23

Crew — Head of the Charles	*9 a.m., Charles River*
Sailing — Oberg Trophy	*9:30 a.m., Charles River*