

# Not so fast, neutrinos

MIT physics professors  
examine the subatomic  
speed limit controversy

By Stephanie Holden

On Sept. 23, European scientists announced that they had observed neutrinos, a class of subatomic particles, traveling faster than the speed of light — the universe's fundamental “speed limit.” The experiment, OPERA (Oscillation Project with Emulsion-tRacking Apparatus), was a collaboration between the Italian Gran Sasso National Laboratory (LNGS) and Europe's high-energy physics laboratory CERN. Since the announcement of this anomaly, the scientific community has been hotly debating its validity, as well as the possibilities that could arise from such results.

MIT Physics Professor Scott A. Hughes said, “Carl Sagan had this saying, that extraordinary claims require extraordinary evidence. This is not extraordinary evidence.”

Hughes pointed out that the OPERA experiment was not originally designed for measuring the speed of neutrinos. The main goal was to transmute — or convert — one type of neutrino, called a muon neutrino, into a tau neutrino, a heavier type of particle.

Hughes conceded that the researchers “have done as good a job as they can, but this is extremely hard to measure ... there's this table of systematic errors in their measurements, and one error tends to dominate. If they combined their errors in a different way, their results could have been within the error bars.”

“I don't think the paper is outlandish,” added Physics Professor Janet Conrad.

However, she and Physics Professor Frank Wilczek — a Nobel laureate — both said that the main evidence that contradicts OPERA's result is the data set from Supernova 1987A, when neutrinos produced from the star explosion arrived

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CHRISTOPHER A. MAYNOR—THE TECH

Members of LBGT@MIT hosted a colorful closet in Lobby 10 on Wednesday, a day after National Coming Out Day. Members of the MIT community were welcome to “come out” of the closet throughout the day.

## Former MIT police officer D'Amelio sentenced to 2.5 years in jail

Former MIT police officer Joseph D'Amelio, charged in 2009 for trafficking prescription drugs, was sentenced to two-and-a-half years in jail at his trial Tuesday.

D'Amelio was arrested in uniform in March 2009 when Boston Police caught him buying OxyContin and Roxicodone pills — both of which contain oxycodone — in East Boston. At his arraignment, D'Amelio was charged with

trafficking more than 100 grams of oxycodone — an offense which carries a sentence of between 10 and 20 years in state prison.

D'Amelio pleaded guilty to — and was sentenced for — the lesser charge of possession with intent to distribute. However, court documents explicitly state that he left the site of the oxycodone deal with “a list of prices,” not the pills them-

selves (as had been previously reported).

D'Amelio was sentenced to serve in Boston's Suffolk County House of Correction, but his defense counsel requested that he serve his time in the Dukes County Jail in Martha's Vineyard — a significantly more pleasant facility — instead. The court subsequently recommended that D'Amelio go to Dukes County, but Suffolk County

District Attorney Press Secretary Jake Wark said that D'Amelio's chance of serving there was “slim.”

As of Thursday evening, it was unclear where D'Amelio will serve his sentence.

Speaking on behalf of the prosecution, Wark said, “We've obtained an outstanding result for a defendant who never had physical possession of the drugs.”

—Adisa Kruayatidee

# House dining popular with 15's

1,888 students enrolled in dining plan, 45% are freshmen

By Ethan A. Solomon  
EDITOR IN CHIEF

The new House Dining program is popular among freshmen, but less so among upperclassmen, according to enrollment statistics released to *The Tech* by the Division of Student Life. The mandatory meal plan for residents of Maseeh, Baker, Next, Simmons, and McCormick amassed a total enrollment of 1,888 students, 45 percent of which are freshmen.

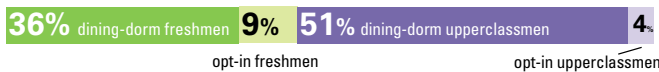
Fourteen percent of all dining plan participants do not live in a dining dorm and voluntarily opted in, and 14 percent of all students in non-dining dorms joined the program. In addition, 719 students chose to “opt-up” from a required meal plan to a more expensive one. The cheapest plan — “Any 7” available only to juniors and seniors — is \$2,500/year for 210 meals, and the most expensive — required for all Maseeh freshmen — is \$4,500/year for 570 meals.

Out of the 446 juniors and seniors who were eligible for Any 7, 110 of

Dining, Page 7

### Who has a dining plan?

1888 students (45%) are on an MIT dining plan

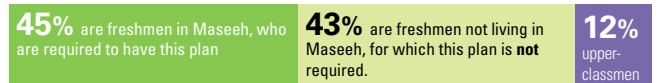


38% of freshmen who weren't required to buy a dining plan **bought one anyway**

Only 4% of upperclassmen did this

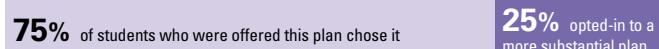
### Who is on the full 19 plan?

Students on this plan have all meals provided by MIT— breakfast, lunch, and dinner on weekdays, and brunch and dinner on weekends. For freshman in Maseeh, this plan is mandatory.



### Upperclassmen stick with Any-7

Juniors and Seniors in dining dorms were given the option of a less substantial plan in which they are allowed 7 meals per week. This plan will no longer be offered after the 2012-2013 academic year



# MIT tackles hunger

MFWH organizes 12 hr. hunger strike

By Adisa Kruayatidee  
STAFF REPORTER

What's for lunch? Next Friday, participants in Hunger Strike will be tackling significantly larger-scale hunger issues. The planned 12-hour fast marks the conclusion of Hunger Week, a series of events and fundraisers sponsored by MIT Fighting World Hunger (MFWH). Community members are welcome to commit to the Strike by paying \$5 for an event T-shirt.

Ting Mao '14, founder of MFWH, said Hunger Week's main goals

were to kickoff the club's year-round commitment to raising hunger awareness. Around campus, the club's black-and-red posters read, “Are you hungry? One in seven in the world are.”

Hunger Week will feature a canned food drive as well as T-shirt and challah fundraiser sales. MFWH's operating base will be the Hunger Week booth in Lobby 10, running from 9 a.m. to 5 p.m. Monday through Friday, where students can learn more about world hunger

Hunger Week, Page 8

## IN SHORT

Nominate a member of the Class of 2010, '11, or '12 for a spot on the MIT Corporation! Nominations are open until Oct. 30. Visit <http://bit.ly/MITCorpNomination> for more information.

DAPER is offering three new PE classes this quarter: broomball, rifle, and boot camp for athletes. Visit <http://mitpe.com/> to learn more.

Send news information and tips to [news@tech.mit.edu](mailto:news@tech.mit.edu).

## HOW DOES THE TECH WORK?

Learn more about what we do and why we do it. **EDITORIAL, p. 4**

## LEGALIZE IT!

Most of you agree, we should legalize pot. **OPINION, p. 5**

## GET LOST IN TIME

A history of cinema in clocks, watches, and timepieces. **ARTS, p. 10**



## SIT DOWN WITH ANDY MCKEE

Fingerstyle guitarist chats with *The Tech's* Jeff Chen. **ARTS, p. 9**

## TEA TOO HOT FOR YOU?

Hal Anil examines the Tea Party movement, and what MIT thinks of it. **OPINION, p. 6**

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# Dennis Ritchie, programming trailblazer, dies at 70

**By Steve Lohr**  
*THE NEW YORK TIMES*

Dennis M. Ritchie, who helped shape the modern digital era by creating software tools that power everything from search engines like Google to smartphones, was found dead Wednesday at his home in Berkeley Heights, N.J. He was 70.

Ritchie, who lived alone, had been in frail health in recent years after treatment for prostate cancer and heart disease, said his brother Bill.

In the late 1960s and early '70s, working at Bell Labs, Ritchie made a pair of lasting contributions to computer science. He was the principal designer of the C programming language and co-developer of the Unix operating system, working closely

with Ken Thompson, his longtime Bell Labs collaborator. The C programming language, a shorthand of words, numbers and punctuation, is still widely used today, and successors like C++ and Java build on the ideas, rules and grammar that Ritchie designed. The Unix operating system has similarly had a rich and enduring impact. Its free, open-source variant Linux powers many of the world's data centers, like those at Google and Amazon, and its technology serves as the foundation of operating systems, like Apple's iOS, in consumer computing devices.

"The tools that Dennis built — and their direct descendants — run pretty much everything today," said Brian Kernighan, a computer scientist at Princeton University who

worked with Ritchie at Bell Labs.

Those tools were more than inventive bundles of computer code. The C language and Unix reflected a point of view, a different philosophy of computing than what had come before. In the late '60s and early '70s, minicomputers were moving into companies and universities — smaller and at a fraction of the price of hulking mainframes.

Minicomputers represented a step in the democratization of computing, and Unix and C were designed to open up computing to more people and collaborative working styles. Ritchie, Thompson, and their Bell Labs colleagues were making not merely software but, as Ritchie once put it, "a system around which fellowship can form."

## Fund chief Rajaratnam sentenced to 11 years for insider trading

NEW YORK — The fallen hedge fund billionaire Raj Rajaratnam received the longest prison sentence ever for insider trading on Thursday, capping an aggressive government campaign that has ensnared dozens and may help deter the illegal use of confidential information on Wall Street.

Judge Richard J. Holwell of Federal District Court in Manhattan sentenced Rajaratnam, 54, the former head of the Galleon Group hedge fund, to 11 years in prison. A jury convicted Rajaratnam of securities fraud and conspiracy in May.

"Insider trading is an assault on the free markets," said Holwell, who also imposed a \$10 million fine and ordered Rajaratnam to forfeit \$53.8 million in ill-gotten profits. "His crimes reflect a virus in our business culture that needs to be eradicated."

The sentence was a watershed moment in a two-year push by federal prosecutors. Over that period, Preet S. Bharara, the United States attorney in Manhattan, has brought charges against 54 people with insider trading crimes. Of those, 50 have been either pleaded guilty or have been convicted at trial. Three others' situations are pending, and the fourth is a fugitive.

—Peter Lattman, *The New York Times*

## French criminal charges against Strauss-Kahn dropped

PARIS — For the second time this year, Dominique Strauss-Kahn escaped criminal charges of attempted rape, despite what prosecutors here said was evidence of sexual assault, ending months of scandal that have tarnished a political career that once seemed destined to lead to the French presidency.

There was evidence from Strauss-Kahn's own testimony of sexual assault in a 2003 encounter with a French writer and novelist, Tristane Banon, the prosecutor said in a statement, but given a three-year statute of limitations on that charge, no case would be brought.

"Facts that could be qualified as sexual assault have been acknowledged," the statement said.

The decision of the prosecutor was no surprise, given the age of the case and the difficulty of finding physical evidence so long after the event.

But once more, as in this summer's case in New York involving a hotel housekeeper, Strauss-Kahn has escaped a criminal trial on sexual charges. In the New York case, criminal charges of attempted rape were dropped in August because of doubts about the credibility of his accuser, Nafissatou Diallo, who had lied in other instances of sworn testimony.

In some sense, Strauss-Kahn, 62, appears to be lucky. But he has been personally chastened and humiliated in a very public fashion, and his political career has been derailed by the charges.

—Steven Erlanger and Maia De La Baume, *The New York Times*

# Massachusetts clears big hurdle in approval of casinos

**By Jess Bidgood**  
*THE NEW YORK TIMES*

BOSTON — The Massachusetts Senate passed a bill Thursday that would legalize casino gambling, paving the way for three resort-style casinos and one slots parlor in the state.

Past attempts to legalize casino gambling failed, but the idea gained popularity recently as the recession tempered the state's economic growth. The Senate bill passed 24-14 after days of debate. Last month, the state's House passed a bill allowing

the same number of gambling establishments. Some differences remain, but they are expected to be resolved in a conference committee of the Democratic-controlled Legislature, and Gov. Deval Patrick has indicated he will sign the final legislation.

Last year, a gambling measure failed when Patrick and the House speaker, Robert A. DeLeo, disagreed on the number of slots parlors. The new legislation emerged after months of closed-door negotiations involving Patrick, DeLeo, and Senate President Therese Murray.

Scott Harshbarger, a former state

attorney general who is now president of the anti-casino group Citizens for a Stronger Massachusetts, criticized what he said was too much secrecy.

"This was just a classic, Massachusetts, behind-closed-doors power play by the special interests and lobbyists and casino owners," Harshbarger said. "Only the public interest lost."

Supporters promote casino gambling as a major job creator, saying it will drive industry growth in construction, service and tourism.

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# Government is a crappy venture capitalist

*Solyndra deserves more credit than the media is giving it, but not much*

**By Keith Yost**  
*STAFF COLUMNIST*

Solyndra deserves more credit than the media is giving it. But not much.

Any discussion of the Obama administration's ill-fated decision to loan more than half a billion dollars to Solyndra, the now-bankrupt solar cell manufacturer, needs to begin with the obvious: the prospects for solar power competing economically as a source of grid power are virtually nil.

The cost of a solar panel system is usually quoted in dollars per watt-peak (peak watts being the output of the system under optimum natural lighting). After compensating for a few factors, primarily the difference between peak wattage and average wattage (the sun does not shine 24 hours per day), a \$1/Wp photovoltaic system is roughly cost competitive with a \$4000 per kilowatt-capacity nuclear plant (a plausible nuclear price tag which is, under some analyses, almost cost competitive with natural gas or coal).

To put that in perspective: the cheapest photovoltaics we have today cost \$4-\$6/Wp. Even the best of the world's solar panel makers (which in my humble opinion, is the U.S.'s own First Solar), will be very lucky to reach \$1/Wp for just their cells in the next two decades. And should they even reach this goal, they have little hope to reduce the balance of system costs associated with solar. Between the inverter, the labor to install the panels, and all the other ancillary costs, the price one pays on top of the cells themselves for a working photovoltaic collector come to \$1.50-\$2/Wp. In the final tally, even if you give away all of the components of a solar system for free, just the labor to mount the panels and wire them together is often enough to make solar more costly than natural gas.

And so, even if there were magical leaps and bounds in the technology of solar panel manufacturers, some cost components of solar power are going to remain and likely ruin whatever hopeful notions of cost parity that the industry might entertain.

In a paradoxical way, these reasons for why solar power is a pipe dream are also the same reasons why Solyndra deserves more credit than it has gotten. No evolutionary process is going to push solar past the threshold of grid parity — to make solar power work, we need a crazy, long-shot gamble, and Solyndra was just that sort of insane moon shot. Here are the things Solyndra got right:

Firstly, Solyndra avoided the use of silicon in its cells. Polysilicon production uses mature, energy-intensive technologies that are unlikely to make any significant improvements over the next half-century. Even with sizable gains in wafer cutting technology (thinner silicon wafers mean less material per cell), polysilicon is like the labor to mount panels — a large enough and intractable enough cost to sink solar's long-term prospects. By using thin-film technologies rather than silicon, Solyndra dodged one of the least manageable cost hurdles in the PV industry.

Secondly, Solyndra aimed for high efficiency cells. All else being equal, a panel which captures 24 percent of incident light is going to cost half as much to install, per watt-peak, as a panel which is only 12 percent efficient. This is one of the few ways in which that obstinate dollar of installation labor can be reduced.

And finally, Solyndra hoped to manufacture solar cells in a different form-factor — a cylinder instead of the typical flat panels. This strikes me as lunacy, but at least it indicates Solyndra understood the significance of the challenge facing PV. The cylindrical design, they hoped, would mean less

wind shear on the solar collectors and thus reduced mounting needs and lower balance of system costs.

Therefore, as pessimistic as I am about the prospects of photovoltaics, I don't see the main lesson to be gleaned here as government making bad technology bets. Yes, the technology didn't pan out (Solyndra's solar cells cost about \$3 more than their competition), but that's the nature of taking risk; as far as solar technology gambles go, Solyndra was probably the brightest one the government could have made.

And still, the story of Solyndra confirms the view of Larry Summers, that “gov is a crappy VC.” It might be splitting hairs to make this distinction, but while Solyndra might have been the best technology bet in the solar industry, it was one of the worst business bets to be had.

**While Solyndra might have been the best technology bet in the solar industry, it was one of the worst business bets to be had.**

Solyndra's business management was abysmal — at every level of the company, workers were complaining about huge money wasting. And the timing of the company was terrible. A glut of polysilicon production, the global recession, and the end of hugely generous solar subsidies in Spain meant that Solyndra's venture was doomed even if the technological gambles paid off.

These are not, as the White House claims, unknowable downsides. These were factors that the federal government had ample time to consider as it made its loan decision. The decision to make the loan to

Solyndra came after the Spanish decision to slash their subsidies — and well after the global recession had hit. And the glut in polysilicon was obvious to anyone with even a passing interest in the industry. In 2009, I estimated that just four incumbent firms — firms whose capitalized plants could manufacture polysilicon at \$20-30 per kg — could supply the world's entire foreseeable demand. Today, the price for polysilicon is at roughly \$44/kg — as old contracts expire and are re-negotiated, that price should plummet even further.

I was not alone in my assessment — it's hard to find any market analysts from 2008 onwards who had anything upbeat to say about polysilicon prices. In fact, the market's outlook on the entire solar manufacturing chain was dismal — the value of solar companies was almost wholly determined by their amount of cash on hand. Their capital, their inventory, their technology and expertise were all worthless; and why not? They were worthless before the crash too, it's just that governments were more willing to throw away taxpayer monies on worthless products before the recession hit.

That the government could step into this grim scene and so confidently misread it, going so far as to have President Obama make Solyndra the poster child for loan guarantees, demonstrates how truly terrible the government is at picking winners. Even absent any cronyism or corruption (which may still yet surface in the Solyndra case), the government is simply bad at investing taxpayer money in business ventures.

As Obama makes the media rounds, he is claiming that he has no regrets about his decision to dump \$535 million into a failing enterprise. But he should — both the loan guarantee program, as well as the specific decision to loan money to Solyndra, are mistakes.

## GETTING OUT OF THE RED

# Legalize it

For a moment, ignore the question of whether, as a matter of principle, marijuana should be legal or illegal. What would be the net improvement of U.S. public finances if the drug were legalized and taxed?

To determine how much additional revenue would be created by legalization, the first step is to judge how large the U.S. market for marijuana is. These estimates vary widely, but both demand- and supply-side analyses of the U.S. marijuana market put it in the area of roughly \$40 billion in transactions per year.

The second step is to estimate how this market would change in response to legalization and taxation. This is a little bit trickier. One could expect that if marijuana were legalized, there would be two effects on supply and demand: first, production costs would fall significantly, increasing supply; and second, by removing the threat of incarceration, consumption of the product would be more attractive, increasing demand. If the experience of the Netherlands is indicative, prices for marijuana would be reduced by half were legalization to occur. From a demand-side perspective, one might expect the quantity consumed to increase as if the price had fallen by another 20 percent.

If these assumptions are correct, and the government ended prohibition and then levied an excise tax on marijuana equal to 60 percent of the end retail value (an exclusive tax rate of 150 percent), then consumption of marijuana would remain unchanged relative to the status quo. Suppliers would sell the drug at half of the pre-legalization price and receive \$20 billion, the government would apply taxes and collect \$30 billion, and the end price to the consumer would rise, but any loss of demand would be offset by the

demand increase from decriminalization. This is a high tax rate, but not so high as to invite a resumption of black market activity — in Europe, many countries tax cigarettes at an exclusive rate of 300 percent, and little black market activity exists.

New revenues are not the only budgetary effect of ending prohibition. In addition, legalization would end significant outlays on law enforcement and incarceration. Jeffrey Miron PhD '84, an economist at Harvard, has studied the budgetary effects of mari-

juana prohibition and estimated the federal and state savings from the legalization of marijuana to be \$13.7 billion annually. This is consistent with California's experience with decriminalization — a reform which has reduced its marijuana law enforcement costs by 75 percent.

Assuming a further three percent annual growth rate in tax revenues and enforcement cost-avoidance, the total savings over a 10-year window from legalizing marijuana come to an even \$500 billion.

It is tempting to ignore the principle of marijuana legal-

ity altogether. After all, the above scenario does not increase total consumption of marijuana from its present state, it merely extracts rents from those involved in the market and returns them to the taxpayer at large. In a sense, it is moot if one sees a legitimate public interest in reducing marijuana use — with high but achievable tax rates, the government could discourage marijuana to the same extent that prohibition does and save itself half a trillion dollars to boot.

And yet, to not bring up the principles behind legalization would be to give the anti-prohibi-

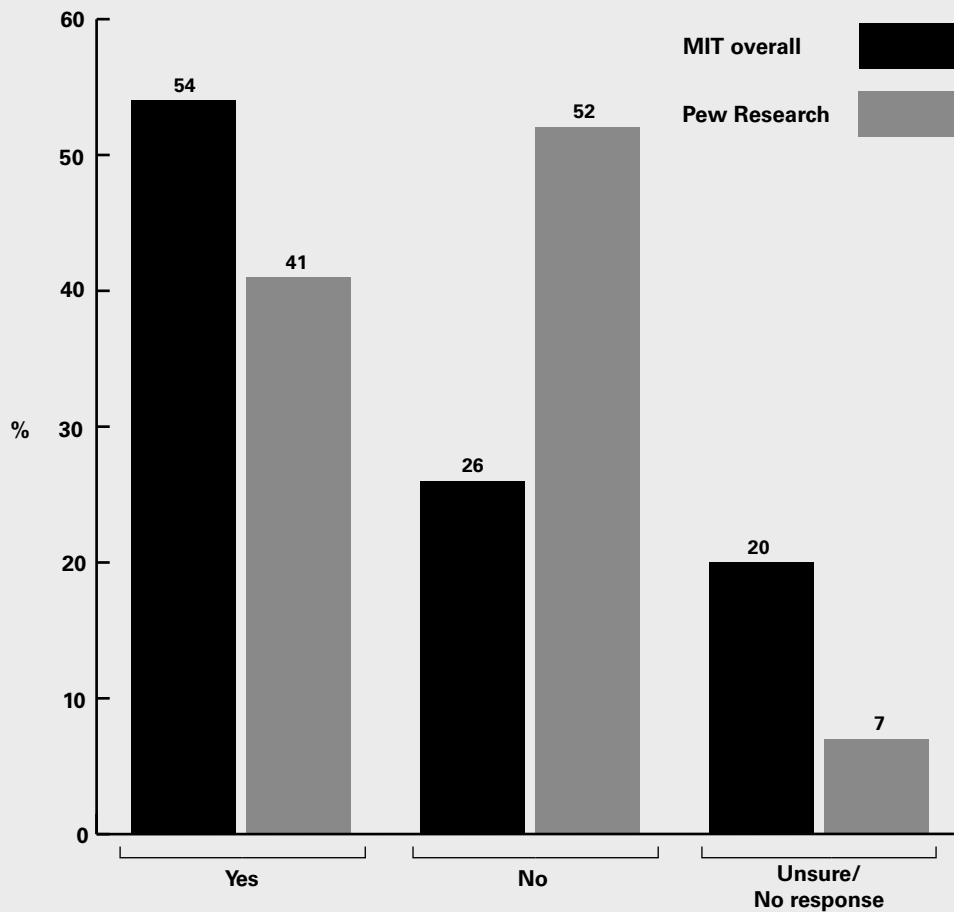
tion movement short shrift. It goes against the American character to deny a fellow man his right to the pursuit of happiness. When we do make such laws, we typically do so under one of two circumstances. The first is when one man's pursuit of happiness conflicts with another's right to life, liberty, or that same pursuit. No matter how much happiness you might obtain from it, the law cannot accommodate your hobby of stabbing people or burning down others' houses without trampling the rights of others.

The second is when society does not believe a person has the necessary mental faculties to make an informed, rational choice for themselves. For example, we deny a multitude of rights to minors, many on the grounds that minors have not reached the level of maturity necessary to act in their own self-interest. Due to the addictive nature of cocaine, as well as the considerable risk of harm that it creates, it would be fair to conclude that there is no age at which a human being has matured to use the drug with rational self-interest, and hence a justification exists for its continuing prohibition.

Neither circumstance applies to marijuana. Marijuana consumption does not interfere with the rights of others, nor is it so harmful or addictive a drug that one could rule out individuals using it out of enlightened self-interest. Like hot dog eating or white water rafting, marijuana consumption should be counted among those activities in which society trusts the individual to make a trade-off between the joys of the activity and its physical risks.

In principal and in practice, the prohibition of marijuana is self-destructive. This country would be uniformly better off if marijuana was legalized and taxed.

**Action:** Legalize marijuana and tax it at an exclusive rate of 150 percent. **10-year savings:** \$500 billion.



**Last October, *The Tech* surveyed over 2100 MIT undergraduate and graduate students about their political views.** We asked whether students supported California Proposition 19, a measure to legalize and regulate marijuana. A majority — 54 percent — said they supported the measure, compared to only 41 percent of Americans overall. And while 52 percent of Americans said they did not support the measure, only 26 percent of MIT students said the same. A fifth of MIT respondents said they were unsure or offered no response.

—Keith Yost







# Black smoke covers Cambridge

On Wednesday afternoon, large plumes of black smoke billowed from the MIT Power Plant after a water feed pump stopped functioning at the plant. The smoke lasted for two hours.

MIT Power Plant Director Randall D. Preston said that the black smoke resulted from a failure in the oil atomization process. Atomization, the process of forcing oil into small droplets before it is burned, relies on high pressure steam, which is produced by water boilers. However, when the water feed pump failed at the plant on Wednesday, the boilers did not have enough water to produce the necessary steam to allow for atomization to take place.

As a result, the unatomized oil burned and released a thick black smoke into the air. Workers at the plant reacted quickly, fixing the water pump and stabilizing steam pressure to normal levels. The plant remained functional despite the incident.

The MIT Power Plant usually runs on gas, but began burning oil last Tuesday while its gas burning system underwent renovation.

According to Preston, burning oil is not ideal because it costs three times as much as burning gas.

The plant finished the improvements on Wednesday and is now back to burning gas.

—Rob McQueen



# 45% of MIT students on dining

## Plan more popular with freshmen than upperclassmen

Dining, from Page 1

them, or 25 percent, chose to opt-up to a more expensive plan. And out of the 258 students who opted-in but were not required to enroll in any plan at all, 173 were freshmen and 88 upperclassmen. In other words, 38 percent of freshmen and 3.8 percent of upperclassmen who were eligible to opt-in chose to do so.

The Tech reported last month that the implementation of House Dining did not appear to substantially affect upperclassman dormitory transfer rates or dormitory popularity in the freshman adjustment lottery.

Overall, the “Any” category of dining plans is the most popular, with 930 students — 49 percent of those enrolled in a plan — choosing a plan that allows

them to use a set number of meals per week for any combination of breakfasts, brunches, lunches, or dinners. About 30 percent of students in a dining plan chose “basic,” which offers a set number of breakfasts and dinners. Twenty-three percent are enrolled in “19 Full,” House Dining’s most expensive plan, which affords all 19 breakfast, brunch, lunch, and dinner meals per week.

### The biggest threat to depression is your awareness of it.

Serious depression strikes millions. Serious depression strikes indiscriminately. Serious depression is MOST dangerous when it goes unrecognized. That's why it's so important to always be aware of the threat of depression. And if your life is ever interrupted by a period of depression, remember that it is readily, medically treatable.

## UNTREATED DEPRESSION

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# MIT World Hunger club forges local partnerships

## Planning collaboration with Harvard Hunger initiative for spring banquet, other events

**Hunger Week**, from Page 1

issues and how to volunteer for the cause.

Money raised during the week will be split equally between Pine Street Inn, a local homeless shelter, and Doctors Without Borders for a project specifically targeting malnutrition in the Horn of Africa. Sherry Fu '14, MFWH club head, emphasized that the club is as committed to relief close to home as it is to visible global causes. She reminds students that they can make an impact on local hunger problems, which are often overshadowed by "bigger" issues.

During Hunger Week, MFWH will also initiate its year-long project of selling nutrition bars from Two Degrees Food, a for-profit company committed to reducing child hunger. Club members will be giving out samples and holding preliminary sales at the Hunger Week booth.. For every

bar sold, Two Degrees donates a medically-formulated nutrition pack to a malnourished child. The nutrition packs are manufactured in their distribution area to minimize transport costs and create local jobs. Thus far, the packs have treated severe or chronic malnutrition at 95 percent success rates and are endorsed by the World Health Organization.

**The club is as committed to relief close to home as it is to visible global causes.**

Professor Abhijit Banerjee, founder of the Jameel Poverty Action Lab, will give a lecture next Thursday evening on problems regarding conventional thinking about hunger. He will offer solu-

tions to such pitfalls as skepticism about the ability to provide aid and being patronizing toward the ones helped. Banerjee agrees with MFWH's overall approach to the issue by raising awareness around campus.

"First I think you have [the] responsibility of learning what's out there — that a huge amount of energy, resources, are wasted because people are ... fighting in the wrong direction," Banerjee said.

Though it is a new club, MFWH has already reached out to collaborate with other campus organizations to spread word about its cause. Challah for Hunger will donate its profits from next week's sale to MFWH, and Amnesty International will share and promote the Hunger Week booth.

"Our solidarity and teamwork toward a common goal will ... generate the potential for a very successful fundraiser," Fu said.

Off campus, the club has al-

ready established an extensive network with local restaurants, non-profit organizations, food companies, and similar groups in other schools, Mao said. Current sponsors include Flour, Clover, J.P. Licks, and Upper Crust, all of which are frequented by MIT students and have the potential to generate good publicity for MFWH.

**'At MIT we have the technology and the resources to truly make an impact'**  
—Laura R. Stilwell '14

MFWH is particularly eager to work with nearby group Harvard Hunger Initiative to organize a Hunger Banquet in the spring. At the event, students will be assigned social classes in proportion to the world's population and eat their class' respective meals. The ban-

quet offers an opportunity to experience global economic stratification firsthand.

Although MFWH is just one of the large host of student groups that also focus on global development, it has already received positive feedback from the community, noted Emma F. Broderick '14 after canvassing local businesses. The Upper Crust in Harvard Square, for example, offered to cater MFWH's screening of Seeds of Hunger next Tuesday for free.

"At MIT we have the technology and the resources to truly make an impact ... what we need is the manpower and the energy of the entire student body," said Laura R. Stilwell '14, one of the organizers of Hunger Week.

Hunger Week T-shirts and raffle tickets will be on-sale in Lobby 10 starting Monday next week. To help out or learn more about MFWH, email [mfwh\\_exec@mit.edu](mailto:mfwh_exec@mit.edu).

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# From time to time

## The Clock

## Christian Marclay

**Museum of Fine Arts, Loring Gallery**

**Sept. 16, 2011 – Dec. 31, 2011****STAFF WRITER**

*The Clock*, by spanning much of cinematic history, reveals something of our deep emotional attachment to time. It is a film made of thousands of clips spliced together, each one of which contains a reference to the time, either verbally or, more usually, in the form of some clock or watch. The clips are chronologically ordered and the film's looped screening is timed precisely so that each

Marclay seamlessly weaves together scenes ranging from students taking an exam to an assassination at a wedding. You might jump as someone is electrocuted while de-misting a bathroom mirror, or laugh as a wrist-watch is "baptized" by Robin Williams in a diner. You might recognize famous actors such as Johnny Depp and Judi Dench, or well-known films like *Big Daddy* and *The Lives of Others*. There are clips in black and white, some in French, and some from sci-fi films and Westerns. With Marclay's background as a musician, the audio of the film is also skillfully edited; for example, the chugging of a drink in one scene is impeccably timed to the impatient pen-tapping of Sandra Bullock in the next.

gling to figure out what's happening. Instead, it's more like watching exciting trailers. There are hints that a complex web of hidden subplots exists, which you are relieved from needing to know about.

Marclay and six assistants spent 21 years creating the nearly \$500,000 film which was recently co-acquired by the MFA and the National Gallery of Canada. Both galleries cannot exhibit the film at the same time, but a shared purchase was encouraged given that only six editions of the artwork exist, and that this arrangement will allow more people to see it. So far, *The Clock* has garnered such success that the MFA has extended its exhibition to Dec. 31.

And with good reason. I myself went to the MFA to see another exhibit, but thought I might as well take five minutes to check out *The Clock*. Forty-five minutes later, I was dragging myself away. It truly is quite a unique and unusual experience. Ironically — even though I was constantly being reminded of it — I found that, while watching it, I forgot the passing of time.



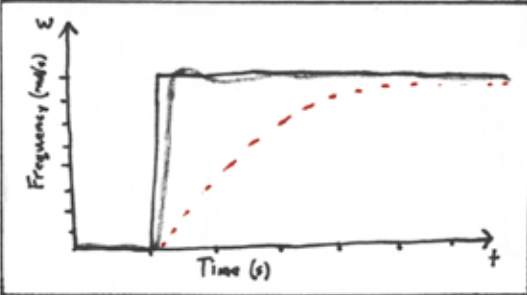
**Christian Marclay's *The Clock* focuses entirely on the concept of time.**

COURTESY OF WHITE CUBE, LONDON AND PAULA COOPER GALLERY, NEW YORK



Help Desk by Michael Benitez

HOURS OF WORK HAVE LEAD TO THIS, THE PERFECT COMPENSATOR FOR THIS MOTOR. I'VE GOT A LEAD TO ADD PHASE MARGIN AND IMPROVE STABILITY PLUS A LAG TO KNOCK OUT STEADY-STATE ERROR. IT WORKS DELIGHTFULLY IN MATLAB, NOW COMES THE REAL TEST.




Michael Benitez  
10-7-11


HERE GOES...

\*click\*

Run



FACT: THE REAL WORLD SUCKS.



S M B C  
SATURDAY MORNING BREAKFAST CEREAL  
BY ZACH WEINER  
[2377]  
Re-run with panels in the correct order (see Corrections, p.6)

BABY, I WOULD CLIMB ANY MOUNTAIN... CROSS ANY VALLEY... JUST TO BE WITH YOU... I WOULD SWIM ANY- WOULD YOU EAT THIS BRICK?

WHAT?

WOULD YOU EAT THIS BRICK. ALL OF IT.

I WOULD CLIMB ANY MOUNTAIN, AND I- LOTS OF GUYS WOULD. I NEED SOMEONE SPECIAL. SOMEONE WHO LOVES ME SO MUCH, HE WOULD EAT THIS BRICK. JUST THIS ONE BRICK.

I DON'T THINK I CAN EAT A BRICK.

WELL, NOW WHENEVER YOU THINK "WHY DOESN'T SHE LOVE ME," AT LEAST YOU'LL KNOW THE ANSWER.

YOU WERE RIGHT! IT'S EASY TO GET RID OF CLINGY GUYS!

HOW'D IT GO?

PAGE 17

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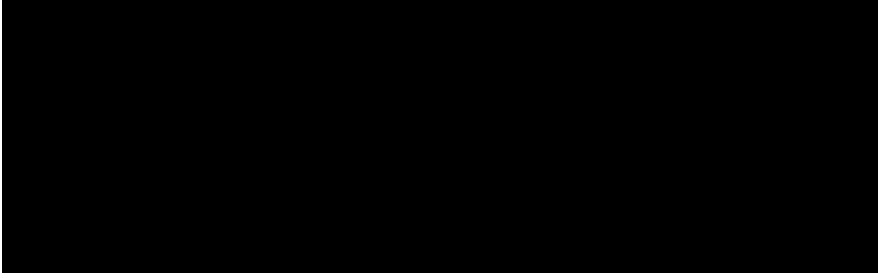
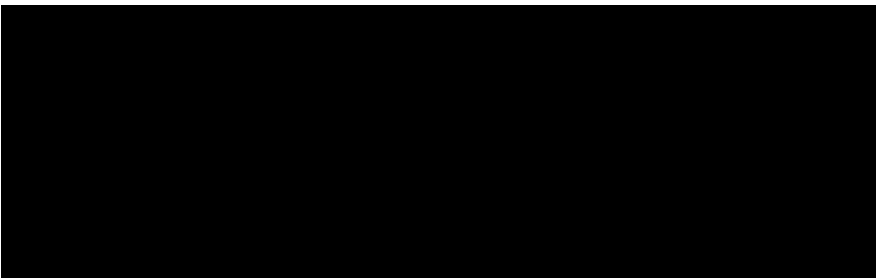








Dilbert by Scott Adams



PILED HIGHER AND DEEPER

by Jorge Cham

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Crossword Puzzle

Solution, page 17

ACROSS

- 1 Abstention periods
- 6 Period on the job
- 11 QB's pursuit
- 14 Bandleader Shaw
- 15 Listens to
- 16 Day's end, in poems
- 17 Start of a quip
- 20 Rugged ridges
- 21 Ticket details
- 22 Pindar product
- 23 "Bellefleur" author
- 26 Removed moisture
- 28 Caution
- 30 Strained
- 32 Paul Anka's "\_\_\_ Beso"
- 33 Curvy letters
- 35 Dining option
- 38 Part 2 of quip
- 41 Ice cream option
- 44 Supporting group
- 48 Dolphin Marino
- 49 Honest!
- 52 Cartographic speck
- 53 Big name in rap

- 56 Actress Berger
- 58 Avoirdupois unit
- 59 Arledge of ABC sports
- 61 Fidel of Cuba
- 63 End of quip
- 67 Shoshone
- 68 Old newspaper sections
- 69 Church officer
- 70 Dropout's doc.
- 71 Missouri River feeder
- 72 Luges

DOWN

- 1 CAB's successor
- 2 Fleet groups
- 3 Intense lookers
- 4 Fork part
- 5 Melee
- 6 California peak
- 7 \_\_\_ up (excited)
- 8 Descartes' conclusion
- 9 Italian monks
- 10 Clicked one's tongue
- 11 More irritable
- 12 Hardest to penetrate

- 13 Winter ATV, \_\_\_-Cat
- 18 Warm up
- 19 Musician's pride
- 22 Be obligated
- 24 Case in point
- 25 Actress Ward
- 27 Buck lover
- 29 Headline material
- 31 N. or S. state
- 34 As written: Lat.
- 36 Pau pronoun
- 37 Vino region
- 39 Nol of Cambodia
- 40 Writer Anita
- 41 Unmatched
- 42 Tell the tale
- 43 Funded
- 45 Spanning
- 46 Bowled over
- 47 Marsh
- 50 Cut into
- 51 Greek letters
- 54 Rogers of oaters
- 55 Latin American January
- 57 Grate deposit

1	2	3	4	5	6	7	8	9	10	11	12	13
14						15					16	
17					18					19		
	20							21				27
22				23		24	25		26			
28			29		30			31			32	
33				34		35			36	37		
			38		39	40						
41	42	43							44	45	46	47
48					49			50	51		52	
53			54	55		56			57		58	
	59				60			61		62		
63						64	65					66
67					68					69		
70					71					72		

- 60 Aphrodite's child
- 62 Renowned archer
- 63 Loutish fellow
- 64 Amtrak stop
- 65 Overeater
- 66 Grads-to-be



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MELISSA RENÉE SCHUMACHER—THE TECH  
**Hackers dressed the Alchemist in the likeness of Steve Jobs** on Monday. There was also an Apple logo hack in Lobby 7 the same day — all in honor of the recently deceased visionary.



FENG WU—THE TECH  
**Danielle Marie '14 scattered leaves on the runway as she showed off an outfit from Free People at KATwalk.** KATwalk, hosted by Kappa Alpha Theta, took place in Walker Memorial on Monday night.



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# OPERA results face intense scientific scrutiny

## MIT physics professors say that results should be questioned, but exposure is valuable

Neutrinos, from Page 1

only a few hours before the light did (neutrinos leave the dying star before visible light from the explosion). Every supernova is accompanied by production and emission of a massive quantity of neutrinos. Physicists can calculate the relative time between when the neutrinos are emitted and when

in other parts, which is why it’s hard to isolate this neutrino ‘disease’ in this small sector,” Wilczek said. But no one is claiming that the European researchers were careless. On the contrary, Wilczek believes that all of the scientists are “competent, professional experimenters who have been wrestling with this for months and can’t make this go away.” “I’m not claiming they’ve done

**‘It’s premature, to say the least, to speculate wildly about the implications, either theoretically or technologically.’**  
—*Frank Wilczek*  
NOBEL LAUREATE

the light is emitted from the explosion. If OPERA’s results are correct, however, the neutrinos should have travelled faster and arrived a few years before the light. Hughes and Wilczek both guess that scientists will most likely approach the neutrino announcement with a variety of new experiments and do tests with different baselines. “I would say there’s a 98 percent chance this is a systematic error,” Hughes said. Scientists note that other predictions of special relativity are valid, and that these neutrinos might be something “special and weird.” “Within the theoretical framework, we have been very successful

it wrong, I’m saying that it needs looking at very carefully,” added Hughes. “There’s a big difference between precision and accuracy — you can measure with precision a very inaccurate result.” **What if it’s true?** If it is true that neutrinos can travel faster than the speed of light, fascinating new lines of inquiry could open. One theory is that these speedy neutrinos could be a crack in the universe that reveals extra dimensions in high energies. “If this were correct, our GPS wouldn’t work,” Hughes said of the navigation technology that relies on relativistic principles. “It’s premature, to say the least, to speculate wildly about the im-

plications, either theoretically or technologically,” said Wilczek. Talk in the media about traveling in time or having causal loops were a misunderstanding of relativity. “If there’s any limiting speed, even if it’s not the speed of light, one would not be able to close the loop from the future to the past,” Wilczek added. Although he is doubtful of the results, Hughes does not have any criticism of OPERA’s report itself. “The paper is very clear — they say they’re throwing [this discovery] out there for further testing. Their paper is very careful and pretty conservative.” He found it “irresponsible,” however, that the authors held a press conference immediately after their accidental discovery. In fact, some of the researchers who were part of OPERA actually removed their names from the paper because they found the analysis to be too preliminary to be able to release the results in such a manner. “This is one of the few things that reveals the tension that was going on within the experiment,” Hughes pointed out. **Public reaction** The fact that this story has made a huge appearance in headlines over the past few weeks does not surprise Hughes, but he is worried that after it dies down, any future and possibly contradictory discoveries will not have as large

an impact in the media. “No headline will say, ‘Oops, we goofed.’ ... My concern is that this potentially big splash will not be compensated for by correction,” said Hughes. Physics student Asher C. Kaboth G also noted that “It’s harder for the general public to understand the little details ... it’s difficult to explain.” Those who do not know much about special relativity might have misconceptions about what these results mean and their possible implications, he said. Conrad did not like the way **“It’s harder for the general public to understand the little details ... it’s difficult to explain.”**  
—*Asher C. Kaboth*  
GRADUATE STUDENT

some physicists reacted to the news. “Way up there in the responses I don’t like [is], ‘If it doesn’t fit my theory, it must be wrong.’ That’s not okay to tell people.” She said that if neutrinos really do travel faster than the speed of light, it breaks current theories and scientists will have to construct new ones. “There’s a difference between us saying what nature will do and

nature telling us what it does,” Conrad said. “When you find a violation, you have to find a way to put it in the perspective of other data.” Despite concerns, the neutrino results have been a great teaching opportunity for many professors. In Hughes’s 8.033 (Relativity) class, he discussed the concept of the experiment in lecture and asked students to think carefully about whether they believed that neutrinos could travel faster than the speed of light. “In the hands of someone who can discuss this well, and the ears of students open to listening, it’s a great topic,” Hughes said. Conrad also brought up the subject in her 8.02 (Electricity and Magnetism) class and asked her students to answer questions like “If this result is proven wrong, what does this say about science? Does science ever get it right?” Her opinion is that things go wrong in science all the time, but the beauty is that one discovery leads to the next, and we continue to change what we know about the world. Wilczek agreed that on the whole, it’s a good thing that people are noticing current research in physics, and that there is exposure of the scientific process. “There’s something about Einstein and space that even after all these years has a certain magic because it’s so profound and unexplained,” he said.

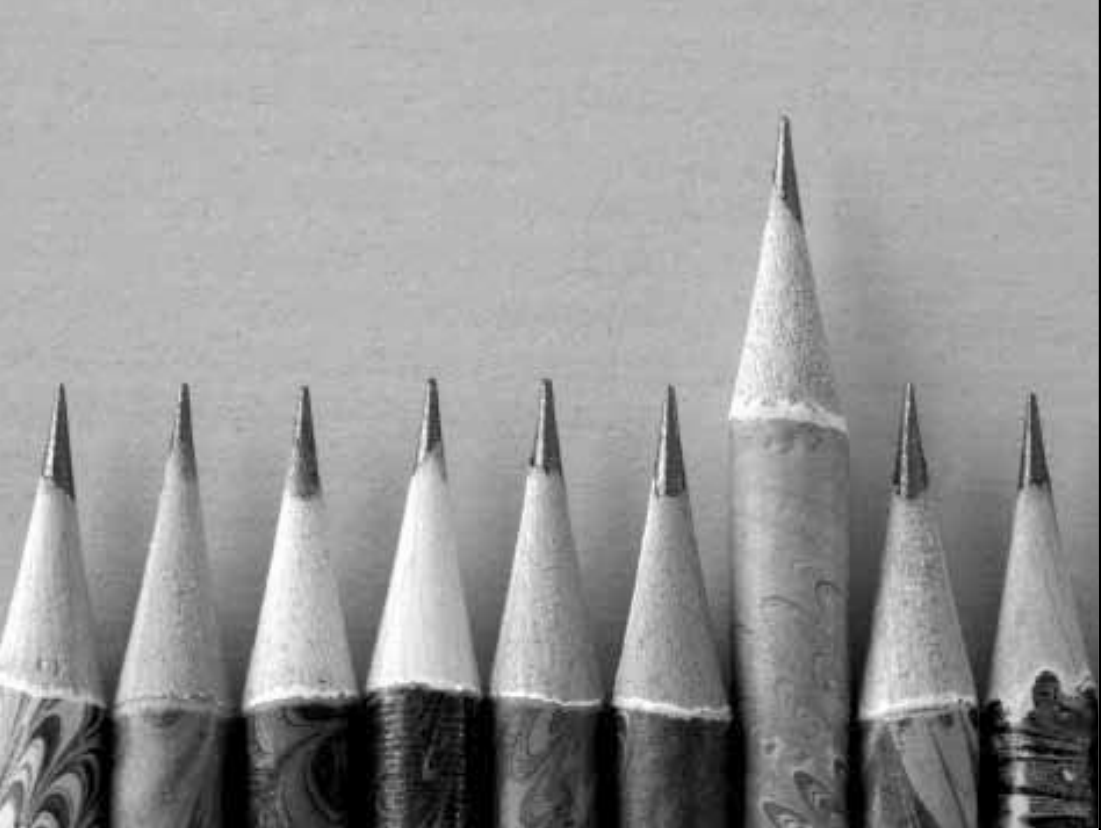
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# Hybrid & electric cars gain traction in fuel economy

## Automakers attempt to meet high mileage goals without making significant sacrifices

By Bill Vlasic  
THE NEW YORK TIMES

The formula for better fuel economy in cars has long been a simple equation: The smaller the vehicle, the farther it goes on a gallon of gas.

Fuel-conscious consumers have been forced to make trade-offs. More size and interior room translated into heavier vehicles and larger engines and increasingly expensive trips to the pump. Saving on gasoline meant choosing narrower, shorter and less powerful vehicles, whether it was a compact pickup truck or a little sedan with a token back seat and minimal creature comforts.

But a quiet revolution has been taking place in the design studios and engineering centers of the world’s major automakers, one that is allowing drivers to select vehicles in virtually every market segment without compromising on fuel economy.

It’s all happening under the hood, where improvements in engine technology are turning gas-guzzlers into relative fuel-sippers, yet still delivering the horsepower, acceleration and utility that U.S. consumers crave.

Government mileage regulations will force automakers to produce fleets that average 54.5 miles per gallon by 2025, nearly double the current standard.

And while that target seems lofty, the car companies are steadily inching toward the goal by improving the mileage achieved by traditional gas engines as well as introducing more hybrid and electric models.

“The average car in 2025 will get the kind of mileage that today’s Toyota Prius hybrid gets, but we’re not talking about some futuristic technology,” said Dan Becker, director of the Safe Climate Campaign, a Wash-

ington organization that promotes efforts to mitigate global warming. “Most of the changes will be invisible to the consumers and achieved with better engines, transmissions and aerodynamics.”

The U.S. auto industry has endured a rough ride in recent years. The economic crisis in 2008 pushed the Detroit automakers to the brink of insolvency. Sales withered, and the car companies were forced to slash unsustainable costs and payrolls. General Motors and Chrysler were forced to seek government aid and go through bankruptcy to survive.

But Detroit emerged from the recession leaner, more competitive and intensely focused on delivering cars and trucks that are fun to drive and practical to own, but also cheaper to fill up, with gas prices that have hovered around \$4 a gallon.

Consumers are discovering cars that meet their needs without busting their budgets on fuel. Bradley Herring, an engineer from Dubuque, Iowa, was recently in the market for a roomy, family-size sedan with the fuel economy of a compact car.

He found exactly what he wanted in, of all places, a Buick showroom. The GM brand has historically offered larger vehicles with cushy rides and mediocre fuel economy. But by choosing a Buick LaCrosse with a small, four-cylinder engine equipped with a direct-injection system, Herring got the space and comfort of a bigger car with a combined city and highway mileage of nearly 25 mpg.

“I didn’t have to downsize to a compact car to get decent mileage,” he said. “I’m saving about \$15 a week on gas with a full-size sedan that runs on regular gas. It’s not going to make or break me, but every little bit

helps.”

Direct-injection technology pushes fuel into the combustion chambers of a traditional engine to create more horsepower at greater efficiency, resulting in better fuel economy and lower emissions. While hardly an automotive breakthrough, the system allows consumers like Herring to enjoy improved mileage without compromising on size.

“Buying a compact car would have been a big step down from the sedans I’m used to,” he said. “Now I’m able to get pretty good mileage and still have the space I need.”

Fuel economy is among the chief considerations for consumers looking for a new vehicle, according to the auto research website Edmunds.com.

“It’s one of the most important factors that people consider when buying a new car,” said Jeremy Anwyl, the chief executive of Edmunds. “But they want to make as few trade-offs as possible, whether it’s the size of the vehicle or the price.”

Several new models entering the market will broaden the choices for drivers weary of rising fuel costs. Toyota is expanding its Prius hybrid line with a wider, more spacious version, and introducing a new generation of its top-selling Camry sedan. General Motors is rolling out a U.S.-made subcompact, the Chevrolet Sonic, that it hopes will captivate younger buyers with a sticker price under \$15,000. Hyundai has a sporty, compact car, the Veloster, on tap that will get nearly 40 mpg.

But it’s not just small and midsize cars that are grabbing the interest of mileage-sensitive consumers. GM, for example, is marketing a new electronic system, called eAssist, that improves the fuel economy of

its larger sedans. Ford Motor Co. has won raves for its EcoBoost technology, which employs direct injection and turbocharging to improve fuel efficiency in a variety of vehicles.

Ford executives have been pleasantly surprised at the success of the EcoBoost version of its F-Series full-size pickup, the best-selling vehicle in America. “The company felt we could change minds about V-6s in trucks if we delivered fuel economy without sacrificing performance,” said a Ford spokesman, Said Deep.

Still, skeptics wondered whether truck buyers would choose a pickup with a six-cylinder engine rather than the traditional V-8. But the F-Series equipped with the 3.5-liter EcoBoost engine now accounts for about 40 percent of Ford’s F-Series sales, proving that even stalwart pickup owners will downsize their engines to shave fuel costs.

One such convert is Thomas Beattie of Chandler, Ariz., who bought an F-150 with an EcoBoost V-6 engine in May. Beattie wanted a rugged truck that could go off-road on camping trips with his 5-year-old daughter, but burn less fuel on long drives.

The EcoBoost engine improves fuel economy by about 10 percent over the conventional V-8. Beattie proudly compared the mileage of his metallic-blue F-150 to that of older-model large sport utility vehicles like the Chevrolet Suburban.

“All those Suburbans are getting between 10 and 13 miles to a gallon,” he said. “But I can set my cruise control to 70 miles an hour and get between 20 and 28 miles per gallon on the highway in my pickup.”

The recent increase in future fuel-economy standards is setting the stage for the next leap forward in pickups — a hybrid truck. Ford and

Toyota recently announced plans to jointly develop a hybrid gas-electric system for trucks and large SUVs.

Hybrids will be an integral part of the industry’s plan to meet the stringent new fuel-economy regulations. Only a small percentage of drivers have embraced hybrid technology, but attitudes are changing as car-makers install hybrid systems in a wider variety of models.

“The hybrid is slowly becoming a mainstream technology,” said Becker of Safe Climate Campaign. “I suspect there are some people who will never be comfortable with them, but their numbers are growing fewer and fewer.”

Becker also estimated that all-electric vehicles would compose about 5 percent of new-vehicle sales by 2025. “The automakers are going to need that number to reach the overall fleet average,” he said.

The market for electric cars remains questionable. Nissan’s electric Leaf has gotten off to a slower-than-expected start since being introduced last year, although its debut was hampered somewhat by problems related to the tsunami in Japan. GM has taken a deliberately patient approach in its rollout of the Chevrolet Volt, a plug-in hybrid electric sedan that runs primarily on battery power but has a small gasoline engine so it can recharge on the fly.

The Volt gets the equivalent of 93 mpg in fully electric mode, but at a price of more than \$40,000. Even with a \$7,500 federal tax credit, the car is pushing the limits of consumer acceptance because of its high cost.

“There is clearly a curve on which consumers are willing to pay for better fuel efficiency,” Anwyl said. “At some point, the improvements in technology cost more than people are able to justify.”

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CHRISTOPHER A. MAYNOR—THE TECH  
A Mechanical Engineering student launches an “angry bird” at targets downrange on Killian Court Friday afternoon. The energetic event was the culmination of several weeks’ worth of designing and building in 2.009 (The Product Engineering Process).

Solution to Crossword

from page 13

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

SMBC, from Page 11



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## CHALLENGED or BANNED in 2010–2011

Alexie, Sherman. *The Absolutely True Diary of a Part Time Indian*  
Anderson, Laurie Halse. *Speak*  
Baker, Larry. *The Flamingo Rising*  
Baskin, Julia; Lindsey Newman, Sophie Pollitt-Cohen, and Courtney Toombs. *The Notebook Girls: Four Friends, One Diary, Real Life*  
Brashares, Ann. *Forever in Blue, the Fourth Summer of the Sisterhood*  
Burroughs, Augusten. *Running with Scissors*  
Butler, Dori Hillestad. *My Mom's Having a Baby*  
Cast, P. C., and Kristin Cast. *Betrayed*

Chbosky, Stephen. *The Perks of Being a Wallflower*  
Chopin, Kate. *The Awakening*  
Collins, Suzanne. *The Hunger Games*  
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# As online education rises, financial aid fraud grows

## Inspector general and universities employ stricter measures to investigate fraud rings

By Tamar Lewin  
THE NEW YORK TIMES

While serving nine months in a South Carolina prison on forgery charges, Michelle N. Owens capitalized on the explosion in online higher education to tap into a new — and highly lucrative — way to profit from fake documents.

Using information she gathered as she handled paperwork in the prison’s education department, Owens filed applications for admission and financial aid to Webster University’s distance-learning programs on behalf of 23 unknowing inmates.

The applicants were admitted and granted the \$467,500 in requested aid, including \$124,821 for books, transportation and living expenses — though of course their room and board was provided by the state. The aid was sent in the form of debit cards to the residential South Carolina address Owens supplied.

An alert employee at Webster in St. Louis, which has campuses overseas and on dozens of United States military bases, eventually noticed an unusual number of applicants from the same address in Florence, S.C. Owens, 36, who continued to make fraudulent applications to Webster for more than a year after she was released from Leath Correctional Institution in 2008, was sentenced Sept. 29 to 51 months in federal prison and ordered to pay \$128,852 in restitution.

She is one of 215 participants in 42 financial aid fraud rings who have been convicted since 2005 and ordered to pay \$7.5 million in restitution and fines, according to a new report by the Department of Education’s Office of the Inspector

General.

But those numbers do not reflect the scale of the fraud rings, the report said, since often the ringleaders are the only ones prosecuted.

With the huge expansion of online college courses, financial aid scams have become a serious problem.

As of Aug. 1, the inspector general had opened 100 investigations into distance-education fraud involving thousands of suspects; such crimes now make up about 17 percent of the agency’s open cases, and investigators are working on 49 new complaints, scrambling to keep up.

**As of Aug. 1, the inspector general had opened 100 investigations into distance-education fraud**

“Because of the sheer volume of referrals, finite resources, and other external limitations,” the report said, “we cannot investigate all of the referrals we receive concerning distance-education fraud rings.”

The rings generally seek federal aid for “straw students” who have no intention of pursuing an education — or, as in Owens’ scheme, are unaware of the application. The aid is sent to the college, which takes the portion covering the initial tuition and fees, and then “refunds” the excess to the student to cover other expenses such as books, transportation and room and board.

Some rings involve vast cad-

res of foot soldiers, many of them lacking a high school diploma, recruited with the understanding that they will keep a portion of the aid money and kick back the rest to the ringleader.

Until 2005, colleges could not participate in federal aid programs if more than half their students were enrolled in what were then known as “correspondence” or “telecommunications” courses. For online courses — but not correspondence courses — the 50 percent rule was eliminated in 2005.

By now, the vast majority of colleges and universities offer online courses, and some huge commercial institutions have hundreds of thousands of online students. Amid tough economic times, an increasing number of these students are actually what are known as “Pell-runners” — people who disappear as soon as they receive the proceeds of their Pell grants or student loans.

Kathleen S. Tighe, the inspector general, suggested that colleges clamp down on identity verification and that Congress and the Education Department to rethink whether online students, mostly working adults, should be eligible for the same federal aid to cover living expenses as students who attend on-campus programs.

“Without that money there would be significantly less incentive for this particular scam,” Tighe noted. “We’ll do the best we can with our resources to investigate the allegations we receive, but there are actions that can be taken to help reduce the appeal of this quick-cash-for-little-effort scam.”

Community colleges have been especially vulnerable to fraud rings, because of their open en-

rollment and low tuition, which leaves room for substantial excess aid.

At Rio Salado College, an online community college in Arizona, 64 people were convicted in a \$538,000 scheme that unraveled after an employee in Rio Salado’s financial aid office noticed similar handwriting on several applications. The ringleader, Trenda Halton, a student who pleaded guilty last year, worked with several accomplices who recruited “straw students” to apply for Pell grants and loans.

Halton signed into their online classes to meet Rio Salado’s attendance requirements, then took a cut of \$500 to \$1,000 once the aid money came through.

**The ringleader worked with several accomplices who recruited ‘straw students’**

(Rio Salado has a business partnership with The New York Times Co. to offer courses through the company’s online education program.)

Pursuing so many people in an individual ring is rare, though.

“It is unlikely that such a robust effort to prosecute all participants in such a large investigation will be repeated in the future,” said the inspector general’s report.

In a similar case two years ago, American River College, a community college in Sacramento, found dozens of people with the same address enrolled in the same courses, all of whom were then either withdrawing or failing. The ringleader pleaded guilty to fraudulently applying for federal financial aid for more than 60 people, and, in May, as a result, he was sentenced to five years and 10 months in prison, and ordered to pay \$234,515.

The biggest fraud, along with

the most significant efforts to combat it, seems to have occurred at Axia College, a two-year program of the University of Phoenix, the nation’s largest for-profit institution. Officials there have identified — and referred to the inspector general — some 750 rings involving 15,000 people.

Axia, which enrolls about 150,000 students, and the University of Phoenix’s parent company, the Apollo Group, have four employees working full time to identify fraud and expose Pell-runners. “We have been able to construct a pretty thick net that is very difficult for these criminals to penetrate,” said James Berg, the Apollo Group’s chief ethics and compliance officer.


Apollo monitors and records the vast majority of calls from potential students, he said, and has what he called an “intense identity verification process” if any red flags are raised.

The company is also on the lookout for multiple applications from the same computer network address, often a tip-off to a fraud ring.

Last year, Apollo introduced a required three-week orientation in hopes of weeding out students likely to drop out. Axia’s new enrollment has since dropped by about half; Berg said the orientation had also cut down sharply on fraud.

“Fraud ringleaders, operating on behalf of several students, have to maintain the appearance that they’re all participating in orientation, and that’s just too much work for the ringleader,” Berg said.

“We’ve heard back from ringleaders that the University of Phoenix is making it too difficult for us. And since the beginning of 2011, on a monthly basis, we have seen a decrease in the number of fraud rings we are flagging. I think with all the cases we’ve referred to law enforcement, word has gotten out that this is not a smart thing to try here.”



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### Solution to Techdoku

from page 12

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

### Solution to Sudoku

from page 12

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

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