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TechTalk

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

It's a taxing time for air travelers

Elizabeth Thomson
News Office

Airline passengers are giving an ever-increasing portion of their travel dollars to Uncle Sam, according to data released by MIT's Global Airline Industry Program and Daniel Webster College.

Airline ticket prices overall have actually dropped over the past several years, the researchers emphasize. However, many of the taxes and fees passengers pay, which fund a significant portion of the costs of U.S. air-traffic control and airport systems, are not linked to the base price of the tickets and have remained about the same.

As a result, the effective tax rate on airline tickets is steadily increasing, and will increase more under the Bush administration's recently released federal budget proposal, researchers report.

Which raises the question: Who should pay for the increases? The airlines or U.S. taxpayers?

"The Bush administration's proposed increase in the security fee added after September 11, 2001, has generated strong reactions from the airline industry," said MIT Professor Amedeo Odoni, the project's director. "The increased fees will place further strain on the airlines at a time when several of them are struggling. On the other hand, it is difficult to argue

that taxpayers at large should subsidize the security costs of airline customers."

Odoni believes that his team's 2004 study and its recent update can add a more factual note to the ticket tax debate. "This study provides an objective basis for Congress to examine the issue and make informed decisions on airfare taxes."

The study team's initial results were published in the July 2004 Journal of Air Transport Management. The U.S. General Accounting Office cited the study in U.S. Senate briefings and in a report submitted to Congress.

After the administration's proposed hike in security fees, passengers would, on average, pay 19 percent in taxes and fees

on top of the ticket price, the researchers found in their update of last year's study. In 2004, passengers paid 16.1 percent in taxes on top of the price of a domestic ticket. This is up from 15.5 percent in 2002 and 10.9 percent in 1993.

Professor Joakim Karlsson of Daniel Webster College explains the significance of the study's results: "The airlines have lost the ability to raise airfares, even to just keep pace with inflation. The average round-trip ticket has dropped 40 percent in real terms since 1993. Meanwhile, average ticket taxes and fees have stayed relatively

See **TICKETS**

Page 5

Author talks on Walker

Sasha Brown
News Office

"Alice Walker: A Life" was a labor of love for long-time journalist and biographer Evelyn White, who came to MIT on March 10 to discuss her process and the book itself with Associate Writing Professor Helen Lee.

White's visit was part of the Committee on Campus Race Relation's week of events and programs highlighting issues of race and diversity.

White said she first came to know of author Alice Walker in 1985 when

See **WALKER**

Page 4



PHOTO / DONNA COVENEY

Evelyn White gave a talk March 10 on the authorized biography she wrote on Alice Walker.

Campus makes grade with grad students, survey finds

Sasha Brown
News Office

Two-thirds of graduate students are satisfied with the resources available on campus and the great majority are pleased with their advisors, according to the 2004 Graduate Student Life Survey.

The survey, sponsored by the Provost's Office, the Graduate Student Office and the Graduate Student Council, represents the views of close to 3,000 graduate students, a response rate greater than 50 percent.

"We wanted to base our decisions on real data," said GSC President Barun Singh, who helped present the findings to about 150 students, administrators and faculty members on Feb. 21 in a town-hall-style meeting.

"While we have room to improve, 85 percent of students are happy with their advisors," said Singh. Still, about a third of the respondents wished for more contact with their advisors, according to the survey. Students ranked their advisors third, above even their parents in terms of whom they turn to when they are in need. "It is an important relationship," said Singh.

Seventy-five percent of students reported satisfaction with the resources available on campus, asking for improvements only in both dining and parking. Yet, not all students are aware of the wide variety of services available to them, said Singh. For example, only 4 percent of students reported using the Ombuds Office in the Office of the President, a service designed to aid in conflict resolution. Those who had used it found it to be enormously helpful, but many did not even know what it was. "There needs to be greater focus on

See **SURVEY**

Page 6

Buddhists help rebuild Sri Lanka

Denise Brehm
and
Sasha Brown
News Office

Sri Lankan families left homeless by the tsunami could find themselves living in an enclave of MIT-designed housing if the efforts of MIT's Buddhist chaplain and a researcher in the Department of Urban Studies and Planning are successful.

And there's every reason to believe they will be.

Immediately after the Dec. 26 tsunami hit, the chaplain, Tenzin L.S. Priyadarshi,

formed an alliance between MIT's Buddhist community and the Prajnopaya Foundation, which is working with the Sri Bodhiraja Foundation in Sri Lanka to collect funds for rebuilding permanent housing near the Sri Lankan seashores. Priyadarshi and the Prajnopaya Foundation, along with the Committee of World Religions for Tsunami Efforts in Taipei, Taiwan, raised more than \$130,000 by Jan. 15. On Feb. 27, the alliance dedicated 25 new homes, each built for about \$1,200. They hope to build 1,000 homes altogether.

"Many people are still thinking about how to relocate the victims and how to build camps for the victims. But because

of the Buddhist monks' involvement in this project, some new homes have already been built and are housing families," said Priyadarshi, who is a Buddhist monk from India. He explained that the Buddhist monks in Sri Lanka wield a great deal of influence with the Sri Lankan government, making it possible for them to work quickly.

The houses built by the alliance are being assigned to families on an as-needed basis, with the first homes going to single mothers who lost their husbands in the

See **SRI LANKA**

Page 4

NEWS

HONORED BY BUSH

An MIT alumnus receives the National Medal of Technology.

Page 3

ENGINEERING FOR GIRLS

MIT women travel the country to give youngsters new career ideas.

Page 6

RESEARCH

PROGRESS ON CANCER

Researchers come to a new understanding of how certain cancers work.

Page 5

GLOBAL WARMING

Survey finds few understand climate issues.

Page 5

ARTS

SOUNDS OF AUTUMN

MIT composer, flutist team up to create a new musical composition.

Page 7

INSTRUMENTAL MUSIC

Traditional Korean instruments get modern use.

Page 7

Researchers identify target for cancer drugs

David Cameron
Whitehead Institute

Researchers at the Whitehead Institute and MIT have discovered a missing piece to the puzzle of how certain cancers work.

For nearly a decade, scientists have been trying to fully understand a particular communication pathway inside of cells that contributes to many malignant brain and prostate cancers. While scientists have identified elements of this pathway, other key components have remained a mystery.

The new finding may present drug makers with a significant new cancer target.

"We believe that we have identified a component that researchers have been looking for since 1996," says Whitehead Associate Member David Sabatini, who is also an

assistant professor of biology at MIT.

At the heart of this new research is a protein called Akt, an important player in the regulation of cell division and survival. Abnormally high activation of Akt has long been implicated in a variety of cancers. If Akt travels to the cell membrane, it is switched on and promotes cell division, often contributing to tumor growth. However, as long as it stays within the cell cytoplasm, it remains relatively inactive. That's because the tumor-suppressor protein PTEN keeps Akt in check by destroying lipids in the cell membrane that normally draw Akt to the surface. In a sense, PTEN keeps a leash on Akt and thus suppresses cell division.

But when PTEN is mutated and unable to function, Akt breaks free. It makes its way to the cell membrane where other

proteins activate it, thereby enabling Akt to contribute to tumor growth. "When a cell loses PTEN through, say, a mutation, Akt goes gangbusters," says Sabatini.

The exact means by which Akt switches on when it reaches the cell membrane has only been partially understood. As a result, researchers have lacked a clear idea about how to prevent the process. However, in the Feb. 18 issue of *Science*, researchers from the Sabatini lab report discovering an important missing piece of the activation process.

This missing component, a molecule called mTOR, is a protein that influences a cell's ability to expand in size. mTOR has been widely studied as the target for the immunosuppressant drug rapamycin (in fact, mTOR is an acronym for "mammalian target of rapamycin"). In July 2004, Dos

Sarbassov, a scientist in Sabatini's lab, discovered a new protein that mTOR interacts with called rictor, but he wasn't yet sure of what these two proteins do together. In this latest paper, Sarbassov reports that when mTOR and rictor bind and form a complex, they help activate Akt by adding a phosphate group to a sequence of its amino acids (a process called "phosphorylation").

According to Sarbassov, "If we find a molecule that can block the mTOR/rictor complex, then we may be able to prevent Akt from becoming active and contributing to tumor formation."

This work was supported by the NIH, the Pew Charitable Trust, the Rita Allen Foundation, the Anna Fuller Fund, the Damon Runyon Cancer Research Foundation, and the Howard Hughes Medical Institute.

TICKETS

Continued from Page 1

constant at \$45 per ticket."

Karlsson adds: "With the total cost of taxes changing only slightly, the relative share of each ticket that goes to taxes and fees has been steadily increasing."

The federal government and airports currently add four types of taxes and fees to the basic cost of each domestic airline ticket. The administration's new proposal increases the security fee associated with passenger and baggage screening by up to \$6.

The MIT/Daniel Webster College ticket tax project estimates taxes and fees by analyzing a representative sample of actual tickets sold. "The airline industry usually computes taxes by picking a single 'typical' ticket. That choice usually results in a much higher estimate of the tax impact, and we usually see the airline industry report the tax as 26 percent," Karlsson said.

Shiro Yamanaka, an MIT graduate student in Transportation and Operations Research, is the third member of the study team. MIT's Global Airline Industry Program is funded primarily through a grant from the Alfred P. Sloan Foundation. Partial support for this study was also provided by a gift to the program from Amadeus, S.A.S.

For more information go to <http://web.mit.edu/TicketTax/>.

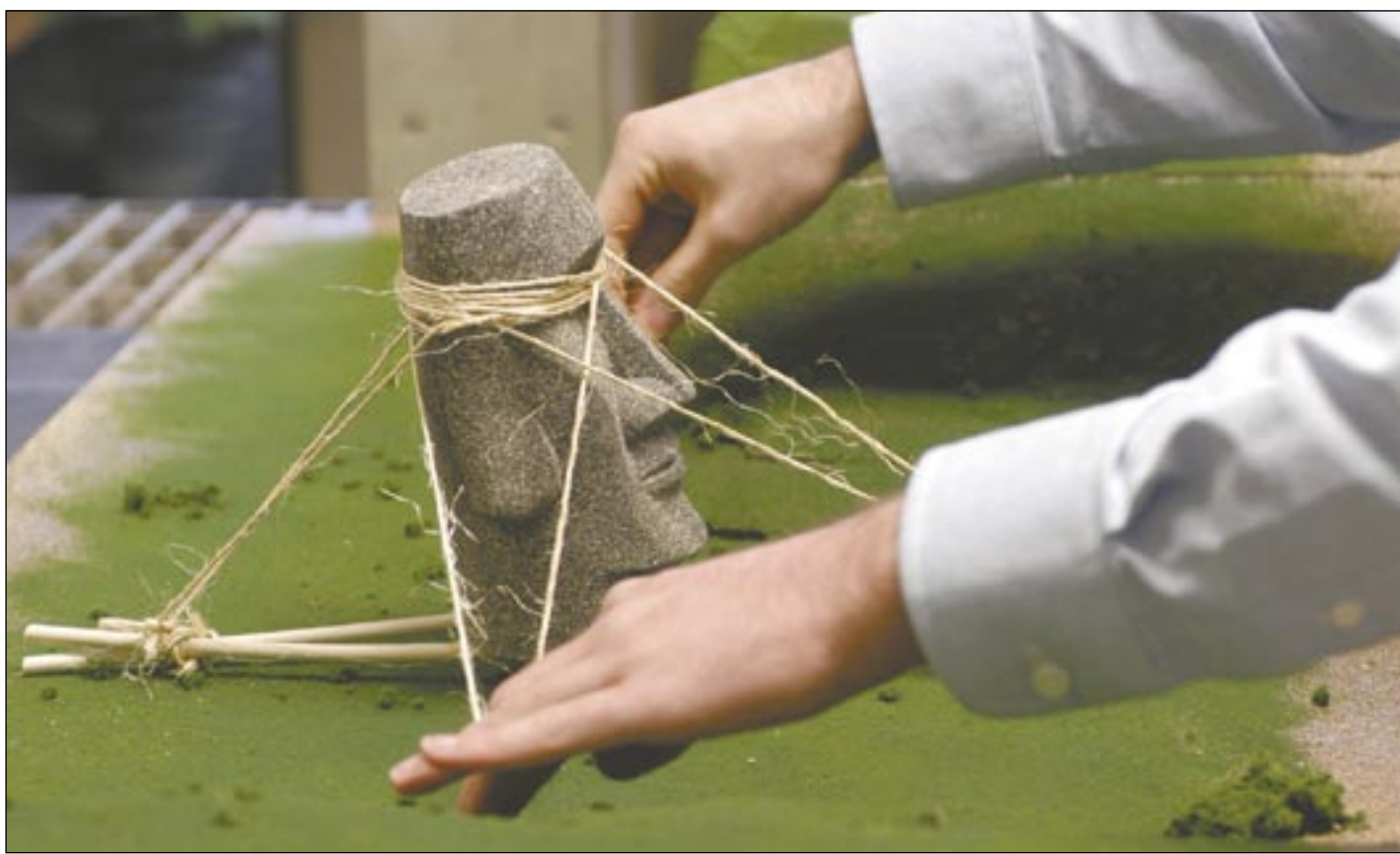


PHOTO / DONNA COVENY

New approaches to an old problem

Members of Professor Herbert Einstein's class, 1.013 Civil Engineering Design, use models to test their theories for how the Rapa Nui people of Easter Island moved the giant stone heads, known as moai, into position on the island 1,500 years ago.

Climate change poorly understood, MIT survey finds

Nancy Stauffer
Laboratory for Energy and the Environment

Climate change and the threat of global warming are poorly understood by the U.S. public, and taking action to reduce their impact is not a high priority, according to a recent MIT survey.

These results suggest that change in U.S. climate policy will not be led by public opinion. Elected officials will have to provide leadership—a task they will find difficult because achieving significant reduction of the greenhouse gases linked to climate change may involve economic costs well above what the average consumer is willing to pay.

For more than a decade, Howard J. Herzog and his colleagues at MIT's Laboratory for Energy and the Environment (LFE) have been studying one approach to climate-change mitigation. In carbon-dioxide (CO₂) capture and storage (CCS), the CO₂ emissions from large sources that contribute to global warming are captured and injected into geologic formations for long-term storage.

CCS has technologic and economic promise, but public acceptance could be a problem. As a result, the researchers wanted to find out what people thought about CCS in particular and about climate change and environmental issues in general.

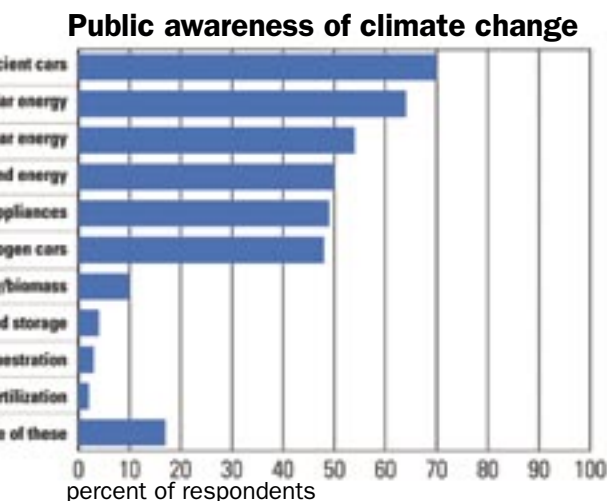
So LFE Principal Research Engineer Herzog, graduate student Thomas E. Curry, Professor David M. Reiner of the

University of Cambridge and Stephen Ansolabehere, the Elting R. Morison Professor in MIT's Department of Political Science, developed a survey that included 17 questions about the environment, global warming and climate-change-mitigation technologies. They collaborated with Knowledge Networks, a company that specializes in Internet-based public opinion surveys.

The 1,200 respondents proved to be relatively unaware not only of CCS but also of other energy-related responses to climate change that were listed in the survey. The researchers were not surprised that CCS fell under the radar for the general public. It was more surprising that many of the respondents also had not recently heard or read about hydrogen cars, wind energy or nuclear energy.

Most striking: Fully 17 percent of the people had heard or read about none of the listed items during the past year.

Other questions demonstrated the public's lack of understanding. For example, when asked what concern CCS would address, well over half of the respondents said they were not sure. Of those that made a choice, 23 percent said (correctly)



GRAPHIC COURTESY / LABORATORY FOR ENERGY AND THE ENVIRONMENT

This chart displays responses to the following question: 'Have you heard of or read about any of the following in the past year? Check all that apply.'

that CCS could reduce global warming, but 29 percent said (incorrectly) that it could reduce smog.

The survey further found that the environment and climate change are not high-priority issues for the public. The environment came out 13th on a list of 22 possibilities for "the most important issues facing the U.S. today." And on a list of 10 specific environmental problems, "global warming" came up sixth, well behind water pol-

lution and toxic waste.

What do the survey results mean for public outreach on climate change issues? Researchers concluded that education is critical. Programs should start with the fundamentals, helping people to understand the links between burning fossil fuels, greenhouse gas emissions and the potential for climate change. Perhaps most important, researchers said discussions must include the relative costs of the various technology options, as cost differentials can profoundly influence people's preferences.

In continuing their work on CCS, the MIT researchers plan to administer the same survey in two or three years to measure the evolution of public awareness. In

the meantime, they are working with their Alliance for Global Sustainability (AGS) partners to analyze similar surveys taken in Japan, the United Kingdom, and Sweden.

This research was supported by the AGS and the Carbon Sequestration Initiative.

For more information, please go to <http://lfee.mit.edu/publications/newsletter/ee200412.pdf#page=7>.