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Scientists create new molecule switches

A research team has developed single-molecules that can change switchboard on/off commands

BY EVA SYLWESTER
SENIOR NEWS REPORTER

A research team with members from the University, Pennsylvania State University and Rice University has developed single-molecule switches that could someday be used in electronics.

"If we think about the ultimate miniaturization of electronics, a single molecule as a switch is just about as small as it gets," University chemistry professor Jim Hutchison said.

And small it is. University graduate student Christina Inman said the number of these molecules that can fit across a human hair is equivalent to the number of human hairs that can fit across a football field.

The existence of molecules that can reverse charge from positive to negative has been recognized for some time. The innovation of this particular study, Hutchison said, is that the switches can now be controlled by humans and reliably remain on or off when turned on or off.

The molecules are specially engineered to have the necessary properties to work in the system. Inman said the double and triple bonds between the carbon atoms make the molecules rigid and highly conductive electrically.

A key component of the switch system is a scanning tunneling microscope, which functions as the "nanofinger" that switches (the molecules) on and off," Hutchison said.

The tip of the switch molecule is always positively charged. The tip of the scanning tunneling microscope can have either a positive or a negative charge, and modulating this charge is what turns the switch on and off. Because opposite charges attract and similar charges repel, when the scanning tunneling microscope has a negative charge, the tip of the switch molecule will be pulled toward it and the switch will turn on, Hutchison said.

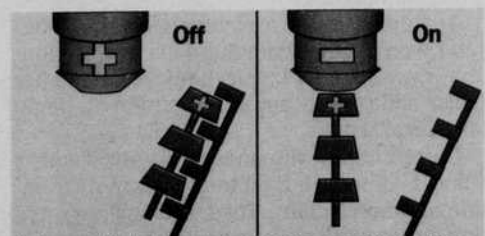
When the tip of the scanning tunneling microscope has a positive charge, the switch molecule falls away from it into the matrix molecules nearby. This is the switch's off position, and it is held in this position by hydrogen bonding between the switch molecule and the matrix molecules.

Paul Weiss, a professor of chemistry and physics at Penn State, said the researchers tried turning the molecule upside down to put the negatively charged end at the top but found that this did not produce similar results because the position of certain important parts of the molecule cannot be changed.

Each school involved in the research contributed to a specific aspect of the project.

Rice University worked on molecular electronic functions in the switches, the University worked on the matrix molecules, and Penn State worked on improving the switch molecules,

SWITCH, page 4



When negatively charged, the tip of the scanning tunneling microscope attracts the positively charged end of the switch molecule, turning the switch on. SOURCE: Jim Hutchison
CHRIS TODD | GRAPHIC ARTIST

Student in Jordan reacts to bombings

An undergraduate abroad overheard Nov. 9 explosions; in Eugene, Overseas Study Programs attempts to fully prepare students for travel

BY JOE BAILEY
NEWS REPORTER

As a University student studying in Amman, Jordan, Thomas Hojem had grown accustomed to loud explosions.

Almost every night in Amman, fireworks punctuate local weddings. So when Hojem heard an explosion on Nov. 10, he assumed it was the sound of celebration.

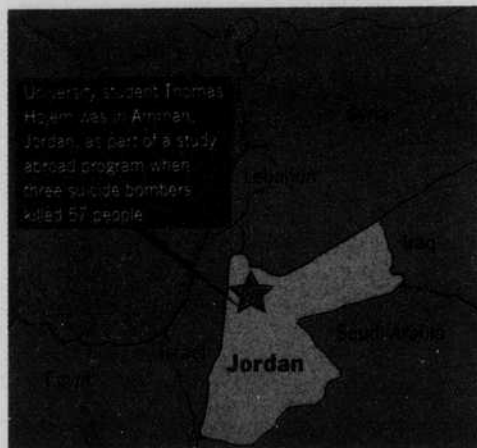
It was not. The sound Hojem heard was a bomb exploding outside a Days Inn hotel, about a quarter of a mile away from his residence.

The attack on the hotel was one of three coinciding suicide bombings in Amman that killed 57 people, according to The New York Times.

For everyone, and particularly students like Hojem who are involved with study abroad programs in the Middle East, the bombings provided a grisly reminder of the dangerous political realities that exist in the region.

Yet evidence compiled after the terrorist attacks of Sept. 11 suggests that frequent media images of violence have not deterred students

JORDAN, page 3



University student Thomas Hojem, in Amman, Jordan, at part of a study abroad program when three suicide bombers killed 57 people.

CHRIS TODD | GRAPHIC ARTIST

Facebook an OPEN book

At some universities, campus police are monitoring the popular Facebook Web site for personal incriminating evidence

BY NICHOLAS WILBUR
NEWS REPORTER

More than 9 million college students from about 2,000 colleges around the country have been making friends, romances and other social connections on Facebook.com, a Web site created in Feb. 2004 to unite students with similar interests.

But users beware. Though it has yet to happen at the University, police and authorities at universities across the country are using the Web site to identify and prosecute offenses.

Students can post pictures, personal anecdotes and favorite activities on their profiles, and anyone within a university system, be it staff, faculty or student, can access the profiles using a school e-mail account.

Pennsylvania State University Police reportedly used Facebook.com after the Oct. 8

FACEBOOK, page 8

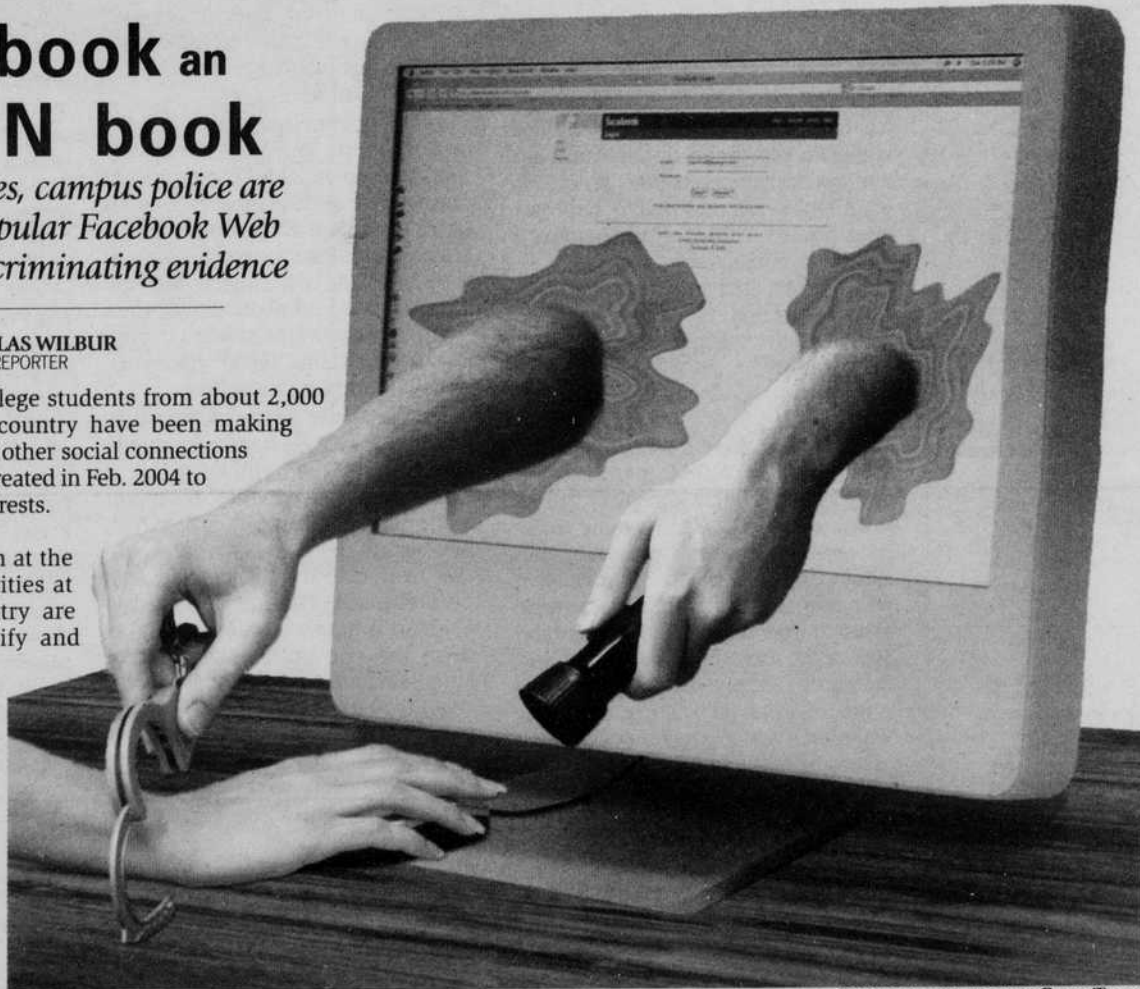


PHOTO ILLUSTRATION BY CHRIS TODD

OSPIRG presents toy survey findings

A State Public Interest Research Group shared its consumer report on dangerous child playthings

BY ERIC FLORIP
FREELANCE REPORTER

For those daring enough to brave the frenzy of holiday shoppers out in full force after Thanksgiving, there is much more to consider than what children want.

According to the Oregon Student Public Interest Research Group, buyers should consider what children shouldn't have.

At a press conference in the daycare center at Lane Community College Tuesday, OSPIRG presented its findings from its 20th annual toy safety survey for parents preparing for the holiday season.

The presentation, called Trouble in Toyland, focused primarily on the dangers posed by common children's toys, including the risks of chemical poisoning, choking, strangulation and hearing damage.

"This is one way to take a preventative stance," said Liz Karas, the campus organizer for OSPIRG at LCC. She led the demonstration along with OSPIRG intern Amber Huls.

Karas said young children are particularly susceptible to dangerous chemicals in toys.

Karas focused on phthalates, a family of chemicals that is linked to the early onset of puberty, certain birth defects and cancer.



TIM BOBOSKY | PHOTO EDITOR

OSPIRG's report says Road Rippers trucks could damage children's hearing. Other toys on the group's watch list pose choking hazards to small children.

OSPIRG researched eight toys that claimed to be free of phthalates, and found that six of them still contained the toxic chemicals, Karas said. One of them was a simple rubber duck manufactured by Schylling.

To show the danger of choking, Karas demonstrated a simple plastic cylinder called a choke tube. At 1.75 inches in diameter, anything that could fit inside the tube was deemed a choking hazard for children. Rubber bouncy balls or pieces broken off from larger toys were used as common examples for choking hazards.

TOYS, page 8