Mission possible: This device will self-destruct when heated

By Liz Althberg, Physical Sciences Editor

Here do electronics go when they die? Most devices are laid to eternal rest in landfills. But what if they just dissolved away, or broke down to their molecular components so that the material could be recycled?

U. of I. researchers have developed heat-triggered self-destructing electronic devices, a step toward greatly reducing electronic waste and boosting sustainability in device manufacturing. They also developed a radio-controlled trigger that can remotely activate self-destruction on demand.

The researchers, led by aerospace engineering professor Scott R. White, published their work in the journal Advanced Materials.

"We have demonstrated electronics that are there when you need them and gone when you don’t need them anymore," White said. "This is a way of creating sustainability in the materials that are used in modern, everyday electronics. This was our first attempt to use an environmental stimulus to trigger destruction." 

White’s group teamed up with John A. Rogers, a Swalland chair in materials science and engineering and the director of the Frederick Seitz Materials Laboratory at Illinois. Rogers’ group pioneered transient devices that dissolve in water, with applications for biomedical implants. Together, the two researchers can control how the devices perform, from disintegrating in minutes after heat is applied, to completely dissolving in water. The devices also can degrade in steps by encasing different parts in wax or other materials. They can be triggered by a heating coil in the device. The user can send a signal to the receiver and an inductive transformer to cause the coil to heat up, which melts the wax and releases the devices.

"This work demonstrates the extent to which clever chemistries can qualitatively expand the breadth of mech

Self-destruct A device is remotely triggered to self-destruct when a radio-frequency signal turns on a heating element at the center of the device. The circuits disassemble completely.

By Sharkia Forrest, Education Editor

Illinois’ guaranteed-tuition law making college less affordable

Tuition Impact Illinois’ guaranteed-tuition law is making higher education less affordable for students who attend its public colleges and universities to escalate faster than they would if schools were allowed to adjust tuition rates annually, say two experts in higher education finance from the U. of I.

Under Illinois’ Truth-in-Tuition law, enacted with the fall 2004 semester, the state’s 12 public colleges and universities are required to charge incoming resident freshmen a fixed tuition rate for the first four years of college.

To gauge the policy’s impact on tuition rates, education professor Jennifer A. Delaney and Tyler D. Kearney, an associate director of the Office for Planning and Budgeting, examined tuition trends from 2000 to 2012 at four-year public universities of similar sizes and missions across the U.S.

Since the Illinois law was enacted, annual tuition rates at the state’s public schools increased by approximately 26 to 30 percent — or an average of $1,479, the researchers found.

Aggregate four-year tuition rates also increased by about 6 to 7 percent above the trends predicted for other institutions, according to the researchers’ analyses. A paper about their work, currently available online, will appear in the August edition of Economics of Education Review.

Guaranteed-tuition programs have gained popularity in recent years in response to mounting concerns about college affordability. In 2008, guaranteed-tuition programs were in place at 356 U.S. colleges and universities. By 2011, that number increased to 467 institutions, according to the study.

While Oklahoma and Texas also enacted guaranteed-tuition laws, schools in those states are required only to offer students the option of a fixed rate. Illinois’ policy is novel in that it applies to all four-year public colleges and universities in the state, the researchers said.

Proponents of the Illinois law said it was intended to contain spiraling tuition costs and promote affordability for Illinois families by providing predictable costs.

"There is growing interest and Best TUTION, Page 2
University already addressing AAUP censure recommendation

By Mike Holetnick
Assistant Editor

C

University officials had asserted that annual tuition increases were larger at master’s colleges and universities, such as Chicago State and Eastern Illinois universities, while increases were smaller at doctorate-granting institutions, such as Northern Illinois University and the U of I.

The magnitude of the rate increases can be problematic, the researchers said, when thinking about how to fund frontloading, the researchers said, which occurs when state appropriations, ‘‘for education as well, in terms of reduced state, but the overall financing environment impacting how tuition rates are set within a policies have far-reaching effects, not only by 20 percent, compared with schools in \textit{ implication legislation went into effect, state fund- appropriations for public higher education. \textit{The ruling creates a bargaining unit for specialized faculty members at University Laboratory High School and one for the specialized faculty members on the rest of the campus. University officials have asserted that the separate bargaining units, represented by two different unions, would cause un- necessary fragmentation, and that one specialized faculty bargaining unit would be more appropriate. ‘Our concern is that this opens up the possibility that small, fragmented groups of employees might form bargaining units, instead of creating a single group to represent the entire community of employees with similar responsibili- \textit{ties, terms and conditions of employment,’ said Robin Kalter, a university spokesperson, after the two units last year were certified separately by the Illinois

\textbf{SELF-DESTRUCT, FROM PAGE 3} temperatures. This gives more precise con- trol over which parts of a device are opera- \textit{tive, creating possibilities for sophisticated devices that can sense something in the en- vironment and respond to it. White’s group has long been concerned with device sustainability and has pioneered methods of self-healing to extend the life of materials. ‘We took our ideas in terms of materi- \textit{als regeneration and flipped it 180 degrees,’ he said. ‘If you can’t keep using some- \textit{thing, whether it’s obsolete or just doesn’t work anymore, we’d like to be able to bring it back to the building blocks of the material so you can recycle them when you’re done, or if you can’t recycle it, have it dissolve away and not sit around in landfills.’ White and Rogers are both affiliated with the Beckman Institute for Advanced Science and Technology at the U of I. The Defense Advanced Research Project Agen- \textit{cy and the National Science Foundation supported this work.}

\textbf{Tuition, continued from Page 1} saying the Renewal and Tenure Committee,\textit{ annual average tuition rates at Illinois col- leges and universities were trending simi- \textit{larly to those in other states, the researchers found. In 2002, prior to the mandate, Illi- nos colleges ranked 13th nationally in tu- \textit{ition costs. However, by 2007, three years after the law was enacted, Illinois had risen to sixth place. The researchers’ analyses showed that annual tuition increases were larger at master’s colleges and universities, such as Chicago State and Eastern Illinois universities, while increases were smaller at doctorate-granting institutions, such as Northern Illinois University and the U of I.}

The magnitude of the rate increases can be problematic, the researchers said, when thinking about how to fund frontloading, the researchers said, which occurs when state appropriations, ‘for education as well, in terms of reduced state, but the overall financing environment impacting how tuition rates are set within a policies have far-reaching effects, not only by 20 percent, compared with schools in other states.

‘It appears as though guaranteed-tuition policies have far-reaching effects, not only by 20 percent, compared with schools in other states. The researchers hope that their findings will inform future discussions of guaran- \textit{ted-tuition policies. ‘There is certainly value in the predict- \textit{ability ensured by these programs,’ Kear- \textit{nay said. ‘The evidence from our studies should be balanced against this value.’}
With the completion of a $34.8 million transportation improvement project in 2019, Green Street may finally live up to its environmentally friendly name.

The project, called the Multimodal Corridor Enhancement Project, or MCORE, is being designed to promote walking and biking, reduce vehicle traffic, and make it safer for anyone traveling through the University District.

In addition to Green Street, several other highly traveled side streets in the heart of the campus will see street upgrades starting next fall.

“This project is unprecedented in many ways,” said Roland White, an engineer with Facilities and Services, which has spearheaded the project’s planning for the university.

He said the university has teamed up in the past on projects with the cities of Champaign and Urbana, and the Champaign-Urbana Mass Transit District, but nothing of this size and scope focused on the core of the community.

“Never have we invested these resources to the core campus and the core community,” he said. “It’s a very smart and far-reaching investment.”

Of the $15.7 million federal grant match, the city of Champaign is leading the project by putting up $9.6 million, the city of Urbana $2.1 million and the U. of I. $3.6 million. The grant was obtained by the Champaign Urbana Urbanized Area Transportation Study group.

White said the partnership has held strong because the project’s impact on each partner – 80 percent of the area’s jobs are within a mile of the project’s corridors – is so huge.

“This already is a really good relationship between the partner agencies because of past experience working together,” he said. “It’s made synchronizing all of this much easier than it might have been.”

“It’s sort of a natural connecting point for alternative transportation,” he said. “It’s made it easier for everyone.”

The five-phase project also is unusual in that work within the University District will be done while classes are in session in an effort to meet federal completion guidelines.

“It’s led to an accelerated design and delivery process,” he said of the guidelines, which will include a year of engineering planning before the first project becomes shovel-ready in fall 2016.

Green Street will get most of the attention as designers attempt to reconfigure the thoroughfare to create a multimodal approach friendly to alternative transport options. Three of the five projects will focus on Green, with major work slated for the area in front of the Illini Union.

White called that area “ground zero” for campus transportation issues, noting that 12,000 vehicles and a significant number of buses pass there each day. He said the current Illini Union configuration causes an undesirable and potentially dangerous “weaving area,” where vehicles, buses and pedestrians all fight for position.

“It’s sort of a natural connecting point for all transportation modes, so there’s a lot going on in that first phase,” he said.

White said conceptual plans call for reducing Green Street in that area from four to three lanes, with the space from the fourth lane used to create dedicated bike and bus lanes. The work would make it easier for bikers and pedestrians to navigate Green, creating a safer environment for them in the process.

“The project is being designed to offer people more choices, encourage alternative transportation options, increase safety and make traffic flow more predictable in some of the most-traveled locations in the region,” he said. “The end result will be enhanced mobility for everyone.”

The two other Green Street projects are from Fourth Street to Neil Street, including the underpass east of Neil, and from Busey Avenue to Race Street in Urbana. Work will focus on improving pedestrian and bicycle access and making the streets safer.

The remaining projects include work on Wright Street from Armory Avenue to White Street, with work extending west on both streets to complete the corridor. Work on Wright may include heated bus stop enclosures for students, who currently congregate in the Illini Union Bookstore lobby when the weather turns cold.

White said the work would set the area on a path for managing future development in the immediate area.

“This is how you handle growth, by planning and reacting before it becomes unmanageable,” he said. “This has the possibility to be a legacy project that not only changes the look of the community, but its behavior.”

That’s why communication is such an important project component, said Steve Breitwieser, a media communications specialist for F&S.

He said a website explaining the project and offering construction updates is already up and running at www.mcoreproject.com.

The site offers a project fact sheet, videos, articles and even animations of the proposed work using local traffic data. The site will continue to be updated and include related closures and detours.

“We want to help connect people with the information,” he said. “This is going to cause short-term discomfort, but the end result will set us, literally, on a more solid path for the future.”

**MCORE PROJECTS**

**Project 1** (2016-17): Green Street (from Wright Street to Busey Avenue)

**Project 2** (2016-17): Green Street (from Neil Street to Fourth Street)

**Project 3** (2016-17): White Street (from Second Street to Wright Street) and Wright Street (from White Street to Springfield Avenue)

**Project 4** (2018-19): Armory Avenue (from Fourth Street to Wright Street) and Wright Street (from Armory Street to Springfield Avenue)

**Project 5** (2018-19): Green Street (from Busey Avenue to Race Street)

Passion for teaching
Anderson’s first faculty position was at Indiana University. Anderson said that when he arrived on campus at Indiana, several people thought he was on the basketball team, so he grew a beard to look older. He quickly adjusted and developed a passion for teaching. He returned to Illinois and became a faculty member at the U. of I. after about three years.

Anderson was happy to help out, so he agreed to apply. It was the least he could do for his former colleagues. But when he arrived for the interview, it was clear they were serious. They made him a generous offer, complete with his own office. He told them he would think about it.

Back at Indiana, Anderson asked the department chair for honest advice. They talked through the pros and cons. At last, the department chair paused and said, “But, there’s no place like Illinois in your field.”

Anderson decided to return to his alma mater, and he never left. At Illinois, he developed a rhythm of teaching courses and continuing to dig into questions. Eventually, he realized that he wanted to publish to get tenure. So, he began to be more mindful of sharing his work. Mostly, he sold it to the Equal Protection Clause, which guarantees an individual the right to an equal education. He nearly served as an expert witness in the Kansas City case. He wrote books. He earned tenure. He won awards.

As his published writings started to flow out, he received positive reactions. He was surprised others seemed to find the information he had gathered. He was asked to make appearances – to speak, to attend scholarly conferences, to participate in panel discussions. He was intrigued by the possibilities – to have his name on the St. Louis case. He wrote books. He earned tenure. He won awards.

As his published writings started to flow out, he received positive reactions. He was surprised others seemed to find the information he had gathered. He was asked to make appearances – to speak, to attend scholarly conferences, to participate in panel discussions. He was intrigued by the possibilities – to have his name on the St. Louis case. He wrote books. He earned tenure. He won awards.

As his published writings started to flow out, he received positive reactions. He was surprised others seemed to find the information he had gathered. He was asked to make appearances – to speak, to attend scholarly conferences, to participate in panel discussions. He was intrigued by the possibilities – to have his name on the St. Louis case. He wrote books. He earned tenure. He won awards.

As his published writings started to flow out, he received positive reactions. He was surprised others seemed to find the information he had gathered. He was asked to make appearances – to speak, to attend scholarly conferences, to participate in panel discussions. He was intrigued by the possibilities – to have his name on the St. Louis case. He wrote books. He earned tenure. He won awards.

As his published writings started to flow out, he received positive reactions. He was surprised others seemed to find the information he had gathered. He was asked to make appearances – to speak, to attend scholarly conferences, to participate in panel discussions. He was intrigued by the possibilities – to have his name on the St. Louis case. He wrote books. He earned tenure. He won awards.

As his published writings started to flow out, he received positive reactions. He was surprised others seemed to find the information he had gathered. He was asked to make appearances – to speak, to attend scholarly conferences, to participate in panel discussions. He was intrigued by the possibilities – to have his name on the St. Louis case. He wrote books. He earned tenure. He won awards.

As his published writings started to flow out, he received positive reactions. He was surprised others seemed to find the information he had gathered. He was asked to make appearances – to speak, to attend scholarly conferences, to participate in panel discussions. He was intrigued by the possibilities – to have his name on the St. Louis case. He wrote books. He earned tenure. He won awards.

As his published writings started to flow out, he received positive reactions. He was surprised others seemed to find the information he had gathered. He was asked to make appearances – to speak, to attend scholarly conferences, to participate in panel discussions. He was intrigued by the possibilities – to have his name on the St. Louis case. He wrote books. He earned tenure. He won awards.

As his published writings started to flow out, he received positive reactions. He was surprised others seemed to find the information he had gathered. He was asked to make appearances – to speak, to attend scholarly conferences, to participate in panel discussions. He was intrigued by the possibilities – to have his name on the St. Louis case. He wrote books. He earned tenure. He won awards.

As his published writings started to flow out, he received positive reactions. He was surprised others seemed to find the information he had gathered. He was asked to make appearances – to speak, to attend scholarly conferences, to participate in panel discussions. He was intrigued by the possibilities – to have his name on the St. Louis case. He wrote books. He earned tenure. He won awards.

As his published writings started to flow out, he received positive reactions. He was surprised others seemed to find the information he had gathered. He was asked to make appearances – to speak, to attend scholarly conferences, to participate in panel discussions. He was intrigued by the possibilities – to have his name on the St. Louis case. He wrote books. He earned tenure. He won awards.

As his published writings started to flow out, he received positive reactions. He was surprised others seemed to find the information he had gathered. He was asked to make appearances – to speak, to attend scholarly conferences, to participate in panel discussions. He was intrigued by the possibilities – to have his name on the St. Louis case. He wrote books. He earned tenure. He won awards.
Antimicrobial compounds evade resistance with less toxicity

By Liz Ahlberg

ew compounds that specifically attack fungal infections with- out attacking human cells could transform treatment for such in- fections and point the way to targeted medi- cines that evade antibiotic resistance. Led by U. of I. chemistry professor Mar- tin D. Burke, a team of chemists, microbi- ologists and immunologists developed and tested several derivatives of the antifungal drug amphotericin B. They published their findings in the journal Nature Chemical Biology.

Amphotericin B is a doctors’ last, best defense against life-threatening fungal in- fections that invade a patient’s blood and tissues, said Burke, who also is a medical doctor and Howard Hughes Medical Insti- tute Early Career Scientist. In half a century of use, amphotericin has yet to be overcome by new resistance forms.

“The problem with this drug is that it is also highly toxic, particularly to the kid- neys, and this limits the dose that can be given,” Burke said. “There are also invasive fungal infections still carry a mortality rate of about 50 percent, resulting in more than 1.5 million deaths each year — more than ma- laria or tuberculosis,” said Burke.

Burke’s group previously discovered that amphotericin B kills yeast and fungi by tar- geting a particular lipid molecule essential to the microbe’s physiology, which is what makes it such an effective treatment, but it also binds to cholesterol in humans, which.

Genome-editing proteins seek and find with a slide and a hop

By Liz Ahlberg

S
earching a whole genome for one particular region is like trying to fish a specific piece from the box of a billion-piece puzzle. Using advanced imag- ing techniques, U. of I. researchers have observed how one set of genome-editing proteins finds its specific targets, which could help them design better gene therapies to treat disease.

Biology and biomo- lecular engineering professors Charles Schroeder and Huimin Zhao, along with graduate stu- dents Zhanar Abil, Charles Schroeder, graduate student Luke Carulis and Zhanar Abil, published their work in the journal Nature Communications.

TALE proteins, or transcrip- tion activator-like effectors, can be programmed to recognize and bind to specific regions of DNA. Researchers have been interested in using TALE proteins for syn- thesis biology, such as genome editing in plants or bacteria, or for gene therapy. For example, Zhao’s group explores using TALE pro- teins to treat sickle cell anemia, which is caused by a mutation in one link of the DNA chain. “People have been using this technique, but nobody fully un- derstood the mechanism before,” Schroeder said. “The main ques- tion is, how do these proteins find their target sites? They are de- signed to bind to a particular site, but there’s this big genome with billions of bases, so how does the protein find its site? If you under- stand the mechanism, you might be able to engineer better, more improved proteins.”

The researchers used imaging techniques that let them watch through a microscope how in- dividual TALE proteins interact with a strand of DNA. They ob- served that the proteins seek and find using a combination of slid- ing and hopping. The proteins bind to the DNA and slide along the helix, traveling down the DNA molecule like a highway. The re- searchers also observed that the proteins perform frequent, short hops along their paths, allowing them to move more efficiently but never straying far from the DNA. “The combination of sliding and hopping means they can cover more ground and potentially move past obstacles that might be in their way,” said Carulis, a co-first author of the paper.

“The combination of behaviors also would allow a TALE protein to switch strands of the DNA dou- ble helix and sample both strands, increasing the chance of finding its target site,” said Abil, the other co-first author.

They also analyzed which parts of the protein did the work, finding a division of labor among the domains within the protein. One part searches, while another part binds to the specific target se- quence. The other parts, the researchers, because it gave them insight into where to tweak the protein design so that it binds even more selectively.

“The major goal would be to engineer improved proteins that have lower off-target binding. You don’t want them to bind to the wrong place,” Schroeder said. “For engineers and proteins such a way where we don’t just na- turally change the specific binding domain, but design a new protein with distinct parts of the protein in different places, we might be able to increase the efficiency without introducing mistakes.”

Next, the researchers are watching the proteins work in live cells to see how they behave changes when immersed in the bustling ac- tivity within the cell nucleus.

“It gives us a better under- standing of the genome editing mechanism,” Zhao said. “When we understand it better, it provides new insights into the design of the protein. If you really talk about therapeutic applications, it needs to be a specific binding interaction.

The Carl R. Woese Institute for Genomic Biology and the David and Lucile Packard Foundation partly funded the research. “In this el- egant example, detailed knowledge of how a drug interacts with its target has pointed not only to possible improvements in our ability to treat life-threatening fungal infec- tions, but also to a new approach for design- ing antimicrobial drugs.”

Since amphotericin B is manufactured in mass quantities, the new compounds also could be made on a large scale. REVO- LUTION Medicines, a company Burke co-founded, has licensed the compounds to develop optimal drug candidates and to pursue new applications.

Burke hopes that this method of tweak- ing naturally occurring compounds to make them more specific and less toxic not only produces better therapeutic fungal infections, but also helps in the development of other medications that cur- rently have no cure.

“More broadly, these results suggest that binding microbial-specific lipids that are critical for microbial physiology could re- present a more general path to nontoxic yet resistance-evading antimicrobial agents,” Burke said.

Therapeutic applications

Using advanced imaging techniques, U. of I. researchers have observed how one set of genome-editing proteins finds its specific targets, which could help them design better gene therapies to treat disease. Pictured, from left: professor Huimin Zhao, professor Charles Schroeder, graduate students Luke Carulis and Zhanar Abil.

New drug compound

Illinois chemistry professor Martin Burke led a research team that found derivatives of a widely used but highly toxic antifungal drug. The new compounds are less toxic yet evade resistance.
The outcome of a case argued before the U.S. Supreme Court last fall could potentially slow the trend of the ever-increasing number of occupations subject to state licensing, says a U. of I. expert in the regulation and financing of health care.

According to David Hyman, the H. Ross and Helen Workman Chair in Law and pro- fessor of Dental Examiners, there are lots of simi- lar cases against practitioners, but they tend to be late to the party,” he said. “They’re not proactive responders to quality problems. They may have a role to play, but we need to be careful not to put the fox in charge of the henhouse.”

Which is why the North Carolina case is so significant, he said. “Essentially, it’s an attempt by licensed professionals to keep unlicensed practitioners from entering their retail space,” he said. “The specific legal question under re- view is the standard for determining when a state professional licensing board’s activi- ties might be considered anti-competitive effect under the federal antitrust laws. In health care, public regulation limits competition by mandating that certain types of services be performed by only those who have met the credential requirements to be licensed as a barber or cosmetologist have very little to do with hair braiding, Hyman said.

“You will have to take extensive classes and pay a lot of money for those classes. But you learn much more useful relative to hair braiding,” he said. “It’s hard to see what the real consumer harm is with unlicensed hair braiding.” But from the perspective of the people providing the licensed services, cracking down on unlicensed hair braiding is com- pletely rational, Hyman said.

“They will talk about how people can be exploited by someone who doesn’t know what they’re doing,” he said. “And they might even be able to find an example of something bad happening — but the reality is that they don’t like the competition.”

licensing boards also don’t act as a bul- wark for consumer protection because they take on such a limited number of cases. “They do occasionally bring disciplinary actions from against practitioners, but they tend to be late to the party,” he said. “They’re not proactive responders to quality problems. They may have a role to play, but we need to be careful not to put the fox in charge of the henhouse.”

Consumers bear the cost of “credential creep,” says David Hyman, the H. Ross and Helen Workman Chair in Law at Illinois.

“With any luck, this type of ruling would encourage a more public discussion of legis- lative standards for state licensing boards,” he said. “Congress might consider enact- ing a federal law, as it did in response to an earlier case in which antitrust law was used to attack the hospital peer review process. Or, states could enact one or more model practice acts that would promote uniformity among boards and assure their accountabil- ity to state government.”

Even if the Supreme Court cuts back on overreaching by the North Carolina Board of Dental Examiners, there are lots of simi- lar cases — and consumers bear the costs of excessive licensing, Hyman said.

“With any luck, this type of ruling would encourage a more public discussion of legis- lative standards for state licensing boards,” he said. “Congress might consider enact-

U. of I. musicians perform on CD by Augusta Read Thomas

By Jodi Heinikel

U. of I. musicians—faculty mem- bers and students—perform works by renowned composer Augusta Read Thomas on a new CD. The music on “Astral Canticle” was recorded in December 2014 in the Great Hall at Krannert Center for the Performing Arts. The CD includes two symphonic works performed by the U. of I. Symphony Orchestra and various other musicians from the University of Illinois Symphony Orchestra, a choral piece per- formed by the U. of I. Women’s Glee Club and several chamber music pieces featuring faculty members as soloists. The CD is the first recording of six of the nine composi- tions, all of which were written between 2000 and 2013.

Donald Schleicher, the conductor of the U. of I. Symphony Orchestra, called Thom- as’s music “extremely collaborative. If you had an idea about something, she re- ally welcomed your impressions of it. She is genuinely interested in what other artists might have to say.”

“Her works have been performed and recorded by every major orchestra in the world and important chamber musicians,” Schleicher said. “It’s putting us up there with all the major performers across the globe.”

It also was a valuable experience for the students who play in the orchestra, he said. Professor of flute Jonathan Keeble agreed, saying the choice by Thomas to record her music with the U. of I. Symphony Orchestra speaks volumes about the quality of the Illi- nois music students and the expert guidance of Schleicher.

“Who I really enjoyed was watching our students perform....”

Yvonne Redman, a voice professor who sings a solo piece on the CD, said she was pleased to support a female classical com- poser in a field dominated by mostly men. Redman described the piece she sang — “Tulip Butterfly,” the most recent com- position on the recording, written in 2013 — as evocative and impressionistic.

“The pacing is just perfect, a breath of emo- tion in her work. It’s very collaborative, so that the pianist role was equally as important as the singer’s role,” Redman said, adding that she would turn toward the piano while singing “so our resonances would combine and create sort of an ethereal sound as we catch those vibrating notes.”

Thomas was at the recording sessions and communicated with Schleicher about details of the music daily while he was pre- paring for the concert.

“She was intimately involved in the en- tire process from the beginning,” Schleicher said. “I think the compositions written by composers who died many years ago. licensed professionals must be actively su- pervised by the state in order to qualify for state action immunity.

‘With any luck, this type of ruling would encourage a more public discussion of legis- lative standards for state licensing boards,’ he said. ‘Congress might consider enact- ing a federal law, as it did in response to an earlier case in which antitrust law was used to attack the hospital peer review process. Or, states could enact one or more model practice acts that would promote uniformity among boards and assure their accountabil- ity to state government.’

Even if the Supreme Court cuts back on overreaching by the North Carolina Board of Dental Examiners, there are lots of simi- lar cases — and consumers bear the costs of excessive licensing, Hyman said.

‘We should be trying to roll back the rising tide of occupational licensing,’ he said.

Regulating health care Consumers bear the cost of “credential creep,” says David Hyman, the H. Ross and Helen Workman Chair in Law at Illinois.
The phthalate DEHP undermines female fertility in mice

Explaining the evolution of insect society, with sterile society members displaying extreme levels of altruism, has long been a major scientific challenge, dating back to Charles Darwin’s day. A new genomic study of 10 species of bees, including a spectrum of social living—from solitary bees to those in complex, highly social colonies—offers new insights into the genetic changes that accompany the evolution of bee societies.

The new findings are reported in the journal Science.

By sequencing and comparing the genomes of 10 bee species that vary in social complexity, the researchers made three important discoveries.

”First, there is no single road map to eusociality—the complex, cooperative social systems that characterize insects from superorganisms to individuals fending on their own,” said Gene Robinson, a professor of entomology and the director of the Carl R. Woese Institute for Genomic Biology at the U. of I. “In this study, we found that independent evolutionary transitions in social life have independent genetic underpinnings.

The second insight involved changes in the evolution of gene regulation: As social complexity increased, so did the speed of changes to parts of the genome involved in regulating gene activity, located in the promoters of the genes, the researchers report.

By contrast, Robinson said, when bees put the brakes on changes in many parts of the genome that code for the actual proteins, the outcome is a slowdown of gene activity, leading to a stunted follicle, he said.

A third major finding was that increases in social complexity were accompanied by a slowing, or “relaxation,” of changes in the genome associated with natural selection. This effect on some genes may be a result of the buffering effect of living in a complex, interdependent society, where the “collective genome” is less vulnerable to dramatic environmental changes or other external threats, Robinson said.

“These results demonstrate once again that important new insights into evolution can be obtained by using genomes as historical books,” Robinson said. “We have now learned what genetic changes have occurred during the evolution of the bees, notable for their elaborate societies and essential pollination services.”

New mobile app expands the outreach of SAWBO videos

Whether the need is to educate people in West Africa about how to safely breed Eloba or to train farmers in Latin America on preventing postharvest loss, Scientific Animations Without Borders has an app—and an animated video—for that.

SAWBO, an initiative out of the U. of I. that develops animated educational videos, recently released a mobile app for Android devices. The Deployer app enables users to view, download and freely share SAWBO’s evolving video library over Bluetooth connections.

Covering topics of importance to the global community, such as health and agriculture, SAWBO’s videos strive to better the lives of people in developing countries.

Developed in collaboration with community experts and relevant scientific organizations around the world, they can be accessed by anyone, regardless of their literacy level.

SAWBO’s collection of 2-D and 3-D animations currently spans about 50 topics, and the Deployer app enables users to download, sort by category, download, filter the list by topic, language or country. Each video is available in both a high-quality version and a “light” version—an option for users who want a smaller file size.

ON THE WEB

g.o.illinois.edu/sawbo_tutorial

Reproductive research

In studies of mice, comparative biochemist professor Jodi Flaws and her colleagues boiled down phthalate exposure during pregnancy to reproductive problems in parents and offspring, and to degradation of the function and structure of the male and female reproductive tracts.

Ultrasound images

The study, which was conducted at the U. of I., which is funded by the National Institute of Environmen- tial Health Sciences at the National Institutes of Health and the U.S. Environmental Protection Agency.

The phthalate DEHP undermines female fertility in mice

By Diana Yates

New studies in mice add to the evidence that the phthalate DEHP, a plasticizer commonly used in auto upholstery, baby toys, building materials and many other consumer products, can undermine female reproductive health, in part by disrupting the growth and function of the ovaries.

In a new study, reported in the journal Reproductive Toxicology, researchers found that exposing pregnant mice to DEHP increased the male-to-female sex ratio of their pups. Reproductive outcomes for the pups were also altered, with males of those exposed to DEHP in the womb took longer to become pregnant and also lost some of their own pups.

The second study, reported in the journal Toxicology and Applied Pharmacology, revealed that DEHP disrupts the growth and function of follicles in the adult ovary. Exposure to DEHP increased the production of proteins that inhibit growth and promote degradation of the follicles, and decreased the production of steroid hormones, the researchers found.

“The follicles are the structures that contain the egg, and if you’re killing those, you may have fertility issues,” said U. of I. comparative biochemist professor Jodi Flaws, who led both studies. “The bottom line is that DEHP may damage the follicles and impair the ability of the ovary to make sex steroids like estrogens and androgens, which are really impor tant for reproduction.”

Most of the research conduct ed so far on the reproductive ef fects of phthalates has focused on males, “because phthalates are thought to interfere with the androgen system,” Flaws said.

“Studies that were done on fe males historically used very high doses of chemicals that aren’t en vironmentally relevant,” she said. “So our work has been to focus on identifying the environmental ismately relevant doses that people might see, either in the environment or occupationally or medically.

It is important to evaluate low er phthalate doses because they reflect real-world exposures, and the effects of endocrine-disrupting chemicals like phthalates can have more serious health consequences than high doses, Flaws said.

“Sometimes it’s at the low dos es that you have the most profound effects, and that’s what we’re seeing with the phthalates,” she said.

These studies are among sev eral initiatives of the Children’s Environmental Health and Dis ease Prevention Research Center at the U. of I., which is funded by the National Institute of Environmen-
I

College’s commitment to helping graduate
multiple fields,” said Sarah Lubienski, the in -
search through collaborations among faculty
ative: to stimulate new interdisciplinary re -

Breeder boosts soybean diversity, develops rust-resistant plant

Soybean diversity Research geneticist Baum Singh introduces the soybean with a related wild perennial plant from Australia, introducing new genetic diversity to the plant.

other scientists, who screen them for desirable traits and conduct
themselves breeding experiments. A report of this work appears
in the journal Theoretical and Ap -

The seven projects awarded funding for 2015-16

Seven Focal Point projects funded for 2015-16

by Diana Telles


took decades of painstaking
work, but research geneticist
Ron Singh managed to cultivate
a popular soybean variety (“Dwight” Glycine max) with a
related wild perennial plant that grows like a weed in Australia,
producing the first fertile soybean plants that are resistant to soybean rust, soybean cyst nematode and other pathogens of soy.

Singh works in the Soybean/ Maize Germplasm, Pathology and Genetics Research Unit in the de -

partment of crop sciences at the U. of I. The unit is a division of the College of Agriculture, Food, and sec -


ture's Agricultural Research Pro -


desires to “unlock the treasure.”

The seven projects announced this fall under Illinois’ Stewardship Initiative are expected to fund research on soybean rust, soybean cyst nematode or

grading soybean plants with 40 chro -

mesosomes. That way, by intro -

somesomes, that way, by intro -

riment Hardware to Improve Subresolution

Modeling in Astrophysical Simulations.”

Joaquin Vieira,

Paul Ricker,

Elif Ertekin,

Nicolas de la Salle, and Francis Ranxiao Wang (professor of

biology, “Using Accel -

eration Hardware to Improve Subresolution

Modeling in Astrophysical Simulations.”

Joaquin Vieira,

Paul Ricker,

Elif Ertekin,

Nicolas de la Salle, and Francis Ranxiao Wang (professor of

biology, “Using Accel -

eration Hardware to Improve Subresolution

Modeling in Astrophysical Simulations.”

Joaquin Vieira,

Paul Ricker,

Elif Ertekin,

Nicolas de la Salle, and Francis Ranxiao Wang (professor of

biology, “Using Accel -

eration Hardware to Improve Subresolution

Modeling in Astrophysical Simulations.”

Joaquin Vieira,

Paul Ricker,

Elif Ertekin,

Nicolas de la Salle, and Francis Ranxiao Wang (professor of

biology, “Using Accel -

eration Hardware to Improve Subresolution

Modeling in Astrophysical Simulations.”

Joaquin Vieira,

Paul Ricker,

Elif Ertekin,

Nicolas de la Salle, and Francis Ranxiao Wang (professor of

biology, “Using Accel -

eration Hardware to Improve Subresolution

Modeling in Astrophysical Simulations.”

Joaquin Vieira,

Paul Ricker,

Elif Ertekin,

Nicolas de la Salle, and Francis Ranxiao Wang (professor of

biology, “Using Accel -

eration Hardware to Improve Subresolution

Modeling in Astrophysical Simulations.”

Joaquin Vieira,

Paul Ricker,

Elif Ertekin,

Nicolas de la Salle, and Francis Ranxiao Wang (professor of

biology, “Using Accel -

eration Hardware to Improve Subresolution

Modeling in Astrophysical Simulations.”

Joaquin Vieira,

Paul Ricker,

Elif Ertekin,

Nicolas de la Salle, and Francis Ranxiao Wang (professor of

biology, “Using Accel -

eration Hardware to Improve Subresolution

Modeling in Astrophysical Simulations.”

Joaquin Vieira,

Paul Ricker,
In business, keep an eye on your competition’s ex-employees

By Phil Ciciora
Business and Law Editor

In the battle for a competitive advantage in today’s dynamic business environment, it’s increasingly common for companies to tap former employees for access to new opportunities such as technological and market knowledge, client and partner relationships, and employee referrals.

But according to research by a University of Illinois professor of human capital strategy, businesses also might want to keep an eye on the comings and goings of their competitors’ former employees.

Business administration professor Deepak Somaya says even when companies are sophisticated about how to generate and capture value from their former employees, they overlook the value of competitive intelligence on their competitors’ alumni and how former employees might, in turn, affect their bottom line.

“Companies are pretty good at keeping tabs on their own former employees,” Somaya said. “But the key thing is, what are your competitors doing? Are they tapping into the knowledge of your former employees who haven’t really caught on yet? And it turns out they may be taking opportunities away from you in the market,” said Somaya, also the Stephen V. and Christy C. King Faculty Fellow at the Col- lege of Business.

In a paper co-written with Seth Carnahan of the University of Michigan and published in the Academy of Management Journal, Somaya studied the employment patterns of patent attorneys moving between law firms and Fortune 500 companies, and how that churn affected the outsourcing of patent prosecution work from the companies to the firms.

“When academic researchers have looked at this phenomenon in the past, they looked just at the firm’s own alumni and what benefits the firm reaps from them,” Somaya said. “Companies also have focused on the strategy of building relationships with their own ex-employees. There’s been very little attention paid to the strategic impacts of their competitors’ former employees.”

In the paper, the researchers reported evidence that a competitor’s former employees can damage a company’s relationships with their current stable of clients.

“Our results show that a single ex-employee hired by a client from a law firm’s competitor is associated with decrease of about 11 percent in the firm’s business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versus a 6 percent drop in business versa...
Trap-jaw ants jump with jaws to escape the antlion’s den

By Diana Yates
Life Sciences Editor

S
ome species of trap-jaw ants use their spring-loaded mandibles to escape a predator. But it was unknown whether this behavior was meant to help them get away from a predator, or if it was more of a pushing behavior.

The study that verifies this in fact aids the ants’ survival when other escape methods fail, the researchers found.

The mandated of the trap-jaw ant Odontomachus brunneus can whip a mandible at the distance of almost 40 meters per second (144 kilometers per hour), instantly maiming a prey or enemy. They are also used for more routine tasks, such as digging nests or tending to eggs and larvae.

Previous studies have reported that trap-jaw ants jump with their jaws, “but it was unknown whether this behavior was meant to help them get away from a predator, or if it was more of a pushing behavior.” Larabee said. “This pulls it closer to the center of the pit where the antlion is waiting.”

The antlion sometimes employs its second strategy: It burts sand at the ant, causing a tiny avalanche that further destabilizes its target. If the ant tumble to the bottom of the pit and the antlion grabs it with its mandibles, the ants usually try to run out of the pit, and sometimes were successful. If that strategy failed, they sometimes jumped with their heads first.

“The ants were able to jump out of the pits about 15 percent of the time in their encounters with antlions,” Larabee said. “But when we glued their mandibles shut before dropping them in the pits, they couldn’t jump at all. It cut their survival rate in half.”

Previous research has showed that Odontomachus brunneus sometimes uses an unusual body posture just before jumping. Suarez said. It lowers its head, making contact with the ground, and occasionally raises a leg before deploying its mandibles to hurl itself into the air.

Based on our earlier studies, if the ant was striking a prey object, the distance between the ant and the prey was about the length of the trigger hairs that come off the mandibles,” Suarez said. “But when they were jumping off a surface, you would often see the ant put their entire face against the surface, and it was more of a pushing behavior than a striking behavior.”

The study shows how a trait or capability that evolved for one purpose can be adapted for different uses, Larabee said. “In this case, a tool that is very good for capturing fast or dangerous prey also is good for another function, which is escape.”

The study was supported by the National Geographic Society, the National Science Foundation and the American Museum of Natural History.
June 4, 2015

brief notes

U. of I. Press
Chicago Tribune Lit Fest is June 6-7

Anyone planning to attend the Chicago Tribune Printers Row Lit Fest in Chicago is invited to stop by the U. of I. Press tent on Dearborn Street, between Congress and Polk. Nine authors will speak and sign books on the dates and times below. Press staff members also will sell Chicago- and Illinois-themed books from 10 a.m.-6 p.m. June 6-7.

Book Signings:
- Adam Mack, “Chicago Living,” June 6, 3:15 p.m.-4 p.m., Classroom 5010.
- Robert Marovich, “Chicago Blues and Jazz,” June 6, 11-11:45 a.m., Classroom 5034.
- Laurent Pernot, “Play Ball,” June 7, 11-11:45 a.m., Classroom 503.
- Cynthia Clampitt, “Midwest Maize,” noon-1 p.m.
- Brian Dolinar, “The Negro in Illinois,” 2-3 p.m.
- Laurent Pernot, “Play Ball,” June 7, 3:15 p.m.-4:15 p.m., Center Stage.

For more information about the event, go to printersrowlitfest.org.

Sustainable Student Farm
Quad farm stand continues Thursdays

The Sustainable Student Farm, a program of the department of crop sciences and in cooperation with the Illini Union and the Student Sustainability Committee, began its weekly Farm Stand on the Main Quad last week. The Farm Stand will be open every Thursday from 11 a.m.-4 p.m. selling fresh produce grown on campus. The Farm Stand is located on the south side of the Illini Union. For more information, go to thefarm.illinois.edu.

On the move
University Archives moves to first floor

University Archives has moved its core collections and public service operations from the basement of the Main Library to the former Applied Health Sciences Library (Room 146 Main Library). Doors opened to the new facility June 1. The new facility has been recently remodeled and outfitted with new equipment, large tables, improved wireless connectivity and expanded oversize storage. In addition to new equipment, the remodel includes designated archival instruction and exhibit space, as well as expanded stations for staff members working with digital images.

For a blog post and photos of the new facility, go to http://bit.ly/1AbmCmC.

Outside at the Research Park
Free concerts are June 12, July 17

This summer’s Outside at the Research Park concerts will feature an all-female bluegrass band, a blue band with local roots and a “green” fair.

The concert dates are June 12 and July 17. The free concerts, sponsored by Kranert Center for the Performing Arts, Fox/Atkins Development LLC and the U. of I., are held near the corner of First Street and St. Mary’s Road in the U. of I. Research Park.

The June 12 concert features local artists Tara Terra, playing pop-rock, followed by Della Mae, a Grammy-nominated, all-female bluegrass band. The July 17 event begins with a green fair that will feature local businesses and organizations showcasing their sustainable practices. The Jones James Trio will kick off the concert with traditional blues, followed by kilborn Alley Blues Band out of Champaign-Urbana, playing Chicago blues and soul.

deaths

Lila Mae Adams, 73, died May 23 at Heartland Nursing Home, Champaign. She was a cook for University Housing from 1965-67.

Nadine Cook, 97, died May 27 at Heritage Health in Gibson City, Illinois. She worked at the U. of I. for 22 years, retiring in 1980 as a clerk I for University Housing. Memorials: Bondville United Methodist Church as a clerk I for University Housing. Memo-


Roy Allen Haycraft, 66, died Jan. 24 at Centennial Medical Center, Nashville, Tennessee. He was a building service worker for Facilities and Services for 25 years, retiring in 2004.


Mary Margaret Jones will be at 11 a.m. June 6 at Morgan Memorial Home, 1304 Regency Drive West, Savoy. Visitation will be from 10-11 a.m. before the service. Jones, 70, died May 25 at Presence Covenant Medical Center, Urbana. She worked for University Housing for 33 years, retiring in 1999 as a chief clerk.

For more information, go to thefarm.illinois.edu.

Janice Marilyn Miller Hartman, 78, died May 26. She taught, administered the undergraduate program and was an assistant and associate dean for the School of Social Work for many years. Memorials: Crisissy Nursery, 1309 W. Hill St., Urbana, IL 61801, www.crisissnursery.net; or St. John Catholic Newman Center, 604 E. Armory Ave., Champaign, IL 61820.

Janice Marilyn Miller Hartman, 78, died May 26. She taught, administered the undergraduate program and was an assistant and associate dean for the School of Social Work for many years. Memorials: Crisissy Nursery, 1309 W. Hill St., Urbana, IL 61801, www.crisissnursery.net; or St. John Catholic Newman Center, 604 E. Armory Ave., Champaign, IL 61820.

Janice Marilyn Miller Hartman, 78, died May 26. She taught, administered the undergraduate program and was an assistant and associate dean for the School of Social Work for many years. Memorials: Crisissy Nursery, 1309 W. Hill St., Urbana, IL 61801, www.crisissnursery.net; or St. John Catholic Newman Center, 604 E. Armory Ave., Champaign, IL 61820.

Janice Marilyn Miller Hartman, 78, died May 26. She taught, administered the undergraduate program and was an assistant and associate dean for the School of Social Work for many years. Memorials: Crisissy Nursery, 1309 W. Hill St., Urbana, IL 61801, www.crisissnursery.net; or St. John Catholic Newman Center, 604 E. Armory Ave., Champaign, IL 61820.
Ads removed for online version