Researchers’ imaging technique trolls in quiet cellular seas

**By Liz Ahlberg**

**Physical Sciences Editor**

Experienced anglers know that choppy waters make for difficult fishing, so they try not to rock the boat. Thanks to a new microscopy technique, cell biology researchers can heed that same advice.

UI researchers developed a method they call “trolling AFM,” which allows them to study soft biological samples in liquid with high resolution and high quality. Led by mechanical science and engineering professor Min-Feng Yu, the group published its findings in the journal Nanotechnology.

“We developed a highly sensitive method for high-resolution imaging of soft biological samples, such as living cells, in their physiological condition,” said Majid Minary, a recent graduate of Yu’s group and first author of the paper. Minary now is a professor at the University of Texas-Dallas.

The widely used atomic force microscope provides images of tiny structures with high resolution at the atomic scale. The AFM has a sharp probe at the end of an arm, called a cantilever. The tip of the probe skims the surface of a sample to measure mechanical, electrical or chemical properties.

When scientists want to study cells, tissue or other live biological materials, the samples must be submerged in a liquid to keep them alive. This poses difficulties for atomic force microscopy, because the cantilever has to be submerged as well.

Cells and tissues are so soft that if the AFM probe were simply dragged across the surface, it would damage or displace the sample instead of reading it. Therefore, scientists have to operate the AFM in oscillation mode – with the probe gently tapping along the sample and detecting resistance.

But oscillation in liquid brings a tide of complications in its wake. Oscillating a relatively large structure, such as an AFM cantilever, through liquid also causes the liquid to surge up and down with the oscillation, like waves in a tidal pool, causing even more drag.

“There’s a huge amount of hydrodynamic drag associated with operating such a big cantilever, compared to the resolution you’re trying to approach,” said Yu, “so it causes lots of disturbance, recorded as noise, which overwhelms all the actual data you’re trying to get from the sample.”

The high noise level requires the probe to tap harder to find a signal. This means the tip deforms a cell as the probe presses down, and only large, stiff structural elements such as the nucleus are visible, rendering AFM unable to resolve the membrane’s structure, properties and contours.

**Gone Fishing**

Professor Min-Feng Yu’s group developed “trolling AFM,” a method for high-quality imaging of soft cells and tissues at atomic resolution.

**How does your garden grow?**

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“It was one of the first positions of its kind in the country,” he said.

He would stay on as mapmaker and instructor for the next 32 years, retiring from the UI in 1989.

*Paradise scaled*

Bier’s map-making acumen also led to professional opportunities he never dreamed of from the seat in his high-school shop classes.

The private map-making business he started led him to opportunities in Hawaii, where he made the first atlas of the islands and then five detailed full-color maps of the six principal islands. The popular maps, first published by the University of Hawaii State Gardeners, include:

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*Map of the Hawaiian Islands*
By Phil Ciciora
Business and Law Editor

A new research by a UI expert who studies process management points to the potential role of regulatory oversight in preventing deterioration of operational routines that are used to complete day-to-day tasks in business organizations.

Even in the face of managerial efforts to promote the sustainability of a system, the tendency of operational routines to move toward a state of higher ‘entropy’ is an organizational reality, says Gopesh Anand, a professor of business administration.

“Maintaining adherence to operational routines poses widespread challenges in all kinds of businesses because people inevitably get complacent about following steps,” he said. “Once that happens, the consistency of products erodes over time, which is why we have to make sure that these routines are being followed.”

In the study, Anand, along with co-authors John Gray, of Ohio State University, and Einar Siemens, of the University of Minnesota, examines laxity in adherence to operational routines over time in the pharmaceutical industry by using longitudinal data from the Food and Drug Administration.

The research, which has implications for companies and regulators alike, outlines three reasons why performance continues to be so important in operational routines: the consumer, the law and the company.

“One thing we as customers don’t pay too much attention to in products is consistency,” Anand said. “We don’t consciously pay attention to it, but we’re always expecting it. For example, when we buy pharmaceuticals, we automatically assume that what’s inside the bottle is what’s advertised on the box. We have to think of consistency because product quality is not really known to the customer. It’s true even in industries where product performance is critical, and strict regulations exist.”

“People sort of take it for granted,” he said. “But when you look at regulated industries – airlines, pharmaceuticals, anything to do with medicine – it becomes even more important to think of consistency because product quality is not really known to the customer. It’s not visible, yet it’s critically important to customers. On the other hand, most companies are constantly dealing with two goals for product quality – features and consistency. They have to come up with new features to sell their products, but also make sure they are sustainable.”

The research also indicates that regulatory oversight – or in the case of the pharmaceutical industry, FDA inspections – can act as a source of external renewal that tightens up processes. Companies and regulatory authorities, deterred by the potential role of regulatory oversight – or in the case of the pharmaceutical industry, FDA inspections – can act as a source of external renewal that tightens up processes.

“The research is timely because there are so many people on this campus – from students to the community around us and staff – who have become committed to integrating sustainable practices throughout our resources and our engagement with the community around us and our engagement with the community around us and the state,” said Chancellor Phyllis M. Wise, who also is a university vice president. “It is an honor to get recognition for our efforts.”

Pradeep Khanna, associate chancellor and acting director of the Urbana Campus Office of Sustainability, said the award is important because it validates the work already being done and provides motivation for the work ahead.

“We have learned that there are so many people on this campus – from top to bottom – who have become committed to sustainability,” he said. “And this is only a start. Right now there are dozens of green projects going on across campus, which will only add to the campus’s position as a leader in sustainable practices.”

In collaboration with the Office for Mathematics, Science and Technology Education, Khanna said, the Office of Sustainability is developing a website that will allow people to monitor progress on any of the projects that are making the campus greener. The ICAP Portal will be unveiled during Sustainability Week, Oct. 22-26.

Climate Survey results announced; committee’s work begins

The UI is forming a cross-campus committee to address the students’ concerns elimi- nated in the results of the Climate Survey administered last year.

Christophe Pierre, the vice president for academic affairs, announced the formation of the committee in a massmail sent June 8 to employees and students.

“The primary finding of the survey is that faculty, students and staff generally have a positive perception of overall climate,” he said.

The Survey Research Laboratory continues to analyze the 17,000 responses. The Urbana campus had a 21.4 percent response rate, each with 34.9 percent. The Chicago campus had a 21.4 percent response rate. Urbana students, at 13.1 percent, were the top responders among students on the three campuses.

“We have learned that though the climate is rated generally positive, there are areas the three cam- puses and the university administration should review,” Pierre said.

An executive summary of the survey and updated survey informa- tion is available online.

ON THE WEB
www.illinois.edu/climatesurvey
Alison Bell receives Young Investigator Award

By Mackenzie Dankle
News Bureau Intern

A lison Bell, a UI biology professor, is a recipient of the 2012 Young Investigator Award from the Animal Behavior Society. The society recognized Bell for her “remarkable research contributions to the field of animal behavior and the early training of young scientists” in her laboratory.

Bell studies animal behavioral syndromes and their implications. She has made significant contributions to the field of animal behavior by studying the behavioral traits of the three-spined stickleback, a species of fish adapted to diverse habitats. She is a pioneer in the study of animal personality and more recently has been using genomics to understand the causal mechanisms of individual differences in behavior.

“I am thrilled that Alison received this well-deserved award,” said Gene Robinson, a professor of entomology and of neuroscience and the director of the Institute for Genomic Biology. As an authority on the study of animal personality, Alison already has had great impact in the field of behavioral biology,” said Robinson, who nominated her for the award.

“She is widely viewed as one of the international leaders in this interdisciplinary research field,” said Andrew Sih, a distinguished professor of environmental science and policy at the University of California at Davis, who also nominated Bell for the award. She is “not just one of the best young scientists in this field, but one of the top scientists at any career stage,” Robinson said.

The award is given to one researcher each year by the Society for remarkable research contributions to the field of animal behavior as a “new investigator.”

Bell is a member of the International Society for Behavioral Ecology and the American Society of Naturalists. The ARS honored Bell at its annual meeting in Albuquerque, N.M.

**ON THE WEB**
Champaign County Master Gardeners
http://www.extension.illinois.edu/cff/champagnemg

**To the brim**
The focal point of the Japan House tea garden is the Daisukatori, a water basin from which all ceremonial water is drawn. James Bier, the designer and caretaker of the Japan House gardens, has spent countless hours reading about and researching traditional Japanese gardening. He enjoys volunteers to help keep up with pruning and weeding at Japan House.

*And while that has been the idea all along, he’s not shy about sharing with others. His house is part of the annual UI Extension and Master Gardener’s Garden Walk 2012, to be held from 9 a.m. to 4 p.m. June 23. More information on the walk is available online. His property has been a part of the event twice before and he expects about 1,500 people to visit his home.*
Hunger insecurity on the rise among senior citizens in U.S.

By Phil Ciciora
Business and Law Editor

The threat of hunger among senior citizens in the U.S. is a growing crisis that will likely lead to additional public health challenges, says a UI economist who studies the efficacy of food assistance programs on public health.

Almost 15 percent of seniors, or more than 7 million, face the threat of hunger in 2010, according to research by Craig Gundersen, a professor of agricultural and consumer economics at Illinois.

In 2005, one in nine seniors went hungry.

“The Great Recession has caused extreme hardship on many families in the U.S., and senior citizens are no exception,” said Gundersen, who also is the executive director of the National Soybean Research Laboratory at Illinois. “This report demonstrates that our seniors may face more challenges than initially thought.”

According to the research, co-written with James P. Ziliak, of the University of Kentucky, the number of seniors experiencing the threat of hunger has increased by 78 percent from 2001 to 2010. Since the onset of the recession in 2007, the number of seniors experiencing the threat of hunger has increased by 34 percent.

“For the entire population, there has been an increase in the threat of hunger, and we see this in the senior population as well,” Gundersen said. “In the full population, there was a marked increase in food insecurity from 2007 to 2008, which largely staved off the threat of hunger in 2009. After the Great Recession, which officially ended in June 2009 after lasting 18 months, the number of seniors experiencing the threat of hunger has increased by an additional 34 percent.”

“Out of those seniors who face the threat of hunger, the majority have incomes above the poverty line and are white,” Gundersen said. “But the news isn’t comforting if you’re a non-white senior, either.”

“Seniors living in states in the South and Southwest; those who are racial or ethnic minorities; those with lower incomes; and those age 60 to 69 are also more likely to be threatened by hunger,” Gundersen said.

The common denominator for all seniors who are food insecure is a lack of talent and won’t be able to strengthen their management or technology skills. They’ll be involved in talent wars with competitors.”

The study was published in the spring edition of Human Resource Development Quarterly.

Nutritional security is an issue many seniors face as they enter retirement. The research suggests that food insecurity among seniors is higher than in the general population and that food insecurity is associated with a host of negative health outcomes.

Given that previous research shows that food insecurity is associated with a host of poor nutritional and health outcomes for seniors, the research suggests that a potential avenue to stem the growth in health care expenditures on older Americans is to solve the food insecurity problem, Gundersen says.

“From my perspective, food insecurity is one of the leading, if not the leading, nutritional public health issues in the U.S. today,” Gundersen said. “Millions of Americans are food insecure, and millions of seniors are food insecure. We should be concerned when millions of our seniors are going hungry, and the fact that there are serious health consequences associated with that. Any sort of comprehensive effort to decrease health care costs in the U.S. should also incorporate some discussion of how to decrease food insecurity.”

The research was supported by The Meals On Wheels Research Foundation Inc.
Matthew Ehrlich

journalism professor on Hollywood’s portrayal of the news media

Editor’s note: Journalism will be getting dramatic treatment starting June 24 with the premiere of HBO’s “The Newsroom,” the latest creation of “West Wing” producer/writer Aaron Sorkin. Will viewers like what they see in the portrayal of journalists and the workings of the news media? Journalist professor and former radio reporter Matthew Ehrlich thought that movies about journalism mostly undermined the press. Then he took a critical look to write “Journalism in the Movies.” Ehrlich discussed the new series and the public’s dramatic perceptions of journalism with News Bureau social sciences editor Craig Chamberlain.

It’s easy to think that movies and other popular media have contributed to the public’s low regard for the news media. Reporters, after all, are often portrayed as cynical, scandal-seeking and worse. What do you see in the movies that contradicts that?

Well, think of a movie like “All the President’s Men,” which shows Woodward and Bernstein doggedly pursuing the Watergate story with the staunch support of their editor and newspaper. There you clearly have a more idealistic and even heroic portrayal. And it’s not that unique or unusual – popular culture has regularly presented stories in which reporters may co-workers trying to maintain their ideological purity and do the right thing. That’s about as heroic as it gets.

The image that emerges is one of journalists being a sort of species apart, but also engaged in high-stakes, important work. Good journalism produced by a free press helps people and serves democracy; bad journalism hurts people and undermines democracy. Either way, the press matters and makes a difference.

What are some of the common themes or storylines in film and other dramatic portrayals of journalism?

You routinely see journalists confronting pressures to build ratings or circulations and either succumbing shamefully to those pressures or fighting the good fight against them. You see journalists having to choose between remaining detached and above it all, or else getting involved and taking a stand. You see “old pro” journalists telling young “cub” journalists how news should be done, for better or worse.

You see journalists both young and old being more successful in their professional lives than in their personal lives, and often becoming romantically entangled with their co-workers or forming family-like bonds with them. And, of course, you see journalists talking really, really fast.

What do we need to know about journalism that we don’t usually see in movies or television?

I suspect that it’s not that much different from Hollywood’s treatments of doctors or lawyers or teachers – real-life journalists do not ordinarily engage in the thrilling and appalling things you see them do in popular culture. More often, they’re just going about their day-to-day business and doing their jobs the best way they know how.

Still, it can be inspirational to see fictional journalists (many based on real-life models) heroically serving the causes of truth and justice, just as it can be instructional to see them as cynics and scandal-seekers who eventually get their comeupance. At the very least, it can be a whole lot of fun.
Wastewater from large dairy farms contains significant concentrations of estrogenic hormones that can persist for months or even years, researchers report in a new study. In the absence of oxygen, the estrogens rapidly convert from one form to another; this stalls their biodegradation and complicates efforts to detect them, the researchers found.

The study, led by scientists at the Illinois Sustainable Technology Center, is the first to document the unusual behavior of estrogens in wastewater lagoons. The study appears in the journal Environmental Science & Technology.

Just as new mothers undergo hormonal changes that enable them to breastfeed, lactating cows generate estrogenic hormones that are excreted in urine and feces, said ISTC senior research scientist Wei Zheng, who led the study. In large “confined animal feeding operations” (CAFOs) the hormones end up in wastewater. Farmers often store the wastewater in lagoons and may use it to fertilize crops.

Federal laws regulate the flow of nutrients such as nitrogen and phosphorus from CAFOs to prevent excess nutrients from polluting rivers, streams, lakes or groundwater. Environmental officials assume that such regulations also protect groundwater and surface waters from contamination with animal hormones and veterinary pharmaceuticals, but this has not been proven.

Hormone concentrations in livestock wastes are 100 to 1,000 times higher than those emitted from plants that treat human sewage, and large dairy farms are a primary source of estrogens in the environment, Zheng said. Recent studies have detected estrogenic hormones in soil and surrounding watersheds after dairy wastewater was sprayed on the land as fertilizer.

“These estrogens are present at levels that can affect the reproductive functions of aquatic animals,” Zheng said. Even low levels of estrogens can “feminize” animals that spend their lives in the water, causing male fish, for example, to have low sperm counts or to develop female characteristics (such as producing eggs), undermining their ability to reproduce.

Hormones that end up in surface or groundwater could contaminate sources of drinking water for humans, Zheng said. “The estrogens may also be taken up by plants – a potential new route into the food chain,” he said.

When exposed to the air, estrogenic hormones in animal waste tend to break down into harmless byproducts. But the hormones persist in anoxic conditions. While conducting the new study on dairy waste lagoon water in the lab, the researchers were surprised at first to see levels of three primary estrogens (17 alpha-estradiol, 17 beta-estradiol and estrone) fall and then rise again in their samples. Further analysis revealed that the estradiols were being converted to estrone, undergoing the normal first step of biodegradation. But then the process reversed itself: Estrone was reverting to the alpha- and beta-estradiols.

“We call this a reverse transformation,” Zheng said. “It inhibits further degradation. Now we have a better idea of why (the estrogens) can persist in the environment.”

The degradation rates of the three hormones in the wastewater solution were temperature-dependent, and very slow. After 52 days at 35 degrees Celsius (95 degrees Fahrenheit) – an ideal temperature for hormone degradation, Zheng said – less than 30 percent of the hormones in the solution had broken down.

The fluctuating levels of estrone and estradiols may lead to detection errors, Zheng said, giving the impression that the total estrogen load of wastewater is decreasing when it is not.

“We need to develop a strategy to prevent these hormones from building up in the environment,” he said.

Researchers from the Agricultural Research Service of the U.S. Department of Agriculture also contributed to this study. The USDA supported this research.

The Illinois Sustainable Technology Center is a division of the Prairie Research Institute at the UI.
The 2012-13 holiday schedule for the Urbana campus:

- **Monday, Jan. 21:** Martin Luther King Jr. Day
- **Monday, May 27:** Memorial Day
- **Monday, July 5:** Independence Day
- **Monday, Sept. 3:** Labor Day
- **Wednesday, July 4:** Independence Day
- **Monday, Dec. 24:** half-day gift (from the chancellor)
- **Monday, Dec. 31:** New Year’s Eve

**December**

**Monday, Dec. 24:** Christmas Eve
**Monday, Dec. 25:** Christmas Day
**Thursday, Dec. 27 and 28:** Reduced-service days
**Thursday, Jan. 1, New Year’s Day**

**Wednesday, Jan. 3:** President’s Day

**Monday, Jan. 21:** Martin Luther King Jr. Day

**Monday, Feb. 18:** President’s Day

**Monday, March 18:** Spring Break

**Monday, April 1:** Easter

**Monday, April 29:** Labor Day

**Monday, May 27:** Memorial Day

**Monday, June 11:** Flag Day

**Monday, June 25:** Independence Day

**Friday, July 6:** Independence Day

**Friday, Sept. 7:** Labor Day

**Monday, Oct. 22:** Columbus Day

**Monday, Nov. 19:** Veterans Day

**Monday, Dec. 24:** Christmas Eve
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**April 1, 2012**

**March 30:** Ron Terpstra, a professor of recreation, sport and tourism, received the Award for Excellence in Undergraduate Teaching (faculty).
**April 3:** Amy O’Neill, a visiting lecturer in the department of kinesiology and community health, received the Award for Excellence in Undergraduate Teaching (faculty).
**April 5:** Robert Motl, a professor of recreation, sport and tourism, received the Award for Excellence in Undergraduate Teaching (faculty).
**April 10:** Robin Hall, a professor of recreation, sport and tourism, received the Award for Excellence in Undergraduate Teaching (faculty).
**April 17:** Scott Martin, a professor of recreation, sport and tourism, received the Award for Excellence in Undergraduate Teaching (faculty).

**April 23, 2012**

**April 20:** The 2012-13 holiday schedule for the Urbana campus was announced.

**June 21, 2012**

**Sharon M. Donovan:**

A report on honors, awards, appointments and other outstanding achievements of faculty and staff members of the College of Media.

**ASQ**

Sharon M. Donovan, the Melissa M. Noel Endowed Chair in Nutrition and Health in the department of food science and human nutrition, has been invited by the American Society for Quality to serve its Food and Nutrition Board. Donovan focuses on issues of safety and adequacy of the nation’s food supply, establishes principles and guidelines of adequate dietary intake, and renders authoritative judgments on the relationships among food intake, nutrition, and health.

**AHS**

Faculty and staff members in the College of Applied Health Sciences were honored with AHS Excellence Awards. Award recipients are nominated by colleagues for outstanding contributions to teaching, research and mentoring and selected by a committee within the college. AHS presented a plaque and cash award during the spring college meeting May 3.

Scott Martin, a visiting lecturer in the department of recreation, sport and tourism, received the Award for Excellence in Undergraduate Teaching (faculty).

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**April 5:** Scott Martin, a professor of recreation, sport and tourism, received the Award for Excellence in Undergraduate Teaching (faculty).

**April 10:** Robin Hall, a professor of recreation, sport and tourism, received the Award for Excellence in Undergraduate Teaching (faculty).

**April 17:** Scott Martin, a professor of recreation, sport and tourism, received the Award for Excellence in Undergraduate Teaching (faculty).

**April 23, 2012**

**April 20:** The 2012-13 holiday schedule for the Urbana campus was announced.

**June 21, 2012**

**Sharon M. Donovan:**

A report on honors, awards, appointments and other outstanding achievements of faculty and staff members of the College of Media.

**ASQ**

Sharon M. Donovan, the Melissa M. Noel Endowed Chair in Nutrition and Health in the department of food science and human nutrition, has been invited by the American Society for Quality to serve its Food and Nutrition Board. Donovan focuses on issues of safety and adequacy of the nation’s food supply, establishes principles and guidelines of adequate dietary intake, and renders authoritative judgments on the relationships among food intake, nutrition, and health.

**AHS**

Faculty and staff members in the College of Applied Health Sciences were honored with AHS Excellence Awards. Award recipients are nominated by colleagues for outstanding contributions to teaching, research and mentoring and selected by a committee within the college. AHS presented a plaque and cash award during the spring college meeting May 3.

Scott Martin, a visiting lecturer in the department of recreation, sport and tourism, received the Award for Excellence in Undergraduate Teaching (faculty).

Robert Motl, a professor of recreation, sport and tourism, received the Award for Excellence in Undergraduate Teaching (faculty).

Amy O’Neill, a visiting lecturer in the department of kinesiology and community health, was honored with the Award for Excellence in Undergraduate Teaching (faculty).

**April 25, 2012**

**March 30:** Ron Terpstra, a professor of recreation, sport and tourism, received the Award for Excellence in Undergraduate Teaching (faculty).

**March 31:** Amy O’Neill, a visiting lecturer in the department of kinesiology and community health, received the Award for Excellence in Undergraduate Teaching (faculty).

**April 1:** Robert Motl, a professor of recreation, sport and tourism, received the Award for Excellence in Undergraduate Teaching (faculty).

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A report on honors, awards, appointments and other outstanding achievements of faculty and staff members of the College of Media.
Yu’s group devised a solution to the problem by allowing the cantilever to oscillate in air above the liquid while the sample is still submerged. They attached a thin, long nanoneedle—a structure the group developed previously—to the end of the probe, effectively extending the tip.

“We call it ‘trolling mode’ AFM, as in fishing where a part of the fishing line is immersed in water and the other part above,” Yu said.

AFM of soft tissues with a submerged probe is like trying to club fish with a large paddle in a wave pool, the new arrangement is like trolling a fishing line in a calm pond. The nanoneedle displaces very little of the liquid and causes very little drag, yet is very responsive, so that the cantilever can oscillate very gently with very small amplitude.

“Once you remove the noise, all the information you’re getting is from the sample, instead of from the interaction between the tip and the liquid.” Yu said.

Using trolling AFM, the group gained high-resolution topographical images of human cells.

“We can tap with such small force that we can reveal the regional contours of the membrane,” said Ning Wang, a professor of mechanical science and engineering and a co-author of the paper. “Not only that, more importantly, we get the viscoelastic map. We put a little bit of force on it, and see how viscoelastic it is.”

Thanks to the minimal disturbance, trolling AFM also can operate at high frequency, which could allow researchers to study the dynamics of cellular structures that previously were not detectable.

Next, the researchers want to expand the utility of this instrument with additional dynamic measurement capability. The team also will work with biologists to identify issues relating to cell membrane and refine trolling AFM to resolve structures in the membrane.

The National Science Foundation and the National Institutes of Health supported this work. Yu and Wang are also affiliated with the Beckman Institute for Advanced Science and Technology at the UI.

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**Deaths**


Lena Domyung Choe, 46, died June 15 at Carle Foundation Hospital, Urbana. Choe was the program director for distance learning in the Office of Continuing Education. She had worked at the UI since 2001.

Memorials: Lena D. Choe Memorial Fund.

Doris M. Eldridge, 88, died June 8 at the Champaign County Nursing Home, Urbana. Eldridge retired from the UI, where she was a cook for many years. Memorials: Champaign County Nursing Home Auxiliary, 500 Art Bartell Road, Urbana, IL 61802.

Edna L. Glass, 93, died May 24 at her home in Washington, D.C. Glass worked at the UI for 23 years, retiring in 1987 as the business manager for the psychology department.

Kristin Hertenstein, 60, died June 13 at her Urbana home. Hertenstein worked at the Survey Research Laboratory for 12 years, retiring in 2007. Memorials: Developmental Services Center, 1304 W. Bradley Ave., Champaign, IL 61821.

Robert Hicks, 83, died June 13 at Champaign Urbana Regional Rehab Center, Savoy. He retired from the UI in 1987.


Fae Elizabeth (Kllifner) Jackson, 89, died June 13 at Carle Foundation Hospital, Urbana. Jackson was a clerk in the psychology department. Memorials: Champaign County Nursing Home Activity Department, 500 Art Bartell Road, Urbana, IL 61802.

Merle Lynn McGinnis, 69, died June 15 at Kirby Medical Center, Monticello. McGinnis was a building service worker for University Housing. He retired in 2005 after 25 years of service. Memorials: Champaign County Humane Society, 1911 E. Main St., Urbana, IL 61802. www.chuhumane.org.

Theodore J. Rowland, 85, died May 20 in Jacksonville, Fla. Rowland joined the UI faculty in 1961 as a professor of physics and metallurgy, where he specialized in nuclear magnetic resonance. He worked at the UI until he retired in 1992 from the department of materials sciences and engineering. He served as assistant dean in the College of Engineering from 1990-1991.

Memorial Service

A memorial service for Lena Frances Carter will begin at 1 p.m. June 24 at University Place Christian Church, 403 S. Wright St., Champaign. Carter, 94, died June 8. She worked for WILL Radio from 1949 to 1964.

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**IMAGING, CONTINUED FROM PAGE 1**

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