FALL 2011

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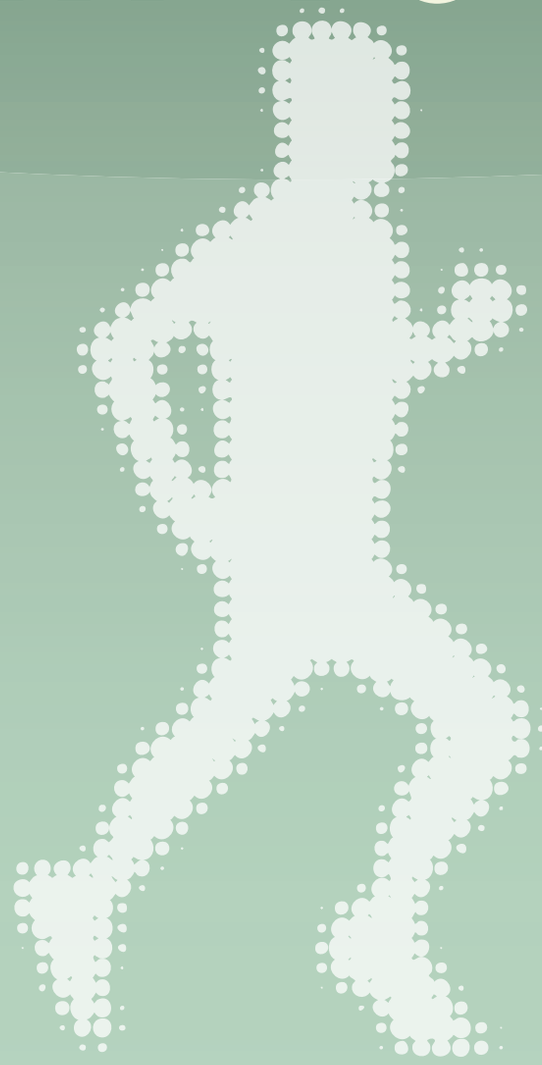
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

BORN TO RUN



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The Value of a Liberal Arts and Sciences Degree

Whenever the economy falters, those of us in the liberal arts and sciences are inevitably called upon to justify our enterprise. The job market tightens, and people want reassurances that there will be a payoff for the sizable investment they are making in an education. "Payoff" usually translates as career, with the query going something like this: "So, what kind of job can I or my son/daughter get with a degree in ___ (fill in the blank)."

I was thinking about this in August when I was preparing to welcome the incoming class of freshmen to our college. I know from past experience that many of them do not know what career they want to pursue. And in a time when even degrees traditionally considered pipelines to careers cannot guarantee the outcome, it takes considerable conviction for students to admit, especially to anxious parents, that they are pursuing their interests.

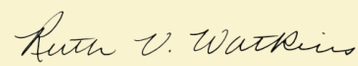
Our country has great expectations of higher education, although they are often contradictory. We want a college education to be vocational and aspirational; to serve as an intellectual sorting system and a means of social mobility; to provide a vehicle for ensuring the nation's competitiveness and a tool for creating an informed citizenry and culturally literate adults. And in difficult times, we want to know it will give us our money's worth.

Earnings statistics show that it will. Over the course of ones' career, the U.S. Census Bureau says the average college graduate will earn twice that of someone with only a high school degree. David Leonhardt writes in the *New York Times* that the wage difference between full-time workers with a high school degree versus those with a college degree is even greater: 83 percent. A research firm in Washington called the Hamilton Project calculated an inflation-adjusted annual return of more than 15 percent…better than the stock market's historical return of 7 percent and the annual growth rate for real estate, which is less than 1 percent.

Our students need to know that their time here will help them achieve their financial goals. But that is a message I'll let others deliver. More important to me is that they recognize their long-term gain. With a liberal arts and sciences education they will sharpen the skills that are most difficult to master yet always in demand—that is, how to bring innovation and creativity to challenging problems, how to effectively communicate, and how to partner with others in addressing challenges.

The distinguishing qualities of a liberal arts and sciences education are the emphasis on teaching students how to think critically, reason analytically, solve problems, and communicate clearly. It isn't a coincidence that many business, engineering, and technical degree programs today are requiring their students to take more classes that are traditionally considered liberal arts classes. Nor that workplaces are discovering that many of their best employees—the ones they elevate to leadership roles—possess these skills.

They are skills for a world and for a job market that is constantly changing. They are an investment that will pay off for a lifetime.



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LAS News FALL 2011

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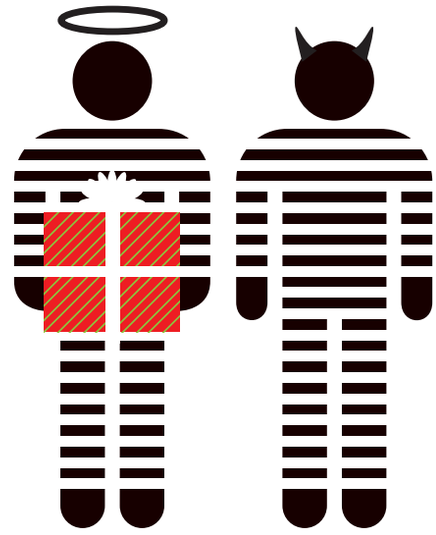
LAS News is published twice annually for alumni and friends of the College of Liberal Arts and Sciences, University of Illinois at Urbana-Champaign, Office of Advancement, 2111 S. Oak St., Suite 100, Champaign, Illinois 61820, (217) 333-7108. The college also publishes a monthly electronic newsletter, *LAS News Online*. Please direct all inquiries about either publication to the editor at laseditor@illinois.edu or at the above address.

The Economics of Santa and Prison

Economist demonstrates how an important principle applies even in unlikely scenarios.



Put yourself in Santa's boots. You've got a problem: Your production and delivery systems are the stuff of legend, but you're no mind reader, and somehow you've got to distinguish good kids from naughty ones.

The solution? Ask them to be good for long enough. Distinguishing naughty from nice will ultimately come down to a matter of economics, says Dan Bernhardt, a professor of economics and finance at the U of I, who studies how information affects all variety of decisions.

The longer you ask a child to be nice, the more likely a naughty one will decide that acting good isn't worth all the fun she's missing. She'll land herself on the naughty list, and voilà, there's one less gift to squeeze down the chimney.

At the same time, however, even a goody-two-shoes will crack if asked to be good for too long, so Santa's demands can't be too excessive.

Despite the, er, unsubstantiated elements of this example, you may notice an important principle at play here called the economics of information. Bernhardt uses the concept in his studies of things such as stock purchases and criminal rehabilitation, and he uses the Santa example to help his students understand it.

Late economist and Nobel Laureate George Stigler introduced the economics of information in 1961, when he questioned an old assumption in economics that consumers are fully aware of relevant information in their buying decisions. His proposition that imperfect information or ignorance also plays a role in decision-making led to a new branch of economic theory examining how information affects decisions.

Bernhardt's work in this area has gained him some attention, including a recent study offering a new perspective on how parole boards should decide whether to grant inmates early release from prison. One of his conclusions, based upon models and analysis, is that parole boards should consider the value of observing a rehabilitated prisoner before granting him early release, and use the information gathered from his behavior to improve future parole decisions.

One drawback comes along the same vein as the naughty kids in the Santa example—if release from prison is too far in the future (or too close), prisoners may decide that efforts to rehabilitate themselves aren't worth the time, and they'll eventually emerge from prison less rehabilitated.

In addition to his own studies, Bernhardt has encouraged students to study the economics of information regarding ballet companies (models indicate that long practice and weight guidelines screen out less committed dancers) and tree-planting companies that pay employees in a lump sum at the end of their work period to increase work quality.

"Quite generally, I try to give students offbeat examples from everyday life about the economics of information," he says.

History Channel's *Modern Marvels* arrived in time to capture the long lines for the corpse flower at U of I's Plant Biology Conservatory. People came to get a glimpse (and a whiff) of the largest and stinkiest flower in the plant kingdom, the titan arum, which took a decade to bloom, and then lasted for only a couple days before wilting. Its odor, meant to attract flies rather than people, is akin to rotting flesh.

Photo by Holly Korab

FROM THE BERENBAUM FILES

Entomologist sticks up for the little bug, takes home premier award.

Photo by L. Brian Stauffer

May Berenbaum still recalls how people would come up to her and ask her to sign their "Bambi Berenbaum" collector card from the popular sci-fi television show *The X-Files*. Bambi Berenbaum was the gorgeous *X-Files* entomologist whom Agent Mulder took a fancy to, and she just happened to be named after May Berenbaum, the head of the University of Illinois Department of Entomology.

Berenbaum (May, not Bambi) responds to such distinctions with her trademark humor, for she has a knack for seeing both the humorous and serious sides of the world of insects. Since arriving at U of I in 1980, she founded the long-running Insect Fear Film Festival on the one hand, and she has done groundbreaking research on how plants evolve to create natural defenses, such as chemical toxins to ward off pests, and how insects, in turn, evolve to overcome these defenses. She has also emerged as a leading expert on colony collapse disorder, which has caused major losses of western honey bee hives.

Her abilities as both a communicator and researcher have earned her the 2011 Tyler Prize for Environmental Achievement, the premier award for environmental science. The honor puts Berenbaum in select company, for the prize has gone to past recipients such as biologist and Pulitzer Prize-winning author Edward O. Wilson, animal conservationist Jane Goodall, and conservation biologist Paul Ehrlich.

"Professor Berenbaum has done more to advance the field of entomology and explain the significance than nearly any other researcher today," says Owen T. Lind, professor of biology at Baylor University and chair of the Tyler Prize executive committee. The Tyler Prize includes a $200,000 cash prize.

Dalkey Archive Press Honored by National Book Critics Circle

A nonprofit publishing enterprise once described by its founder as "a hopelessly quixotic venture" has been named a recipient of the National Book Critics Circle's Ivan Sandrof Lifetime Achievement Award.

Dalkey Archive Press, which is based in the College of Liberal Arts and Sciences, is an independent nonprofit organization specializing in literary translations of contemporary fiction that was founded in 1980 in Chicago, and moved to the U of I in 2006, working with LAS's Center for Translation Studies.

Past honorees include Joyce Carol Oates, the PEN American Center, Pushcart Press, Studs Terkel, and U of I alumnus William Maxwell.

A LIFETIME OF ACHIEVEMENT

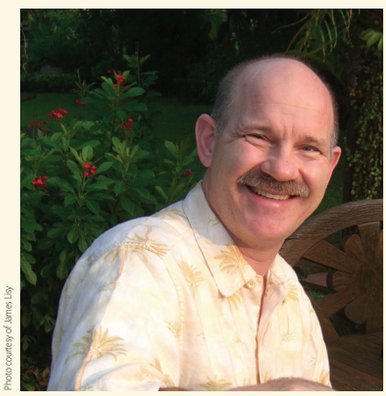


Photo courtesy of James Lisy

U of I chemistry professor James Lisy has been chosen to receive a prestigious Humboldt Research Award honoring a lifetime of research achievements.

The Alexander von Humboldt Foundation in Bonn, Germany, annually honors up to 100 researchers elected by a multinational, multidisciplinary panel of scholars. The recipients are each awarded a prize and extended an invitation to pursue research of their choice with colleagues in Germany.

Lisy uses molecular beam and laser spectroscopy techniques to study properties of molecular and ionic clusters. He is internationally recognized for his research on ion solvation, particularly ion size selectivity, with applications to both biological and environmental systems.

Revising Our Views on Happiness

It's been 68 years since psychologist Abraham Maslow's "theory of needs" defined how people achieve happiness and became a staple of psychology classes. Oddly enough, proof of the theory has been elusive until it came under scrutiny recently by a researcher at the University of Illinois who knows a thing or two about happiness.

Maslow proposed that enjoying life is based upon a hierarchy of needs, with the most basic being physiological necessities such as eating and breathing, followed by safety, love, esteem, and reaching potential. Psychologist Ed Diener, nicknamed "Dr. Happiness" for his work on the subject, and other researchers at Illinois tested Maslow's theory and found that Maslow was largely correct but his idea needs revising.

Using data from the Gallup World Poll, which conducted surveys (designed by Diener) in 155 countries, they found that fulfilling a diversity of needs as defined by Maslow are important to happiness, but, contrary to Maslow's hierarchy, the order in which the needs are met has little bearing on how much they contribute to life satisfaction and enjoyment, Diener says.

"An important departure from Maslow's theory is that we found that a person can report having good social relationships and self-actualization even if their basic needs and safety needs are not completely fulfilled," Diener says.

Research also indicated that people are happier when others in their society also have their needs fulfilled.

Professor Wins One of Science's Biggest Prizes

Photo by L. Brian Stauffer

A professor credited for technological breakthroughs in materials and electronic components has won one of the world's largest single cash prizes for invention.

John A. Rogers, the Lee J. Flory-Founder Chair in Engineering, with a joint appointment in the Department of Chemistry, will receive $500,000 for the 2011 Lemelson-MIT Prize, which is granted every year to encourage innovators to advance economic, social, and environmentally sustainable development.

Rogers has pioneered work in semiconductor materials and flexible, stretchable electronics and has devised technology for solar power, biointegrated electronics, sensing, and fiber optics. His recent work has produced tiny eye-like cameras, less invasive surgical tools, and biocompatible sensor arrays.

He's also affiliated with the Beckman Institute for Advanced Science and Technology, and has been elected to the National Academy of Engineering and named a fellow of the American Association for the Advancement of Science.

Give Me a Break

Taking brief breaks boosts work performance.

Photo by L. Brian Stauffer

It's official. Coffee breaks can increase performance at work.

Actually, *any* kind of brief break can improve concentration on tasks that require focused concentration, according to research from psychology professor Alejandro Lleras. The U of I study zeroes n on a phenomenon known to anyone who has ever had trouble doing the same task for a long time. After a while, you begin to daydream and lose focus. The result: Your performance declines.

Lleras's findings are based on research in which subjects, divided into four groups, were asked to focus on a repetitive computerized task for about an hour under various conditions. Only one group was allowed to switch from the task and take two breaks. And they were the only participants who showed no drop in performance over time.

"It was amazing that performance seemed to be unimpaired by time, while for the other groups, performance so clearly dropped off," he says. This is consistent with the idea that the brain is built to detect and respond to change.

Lleras points out that the study's results apply to any activity in which people try to concentrate on one task for a long time. "Anytime we need to maintain a steady level of heightened focus, I believe our mind is in a similar state," he adds. "So, from a practical standpoint, our research suggests that when faced with long tasks—such as studying before a final exam or doing your taxes—it is best to impose brief breaks on yourself."

Coffee is optional.

FRIEZING

Once destined for dumpsters, U of I's collection of plaster friezes from Greece's Parthenon are now recognized as priceless snapshots in time.

By Holly Korab

The songwriter Joni Mitchell famously crooned in the 1970s that you don't know what you've got 'til it's gone.

She was protesting the "paving of paradise" but the director of U of I's Spurlock Museum, Wayne Pitard, could say the same about beautiful plaster reproductions that were once a mainstay of museum collections worldwide. In a flurry of house cleaning from the 1940s to the 1970s, leading museums abandoned these once-popular reproductions, many of them centuries old, in favor of originals only.

"You might say it was luck that the World Heritage Museum [the predecessor of U of I's Spurlock Museum] was too broke at the time to hire the staff to throw ours out, otherwise today we would not be glorying in the collection we have," says Pitard.

The collection of casts of friezes from Greece's ancient Parthenon in U of I's Spurlock Museum is the largest collection in the U.S. and they preserve details that have been damaged or destroyed in the originals.

Pitard is standing before one of the museum's most famous collections of plaster casts—45 casts of friezes from Greece's 2,400-year-old temple to Athena, the Parthenon. The casts turn 100 this year—as does the museum itself—and are symbolic of the sometimes unexpected role that museums play in preserving human cultural heritage.

The original friezes, which are at the British Museum and to a lesser degree museums in Paris and Athens, were carved in massive slabs of marble and encircled a 524-foot inner colonnade of the Parthenon. They depict a procession of horsemen, townspeople, and gods that are remarkable for their vitality and also for being groundbreaking in their day—they were the first Greek art to tell a continuous story.

The greatness of these classical pieces is evident in the collection at Spurlock, as is something else.

"See Aphrodites and Eros," asks Pitard, pointing towards the god and goddess in the all-important culmination of the procession. "You won't find that in the British Museum."

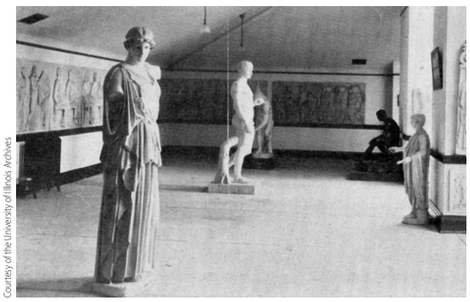
The replicas attract scholars and artists from across the country to Spurlock, according to Pitard, because the replicas were cast from the earliest molds made of the Parthenon, and like time capsules, preserve details lost in the originals.

"It is one of the largest and most unique collections of the friezes in the United States," says Pitard. "There is a museum in Switzerland that has the complete collection of friezes from the same era. But we have 45. More than any other American museum."

The University of Illinois got into the business of buying the frieze casts in 1911 when the ambitious, young university opened a classical museum on the fourth floor of the then-new Lincoln Hall. Among the first purchases by its curator, Arthur Pease, were 40 of the 83 Parthenon frieze slabs (five more were purchased years later). His source was P.P. Caproni

TIME

Images courtesy of Spurlock Museum



Courtesy of the University of Illinois Archives

Most of U of I's friezes were purchased in 1911 for the classical museum on the fourth floor of the then-new Lincoln Hall.

Brothers of Boston, the best plaster cast studio in the country at the time.

The original molds were made in Greece in 1787, by Louis Fauvel, an artist and French general counsel stationed in Athens who was unsuccessful in pilfering the original marbles and, instead, settled on making reproductions. The Parthenon had remained remarkably intact for 2,000 years until 1687 when Venetian troops lobbed a canon ball into the temple, where the Turkish troops stored gunpowder. The resulting explosion blew off the roof and destroyed the north and south sides, leaving only the west and east ends standing.

Fauvel's making of molds of the frieze 100 years later was fortuitous, because a few years afterwards many of the marble blocks, now mostly lying on the ground, were vandalized. That his casts predate the serious damage is why the details they preserve are so important.

A decade later Britain's Lord Elgin proved more resourceful and shipped crates of sculptures and friezes to England in what some consider the greatest pilfering of antiquities in history. Elgin eventually sold his collection to the British Museum for a small fortune, where they remain today. The scale of his appropriation was scandalous, even for the age that glorified plundering, and it is still a source of tension between Greece and Britain.

Casts were popular when travel was limited, and the replication in plaster allowed greater numbers of people to experience the world's masterpieces.

When travel abroad became more commonplace after World War II, museums sought authenticity in their quest to remain relevant, and either mothballed or simply tossed their casts in dumpsters like mementos of a failed love affair. Pitard says there were even rumors of cast-smashing parties at U of I during that time.

These sections from the east frieze show the culmination of the procession and capture details lost in the originals.

Poor finances spared the collection now housed in the Spurlock Museum—the museum too broke to pay for staff to discard them. By the time the museum's finances had improved in the 1970s, so had scholars' opinions of old casts.

A steady stream of scholars—including the future Academy Award-winning animator Paul Debevec—began showing up at the museum to study its collection. Debevec, who teaches computer graphics at the University of Southern California and is an Urbana native, visited in 1989 and was taken by the friezes and the Parthenon's remarkable story of survival. Eventually he incorporated scans of the friezes into his animated re-creation of the Parthenon, which has appeared in PBS's *NOVA*, National Geographic's *Treasure Wars*, the Louvre, and the 2004 Olympics.

Today they are recognized as gems. Only about a third of the original Fauvel molds still exist, according to Robert Shure, owner of Giust Gallery, which now owns what remains of the Caproni collection. Thus collections made from the original Fauvel molds—such as Spurlock's—are rare.

"What I like about this situation," says Pitard, referring to the casts, "is that they were considered worthless for 50 years and now they turn out to be invaluable."

Apparently, you sometimes can save a little bit of paradise. ■

Watch the animation inspired by the friezes at Spurlock Museum.
las.illinois.edu/alumni/magazine

BORN TO RUN

By Doug Peterson

Sheep on treadmills and bones of extinct animals reveal secrets of motion.

It isn't something you see every day in the local gym: sheep running on treadmills. But if you had stumbled into the research labs on the South Farms of the University of Illinois not too long ago, you might have done a double take at this startling sight.

It was all part of an anthropological analysis of how movement patterns affect our bones. The data collected has helped researchers in probing the bones of extinct animals and determining how early primates might have moved around in their environments, says John Polk, a U of I anthropologist who has spent much of his career studying how the human skeleton evolved so we can walk upright and run with endurance.

According to Polk, their research team had sheep walk and run on a treadmill at different angles to find out how walking with flexed knees or extended knees affects patterns of bone density on joint surfaces. The sheep were contained by a box placed over the treadmill, but the front and one side of the box were made of plexiglass so the running sheep could see directly ahead of them.

"If you put another sheep in front of them, they'll run towards it," Polk says. "Sheep are wonderful treadmill runners."

Researchers discovered that when the sheep walked with legs flexed, the bones were denser on the posterior, or back, side of the knee joint; and when they walked with extended legs, bones were denser on the front of the knee joint. This knowledge has made it possible for anthropologists and paleontologists to determine, by measuring density patterns in the bones of extinct animals, whether a particular primate walked in a crouched or more upright position.

Polk is interested in two major transitions among early humans—the shift to walking upright about 5 to 7 million years ago and the origin of endurance running about 2 million years ago. For instance, the human ancestor, *Australopithecus,* had shorter limbs and may have used more flexed lower-limb postures when they walked.

"They didn't have the anatomy to run long distances, but they were not ecologically required to do so," Polk says. "They probably didn't walk exactly like us either, and it is quite possible that there is more than one way to be an upright biped. The australopithecines lived in forests, and meat wasn't a big portion of their diet, so endurance running was not required in tracking down prey."

But when long-distance hunting arose, that all changed.

Polk has been intrigued by research at Harvard, where he did his post-doctoral work, which argues that humans developed their endurance running ability because hunting required it. Human hunters would "run down" animals in hot environments until their prey collapsed due to hyperthermia and exhaustion.

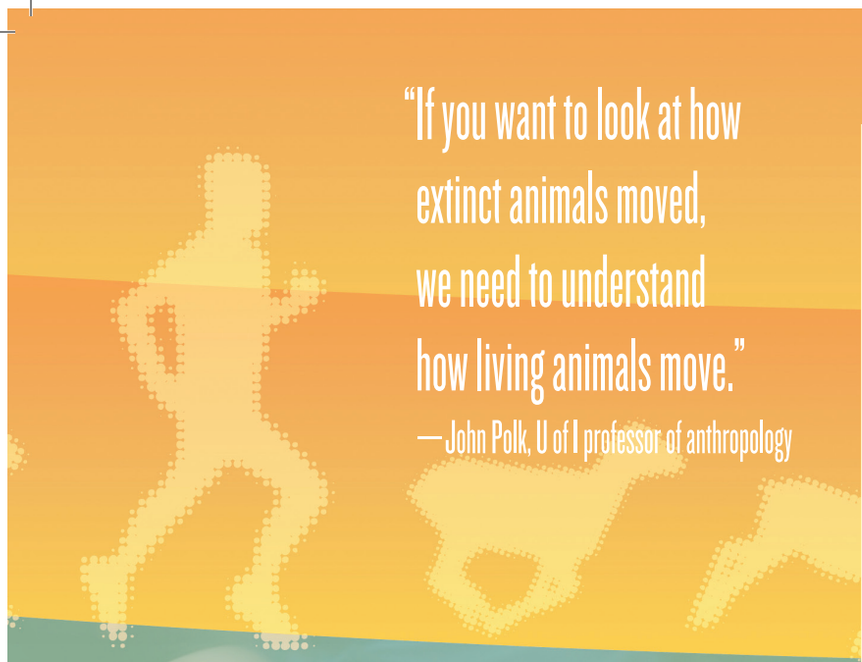
"Baby, we were born to run," sang megastar Bruce Springsteen back in the 1970s. This lyric rings true, but Polk says that it goes deeper than that. Humans weren't just born to run. We also evolved to run.

"The modern human body shape resulted from the fact that we are great endurance runners," he points out. "A lot of our anatomy is well-adapted to endurance running. We have relatively long limbs and narrower hips compared to other primates or animals. Our Achilles tendons are long and can store and recover elastic energy more effectively than other primates, and we sweat more and have less hair than other animals, making us very good at dumping heat in hot environments."

Like other specialized running animals, humans also have a tendinous band connecting the back of the head to our upper backs, stabilizing our heads during running. In addition, we can regulate the number of breaths per stride, whereas quadrupeds can take only one breath per stride.

When quadrupeds stretch out during a run, they have to breathe in; then they breathe out as their stride compresses. This is one of the few ways quadrupeds can try to cool down, he says, and if they're running for long periods of time, the heat dumping is limited and

Photo by Thompson-McClellan



"If you want to look at how extinct animals moved, we need to understand how living animals move."

—John Polk, U of I professor of anthropology

body temperature can rise dramatically. Because humans can regulate their breathing, they can keep cool and have greater endurance.

Polk says that aside from a couple of exceptions, such as pronghorn antelopes or perhaps some wild dogs, very few wild animals would be able to run a marathon, as humans do. Pronghorns can maintain an incredible 40 mile-per-hour pace for a half hour or more. Other animals, such as sled dogs, can be bred and trained for endurance, but the ability does not come naturally. Horses are sprinters, and although some breeds can also be trained for distance running, there is always the risk of being run to exhaustion.

Over the years, Polk's laboratory has been putting bones to the test, using CT scans and other devices to find out how people and animals, both living and extinct, came to walk and run the way they do. Polk has also created three-dimensional models of top college sprinters to figure out the secret of their success, and has been working with colleagues across the University to develop new ways to diagnose the motion problems of people with gait impairments (see accompanying sidebar).

"If you want to look at how extinct animals moved, we need to understand how living animals move," he says. "So we're interested in how the forces we encounter during motion act on our skeletons and can alter bone properties. This helps us figure out what kinds of skeletal and physiological changes were involved in both the transition to walking upright, and in the transition from habitual walking to more active running."

Polk has spent countless hours studying how animals run, but he didn't actually run in a long-distance race himself until he tackled a half marathon in the spring of 2010. He says his performance was passable, and he was pleased that at least he was not lapped by any of the full marathon runners.

The other good news: No sheep outdistanced him either. ■

RESEARCH ON THE RUN

Finding the secret to sprinting and injury recovery.

It looks like something you might see on the set of a big-budget, special-effects movie—people wearing Ping-Pong-sized balls all over their body, enabling computers to capture their motion and create three-dimensional images. In Hollywood, this technique was used on an actor to create the computer-generated Gollum character in *Lord of the Rings.* At the University of Illinois, LAS anthropologist John Polk has used this technique to determine how world-class sprinters can reach great speeds.

"A U of I sprinter was in one of my classes and we got to talking about how different training regimes help people increase their sprint performance," says Polk, who studies motion and its impact on the evolution of our skeletons. "I was interested in the mechanics of limbs during sprinting."

So Polk had several top Illini runners wear the little balls while sprinting around the Armory track on campus. This enabled the researchers to capture their motion, create 3-D images, and determine the secret to their success.

"Sprinters use sheer power to get up to speed, and then they maintain their speed with the elastic characteristics of their limbs," he says. "They're like springs. They're using the arches of their feet, and they're using the Achilles tendons in their legs to bounce. But it's a directed bounce. It's not up and down, but a bounce in the direction they want to go."

In addition to the study of runners, Polk's lab has been working with researchers in engineering and psychology, measuring the motion patterns of people. They're hoping to quantify motion patterns so physical therapists could use them to diagnose movement problems in patients, such as those recovering from injuries.

"Right now, if you go to a physical therapist, the therapist will look at how you're moving, ask if you feel pain, and maybe take some simple measurements like stride length," Polk says. "We want to develop new tools that clinicians and physical therapists can use to quantify motion."

The result would be a state-of-the-art tool to determine where motion patterns are off kilter.

"There are simple ways of describing motion, but we know that our motion patterns result from complicated interactions among many muscles acting along all of our limb segments," he says. "We want to figure out how an injury at one joint affects motion patterns at other joints."

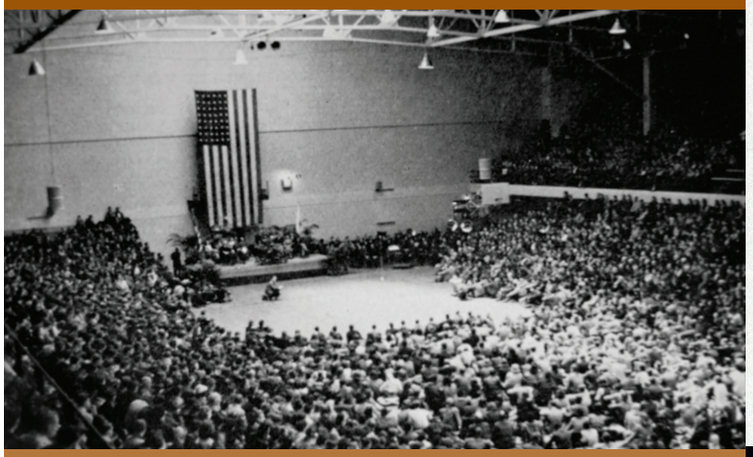
WAR AND THE NEW ERA

A GIFT FOR THE AGES
THE LINCOLN HALL PROJECT
A LEGACY HONORED. A FUTURE PRESERVED.

This is the fourth part in a series examining the evolution of higher education at Illinois since the construction of Lincoln Hall. See the entire history series online at lincolnhall.illinois.edu/history.

By Dave Evensen

Images courtesy of University of Illinois Archives



With the advent of World War II, the University of Illinois campus turned into a virtual military base.

Thousands of military personnel were housed in requisitioned dorms and fraternity houses as the U.S. Army and Navy set up specialized training programs on campus. The ice rink and Illini Union were converted to mess halls, and new courses in civil defense filled with students.

Armed guards were posted around academic buildings where contributions to the war effort were underway. Chemists on campus were key players in one of the largest research initiatives of the war, the Synthetic Rubber Project, which literally kept Allied armies on the move.

There were a few voices of dissent about the war effort taking priority over civilian education, but support for the conversion was overwhelming, particularly when the war's outcome was in doubt.

"It is the first concern of the University of Illinois to help win the war," declared the Board of Trustees in March 1942, in offering University facilities and staff services in support of the war. "Everything else is secondary, even the much talked of long-time educational program so essential for making a durable peace to which every university is dedicated."

Even when the war ended, however, and the military left campus, the University discovered that there would be no return to normal. The public had come to regard universities in a new light. The same veterans who had flooded enemy beaches were, with help from the G.I. Bill, flooding campus in search of education. In many ways it became a more serious and career-oriented place.

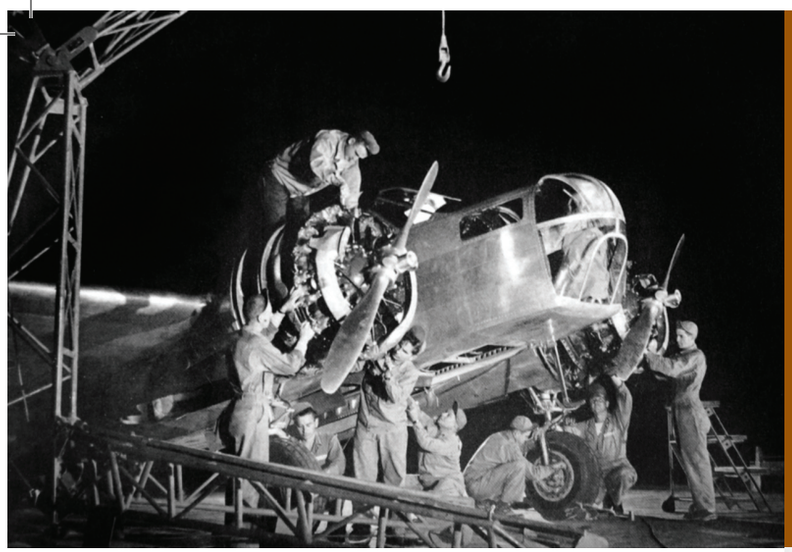
The University of Illinois did all it could to honor the nation's commitment to provide higher education to veterans after the war. But it quickly became clear that campus would never be the same.

Voices of Skepticism

Nerves on campus were frayed in the grim, early months of the war. As the University designated air wardens, erected anti-sabotage lights, and formed war committees, however, some maintained cooler heads. One professor, W.A. Oldfather, mindful of salary cuts, staff reductions, course restrictions, and other cost-saving measures that had already occurred, complained in a letter to his dean that a plan to repave streets in anticipation of possible troop movements was "just a bit too thick," and quoted Madame Roland: "O Liberty! What crimes are committed in thy name!" At least one administrator at the physical plant agreed with him, though it's unclear if the dissent affected any paving plans.

Combat and Sacrifice

The University of Illinois received high praise from the military for its assistance in training personnel during World War II. But Illini also made contributions overseas. Almost 20,000 students and alumni and some 600 faculty and staff from the University served in World War II. An estimated 738 of them were killed in service.



Keeping Armies on the Move

Campus researchers tackled a variety of subjects related to the war effort, including anti-malarial drugs, how to remove chemicals from water, food and nutrition, plastics, alloys, concrete, airplane wings, enamels, and munitions. But the most important was the University's research contributions in the ambitious Synthetic Rubber Project. The project came about as the Japanese cut off supplies of natural rubber early in the war, threatening stockpiles of tires, rubber-soled boots, and other essential materials. Government, industry, and universities worked together to come up with a substitute. The University of Illinois, led by chemist Carl "Speed" Marvel, became a key player—receiving the most funding of any university for the project—in the effort that eventually produced hundreds of thousands of tons of synthetic rubber.

Measuring Leftovers and Tire Treads

Sometimes on its own initiative, and sometimes under orders from the government, the University of Illinois rationed essential materials during the war. Campus efforts in this matter were careful and even extreme. Air conditioning was turned off and elevators were shut down. Tires and gasoline were preserved through the close monitoring of odometers and tire treads (tire theft was a problem). In one of the more exhaustive efforts, the University, at the request of the U.S. Department of Agriculture, carefully weighed food portions and leftovers at eating halls to determine how much food students ate (22.84 lb. per week per student) and how much was thrown away (4.25 lb. per week per student).

Campus on War Footing

The University of Illinois revamped virtually every aspect of itself to assist the war effort. Campus hosted military training programs and created two-year curriculums heavy in math, physics, chemistry, engineering, and English for service members. Navy personnel trained in the pool in the English Building. Other teaching and research programs were shortened to produce graduates as quickly as possible and with expertise applicable to national defense. Students filled extracurricular courses in first aid, radio, riot duty, firefighting, and other matters of civil defense. "With a change of emphasis here and a slight alteration there, the research and scholarship of the whole institution were promptly placed on a war footing," stated the Board of Trustees at the time.

More Stringent Admissions

Historians say that one of the most important legacies of the G.I. Bill was how it threw open the doors of college and made higher education a more common and accepted pursuit for millions of Americans. The growth in interest, however, also forced universities to control their size. After the war there were calls at Illinois for more stringent admissions standards.

Extra Housing and Long Instructor Hours

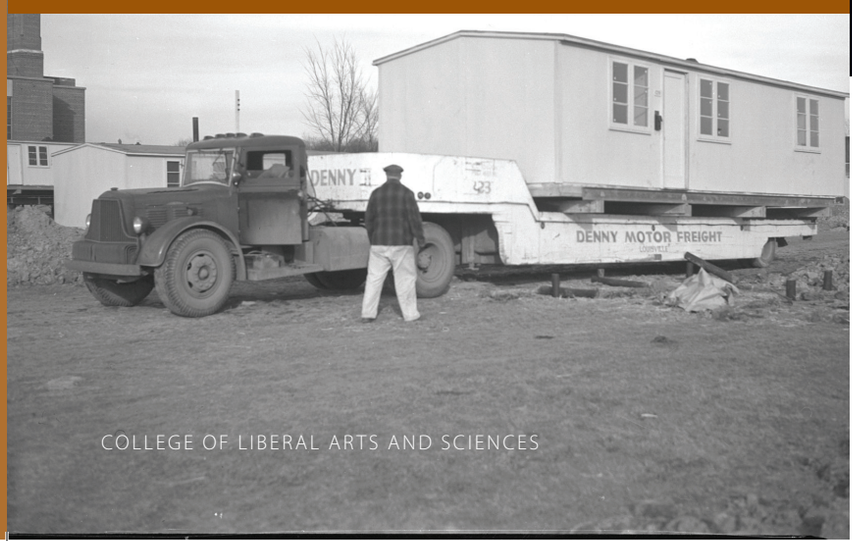
The sheer number of veterans who took advantage of the G.I. Bill's higher education provision nearly overwhelmed universities, including Illinois. A year after the war, the Urbana-Champaign campus had 23,000 students who hoped to register. Campus could handle 15,000. To accommodate the influx, instructors worked longer hours and classes were held in the evening. Single beds in dormitories were replaced with bunk beds. The Old Gym Annex, ice rink, and Memorial Stadium were converted to barracks-type housing. Portable houses were set up on the south side of campus for married veterans. Temporary campuses were established in Galesburg and at Chicago's Navy Pier (a precursor of today's Chicago campus).

The End of 'Joe and Jane College'

Veterans changed the character of student life after the war. In some ways veterans—who were often married with children, and older than the typical student—were more reticent and serious than the typical student and had little interest in student social life. Veterans were known to be hard-working students, but professors complained that some veterans, particularly former officers, were irreverent toward professorial authority. But Jean Howerton, then editor of the *Daily Illini*, said at a campus meeting in 1946 that students welcomed veterans and the new attitudes they brought to campus. They weren't part of the traditional college crowd. "Most of us are glad the 'rah-rah' days are gone and 'Joe and Jane College' with them," she said.

Veterans Come Home

Student enrollment at the University (aside from military trainees) plunged during World War II, with numbers falling more than 50 percent to 8,541 in 1943-44. On the Urbana-Champaign campus women outnumbered men. The situation changed drastically as eventually some 2 million veterans across the country took advantage of the G.I. Bill, which provided a free college education. By the mid- and late 1940s, enrollment at the University of Illinois ballooned to an all-time high of 38,637 (with men outnumbering women almost 4 to 1). Sporting events revived, as did the marching band. Veterans also flocked to work at campus publications, such as the *Daily Illini*, and they unfortunately displaced many women who filled the roles of editors and writers during the war. Veterans also had a preference for theater. One student who previously worked on the stage crew of the play *Beggar on Horseback* before going to war was given the lead part after he returned.



A Changed Outlook on Education

More so than other students, World War II veterans arrived on campus focused on one thing: getting the skills necessary to land a job. For the most part they knew what they wanted to do (in some cases they already had a job lined up). They had little patience for coursework that wasn't directly applicable. Extra classroom space and instructors had to be found

for subjects such as engineering, chemistry, psychology, geology, math, business, law, medicine, math, and journalism. The College of Liberal Arts and Sciences added 142 sections of rhetoric, a required course for all students. Other fields, such as humanities, suffered. LAS waived its language requirement for students who didn't need it in their field. G.E. Moore, associate dean in LAS, said in 1946 that many veterans wanted to get through college as quickly as possible.

New Roles in Research and the World

The war and its aftermath helped open the University of Illinois to the world. Historian John Thelin notes that the cooperation between the federal government and universities during the war opened the door for continued collaborations afterward. The federal government laid the groundwork for programs such as the National Science Foundation, which awards grants to university researchers through the present day. Illinois and other universities became more firmly established as research centers. The Department of Astronomy at Illinois, for example, began tracking U.S. and Soviet satellites after the launch of Sputnik I, which generated federal funding that eventually led to the Vermillion River Observatory and a radio astronomy program. A growing awareness of America's place in the world emerged, too, with courses in English as a second language beginning in 1947, and a Latin American studies major established in 1949.

The G.I. Bill Runs its Course

In terms of numbers, the flood of veterans in the wake of the G.I. Bill was relatively brief. By 1950 University enrollment had begun to dip as veterans graduated, although it never fell again to pre-war levels as the University had expanded. The barracks-style living at the Gym Annex was closed, but after an outcry from students who preferred that type of housing the University added a similar facility on Fourth Street. Two years later, however, the facility was converted to traditional living space. The next generation of students didn't appreciate barracks-style living as much as the veterans had.

Storyography (Kind of) Solves 30-Year Campus Mystery

Mysterious story submission shows up in the mail.

Any detective knows that people confess their wrongdoings for countless reasons: Guilt, pride, love, alcohol.

The narrator in *A Tell-Tale Heart* heard his victim's heart beneath the floorboards. And whoever stole the bust of Lincoln from Lincoln Hall almost 32 years ago read his copy of *LAS News*.

The Storyography project recently received an anonymous story submission in which the speaker, his voice altered, provided details of the October 1979 bust heist that ended when police found the statue sitting on a tree stump a few days later at the eighth hole of the University golf course.

Aside from a few newspaper articles at the time, the unsolved prank had gone into the dustbin of history—and long beyond the statue, er, statute of limitations—until the recent renovation of Lincoln Hall commenced and some of the building's colorful history came back to light. That includes the fact that the bust of Abe had sat there for more than 80 years. . . except for a few nights in 1979.

The speaker came forward after an article appeared in the Winter 2011 *LAS News* in which a museum official speculated that damage to the bust (it was recently refurbished) may have occurred during the prank in 1979. Not so, says the eagle-eyed reader and prankster.

"We never intended to harm the bust," says the speaker, whose full story, including details and motives behind the prank, and how it sparked the Statue Liberation Society and other campus pranks, can be found at www.lincolnhall.illinois.edu/storyography.

"And after a couple of days we put it on the golf course," says the speaker. "We alerted University police, and certainly we were not responsible for any damage or any scratches that appeared later."

The story was submitted via CD, and the name and address on the package could not be confirmed. Suffice it to say, however, that after a review of the matter, the staff of Storyography feels reasonably certain that it's gained authentic insight into one of Lincoln Hall's more comical moments.

We have questions for the pranksters that, as of the writing of this story, remain unanswered. Perhaps you know how to reach them?

Hear the pranksters' side of the story at lincolnhall.illinois.edu/storyography. Storyography

Make your "I will never forget" moment part of campus lore.

"Literally it was down to the last minute where she would have walked out the door and vanished maybe forever."

"I am the founding member of the Statue Liberation Society."

"I remember telling someone that I realize now how important how I was going to do in school would be to my parents."

Add your voice to the mix!

The Storyography project in the College of Liberal Arts and Sciences has collected dozens of stories about campus life from alumni, students, and faculty, and we'd like to hear more. Contribute your story— whether it be happy, sad, contemplative, or humorous—and help define the University legacy for future generations.

How you can still participate:

- Share photos.
- Write it down.
- Send us your own video or audio recording.
- Contact us and have us record your story on your next campus visit.

lincolnhall.illinois.edu/storyography

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COLLEGE OF LIBERAL ARTS & SCIENCES
Storyography

SONIC INVENTORS

'TURNTABLISTS' TURNED MUSIC UPSIDE DOWN, BUT NOW HAVE TO ADAPT.

By Doug Peterson

His name was Joseph Saddler, but people in the Bronx knew him as Grandmaster Flash. During the 1970s, Grandmaster Flash and his friends would block off an entire intersection, and he would blast the makeshift sound system that he had assembled using parts from abandoned cars and discarded stereos. For power, he tapped into the base of a streetlight, and then the streets filled with music and dancing.

Hip-hop music was born on the streets of New York in the 1970s, and with it came break dancing, rapping, and DJing. Grandmaster Flash was a DJ, and his innovations took this skill to a new level as he became one of the first to use turntables as a musical instrument, says LAS history professor Rayvon Fouche.

Fouche has long been interested in the innovations made by African Americans, for as he puts it, "I'm interested in how black people interact with technology in new and innovative ways."

Previously, Fouche studied and wrote about black inventors working in more traditional areas—such as Granville T. Woods, an African American who holds numerous patents for devices on trains and streetcars. But more recently Fouche has gone beyond the traditional realm to look at "sonic inventors"—African Americans who have made technological breakthroughs in music, particularly in jazz and hip-hop.

These sonic inventors include "turntablists"—hip-hop artists like Grandmaster Flash, who turned the conventional turntable into a musical instrument. Just as a pianist plays a piano, a turntablist plays two turntables, one with each hand.

Using the turntables, DJs sample music from vinyl records and incorporate these sounds into hip-hop music. According to Fouche, Grandmaster Flash came up with the "quick mix" technique, which allowed him to seamlessly switch between the two turntables. Using both hands, Grandmaster Flash would locate musical phrases on the two vinyl records and switch between them.

Early DJs sampled music from sources ranging from the Beatles and Prince to Led Zeppelin and the Jackson 5. Of course, lifting music from vinyl records and then incorporating it into hip-hop songs eventually raised copyright issues, but in the 1970s there was an air of rebellion that encouraged this indiscriminate lifting of music.

"Early on, groups such as Public Enemy were known for sampling bits and pieces of music and not paying royalties," Fouche says. "But in the mid-'80s there was considerable legal action to regain royalties. It's now been ironed out, and there is a royalty system that allows people to be compensated for sampled music. But early on it was a terrible mess."

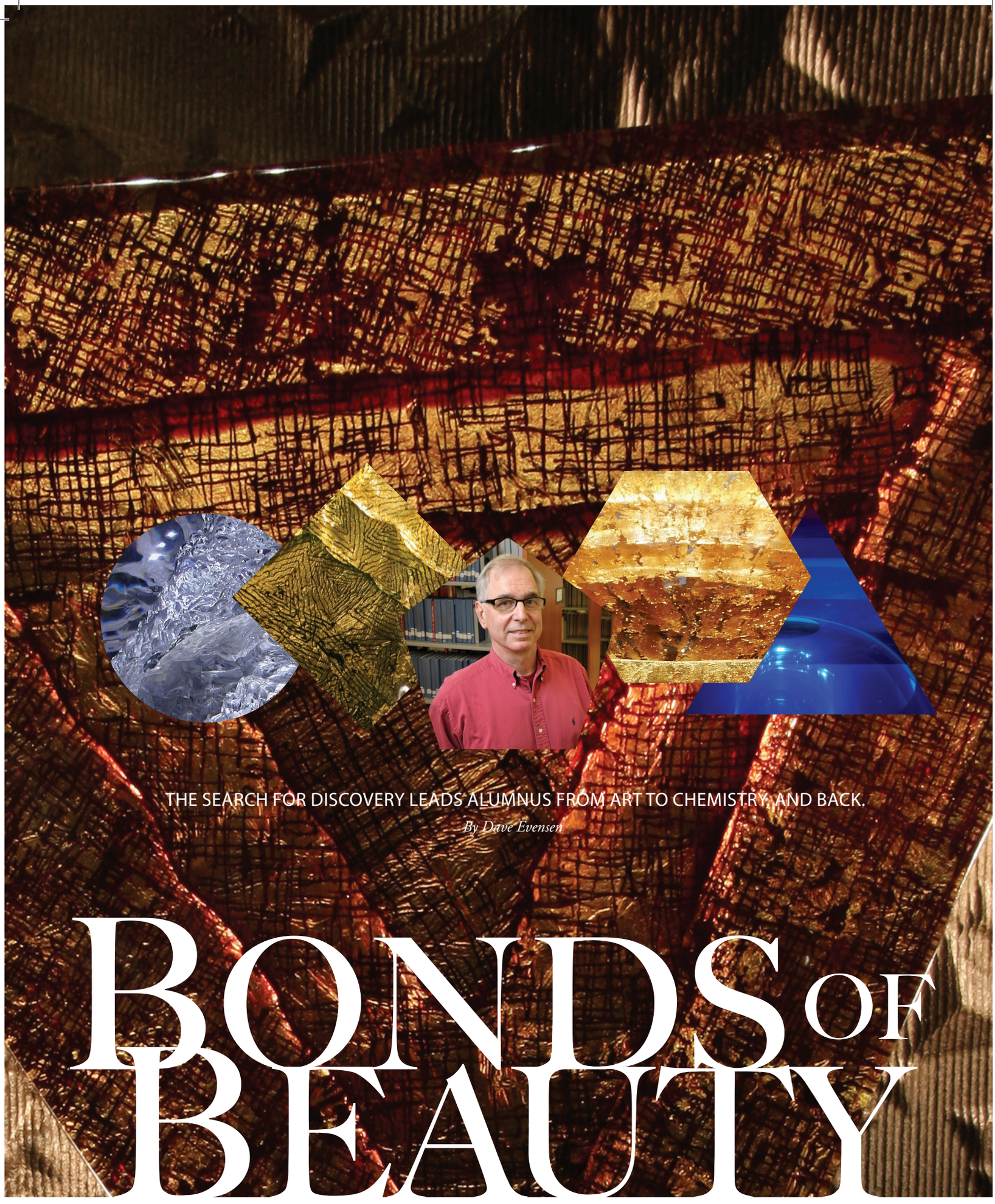
With its early flouting of copyright law, hip-hop has always maintained a rebel outlook, a "resistance to the broader culture," as Fouche puts it. "People said that instead of listening to prerecorded music, we're going to *perform* prerecorded music with our turntables. Hip-hop today may have lost a lot of its African American roots, but it still maintains this idea of cultural resistance."

Hip-hop upset the musical world's apple cart, so it's ironic that digital innovations have disrupted the hip-hop culture over the last 10 years. Turntables and vinyl records are artifacts of the past, Fouche says, and most artists have made the move, sometimes grudgingly, to "digital vinyl" systems.

With a digital vinyl system, DJs still use turntables, but the music comes from a laptop computer, not from vinyl records. The two turntables now act as *controllers* to manipulate the digital music on the computer, thus retaining some of the skill that DJs used to manipulate music on traditional vinyl records.

"It allows DJs to embrace all that is available in the digital realm without undermining the historical authenticity of performing with vinyl records," Fouche says. "But there has been a lot of tension around this because when you move from turntables and vinyl records to digital controllers, it's a different performance and a different skill."

Fouche concedes that it's easier to master a digital vinyl system than traditional vinyl records, "but the best are still the best whether you're using a digital system or analog system or anything in between." ■



THE SEARCH FOR DISCOVERY LEADS ALUMNUS FROM ART TO CHEMISTRY, AND BACK.

By Dave Evensen

BONDS OF BEAUTY

On Whidbey Island in Puget Sound, 90 minutes north of Seattle, Wash., and surrounded by gardens, fences, and fruit trees, Terry Balle works at the unusual intersection of art and science.

Inside his sculpting studio he carefully assembles the various raw materials of his trade: polymer resins, graphite, organic dyes, polymers, and leaves of gold and silver that have been hammered into sheets so thin and fragile that they'll blow away if he sneezes.

Then, with sketches, mathematical calculations, and tools he's made himself, Balle begins to sculpt. Thorough and gentle by nature, he bonds the raw materials together and places the shape into an oven for days to prepare it for carving. Once he carves an outline, Balle grinds and fashions the material into artistic form with a progression of sandpaper, rough to smooth. Finally he polishes it and inscribes his signature on the glassy surface.

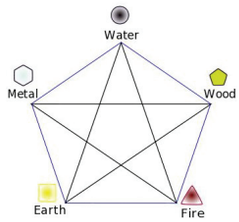
Balle says that symbols can't be put into a box, but they can, in a way. He sculpts various geometric shapes and objects, ranging in size from a few inches in diameter to 10 feet in height, and delivers the commissioned works to galleries, businesses, homes, and hospitals across the country. Noted for their dazzling interiors of etched gold and silver, it's what happens to the sculptures under the light that can't be easily defined.

"We consider the art an exploration of the reciprocal nature of medicine as a science and art, and art as a science and vehicle for healing," says Reed Kratka, a physician at Northwest Specialty Clinics in Springfield, Ore., when they placed 25 of Balle's sculptures on permanent display throughout five floors of the clinic.

Balle, in his 60s, has experience ranging from war to welding shops, and from chemistry labs to art studios. What he's learned is this: Art and science merge together. In fact, for Balle, who has a doctoral degree in physical chemistry from the University of Illinois, the two need each other.

"I believe science can supply an objective criterion to guide the creation of sculpture, whereby art gives beauty to science, and science gives new meaning to art," Balle says.

He didn't always think so. As a young man in the 1960s he tried to make it as an artist, working in metals, but it was a struggle. Then he went to Vietnam and came home motivated to counter the enormous destruction he'd witnessed in the war.



Balle bases his work on the 5-Element Theory, which he says is a useful model for any dynamical system.

Balle re-enrolled in college to pursue not art, but science.

"In the presence of the huge machine that is war, art seemed rather ineffective," he recalls, "but science is based on the fundamental power and truth of the physical world. Since science is grounded in physical reality, that is where you need to start in order to build or create anything, including art."

While earning his bachelor's degree at the University of Oregon, Balle heard of Willis "Bill" Flygare, a young professor at the University of Illinois then considered one of the most promising physical chemists in the field. When Balle was admitted to the doctoral program in chemistry in the mid-1970s, he asked Flygare if he could study under him.

Terry Balle combined his love for chemistry and art to create high-tech sculpture, ranging in size from a few inches wide to 10 feet tall.

Flygare was a hard-driving, pickup-basketball-loving, brilliant researcher whose love of chemistry and learning has resonated in former students for their entire careers. Eventually, he was also one of the inspirations for Balle to return to art.

In 1981, not long after Balle earned his doctoral degree, Flygare died of Lou Gehrig's disease, at age 44. His former students were devastated.

"We developed very close relationships," recalls another of Flygare's former students, Alan Burnham (PhD '77, chemistry). "I know that when he got sick it was kind of hard to believe and hard to take. His death affected me almost like a father."

Balle was amongst those closest to Flygare. While studying at Illinois, Balle worked with Flygare to develop a new technique of spectroscopy to analyze molecules that has since been used in research laboratories worldwide. It was through Flygare that Balle also heightened his taste for discovery.

After leaving Illinois, Balle worked in industry from Bell Laboratories to Digital Equipment Corporation, but something seemed missing to him. In one job he approved new equipment purchases, which he would turn down if they weren't based on good science. That didn't always earn him friends, but Balle couldn't help himself.

"I was a little bit spoiled from working with Flygare," Balle says. "He was such a great man that it was almost like industry never had that level of seeking for the truth of materials that I had at Illinois. It was always kind of disappointing."

Disenchanted, Balle left industry in 1988 to pursue the "truth of materials" he'd learned in the chemistry labs with Flygare. But deep down Balle was still an artist, and it occurred to him that he could search for the truth of materials in art studios, too.

With savings, he started a sculpture studio in Boston and learned about an acrylic with similar light properties as glass, with the key difference being that acrylic was based on carbon instead of silicon—an important distinction for the artist/chemist.

"All our chemistry is DNA and our whole bodies and tissues are carbon based," Balle says. "Glass is silicon based. And so I wanted to do sculptures that were based on carbon."

Before long Balle hired a staff to help him handle increased demand for his sculptures. But he felt bogged down by paperwork and payrolls, and in 2003 Balle and his wife, Didi, a writer and director, moved to Whidbey Island, where Balle resumed sculpting, this time as a sole proprietor. Today he enjoys a steady stream of commissions.

This past March he returned to Illinois for the annual Flygare Memorial Lecture, where he unveiled a new sculpture, *The Golden Tetrahedron,* in honor of his old advisor. In typical fashion the sculpture is packed with symbolism, all the way from its shape, symbolizing carbon bonds and carbon chemistry, to the 23-karat gold leaves that draw a parallel between the incorruptible metal and Flygare's pursuit of truth.

Before the lecture, Balle placed the sculpture on a podium. When someone turned on the spotlights the sculpture glittered and seemed to dance with the light, making clear to those who stopped that indeed there is common ground between art and science, and it is beauty. ⬟

Hear Balle remember the U of I professor who died young yet changed Balle's life.
lincolnhall.illinois.edu/storyography

Storyography

Photo by Thompson-McClellan | Images courtesy of Terry Balle

Chinese Dust Bowl Inspired Award-Winning Student to Study Global Ecology

Dan Dong remembers days when the entire sky turned yellow with sand, and you could barely see beyond the length of your arm.

"Even if you blocked all of your windows, the sand would come into your house—very, very small particles," says Dong, an LAS student in geography. "When you tried to inhale, you breathed in sand. It's very serious."

The sandstorms of China triggered Dong's interest in the environment and her studies in global ecology. She grew up in the northeastern Chinese province of Liaoning, which sees its share of sandstorms, and today she is a PhD student at the University of Illinois. She is also a recipient of the 2011 Special Achievement in GIS award from Esri, the world leader in Geographic Information System (GIS) software. Dong is one of only two students nationwide to receive the prestigious award.

Since coming to Illinois last year, she has continued to focus on the environment, working on a project to refine the EcoCAT mapping system. This GIS system is used to identify sensitive natural resources, such as wetlands and endangered or threatened species.

"For example," Dong says, "if you are a real estate developer, and you want to construct a building in a certain area of Illinois, you can go to the EcoCAT website, mark out the area where you want to build, and do a spatial query to find out if your action would encroach on sensitive natural resources."

She has also been involved with DIRT (Detailed Impact Review Tool), a system that can identify many layers of information about parcels of land in Illinois—information ranging from soil types and rivers to streets, railways, and freeways.

Dong says she is especially fascinated with remote sensing, particularly systems that can analyze satellite images to determine the extent of vegetative cover on the ground—a geographic feature linked to the dust storms of China. These storms have resulted from the degradation of vegetative cover in Inner Mongolia, west of her province. Cows and sheep have grazed the grasslands down to nothing, leaving the sandy soil at the mercy of the wind.

According to Dong, China has acted to remedy the problem by building the "Green Wall of China"—an extensive belt of trees to hold back the advancing desert. She envisions herself returning to China some day; but in the meantime, she hopes to do academic work in the United States after she finishes her PhD at the U of I.

For Some Plants, it Pays to Be Devoured

When certain herbs are eaten down to the ground, they re-grow even larger, producing significantly more biomass, flowers, fruits, and seeds than plants of the same species that were not eaten. Now, LAS researchers may know the reason why, for they discovered what might be one mechanism behind these comeback plants. Remarkably, these plants increase their number of chromosomes after being damaged.

"Finding out that an organism can change its chromosome number under environmental stress was pretty surprising," says Ken Paige, head of the University of Illinois Department of Animal Biology. "This had not been shown in any form by any other living organism."

Paige and LAS graduate student Dan Scholes have been studying several types of herbaceous plants, including *Arabidopsis,* commonly known as mouse-ear cress. Mouse-ear cress plants normally have five pairs of unique chromosomes for a total of 10, says Scholes. But after simulating the kind of damage done by small mammals, they discovered that the number of chromosomes in an individual plant can skyrocket from 10 to up to 80.

Photo by L. Brian Stauffer

The mouse-ear cress plant does not create any new chromosomes, Scholes points out, but it creates additional copies of the same five unique chromosomes. As a result, individual plant cells increase in size because they must be larger to support the additional DNA. Such changes could be a factor behind the incredible rate of re-growth, allowing greater nutrient and water transport, protein synthesis, and light absorption.

"It's phenomenal," Paige says. "When mouse-ear cress is eaten to the ground, it re-grows exceedingly fast during the same season and catches up with undamaged plants in flower and fruit production. The damaged plants also wind up with higher seed set, and the biomass is greater."

"We're not saying that the increase in chromosome numbers is the only mechanism behind this adaptive strategy," Scholes adds. "But it's fascinating that a plant can get eaten, and it improves its performance. It's a paradox."

Atom-by-Atom Action Shots

Capturing action on camera is difficult. Just ask any sports photographer who has tried to capture a frozen moment in football. But trying to take action shots on the microscopic level, with atom-by-atom detail, has been beyond the current technology—until now. LAS researchers, working with scientists in Germany, have found a way to take the first detailed picture of a ribosome in action.

"We were able to get the first snapshot ever that sees a newly born protein moving out of a ribosome and into a SecY channel and then into the cell's membrane," says Klaus Schulten, University of Illinois physics and biophysics professor. What's more, this picture is a *detailed* action shot, depicting the roughly 3 million atoms that make up the ribosome and other players on the microscopic field.

Ribosomes are found in every living cell, and they carry out a central function—to read genetic information for the synthesis of protein. They also play an important role in the development of antibiotics, so seeing them in action has important medical benefits.

The U of I work builds upon research by the 2010 Nobel-winning scientists who determined the structure of the ribosome in crystallized form. Schulten says that in crystallized form, "the ribosomes all stand at attention and don't do very much because they are closely packed together."

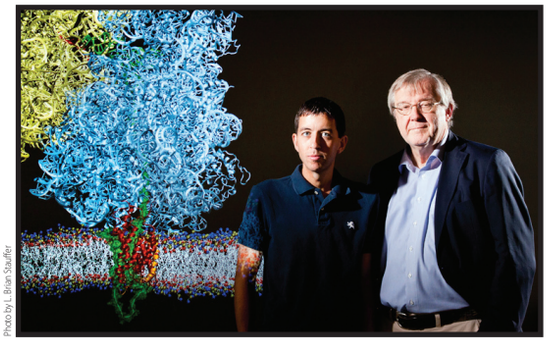


Photo by L. Brian Stauffer

He compares it to taking a photograph of football players lined up on the sidelines singing the national anthem. "You can see the players, but if you want to teach someone how the players function on the field, a photograph of them on the sidelines doesn't tell you very much. You need to take a picture of the players in action."

So Schulten and physics graduate student James Gumbart set out to do just that. They worked with Roland Beckmann at the University of Munich, who had captured the action of a ribosome with electron microscopy. The problem was that the images were fuzzy.

"Electron microscopy doesn't see the detail," Schulten points out. But the U of I team successfully brought these fuzzy images into focus by filling in the details with a "computational microscope"—a computer program developed by Schulten and others at the U of I.

This image shed new light on how a protein threads itself into a cell membrane. About half of the drug targets for antibiotics are proteins that move from the ribosome into the cell membrane of bacteria, making these proteins extremely important in the ongoing war against bacterial infections.

"So understanding the ribosome better and how an antibiotic interferes with it is very relevant," he says. "It may be one of the most important things we can do right now in medicine."

Blogging for Science

Photo by L. Brian Stauffer

The world's oldest popular science magazine has included three bloggers from the College of Liberal Arts and Sciences in its new, selective blog network, launched in July.

Alex Wild, a postdoctoral researcher in entomology; Joanne Manaster, an instructor in the School of Integrative Biology; and Kate Clancy, professor of anthropology, are part of the blogroll at *Scientific American.* The network is atblogs.scientificamerican.com.

Wild, whose insect photography has been published in the *New York Times* and *National Geographic,* will host "Compound Eye," focused on science photography. Manaster will co-host "PsiVid," a blog about science videos and film. Clancy will move her oft-cited women's health blog, "Context and Variation," to the magazine network.

The 165-year-old magazine has become known for its cutting-edge online presence. The three bloggers in LAS were chosen after the magazine searched thousands of existing science blogs on the Web and invited 45 bloggers to join the network. The University of Illinois is one of a few institutions with multiple bloggers in the network.

"I invited bloggers whose expertise, quality of writing, and professionalism fit well with the mission and general tenor of our organization," says Bora Zivkovic, the magazine's blog and community editor.

LAS Student Wins Goldwater Scholarship

U of I junior Justin Kopinsky's studies in math and computer science and numerous qualifications have added up to equal one Barry M. Goldwater scholarship for 2010-2011.

The scholarship—awarded to highly qualified sophomores and juniors in the fields of science, mathematics, and engineering who intend to pursue careers in these fields—covers the cost of tuition, fees, books, and room and board up to a maximum of $7,500 per year.

Kopinsky, a Chancellor's Scholar from Buffalo Grove, Ill., who is majoring in math and computer science, began pursuing graduate-level math courses at Illinois as a second semester freshman. He takes part in mathematics contests and in computer science competitions, and as a member of a U.S. regional team in 2010, he competed at the finals of the ACM International Collegiate Programming Contest in Harbin, China.

Political Equality Can Lead to Funding Inequality

"One person, one vote" is often the rallying cry for democratic reform, suggesting everyone should get an equal say in their government.

Yet in some of the oldest and largest democracies, some votes are worth far more than others by design. A Wyoming voter, for instance, is significantly overrepresented compared with a California voter. Each state has two U.S. senators, but California has 66 times more people.

Does it matter? According to a recent study of data from the U.S. and eight other countries, it matters a lot when it comes to money.

"Other things being equal, the most overrepresented states or provinces can expect to receive more than twice the federal funding per capita as the most underrepresented states or provinces," according to Tiberiu Dragu, a professor of political science at the University of Illinois who studied the issue.

Photo by L. Brian Stauffer

The authors used three decades of data from Argentina, Australia, Brazil, Canada, Germany, Mexico, Spain, Switzerland, and the U.S. All are democracies in which partially self-governing states or provinces are united under a central government.

In all nine countries, "the story remains the same: Representatives of overrepresented provinces are able to bargain for a disproportionate share of the budget," Dragu says.

At its Extreme, Political Rule Is an Elusive Concept

Dictatorship is a dirty word for pretty much everybody but dictators, but with roughly half the countries of the world under authoritarian rule, how much do we really understand it? Not enough, says a political science professor who studies one of the most complex models of power.

By comparison, democracies are relatively simple, with voters determining the balance of power. But dictatorships are secretive, deeply complicated, and each unique. Some hoard power; others rule by sharing enough power to make people reliant on the system.

By their nature, each dictatorship may be understood by only a handful of people.

"We know the dictator runs the show, but then who else are the key players?" asks Milan Svolik, at the University of Illinois. "Depending on the setting, maybe the ones who do the repressing should be the key players, like the military in Egypt, or maybe it should be the members of the party or the members of the ruling circle of the dictator."

Svolik has compiled a mountain of raw data on post-World War II dictators and builds models of dictatorships by applying game theory, a method increasingly used in the social sciences to understand how strategically-minded political leaders interact. For all that he's learned about dictators, he warns against making blanket statements regarding authoritarianism.

For example, dictatorships in North Korea, Iraq, and Libya are among the most notorious authoritarian regimes, but they're not typical. The median life expectancy of a dictatorship is merely a couple of years before the ruler is overthrown.

Patterns exist. Democracies in economically poor nations are more likely to revert to authoritarianism (India is a prominent exception), and ethnically homogenous countries are more stable whether they're democracies or dictatorships.

Broadly speaking, dictators rule by either repression or by power-sharing and inclusion. Svolik details the Chinese Communist Party, where party membership is reserved for only the most highly educated and ambitious.

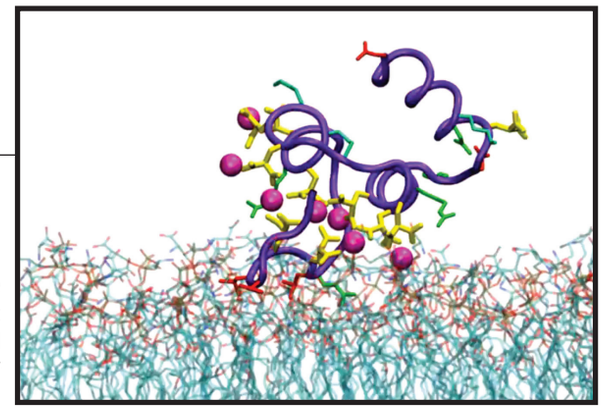
"The purpose was to say, 'So you think there's an alternative to this regime? Well, look, the smartest, most ambitious individuals are with us! So how could you even think that you could come up with an alternative that could outperform China today?'" Svolik says.

On the other hand, those who rule through repression share less power but risk being overthrown by the military. Rulers like Muammar Qaddafi and Saddam Hussein may have been able to rely on the military for so long because of ethnic ties, Svolik says.

With dictators so reliant on secrecy, Svolik's task is complicated. Even researchers allowed to enter a dictatorship must be skeptical of what they're told about the power structure—and maybe that's true anywhere.

"If I interviewed President Obama, he would not really be telling me about how politics are made in the White House. He would be telling me the kinds of things he tells constituents because that's what will get him re-elected," Svolik says. "It's even more pronounced in dictatorships because they have more incentive to keep things secret and not be sincere."

Getting a Better Picture of Blood Clotting



You're chopping wood when the ax slips and you suddenly find yourself staring in shock at a deep gash in your leg. While you call for medical help, your body is already in emergency mode on a microscopic level, ringing its own version of 911 to stop the bleeding.

The muscles around your blood vessels contract, attempting to choke off the bleeding. Platelets also become activated and they form a platelet plug that pulls the wound together. Meanwhile, the blood-clotting system goes into full gear, as it converts blood plasma near the wound from liquid to a thick gel.

James Morrissey, an LAS biochemist, has been studying the body's blood-clotting system for over 20 years, beginning when he first cloned "tissue factor," the triggering agent for clotting. Most recently, his lab—working in conjunction with three other University of Illinois labs—has shed light on how blood-clotting proteins bind with cell membranes, creating a cascade of chemical reactions in the clotting process.

This research could have an impact on the development of drug treatments to prevent dangerous clots from forming in the bloodstream, as well as treatments that promote clotting in hemophiliac patients.

"We want a blood clot to form where there is injury, but we don't want the clot to keep growing," says Morrissey. "So there have to be mechanisms to limit blood-clotting reactions to the areas of injury. The binding of blood-clotting proteins to cell membranes is one of those mechanisms."

Scientists already know that when an injury occurs, two types of phospholipids—PS and PE—are exposed on the surface of ruptured cells. Normally, PS and PE exist on the inside of cell membranes, preventing clotting from taking place under normal circumstances. But when released from a ruptured cell, they appear on the outside of cell membranes, enabling blood-clotting proteins to anchor in the membrane.

This explains why a smooth cut, such as one from a sharp knife or piece of glass, will lead to more bleeding than a ragged wound, Morrissey says. If a cut is smooth, fewer cells are ruptured and less PS and PE are exposed to the bloodstream. With less PS and PE, blood-clotting happens more slowly and you bleed more heavily.

Specifically, scientists know that a little bit of PS, along with a larger quantity of PE, make it possible for the "GLA domain" on blood-clotting proteins to anchor to cell membranes. "But nobody knew how these GLA domains interacted with a membrane," he says. "Nobody had a picture of what was going on at the membrane surface."

That is, until now.

The lab of Illinois biochemistry professor Emad Tajkhorshid, working with Morrissey's team and two other U of I labs, ran sophisticated computer simulations that made a good case for what is happening. According to Morrissey, they found that PS has one specific binding site for the GLA domain, which anchors the blood-clotting protein to the cell membrane. This primary anchor makes it possible for the phosphorus in PE to bind with calcium, further holding the blood-clotting protein in place.

In fact, they also found that PS will work in conjunction with other, less abundant phospholipids, except for PC, which contains choline. That's why they call their hypothesis the ABC Hypothesis—"Anything But Choline." This hypothesis was successfully tested in the lab.

One of the most popular anti-coagulants (or "blood thinners") on the market is warfarin, which interferes with the liver's ability to make GLA domains. This, in turn, weakens the ability of blood-clotting proteins to anchor to cell membranes, stifling the clotting process and reducing a patient's threat of unwanted clots.

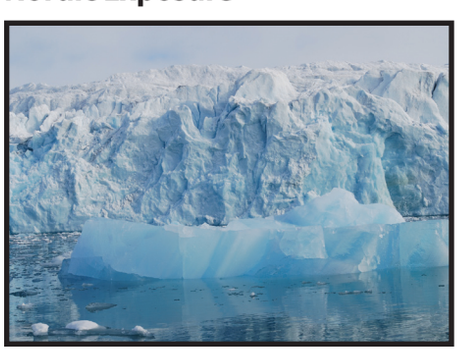
But there are side effects to warfarin because it hits both anti-coagulant and pro-coagulant proteins. "So getting the right dose is tricky," Morrissey says.

The Illinois research could help refine this and other blood treatments.

Morrissey says their work would not be possible without the unique environment at the U of I, which fosters cooperation among the four labs—Morrissey's lab, along with the labs of Chad Rienstra in chemistry and Tajkhorshid and Stephen Sligar in biochemistry.

"It's the most intense and rewarding collaboration I've ever entered into," Morrissey says. "I don't know another place on earth right now where you can get this collection of expertise together to tackle the problem of blood clotting. It's really unique."

Nordic Exposure



After a long winter you may shudder to hear this, but much learning remains to be done in the lands of ice and snow. Thanks to a budding partnership at the University of Illinois, however, that task is getting more exciting, and it leads through Sweden.

Researchers and educators across campus are expecting valuable opportunities to rise from a trans-Atlantic collaboration with KTH Royal Institute of Technology in Stockholm that has roots in the College of LAS. The partnership, which has been forming rapidly during the past several months, will allow Illinois to share expertise with a part of the world where studies in energy, humanities, information and communications, materials, medicine and biotechnology, and transportation are highly advanced.

The partnership, named Illinois-Sweden Program for Educational Research Exchanged (INSPIRE), could also provide Illinois researchers and students with a new access point to the Arctic Circle, making for chilly but beneficial study-abroad and research possibilities.

Watching Over His Namesake

By Holly Korab

Photos by Holly Korab

Renovations of old buildings are supposed to be plagued by problems. But in the case of Lincoln Hall, the unexpected hurdles have been so minor that even skeptical observers are starting to think that maybe old Abe is watching over his legacy.

As of June, the renovation was 50 percent complete, making the building right on schedule for opening in the fall of 2012.

Certainly there have been worries, such as the Illinois Supreme Court challenge that would have put a halt to funding (resolved favorably in July). Then there was a broken water main that flooded the basement for a couple of days.

Most of the bumps in blood pressure, though, have come from tricky stages in the construction that the architect and contractors knew were coming, according to Matthew Tomaszewski, the associate dean in LAS who oversees physical facilities.

For example, the building had its feet kicked out from under it as contractors excavated the basement to accommodate new, larger mechanical systems. To prevent the building from collapsing while the basement was being deepened, engineers installed 50-foot-deep "micropiles" along the foundation walls, pushing this widely used technology from reinforcing foundations to supporting the entire structure.

"It took the equivalent of 3.2 miles of micropiles to support the building," says Tomaszewski, "but it worked and produced a stronger building in the end."

Several major milestones are nearly complete, such as the new slate roof, including some 85,404 tiles, which is enough to cover nearly an acre of rooftop; the restoration of 62,600 sq. ft. of external masonry; and installation of the electric service, which is equivalent to powering 67 homes. Framing and drywalling, which contractors started on the top floor and are working down, has now reached the first floor.

Most rewarding of all is that the restoration work is underway. The foyer, the main entrance off the Quad, now glitters with a gold-like paint and gold leaf on the decorative trim work that encircles the space. In the theater, craftsmen from two of Chicago's oldest and most storied ornamental plaster companies, Luczak Brothers and Decorator's Supply, are repairing the medallions and decorative elements rimming the rooms.

Keep watching the website for photos and video updates as the project moves into its final stages. The carpenters have 6.1 miles of restored oak trim to install!

lincolnhall.illinois.edu

To celebrate the renovation of Lincoln Hall and our commitment to Lincoln's legacy of educational opportunity, the College of Liberal Arts and Sciences is raising **$10 million in scholarships.** Be part of this historic initiative by giving at lincolnhall.illinois.edu.

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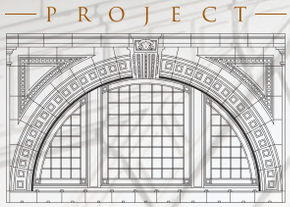
THE LINCOLN HALL PROJECT



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LINCOLN HALL TIME CAPSULE—One of the last steps in renovating Lincoln Hall will be the installation of a time capsule. Help the college decide what mementos we should leave for future generations to uncover. For details, read the college's monthly e-newsletter, visit the Lincoln Hall website (lincolnhall.illinois.edu), or send your ideas to las-news@illinois.edu.

December 2010

LASNews

IN THIS EMAIL:
News | Events | Get Involved | Class Notes

Campus Life

Subscribe to LAS's Monthly E-Newsletter

Follow the Lincoln Hall renovation and get more news, more alumni profiles, more notices of upcoming events.

Go to las.illinois.edu/alumni/contact/form or send an email to las-news@illinois.edu.

ILLINOIS CONNECTION

Be part of a grassroots advocacy group for the University of Illinois and make your voice heard in Springfield. Learn more at www.ic.uillinois.edu.

Send Us Your Class Notes

For many years, the Class Notes section of *LAS News* has been a place for alumni to reconnect and find out the latest about former classmates and old friends. Changing with the times, though, these printed notes have now been moved online so you'll have more room to submit photos and exchange news.

las.illinois.edu/alumni/magazine/classnotes

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ILLINOIS

MARK YOUR CALENDAR

LAS CELEBRATION
HOMECOMING 2011

Breakfast Buffet with LAS

Saturday, October 1, 2011
U of I Research Park, 2 blocks from Memorial Stadium
9:00-10:45 a.m.

Celebrate Homecoming with LAS alumni and friends.
Prizes, entertainment, Illinois memorabilia, plus more festivities!

Breakfast Buffet: $15 per person, children 5 and under free.
Illinois vs. Northwestern Football: $41 per ticket (discounted!)
Registration Deadline: Sunday, September 25, 2011

Register online at las.illinois.edu/alumni/events or call toll-free (888) 333-9644 or (217) 333-3387.

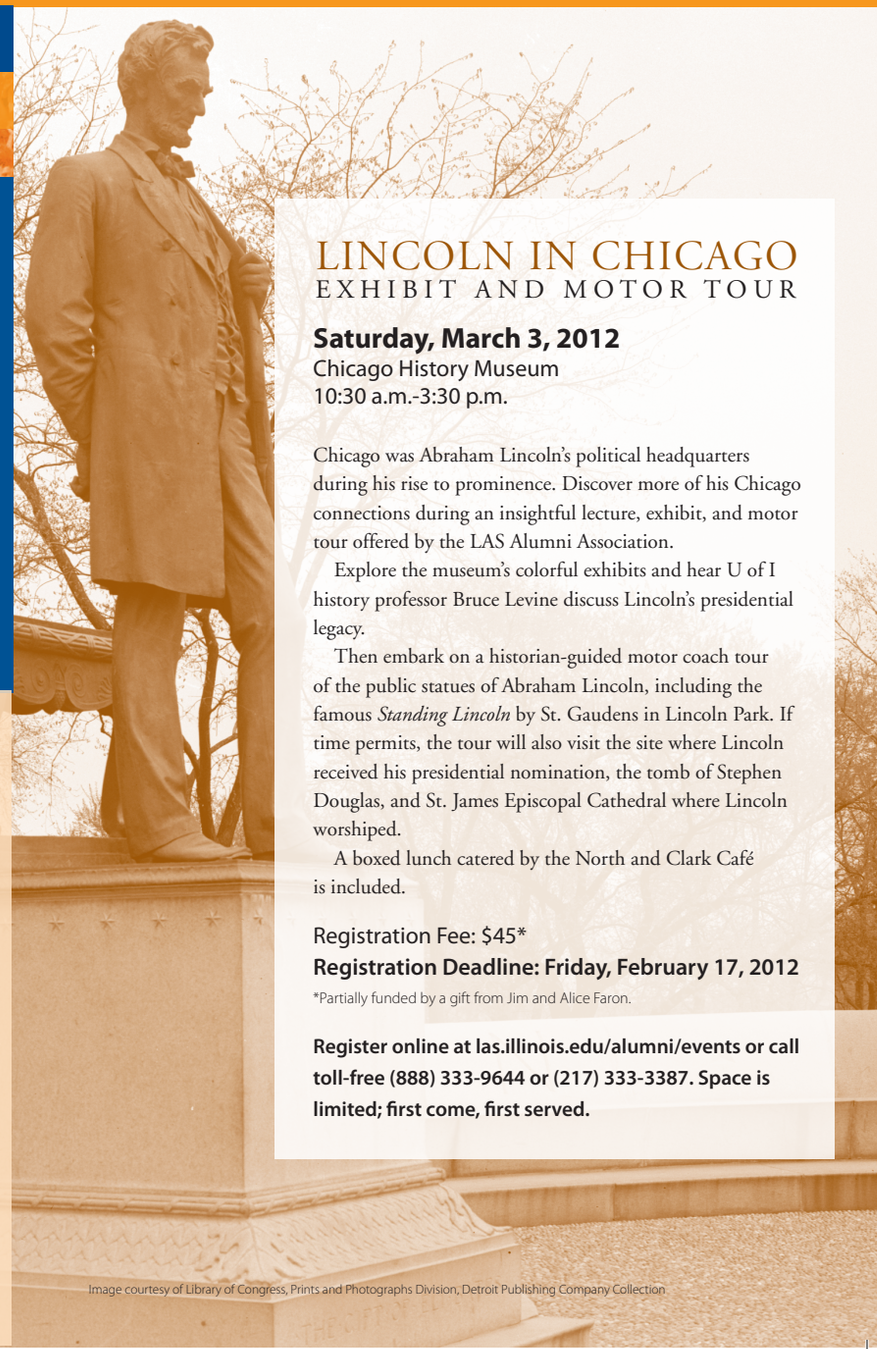
VOLUNTEER OPPORTUNITIES

LAS Career Exploration Night
Tuesday, November 8, 2011

Illini Union
6:15-8:30 p.m.

Talk one-on-one with LAS undergraduate students about how and why you chose your current career path. Help them discover how they may use their college experiences and degree in positioning themselves for careers.

To learn more or volunteer, call the LAS Office of Alumni Relations toll-free (888) 333-9644 or (217) 333-3387 or see las.illinois.edu/alumni/volunteer/careernight.



LINCOLN IN CHICAGO
EXHIBIT AND MOTOR TOUR

Saturday, March 3, 2012
Chicago History Museum
10:30 a.m.-3:30 p.m.

Chicago was Abraham Lincoln's political headquarters during his rise to prominence. Discover more of his Chicago connections during an insightful lecture, exhibit, and motor tour offered by the LAS Alumni Association.

Explore the museum's colorful exhibits and hear U of I history professor Bruce Levine discuss Lincoln's presidential legacy.

Then embark on a historian-guided motor coach tour of the public statues of Abraham Lincoln, including the famous *Standing Lincoln* by St. Gaudens in Lincoln Park. If time permits, the tour will also visit the site where Lincoln received his presidential nomination, the tomb of Stephen Douglas, and St. James Episcopal Cathedral where Lincoln worshiped.

A boxed lunch catered by the North and Clark Café is included.

Registration Fee: $45*
Registration Deadline: Friday, February 17, 2012
*Partially funded by a gift from Jim and Alice Faron.

Register online at las.illinois.edu/alumni/events or call toll-free (888) 333-9644 or (217) 333-3387. Space is limited; first come, first served.

Image courtesy of Library of Congress, Prints and Photographs Division, Detroit Publishing Company Collection