

# LAS NEWS

COLLEGE OF LIBERAL ARTS & SCIENCES | FALL 2018



## The digital humanities

How technology is helping to expand our understanding of history, literature, and language

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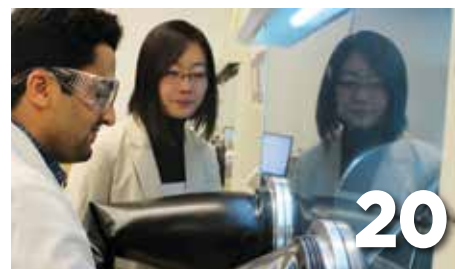
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GREETINGS FROM THE

College of Liberal Arts & Sciences

Dear alumni and friends,

Studying the humanities helps us to understand our history, puts into context our present, and gives us the tools we need to create our future. In this issue of LAS News magazine, our cover story explores some of the ways in which LAS faculty are harnessing technology to further humanistic studies on our campus. From a unique examination of women in literature made possible by supercomputers, to a project that helps preserve our historical records in the internet era, exciting and meaningful work is happening in this area. I hope you'll read more about it here.

Also in this issue, learn more about how LAS launched a new competitive graduate fellowship program to attract the best and brightest students in the humanities and arts-based humanities. In collaboration with the College of Fine and Applied Arts, the Graduate College, and the Office of the Provost, LAS will offer the Distinguished Graduate Fellowship in the Humanities and Arts to almost 50 graduate students in the humanities and arts-based humanities each year when the program is fully implemented.

This summer, LAS received funding from campus for an important new initiative focused on supporting and promoting careers in the humanities. This proposal calls for a Humanities Professional Resources Center that will work with corporate partners and employers seeking students with skills fostered by a humanities education. It is modeled after a successful program in our Department of English. Together with our college's new Life + Career Design Lab, which uses design thinking to help students from across the college find their passions and prepare for their careers, it will provide important additional support for our students.

In another exciting development this summer, President Tim Killeen announced a new initiative that will highlight the public good flowing from the arts and humanities across the University of Illinois System. The initiative will provide money to faculty projects that enhance and celebrate the arts and humanities while making a significant public impact. We look forward to the creative ideas that this initiative will produce.

Whether it be the humanities, social sciences, or the sciences, our efforts are always enhanced by the support of alumni and friends. If you'd like to hear more about these or other college initiatives, contact me at [lasdean@illinois.edu](mailto:lasdean@illinois.edu).

With my best wishes,

Feng Sheng Hu,  
Harry E. Preble Dean

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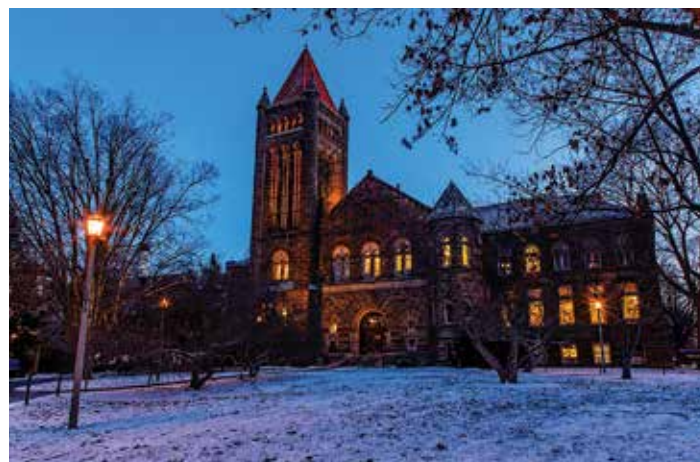
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Molecular and integrative physiology professor emeritus **Rhanor Gillette** and his colleagues built a virtual ocean predator, a “cyberslug,” that has elements of self-awareness. Cyberslug was modeled on the sea slug *Pleurobranchaea californica*, pictured here. ■

### Campus pledges \$27 million in student funding to renovate Altgeld



The Academic Facilities Maintenance Fund Assessment Oversight Committee at Illinois has conditionally approved allotting \$27 million in student funding to upgrade the iconic **Altgeld Hall**. Mosaics, murals, and woodwork in the library will be restored in the historic building. ■

### Faculty and staff honored

A partial list of faculty honors this past winter and spring include:

- **College of Engineering Dean's Award for Excellence in Research:** **David Flaherty** and **Brendan Harley**, chemical and biomolecular engineering.
- **John A. and Grace W. Nicholson Professorial Scholar:** **Eleonara Stoppino**, French and Italian.
- **Brad and Karen Smith Professorial Scholar:** **Vera Hur**, mathematics.
- **Lynn M. Martin Professorial Scholars:** **Ariana Traill**, classics; **Dana Rabin**, history; **Carla Cáceres**, animal biology.
- **Richard and Margaret Romano Professorial Scholars:** **Francina Dominguez**, atmospheric sciences; **Prashant Jain**, chemistry; **Ripan Malhi**, anthropology; **Kevin Mumford**, history; **Tracy Sulkin**, political science; and **Shaowen Wang**, geography and geographic information science.
- **Endowed Chairs:** **Stephen Long**, plant biology, and **Jeffrey Moore**, chemistry (Stanley O. Ikenberry Endowed Chairs); **Antoinette Burton**, history (Swanlund Endowed Chair).
- **University Scholars:** **Martin Burke**, chemistry; **Cara Finnegan**, communication; and **Andrew Leakey**, plant biology.
- **Chemical Pioneer Award:** **Kenneth Suslick**, chemistry.
- **Sloan Research Fellow:** **Ying Diao**, chemical and biomolecular engineering.
- **Lincoln Excellence for Assistant Professors Award:** **Eric Calderwood**, comparative and world literature; **Jenny Davis**, anthropology, American Indian studies, and gender and women's studies; **Wendy Yang**, plant biology; and **Sihai Dave Zhao**, statistics.
- **LAS Dean's Award for Excellence in Undergraduate Teaching:** **Brendan Harley**, chemical and biomolecular engineering; **Robert Rushing**, French and Italian and comparative and world literature; **Gisela Sin**, political science; **Renée Trilling**, English.
- **Excellence in Undergraduate Teaching for Instructional Staff:** **Jeffrey Frame**, atmospheric sciences.
- **Excellence in Undergraduate Teaching for Graduate Teaching Assistants:** **Bryan Abendschein**, communication; **Kylee Britzman**, political science; **Valerie O'Brien**, English; **Michael Perino**, psychology; **Nima Rasekh**, mathematics; **Daniel Storage**, psychology.
- **Excellence in Undergraduate Advising (LAS and campus):** **Pamela Greer**, LAS Student Academic Affairs.

See a complete list of faculty honors at [go.las.illinois.edu/honors-fall18magazine](http://go.las.illinois.edu/honors-fall18magazine). ■

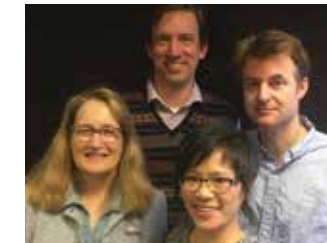
### College of LAS wins energy conservation awards



The Astronomy Building and the building housing the Department of Latina/Latino Studies recently won awards under the campus **Energy Conservation Incentive Program**. The Office of the Provost established ECIP as a way to recognize outstanding individual and team efforts that make the university more energy efficient. ■

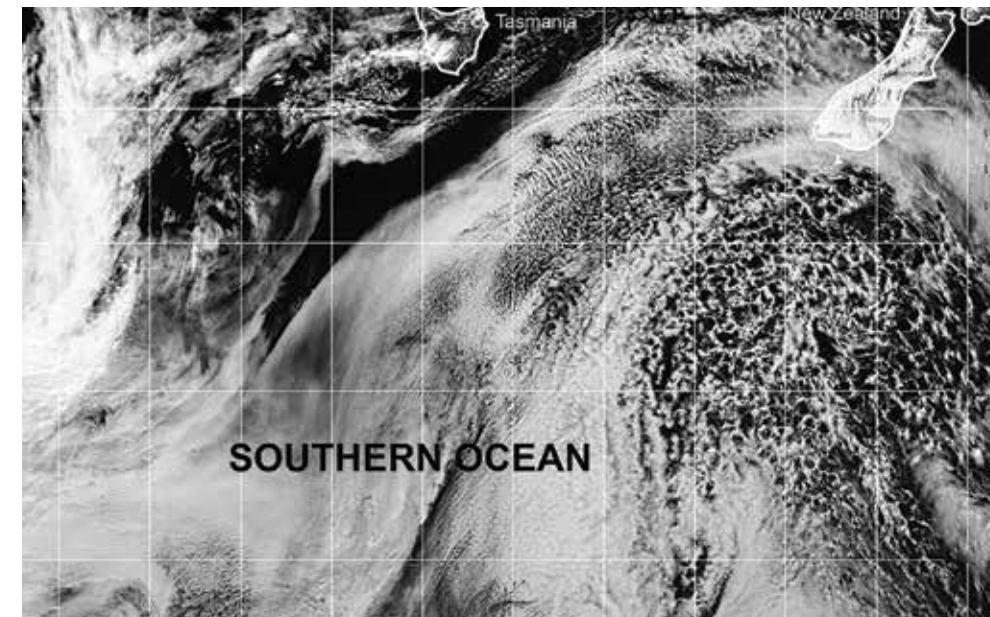
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### Researchers win grant to help document the modern era



From left: *Kathryn Oberdeck, John Randolph, Bonnie Mak, and Daniel Gilbert.*

Students, faculty, and staff from Illinois and other institutions will investigate what role higher education can play in the making of the historical record of the future. A \$138,360 grant from the **Humanities Without Walls Consortium** allows for all of these issues to be the subject of a three-year, multi-institutional research project. ■



In a multi-agency project called SOCRATES, students and faculty in the **Department of Atmospheric Sciences** are studying how the brighter clouds over the Southern Ocean affect the atmosphere. ■



*Bob Rauber, far right, University of Oklahoma (and former U of I professor), Greg McFarquhar, third from left, along with students from both universities.*



**Isabel Molina-Guzmán**, professor of Latina/Latino studies and media and cinema studies, was named the first faculty director for diversity and inclusion in the College of LAS. She will coordinate critical efforts to recruit and retain diverse faculty, staff, and students. ■

### Entomology professor wins Wolf Prize

**Gene Robinson**, a professor of entomology and director of the Carl R. Woese Institute for Genomic Biology, has been awarded the prestigious 2018 Wolf Prize in Agriculture for “leading the genomics revolution in the organismal and population biology of the honey bee.” Only eight other people received Wolf Prizes in 2018, including British rocker Paul McCartney in the music category. ■





**Thomas Dowling** (BA, '18, political science and history) was named a Rhodes Scholar. He's the first Illini since 1998 to receive the honor, which includes the opportunity for postgraduate study at Oxford University. ■

### Chemistry professor named to National Academy of Sciences



Scott Denmark, left, with former graduate student Timothy Chang.

The National Academy of Sciences elected **Scott Denmark**, Illinois chemistry professor, to its organization. It's one of the highest professional honors a scientist can receive. Denmark was recognized for distinguished and continuing achievements in original research. "At the University of Illinois, I have been blessed with generations of outstanding, dedicated coworkers, to whom I offer my heartfelt thanks and whose efforts are being celebrated today," he said. ■

### Professor selected to lead Renaissance Society of America



Germanic languages and literatures professor **Mara Wade** has been appointed vice president of The Renaissance Society of America, the largest international learned society of its type in the world. She will serve two years as the vice president, two years as president, and two years in the past-president position. RSA is devoted to studying the 400-year era spanning from 1300 to 1700. ■



The International Union of Bricklayers & Allied Craftworkers awarded the **2017 Best Comprehensive Restoration Project award** to the Bricklayers and Allied Craftworkers Local 8 of Illinois for its work on the Natural History Building. ■

### Study: Court rulings susceptible to gender bias



A new study suggests that trial court judges sometimes let their personal ideas about gender roles influence their decision-making. The findings, which are part of a broader study of judicial behavior by Illinois psychology professor **Andrea Miller**, revealed that the judges were just as likely as laypeople to discriminate—in ways that harmed both men and women—in decisions involving child custody or workplace discrimination cases related to family caregiving duties. ■

### Largest class of Lincoln Scholars graduates



Nicole Odulate

Fifteen students in the College of LAS' **Lincoln Scholars Initiative** graduated this May. They made up the third—and largest—class of LAS students who have earned a degree with support from the scholarship program. A 16th Lincoln Scholar received his degree last December. The program was created in 2012 to support promising LAS students with financial need. ■



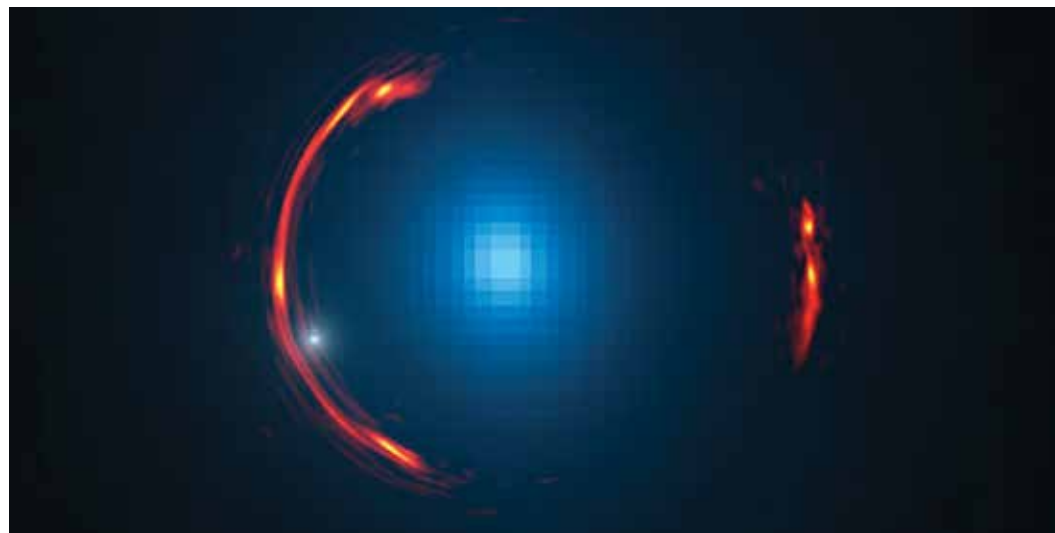
The 35th-annual **Insect Fear Film Festival** focused on ticks this year. The film festival, which takes place on campus each February, debunks myths about insects by contrasting Hollywood depictions with reality. ■

### Illinois receives \$10.6 million to produce biodiesel and biojet fuel



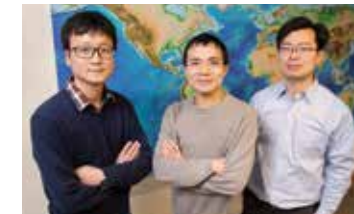
The U.S. Department of Energy awarded the University of Illinois a \$10.6 million, five-year grant to transform two of the most productive crops in America—sugarcane and Miscanthus—into sustainable sources of biodiesel and biojet fuel. The new research project **Renewable Oil Generated with Ultra-productive Energy cane**, led by Stephen Long, an Ikenberry Endowed Chair and Gutzell Endowed Professor of Plant Biology, kicked off in February. ■

A team of astronomers—including some from Illinois—using the Blue Waters supercomputer at U of I have determined that a **dark dwarf galaxy** is lurking nearly 4 billion light-years away. (Image courtesy of: Y. Hezaveh, Stanford Univ.; ALMA (NRAO/ESO/NAOJ); NASA/ESA Hubble Space Telescope). ■



### Heat from below the Pacific Ocean fuels Yellowstone

Geology professor **Lijun Liu** and graduate students Quan Zhou and Jiashun Hu used a technique called seismic tomography to peer deep into the subsurface of the western U.S. and piece together the geologic history behind the volcanism. By using supercomputers, the team ran different tectonic scenarios to observe a range of possible geologic histories for the western U.S. over the past 20 million years. What they found didn't align with traditional mantle plume hypotheses. ■



From left, Jiashun Hu, Quan Zhou, and Lijun Liu.

### Two faculty and LAS alumni receive NEH fellowships

Six faculty members on campus have been awarded National Endowment for the Humanities Fellowships for 2018, making this the third year in the last four that Illinois has garnered more fellowship awards than any other single institution. Recipients include **Candice Jenkins**, a professor of English; **Craig Williams**, a professor of classics; and **Elizabeth Hoiem** (PhD, '13, English), a professor of information sciences. **Jon Stone** (MA, '10; PhD, '15; English), a professor of rhetoric and writing at the University of Utah, also received a fellowship." ■



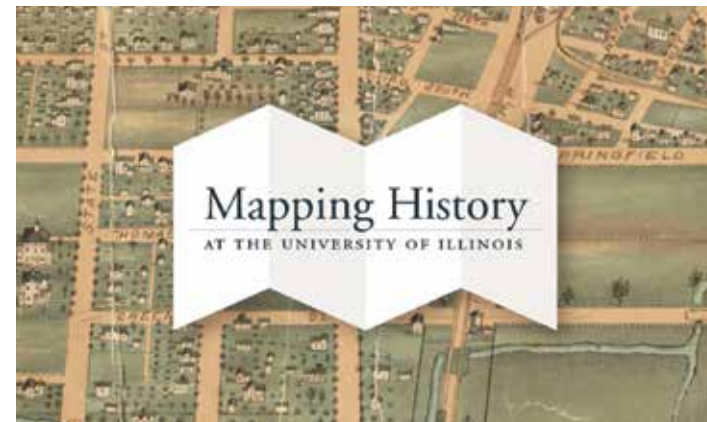
Candice Jenkins

## Two faculty members elected AAAS fellows

Two faculty members in the College of LAS were elected 2017 Fellows of the American Association for the Advancement of Science. They are animal biology professor **Carla Cáceres**, director of the School of Integrative Biology, and statistics professor **Douglas Simpson**.



About 180 LAS students attended the **Strengths Finder** workshop this spring, which was designed to teach leadership skills and direct participants how to help new students acclimate to college.



The **Mapping History** project—with the help of College of LAS faculty, students, and alumni—puts campus's rich history just a click away. See a story about the project at [go.las.illinois.edu/mapping-history](http://go.las.illinois.edu/mapping-history)

## College of LAS professors called the world's most influential



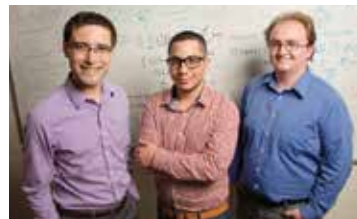
*Yi Lu and Brent Roberts.*

Five Illinois professors—including four in the College of LAS—were named to the 2017 Clarivate Analytics Highly Cited Researchers list. Plant biology and crop sciences professors **Lisa Ainsworth** and **Stephen Long**, chemistry professor **Brent Roberts**, and civil and environmental engineering professor **Tami Bond** were recognized among top researchers in the world.

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## Taking the first steps toward the self-assembly of synthetic materials

Illinois chemical and biomolecular engineering professor **Charles Sing** and graduate students Jason Madinya and Tyler Lytle co-authored a study that found they could create new synthetic materials by tuning the electrostatic charge of polymer chains. This advance could prove useful in designing new bioinspired, smart materials for applications ranging from drug delivery to sensing to remediation of environmental contaminants.



*From left, Charles Sing, Jason Madinya, and Tyler Lytle.*

Psychology lecturer **Sanda Dolcos** and graduate student Yuta Katsumi examined functional MRI to determine that emotional suppression reduces memory of negative events. Read more about the study at [go.las.illinois.edu/emotional18](http://go.las.illinois.edu/emotional18).



## Illinois hosts convention to discuss the future of Brazil



Illinois hosted the 2017 Lemann Dialogue, an annual international convention that focuses on the contemporary social, economic, and political challenges facing the South American nation of Brazil. The keynote speaker was Brazilian senator and past presidential candidate, Cristovam Buarque, and other participants included Illinois alumnus **Alexandre Tombini** (MS, '88; PhD, '91, economics).



The Endowment in Ukrainian Studies in the Department of Slavic Languages and Literatures is being established by the daughter of retired professor **Dmytro Shtohryn**, who is credited with establishing Ukrainian studies at Illinois.

## Citizenship question could alter the 2020 Census



Illinois professor **Julie Dowling**, in Latina/Latino studies, is questioning the Commerce Department's announcement that it will include a citizenship question on the 2020 U.S. census. The citizenship question is likely to increase the undercount, particularly of groups with higher percentages of immigrants, said Dowling, a member of the U.S. Census Bureau's National Advisory Committee on Racial, Ethnic and Other Populations.

**Bruce Rhoads**, professor of geography and geographic information science, has received a lifetime designation as an American Association of Geographers Fellow for his outstanding contributions to geographic research and education. Rhoads is a leader in the study of how streams and rivers form and change.



## Anthropology professor testifies before U.S. Congress



Anthropology professor **Kathryn Clancy** testified before the U.S. House of Representatives during a hearing devoted to sexual misconduct and harassment in the sciences. Clancy has published multiple papers on the prevalence of sexual assault against women both in field research and in university research labs.



Chemistry professor **Paul Hergenrother** and his colleagues are testing the safety of a new cancer drug in a clinical trial for people with late-stage brain cancer. PAC-1 reduced tumor sizes in pet dogs such as **Pretzel**, pictured, here. Read more about the trial at [go.las.illinois.edu/PAC-1](http://go.las.illinois.edu/PAC-1).

## Seeing the world like a fish



**Becky Fuller**, professor of animal biology in the School of Integrative Biology, worked with Information Technology Services at Illinois and her colleagues at BassInSight to create a first-of-its-kind iPhone app to help anglers catch bass by showing how the fish see their lures under current light and weather conditions.

# A whole new ball game

## CS + Astronomy major analyzes the physics of college baseball

**CHARLIE YOUNG** sits about 30 feet behind home plate at a University of Illinois baseball preseason practice. He shares the space with a spindly piece of technology, known as a FlightScope, which gathers data about every pitch, swing of a bat, and batted ball and sends it to the tablet in his hand.

Young is a junior CS + Astronomy major, but he's putting his computational skill to work on something else: baseball.

It turns out that computer science and aspects of astrophysics—exit velocity, launch angle, carry distance, spin rate, etc.—can also tell a lot about America's pastime.

He's running the Fighting Illini's new analytics program, applying the data-gathering and sorting now familiar in Major League Baseball to what is still the mostly unexplored terrain of college baseball.

For Young, the position pays in only academic credit. But it's also giving baseball a prominent role in his life that the Cubs fan thought ended after he stopped playing in high school. And it's provided Young with a new career plan.

"I originally thought I was going to go to astrophysics grad school and work with CS, but I definitely know that I now want to do data analytics for a Major League Baseball team," said Young, who is from Naperville, Illinois.

His plan is more than a dream.

He spent summer 2017 working for the Cincinnati Reds and this past summer with the Baltimore Orioles. He's also worked with University of Illinois professor emeritus of physics Alan Nathan, who is widely known for his research on the physics of baseball. His advisor, astronomy professor Brian Fields, has been very supportive of Young's pursuit of a career in baseball.

After all, Young chose astronomy not only because he enjoyed math and physics, but because of the exciting prospect of making

discoveries. Ironically, he discovered that he could explore in baseball, too.

"I can see that original wonder for the unknown has transitioned perfectly into the field of baseball analytics," Young said. "With new types of tracking being tested and tried out every year, the odds of a new metric becoming available greatly increase. Just like how quickly astronomy is progressing, baseball is progressing in terms of technology and analytical methods, and that's what drives me."

That said, open minds were required to make the connection between astronomy, CS, and baseballs. Nathan introduced him to Illini hitting coach Adam Christ, and Young made his own unlikely pitch to head coach Dan Hartleb.

After listening to his staff, Hartleb said yes to Young's longshot idea. The longtime Illini coach gives Young a lot of credit for taking a leap of faith that might have deterred other students.

"He sold himself," Hartleb said. "We talked about the technology a little bit, what we were going to get. He's been out every single day volunteering his time, comes in with a great attitude. He's just been awesome."

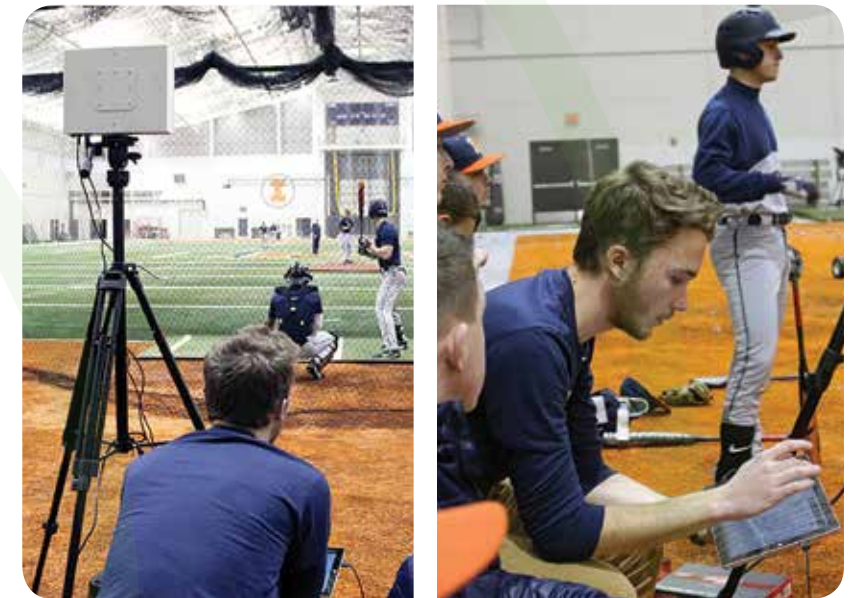
Young started with an app he built that allowed him to manually enter data on each pitch and swing of the bat. But the addition of FlightScope increases the possibilities.

The portable device stands on a tripod and uses Doppler radar technology to track baseballs, providing positions, speeds, and angles of pitched and batted balls. A number of Major League teams as well as a handful of college baseball and softball teams use the same tracking devices.

But where Major League teams gather data over many years, the relatively short four-year stay of college players will likely limit some of what Illini baseball can do with its data, Hartleb said. There are also limits to what data can be gathered on opponents.

By David Mercer, CS @ Illinois, and Taylor Hoffman

Charlie Young and FlightScope images courtesy of CS @ Illinois.



CS + Astronomy sophomore Charlie Young has launched the Fighting Illini's new baseball analytics program. Above, he uses a FlightScope during their practice.

Major League teams face opponents a number of times over a 162-game season. Big Ten teams will only see conference opponents a few times each year.

What Hartleb wants from Young's work is a full year of data, particularly spin rates – how quickly a baseball spins when a pitcher throws it, a key factor in determining how it curves or breaks – and how hard each batter can hit the ball, known as exit velocity.

"I'm really excited to see players and how they improve from year to year – if spin rates change, if exit velocities change. When we get players in as freshmen, they're usually not as physically strong and mentally developed as our older players and you can see those physical changes," Hartleb said.

During a recent indoor practice, Young watched the data being displayed on the tablet as it was gathered. Batters occasionally checked in to see what they could learn about their swings and their teammates' swings.

"A few have called me Analytics as my nickname, like 'Hey Analytics,'" Young said. "I totally embrace that. I think it's awesome."

His data are also playing a role in the competitive back and forth that's common to practice.

"One time there was a competition to see who could have the highest exit velocity, how hard it is off the bat," Young said. "There were these two guys that were asking me, 'Hey, what was this?'"

Young was among the first few dozen majors in CS + Astronomy, one of the growing group of CS + X degrees that blend computer science with other disciplines. He wondered if he would be treated differently from students focusing strictly on computer science.

"But when I got here, I instantly knew that it was an entirely welcoming community of people," he said. "I have exactly the same opportunities as all the other engineering majors. The CS + X program really gives me an opportunity to explore the liberal arts side of my education. This kind of dual degree was exactly what I wanted coming in to college. The end goal will be a solid technical background, and a great ability to communicate ideas effectively and efficiently."

Soon he'll venture into another unknown. Though analytics is now a staple of Major League Baseball, the backgrounds of those who work in the field are anything but set. The move will require another leap of faith, one that Young said his parents are behind.

"I didn't know I was going to be doing this, they didn't know

that I was going to be doing this," Young said. "But when

I said, "Hey, I'm

working for the

team, I want

to work for a

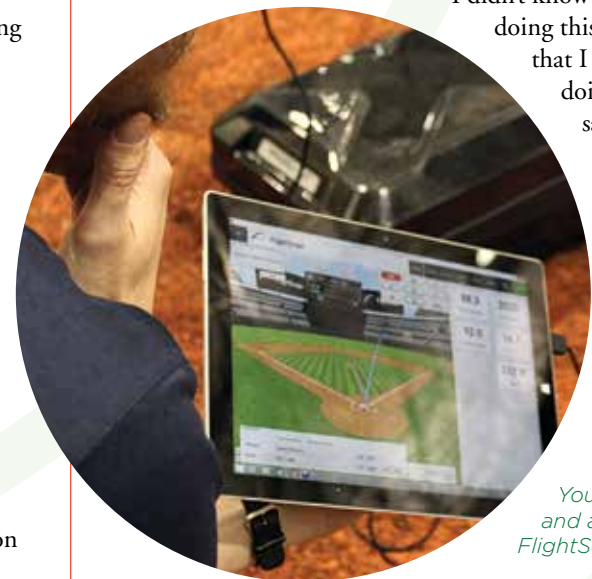
Major League

team," they

were like, "We'll

support you

100 percent." ■



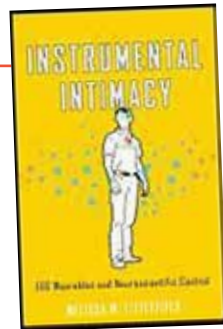
Young collects and analyzes FlightScope data.



# Books from LAS

Our faculty have written recently about a variety of topics, from college football to the influence of a Hindu goddess.

**“Instrumental intimacy: EEG wearables and Neuroscientific Control,”** by **Melissa Littlefield**, professor of English, kinesiology, and community health, examines neuroscience, wearable technologies, self-tracking, and personhood in the 21st century through the world of EEG technology. (Image courtesy of Johns Hopkins University Press.)



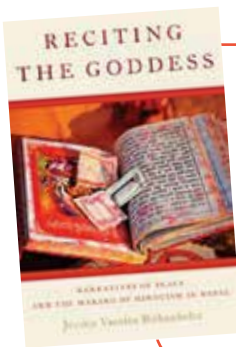
**“Britain and its internal others, 1750-1800: Under rule of law,”** by **Dana Rabin**, professor of history, revisits six notorious incidents in history that challenged longstanding notions of English identity and exposed contradictions in rule of law as the British Empire expanded. (Image courtesy of Manchester University Press.)



**“Creating the Big Ten: Courage, Corruption, and Commercialization,”** by **Winston Solberg**, professor emeritus of history, details the first 50 years of the Big Ten football and its resonating impact on sports. (Image courtesy of The University of Illinois Press.) (Watch our interview with Winston Solberg at [go.las.illinois.edu/SolbergBigTen](http://go.las.illinois.edu/SolbergBigTen).)



**“Reciting the Goddess: Narratives of Place and the Making of Hinduism in Nepal”** by **Jessica Vantine Birkenholtz**, professor of religion, is the first detailed study of the Hindu goddess Svasthani and offers a new perspective of the history, language, and literature of Nepal. (Image courtesy of Oxford University Press.)



**“The Velizh Affair: Blood Libel in a Russian Town,”** by **Eugene Avrutin**, professor of history, draws on newly discovered trial records to reconstruct the aftermath of a chilling murder of a 3-year-old boy in 19th century Europe. (Image courtesy of Oxford University Press.)



**“New Directions in Literature and Medicine Studies,”** edited by **Stephanie Hilger**, head of the Department of Germanic Languages and Literatures and professor of German, comparative and world literature, and gender and women’s studies, examines the intersection between medicine and literature and presents the latest research by scholars who try to bridge the two endeavors. (Image courtesy of Palgrave Macmillan.)



**“Medicalizing Blackness: Making Racial Differences in the Atlantic World, 1780-1840,”** by **Rana Hogarth**, professor of history, shows how pre-Civil War racial beliefs affected medical practice in the past—and how some of those beliefs continue today. (Image courtesy of The University of North Carolina Press.) (See story on Page 13.)



## LAS @Work

### TOP COP ON CAMPUS

#### Jeff Christensen concludes a career with the University of Illinois Police Department

Ever since he was an undergraduate, **Jeff Christensen** has worked to protect the Illinois campus. He eventually became executive director of public safety and chief of police at the University of Illinois Police Department, until he recently retired. The words of his professors lingered with him for his entire career.

**Degrees:** BA, '85, sociology (criminology); MA, '91, human resource education

**Family:** Wife, Michelle (has worked with students with disabilities); a son, Cory (Champaign County Sheriff's deputy); and a daughter, Kylie (recently earned a degree from the U of I in social work).

**What was your first job out of college?**

University of Illinois police officer. I was involved with the Student Patrol while

an undergrad student—this confirmed my law enforcement aspirations and made me very hopeful that I would continue working with the University of Illinois Police Department. Following graduation, I went through civil service testing and scored high enough for a referable position.

**Describe your career path.**

I have been with the University of Illinois Police since graduation. I've been lucky to be mentored by many special individuals and receive the support of the community and the department—these were all very important to finding my roles and moving through the department ranks. I also strived to continue my education by earning my master's degree, attending Northwestern University's School of Police Staff and Command, and attending the FBI National Academy.



Jeff spends a night on the street to raise awareness for homelessness.



As a new police officer in 1986. (Reproduced by permission of The News-Gazette, Inc., 2017. Permission does not imply endorsement.)



Jeff with a member of the Student Patrol.

**What about college best prepared you for your career?**

Even today, I use what was imparted in the classroom experience working inside and outside the department. For example, I have met monthly with emeritus professor of sociology Clark McPhail for breakfast to catch up and discuss “gatherings” as related to First Amendment issues, management of gatherings, types of gatherings, etc. Sociology really gave me a foundation to have a deeper understanding of—and appreciation of research into—our past, current, and future community concerns and dynamics as related to quality of life and policing.

Read more LAS@Work features at [go.las.illinois.edu/LASatWork](http://go.las.illinois.edu/LASatWork). ■

By Dave Evensen

# MATHEMATICIAN:

## Tips could bite into profits



What's good for waitstaff might not be good for eating out



Sara Clifton

Tipping has become a prominent part of American food service culture. That's not to say it goes without debate—and a mathematics researcher has found that there is a point where restaurants would be better off eliminating the practice altogether.

Sara Clifton, a J.L. Doob Research Assistant Professor, set out to determine if there is a tip rate when gratuities change from being economically beneficial for restaurants to one that restaurant owners would be smarter to avoid.

"I wanted to know when the no-tip trend would finally take over like it already has in other countries," said Clifton, whose research has been published in *Chaos: an Interdisciplinary Journal of Nonlinear Science*.

Clifton and colleagues created a model of restaurant competition to determine the economic point where it is wise for restaurant owners to eliminate tipping. The model took into account basic service fundamentals, such as the fact that better-paying restaurants will have more talented employees, and that service, food quality, and price affects how many customers come to the establishment.

"Tipping gums up the works, because waiters like tips," Clifton said, "but cooks don't like getting paid less than waiters because of tips, and diners don't like paying an extra 20 percent at the end of a meal. Because the tip rate has been rising for many decades now, the tension has been growing between waiters, who love tips, and customers and cooks, who dislike tips."

Her research concluded that there is a specific "critical tip rate" (the exact value was undetermined) that decides the economic viability of tipping. If a restaurant's tip rate was below this critical rate, tipping is a wise practice for restaurants, but if the tip rate is above the critical rate, it is more beneficial for restaurants to eliminate tipping.

Based on historical tip rates, Clifton says that she assumes that the conventional tip rate will continue to rise, eventually making it economically beneficial for tipping to go away. Clifton hopes to improve the model to make more precise predictions about the critical tip rate. ■

By Logan Weeter

## HISTORIAN REVEALS HOW DOCTORS PLAYED A ROLE IN IDEAS ABOUT RACIAL DIFFERENCES

### SOME PRE-CIVIL WAR MEDICAL BELIEFS STILL SURVIVE



Rana Hogarth



Slavery and racism played their roles in planting beliefs about race and racial difference, but so did medicine, according to an Illinois history professor.

Many physicians in pre-Civil War America and the West Indies developed ideas that black bodies were different in basic ways: naturally immune to some diseases, more susceptible to others, more tolerant of pain, and in need of specialized care.

Some of those ideas have survived to the present day, in both formal research and informal attitudes, according to professor Rana Hogarth.

The physicians were "Medicalizing Blackness," per the title of Hogarth's book. It makes the case that "medicine and science were certainly complicit, at least in making it acceptable, to say that race is real and here's our proof of it and here are these physical differences."

Some research has suggested that doctors' ideas about racial difference were meant to justify slavery. But Hogarth found too many contradictions in that explanation and doesn't believe that slavery was the driving force.

In fact, some involved in this medical discourse held anti-slavery views, among them Benjamin Rush, a prominent Philadelphia physician. He told his students that black people were more tolerant of pain. When a yellow fever epidemic struck the city, he asked black friends to stay behind, thinking they would be immune—then finding they weren't.

Physicians at the time were not yet aware of acquired immunity in the modern sense or the genetics involved in susceptibility to certain diseases, making a racial explanation that much more attractive, Hogarth said.

Certain ideas of "medicalized blackness" remain today, Hogarth said. Sickle cell anemia has been described as a black disease, yet it's caused by factors related to genetic adaptations to malaria in various regions and affects many non-African populations.

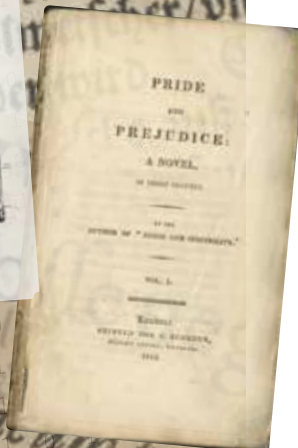
"We keep thinking that race, that blackness, rather than racial inequities, is this thing that carries weight in the clinical setting," Hogarth said. "And of course that spills out into the social, too." ■

By Craig Chamberlain, Illinois News Bureau



# The digital humanities

By Doug Peterson



**W**hat think you of books?" Mr. Darcy asks Elizabeth Bennet in Jane Austen's immortal novel, "Pride and Prejudice." "Books—Oh! no.—I am sure we never read the same, or not with the same feelings," answers Elizabeth.

Today, more than 200 years since "Pride and Prejudice" was published, the digital revolution has transformed books in ways that would astound Elizabeth and Mr. Darcy, not to mention Jane Austen. But one thing has not changed. The proportion of women characters and women writers is roughly the same today as in the days when Austen's characters were exchanging witty barbs in drawing rooms.

In fact, **Ted Underwood**, a U of I English professor, found that through most of the 20th century there were actually fewer women writers and female characters in proportion to men compared to Austen's time period. It wasn't until the last 30 years that the ratio of male to female writers has returned to the level of the early 1800s.

Underwood's work reflects a dramatic change in the way research is being conducted in the humanities. His research is part of the emerging digital humanities—a field that puts computers to use in creative ways not possible even 20 years ago. He's one of several LAS faculty whose humanities research has been enhanced by computing power.

"I tried to do this kind of work in the 1990s, but the resources just weren't there," said Underwood. Today he has teamed up with Sabrina Lee, a graduate student in English, and David Bamman, an information scientist with the University of California at Berkeley who has developed an algorithm that can analyze words and even character descriptions in hundreds of thousands of digitized books.

## How technology is helping to expand our understanding of history, literature, and language

So why did the proportion of female writers go down in the 20th century? Ironically, Underwood believes that women's expanded roles throughout society may have been the reason.

"During Austen's day, fiction writing was one of the acceptable pursuits for women," he said. "But as there were more opportunities for women, many of them moved out of fiction." This decline was halted beginning about the 1970s.

Digital tools have also allowed Underwood to study changes in genres, as well as gender stereotypes in literature.

"In the 19th century, if the inside of a character's mind was described at all, she was likely to be a woman," he said. "The inward world was described for feminine characters, while the men were out there waving their swords."

What's more, if a character's eyes or hair were described, she was most likely a female character. But if the person's chest or jaw was described, the character was probably a man.

To do this research, Underwood has tapped into HathiTrust, a massive digital library founded at Illinois. Meanwhile, **Mara Wade**, U of I professor of Germanic languages and literatures, works with **Tim Cole** and **Myung-Ja Han** at the U of I Library to lead

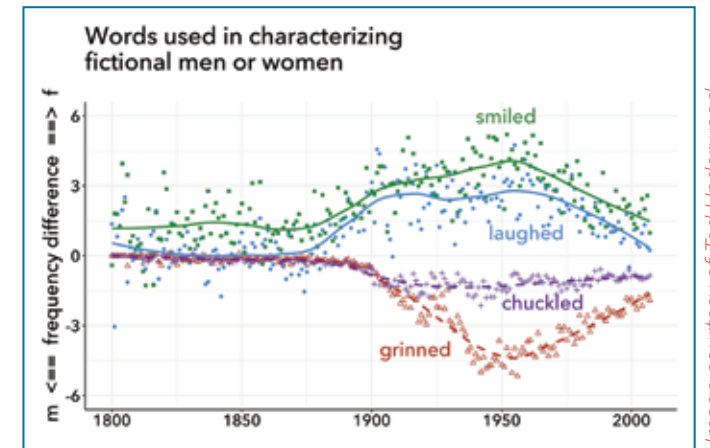


Image courtesy of Ted Underwood.

Emblematica Online, a major effort to digitize and make accessible rare Renaissance emblem books.

"The new technology leads to the creation of new knowledge because digital resources have made it possible to ask different questions," she said.

Emblem books were the rage from 1521 to 1750, and Wade said they "open a window into the mentalities and attitudes of people in the Renaissance world."

An emblem is a symbolic image accompanied by a brief text and an epigram, or short poem. A single book can contain up to 1,500 of these emblems. As one example, Wade cites an emblem that depicts the goddess Fortuna standing on a rolling globe (shown below). She holds a sail in her right hand and a waxing moon in her left, and the epigram says, "Fortuna ut Luna" or "Fortune is as the moon."



Illinois is digitizing emblems that were created during the Renaissance. (Image courtesy of Emblematica Online.)

It's another way of saying that our fortunes wax and wane like the moon.

The U of I holds one of the largest collections of emblem books in the world, and about 53 percent have been scanned and digitized, as well as indexed with data that makes them searchable and widely available for research and

teaching. In addition, Emblematica Online provides access to emblem collections at universities in Glasgow, the Netherlands, and the Herzog August Bibliothek in Wolfenbüttel, Germany, as well as Duke University Library and the Getty Research Library. In all, roughly 1,400 of these rare books and 30,000 emblems have been digitized and indexed.

"For literary scholars of the Renaissance and art historians, those 30,000 emblems are gold," Wade said.

The secret to using this collection is Iconclass—a classification

(continued on page 16)

The collage on the left, includes video stills related to John Randolph's research into the validity of historical videos on the internet. These stills are from a video about facial reconstruction after World War I. An illustration from the Pride and Prejudice novel. The camel and turtle illustrations are related to Mara Wade's research into Renaissance-era emblems.

system that describes art, allowing researchers to search for images by specific themes or content. Iconclass tags each image with alphanumeric notations that describe what is depicted in the emblem. For instance, the code 25F24 is a camel. If any emblem includes the image of a camel, it is tagged with 25F24, among other notations. This universal language enables researchers to scour the extensive database for specific images, and they can search in English, French, German, and Italian—the key languages of the Renaissance.

The research possibilities are endless. For example, a grad student from Arizona was researching medicine in 16th- and 17th-century Germany. Using Emblematica Online, the grad student found a storehouse of emblems depicting medical scenes, such as amputations or a family weeping over a deceased infant.

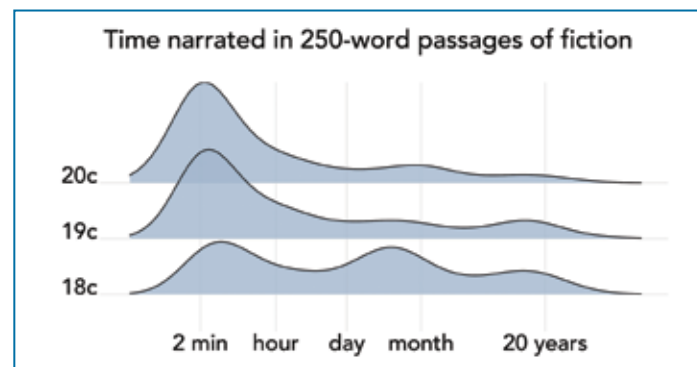
“There was an emblem for almost everything in the Renaissance,” Wade said.

In the past, researchers had to travel the world to study these rare books, but digital facsimiles make it possible to study them without leaving their desk. Emblematica Online also enables researchers to study large numbers of emblem books, not just a handful at a time.

Emblematica Online puts the digitized books in a researcher-friendly format, but that is not always the case with historical materials you find on the internet, said **John Randolph**, U of I history professor. You can find all kinds of YouTube videos depicting events from history, but researchers’ questions about online historical sources abound. Where did the video come from? Is it under copyright? Is it the entire film or only part? Has the video been doctored?

“The majority of digital records being created online do not provide this basic information,” Randolph said. While the internet brings historical artifacts to a wider audience, he added, “that doesn’t necessarily make them intellectually more accessible, or make them more useful in understanding history.”

Traditionally, universities, colleges, archives, libraries, and publishers ensured that historical material came with critical supporting information. To merge the traditional methods of publishing history with the online world, Randolph and several other Illinois professors are leading a team in tandem with the University of Nebraska and Michigan State University, using a grant from Humanities Without Walls.



How much time passes in a page of fiction? Ted Underwood’s research reveals that 20th century fiction writers dwelled increasingly on minute-to-minute interaction, as shown on this logarithmic scale. (Image courtesy of Ted Underwood.)



Video still from Red Cross work on Mutilés, at Paris (1918): a Sourcelab edition. By Alison Marcotte and Alex Joseph Villanueva. Sourcelab prototype series, vol. 1, No. 1 (2015).

The grant supports SourceLab, which Randolph runs to train students on how to put online sources in a form that historians can use. For instance, his students worked on a 1918 silent movie showing French sculptors preparing masks for soldiers who suffered terrible facial wounds during World War I. SourceLab provides a thorough description of the source, copyright, and other details about the movie, such as where and how it was preserved. It also places the film in a context, explaining that this short movie was just one of many—although most were discarded or burned.

Digital humanities, with its emphasis on both quantitative and qualitative research, has opened the door to more interdisciplinary studies, such as Underwood’s work with the Berkeley information scientist.

In addition to SourceLab, the Humanities Without Walls grant supports the Public History initiative coordinated by **Kathryn Oberdeck**, history professor, and **Daniel Gilbert**, professor of labor relations and history. Public History aims to connect students with community history projects that will produce digitized documents and exhibits. The initiative also involves public history interns who put together “hidden history” tours about places associated with underrepresented student activism on campus.

You can also find interdisciplinary work in the research of **Robert Markley**, professor of English and an 18th century specialist. Together with researchers from two other universities and an Illinois computer scientist, he developed software to analyze 237 maps of the Great Lakes. The maps, published between 1680 and 1730, are works of art, but they were also created for commercial and political reasons. Markley studied them for environmental and climatological information.

In another digital humanities effort, **Randall Sadler**, professor of linguistics, recently coordinated an international conference dedicated to the use of computer technology to learn languages. The Computer-Assisted Language Instruction Consortium (CALICO) drew several hundred people to the U of I campus this past summer; it brought into sharper focus all kinds of ways to teach language with new technology, including virtual reality, podcasts, and word games on smartphones.

“My hope for the digital humanities is that we’re starting up new conversations with many types of scientists,” Underwood said. “You don’t have to put on different-colored spectacles to look at literature and then put them away when you look at law or social history. It’s all part of a single story.” ■



## Illinois announces results of latest Illini Success initiative

### Young LAS alumni are more quickly finding jobs and other endeavors after graduation

New graduates from LAS are increasingly successful at securing a first destination after college. They continue to be in strong demand by employers.

These results are according to the Illini Success initiative, a campuswide effort to gather career-related information about recently graduated bachelor’s degree recipients. The latest report includes data about 2016-17 graduates of Illinois based on survey responses, employer and college reports, and the LinkedIn social media network.

Roughly 86 percent of bachelor’s degree recipients in LAS had secured a first

destination—employment, continuing education, or volunteer/service positions—within six months of graduation, up from 83 percent last year and 77 percent two years ago.

“Clearly, we are thrilled by the implications of the latest Illini Success initiative,” said **Feng Sheng Hu**, Harry E. Preble Dean of the College of LAS. “The vast majority of our young alumni are engaged in new, productive endeavors very soon after graduation. It speaks to the value of an LAS degree, and we expect the success of our alumni to continue to grow as their lives and careers develop.”

Of the 86 percent of LAS graduates who had secured a first destination, about 66 percent were employed. The more frequent employment destinations include health care, investment and finance, higher education, K-12 education, and the food and beverage industries.

The average annual salary of new LAS graduates in the study is \$53,226, up from \$48,981 last year. New LAS graduates’

average salary is the third-highest on the Illinois campus, after graduates from the colleges of engineering and business.

The latest report includes data for 2,021 bachelor’s degree recipients, or 65 percent of the total number from 2016-17.

#### Other items of note include:

- **20 percent** of respondents in the survey self-identified as **first-generation college students**.
- **81 percent of communication majors** reported their first destination as **employed**, the highest of any major. Second was English and creative writing at 78 percent.
- Of the full-time employed graduates, those in **mathematics and statistics** reported the **highest average salaries at \$68,118**. Next was astronomy and physics at \$67,491. ■

By Dave Evensen



*Illinois students in the field class **Geology 415/515** absorb an ocean view as they sketch Carboniferous (318 million years old) deltaic sediments to study the ancient sedimentary and tectonic evolution of County Clare in western Ireland. (Photo by Jim Best, the Jack and Richard Threet Professor of Sedimentary Geology and professor of geography and geographic information science.)*



**LAS**  
**Experts**

By Dave Evensen

## The wisdom of living systems

Ying Diao learns from biological processes to create a new generation of green technology

**Ying Diao** arrived at the Department of Chemical and Biomolecular Engineering as a faculty member in 2015, and already the professor and Dow Chemical Company Faculty Scholar has generated widespread interest in her research of nanotechnology and materials. She's been named an Innovator under 35 by MIT Technology Review, with her breakthroughs including organic plastic that can detect disease markers in a person's breath. As Diao puts it, she relies upon the "wisdom of living systems" to innovate new ways to create materials for electronics, renewable energy, and health care.

### What are you currently working on?

We are currently developing printed electronics technologies and methodologies to direct the assembly of semiconducting molecules from molecular to device scale. We learn from living systems and design bio-inspired assembly processes, allowing molecules to put themselves together cooperatively into highly ordered structures otherwise not possible with drastically improved electronic properties. We innovate printing processes that can control the assembled structures down to the molecular scale, while at the same time exhibit enhanced and even dynamic and switchable electronic and optical properties. We fabricate wearable, disposable

electronic devices capable of detecting disease biomarkers at ultralow concentration to advance personalized health monitoring and to pave ways for early diagnosis. We print organic transistor arrays—the technology central to enable flexible, rollable displays.

### What is significant about this work?

Printed electronics based on semiconducting molecular systems have emerged as a new technology platform that promise to revolutionize the electronics and clean energy industry. In contrast to traditional electronic manufacturing which requires high temperature and high vacuum, these new electronic materials can be solution printed at near ambient conditions to produce flexible, light-weight, bio-integrated forms at low-cost and high-throughput.

Directed assembly approaches designed for conventional hard materials are far less effective for soft matters that exhibit high conformational complexity and weak, non-specific intermolecular interactions. On the other hand, biological systems have evolved to assemble complex molecular structures highly efficiently. We are eager to transfer the wisdom of living systems to developing printed electronics technologies to enable next-generation electronics for clean energy and health care. ■

# FOUR LAS STUDENTS HONORED BY GOLDWATER SCHOLARSHIP PROGRAM

Four College of LAS students have earned national recognition for their potential to contribute to the advancement of research in the natural sciences, mathematics, or engineering.

Junior **Alayna Johnson** was awarded a Barry M. Goldwater scholarship for the 2018-19 and 2019-2020 academic years, seniors **Michael Toriyama** and **Rebecca Wipfler** were awarded Goldwater scholarships for 2018-19, and senior **Wesley Tung** earned honorable mention.

The Barry M. Goldwater Scholarship and Excellence in Education Program was established by Congress to honor Barry M. Goldwater, who served 30 years in the U.S. Senate. Recipients receive \$7,500 annually for tuition, fees, books or room and board. The scholarship is the premier undergraduate award of its type in the U.S. in the fields of science, technology, engineering, and mathematics.

**David Schug**, the director of the National and International Scholarships Program at Illinois, said the U of I is one of only a dozen institutions in the country with at least three awardees and an honorable mention recipient.

"The caliber of our top STEM students is as high as those from any other program in the country," he said.

Johnson, of Wayzata, Minnesota, majors in chemistry and in materials science and engineering. She aspires to explore the physics and chemistry behind organic

materials, polymers and catalysts to investigate how various properties of these materials influence their usefulness in laboratory and industrial settings.

Toriyama, of Bloomington, Illinois, majors in applied mathematics and materials science and engineering. His scientific aspirations are twofold: to use material simulation tools to enhance the performance of energy-efficient materials, and to develop high performance computational methods to accelerate novel material discovery.

Wipfler, of Metamora, Illinois, majors in molecular and cellular biology. Once arriving at Illinois, Wipfler began working at the NASA Astrobiology Institute on extremophile microorganisms within the domain archaea and

has continued this work throughout her studies.

Tung, of Normal, Illinois, majors in molecular and cellular biology. He desires to generate personalized therapies to combat a wide variety of cancers. He has spent the past two years at Illinois studying the RNA-binding protein hnRNPI and how it prevents colorectal cancer. ■



Alayna Johnson



Michael Toriyama



Rebecca Wipfler (also in background)

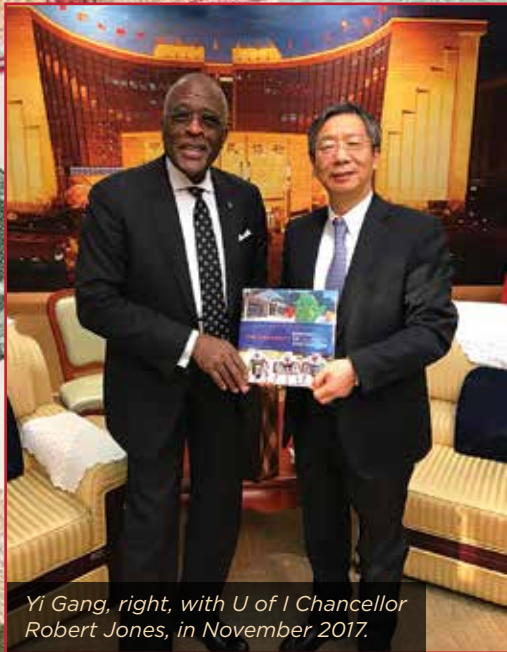


Wesley Tung



## Undergraduates recognized for potential to advance research

By Illinois News Bureau



Yi Gang, right, with U of I Chancellor Robert Jones, in November 2017.

## Illinois alumnus appointed to direct China's central bank

### Yi Gang earned graduate degrees in economics

By Dave Evensen

An alumnus from the University of Illinois has been named the next governor of China's central bank.

The National People's Congress voted to approve **Yi Gang** (MS, '84; PhD, '86; economics) to lead the People's Bank of China, where he has been a deputy governor since 2008. He succeeds Zhou Xiaochuan, who led the bank for more than 15 years.

"The main task is that we should implement prudent monetary policy, push forward the reform and opening-up of the financial sector, and maintain the stability of the entire financial sector," Yi told reporters following his appointment.

The New York Times reported that Yi is one of the rare Chinese officials to reach a top rank after spending considerable time overseas. After earning his degrees at Illinois, Yi taught economics from 1986 to 1994 at Indiana University in Indianapolis, where he became known as a leading expert on China's monetary and financial sectors. He joined the People's Bank of China in 1997.

George Judge, professor emeritus of economics who served

as Yi's dissertation chair, said that Yi is an intelligent and highly motivated person.

"He has an inquisitive mind and he is not afraid to take on new, hard problems," Judge said. "His training in the quantitative areas of economics is excellent."

Feng Sheng Hu, the Harry E. Preble Dean of the College of Liberal Arts & Sciences, said that Yi's appointment is inspiring.

"He will be making decisions that have global implications," Hu said. "His career is a testament to the power of an education in economics at Illinois, and also to the university's ability to create world leaders."

At Illinois, Yi served as a teaching assistant in economics statistics courses and was also a research assistant. His dissertation was titled Stein Estimation and Model Selection. In his new post, he is expected to continue ambitious reforms to control China's debt while maintaining the country's economic growth. ■

# RESEARCHERS shed light on how influenza evades immune systems

### Mutations allow virus to escape antibodies and regain strength



Seasonal flu viruses continually undergo mutations that help them evade the human immune system, but some of these mutations can reduce a virus's potency. According to new research at Illinois, certain mutations in the genome of influenza A may help counteract the weakening effects of other mutations.

Influenza A persists, in large part, due to continual changes in the sequence of amino acid "building blocks" that make up the viral protein hemagglutinin, enabling it to avoid recognition and removal by immune system antibodies. Many of these mutations can reduce a virus "fitness," or its ability to make more copies of itself, raising the question of how viruses' recover their mojo.

In a study published in PLOS Pathogens, **Christopher Brooke**, professor of

microbiology at Illinois, and other colleagues investigated hemagglutinin mutations to better understand the mechanisms by which influenza A viruses maintain fitness despite continual mutation.

To identify the accumulated mutations that restored viral fitness, the researchers sequenced the viral RNA using a supersensitive method called PrimerID sequencing, which enables tracking of all individual viral genomes so that any relevant mutations can be spotted. They found several mutations that add a new sugar molecule to the hemagglutinin, thus creating a novel "N-linked glycan" site.

How does this help the virus to replicate? The new sugar allows the virus to regain "Goldilocks" binding to the host cell: not too weak, but not too tight either. In escaping the immune system, the new mutations can inadvertently disrupt

this golden binding point, which can be remedied by adding sugar molecules in part of the hemagglutinin.

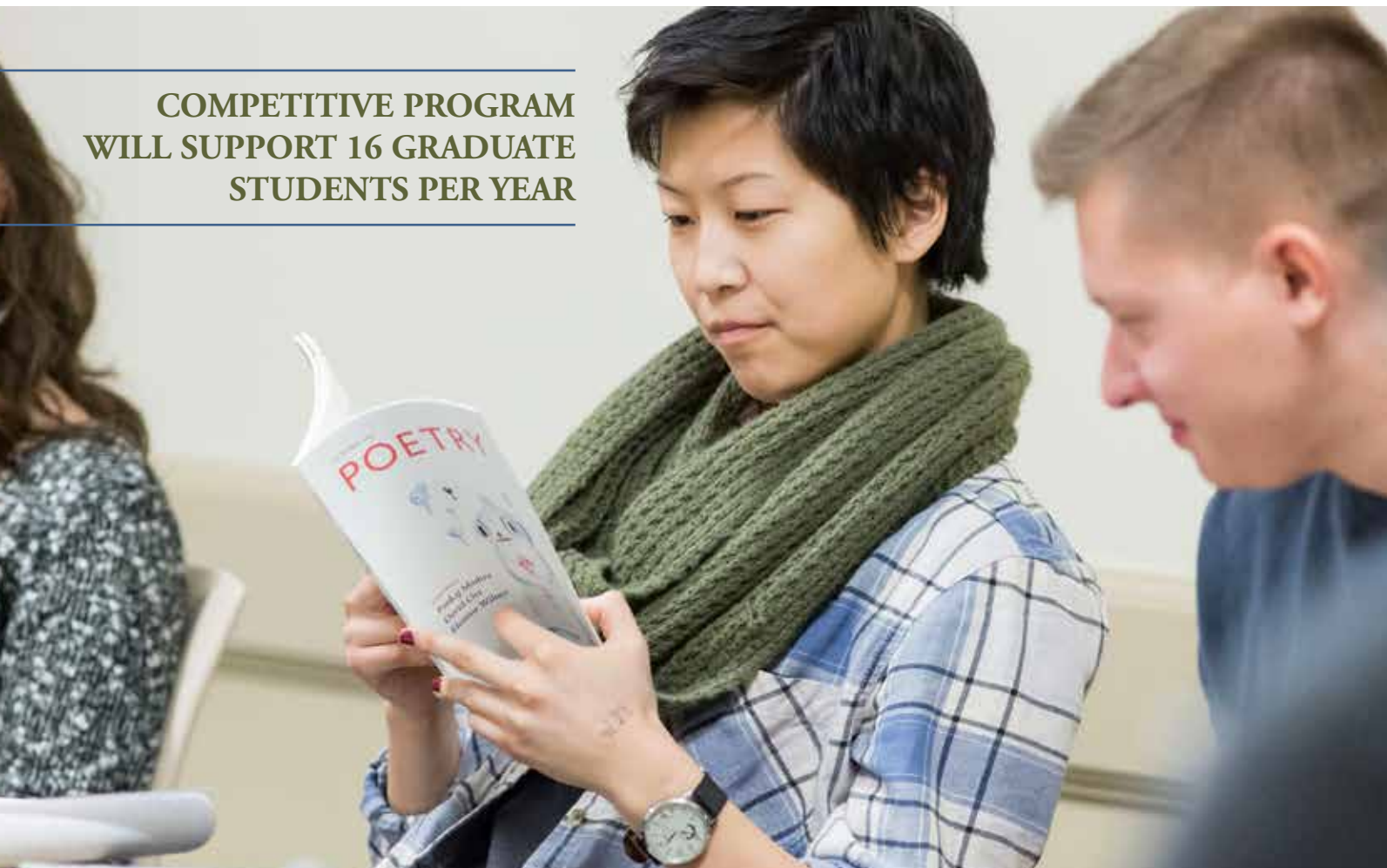
These findings improve understanding of the mechanisms that make flu outbreaks so difficult to prevent, and inform efforts to design more effective flu vaccines that are less easily thwarted by continual mutation. The results also demonstrate the value of PrimerID sequencing to provide a high-resolution view of all the mutations present in a given viral population—something that conventional deep sequencing approaches cannot do as efficiently.

Brooke's home department is part of the School of Molecular and Cellular Biology. ■

By Steph Adams, School of Molecular and Cellular Biology

# NEW FELLOWSHIPS bolster humanities and arts-based humanities at Illinois

COMPETITIVE PROGRAM WILL SUPPORT 16 GRADUATE STUDENTS PER YEAR



The University of Illinois is reaffirming its commitment to the arts and humanities by launching a new graduate fellowship program intended to attract the best and brightest students in these fields.

The College of LAS is collaborating with the College of Fine and Applied Arts, the Graduate College, and the Office of the Provost to offer competitive Distinguished Graduate Fellowships in the Humanities and Arts to 16 graduate students in the humanities and arts-based humanities per year.

**Feng Sheng Hu**, the Harry E. Preble Dean of the College of LAS, said the new fellowships are part of an effort to advance and promote the humanities at Illinois at a time when students are increasingly opting to enroll in programs outside these fields.

“There is not a single comprehensive university in the world that is considered first-rate without strong humanities programs,” Hu said. “It doesn’t matter how many challenges we have; we’re going to have history, philosophy, English, and other humanities units. They are so essential to the training of our students. That’s how they develop a broad perspective, critical thinking, and the ability to articulate their opinions and ideas clearly. We have to have resources to attract the best graduate students and the best faculty in the humanities.”

Relevant units can submit nominations for these fellowships during the process of recruiting doctoral students to Illinois. Nominees will be considered by an awards committee. A regular competition started

during the 2018-19 academic year.

Faculty and administrators across campus voiced strong support for the new fellowships.

**Antoinette Burton**, director of the Illinois Program for Research in the Humanities, Swanlund Endowed Chair, and a professor of history, said the fellowships are a “welcome recognition of the links between research excellence in the humanities and institutional support for graduate education and training.”

“Students recruited to Illinois through these fellowships are the very best and brightest humanities scholars in the nation, and indeed the world,” Burton said. ■

By Dave Evensen

# Writing for SUSTAINABILITY

## Student demand leads to new certificate in environmental writing

What’s one item you use every day that you couldn’t live without? Mascara, Nike sneakers, paper towels, or perhaps your daily Starbucks coffee? But what happens to these items once you toss them (or their containers) out?

This is one question that English professor **Gillen Wood** asks students in his English 360: Environmental Writing course, the first in a series of courses offered to complete the newly implemented and interdisciplinary Environmental Writing Certificate.



The certificate launched in Fall 2017 and is the only opportunity of its kind in the country due to the publication component required in the capstone course, said Wood, who directs the new program. The certificate is a joint offering through the Department of English; the School of Earth, Society, and Environment; and the Institute for Sustainability, Energy, and Environment.

The certificate itself resulted from increasing student demand, as the first environmental writing course filled up each semester with a waiting list.

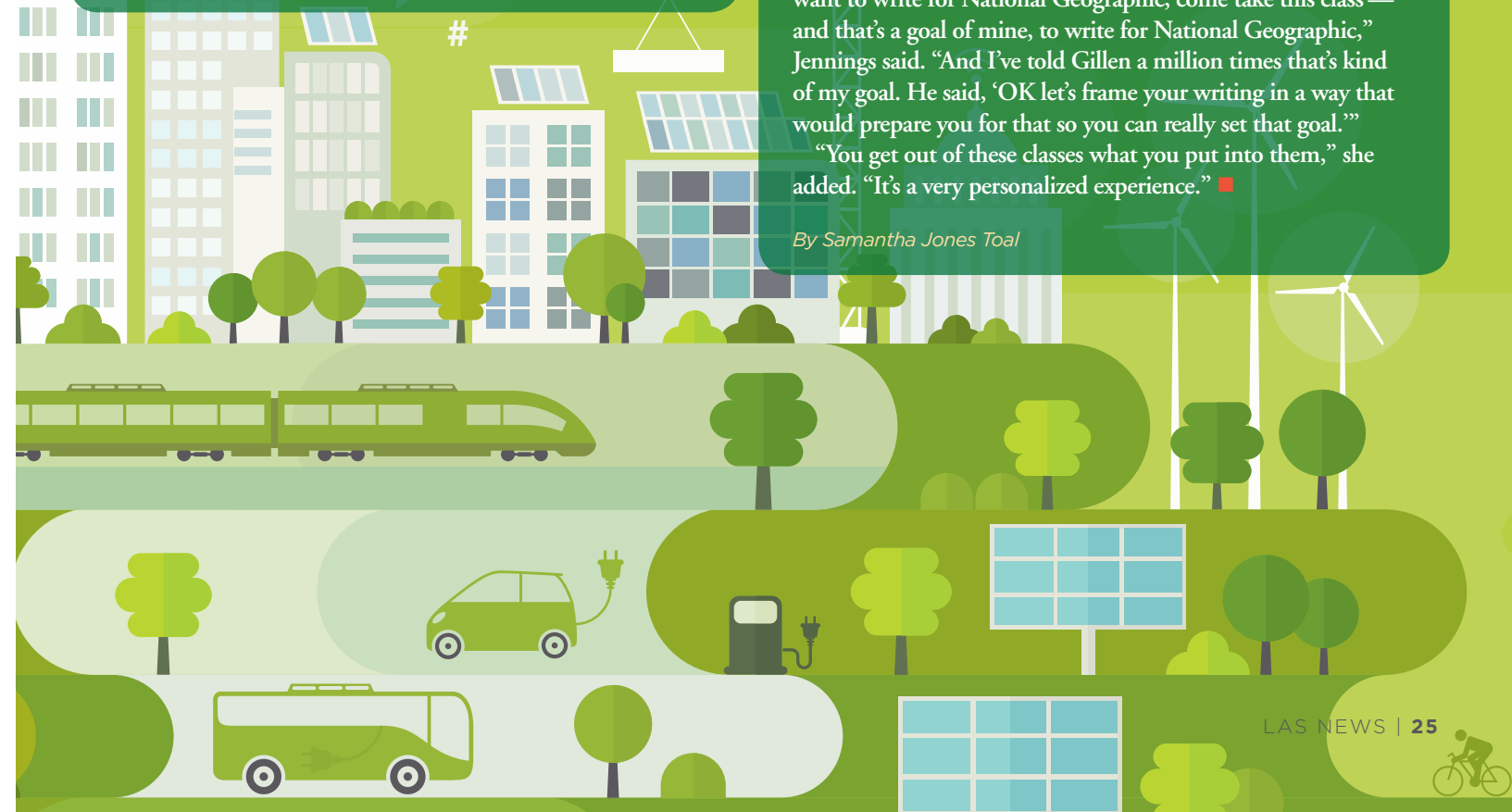
The capstone course, Environmental Writing for Publication, will be tied to launching a magazine called “Q” which is a play on the big questions posed throughout the new program. The magazine, featuring exclusively student writing, will be published twice a year. The first issue is scheduled for this fall.

**Taylor Jennings**, an undergraduate majoring in global studies and English, has taken certificate courses called Environmental Writing for Publication and Advanced Environmental Writing. She’s collaborated with students from a variety of majors.

“Advanced Environmental Writing was framed as, ‘If you ever want to write for National Geographic, come take this class’—and that’s a goal of mine, to write for National Geographic,” Jennings said. “And I’ve told Gillen a million times that’s kind of my goal. He said, ‘OK let’s frame your writing in a way that would prepare you for that so you can really set that goal.’”

“You get out of these classes what you put into them,” she added. “It’s a very personalized experience.” ■

By Samantha Jones Toal



# DEEP SEA EXPLORERS

Much of what we know about the ocean floor began with scientists from land-locked Illinois

By Samantha Jones Toal

FOR MOST OF HISTORY, the 70 percent of our planet's surface that hides below the ocean surface have been a mystery, too deep for humans to observe and understand. A century ago scientists knew more about the surface of the Moon than the bottom of the ocean.

Modern science has since allowed us to explore the ocean's depths, however, and beside the discoveries themselves, one of the biggest surprises about marine geology—the study of the ocean floor—is how much of it began at the land-locked University of Illinois.

In fact, Francis Parker Shepard, known as the “Father of Marine Geology,” spent much of the early part of his career (1922-1936) teaching and researching at Illinois. He joined Illinois as an instructor specializing in the Rocky Mountains, but soon he transitioned to studying the ocean floor.

“I am often asked how I got into the study of the geology of the oceans, living as I did in Illinois,” Shepard wrote in his autobiography. “My development of this new field was due to a series of accidents or coincidences.”

It started during summer 1923, when Shepard's wife, Elizabeth, was pregnant and unable to accompany him to study the Rockies. Therefore, instead of heading west, the couple spent the summer in Massachusetts, where Shepard used his father's yacht to satisfy his curiosity about coastal Atlantic regions that he'd read about in research papers.



Francis Parker Shepard (Image courtesy of U of I Archives.)

Using the yacht along with a reel and some small, weighted sampling devices, Shepard examined sediment that he drew up from the ocean floor. What he found was contrary to what he'd learned in geology courses.

“We were told that sand is found along the shores and this, in turn, is replaced by finer sediments outside, and only mud occurs on the outer continental shelf,” Shepard wrote. “This is not what I found at all. Mud often occurred right near the shore and was replaced by sand in deeper water outside; then sometimes gravel still farther out.”

Intrigued—and with help from a grant from Illinois to obtain nautical charts from around the world—Shepard refocused his career to study the ocean floor, and this work at Illinois helped him reshape what we knew about this hidden realm.

“One of the things he's best known for is the discovery of submarine canyons,” said Steve Marshak, professor emeritus of geology and former director of the School of Earth, Society, and Environment at Illinois. “These canyons cut into the continental shelf and provide a conduit in which sediment from nearer the shore can be carried out to the deeper parts of the sea.”

Shepard's research at Illinois helped him later develop his theory that the near-shore parts of submarine canyons were formed from running water and rivers and erosion during the Pleistocene Epoch (between about 12,000 and 2.6 million years ago) when the sea level was much lower. In later years, he also recognized that erosion in the deeper reaches of these canyons was the result of turbidity currents, or “underwater avalanches” in which clouds of sediment rushed down slope and carved into the sea floor. Shepard's findings are now the standard scientific explanation for submarine canyon formation.

Shepard's new knowledge of submarine canyons helped the U.S. Navy fight German submarines during World War II. By then, Shepard had left Illinois for a successful career at the Scripps Institute of Oceanography. He passed away in 1985, but today the Francis P. Shepard Medal for Marine Geology is considered one of the most prestigious awards in the field.

Two graduate students who studied with Shepard at Illinois are also regarded as pioneers in marine geology. According to some accounts, once Robert S. Dietz and Kenneth O. Emery completed their degrees, they hitchhiked and traveled via boxcar to meet Shepard at the Scripps Institute in California to assist in Shepard's research. Then they moved on to make their own discoveries.

Dietz is best known for his contributions to the theory of plate tectonics, the grand-unifying theory of geology, which modern geologists use to explain continental drift, volcanism, mountain building, and earthquakes. He coined the term “seafloor spreading,” for the process by which new ocean floor forms.

Dietz also made significant contributions to meteorite impact theory. He is credited with recognizing a number of huge, ancient

impact craters on Earth, including the Sudbury Basin in Canada.

Meanwhile, Emery made a name for himself studying the Pacific and Atlantic Oceans. He served on the U.S. Geological Survey team based in Los Angeles from 1946 to 1960, studying the effects of nuclear testing in the Marshall Islands on the Bikini Atoll. Emery's studies confirmed a hypothesis by Charles Darwin that atolls consist of coral reefs atop the rims of extinct volcanoes that have slowly been sinking below sea level.

Emery also served two years as oceanographer at the Navy Ordnance Test Center. He published 290 articles or monographs and 15 books and also researched acoustic submarine warfare.

In recent decades, geoscientists associated with Illinois continue to have strong influence in what we learn about the oceans. Margaret Leinen (BS, '69, geology) is director of the Scripps Institution of Oceanography. Prior to that, Leinen served as the vice provost for marine and environmental programs at the University of Rhode Island and assistant director of National Science Foundation.

Leinen also served as the president of the American Geophysical Union, a position once held by Illinois President Tim Killeen. Similarly, Susan Avery (PhD, '78, atmospheric sciences) acted as president of the Woods Hole Oceanographic



Unique submersible vessel Alvin. (Underwater photos in this story taken using WHOI MISO facility deep-sea camera systems and Alvin cameras. ©Copyright WHOI.)

Institution, meaning that for a while Illinois alumni were in charge of two of the world's most prominent oceanographic research institutions.

Research of the ocean floor continues on campus. Patricia Gregg, professor of geology, was recently chief scientist of a National Science Foundation-funded expedition to the floor of the Pacific Ocean on the

unique submersible vessel Alvin. The journey allowed Gregg and her students to study never-seen underwater volcanoes 750 miles west of Mexico so as to better understand how new seafloor is created.

And, Gary Parker, the W.H. Johnson Professor of Geology, was recently elected to the National Academy of Sciences for his work on the fluid dynamics of sediment-transporting currents, and today is considered to be the world's leading authority on turbidity currents. ■



A tripod fish, or stilt walker, known for perching itself over the floors of the deep sea.

# WHERE DO LAS STUDENTS COME FROM?

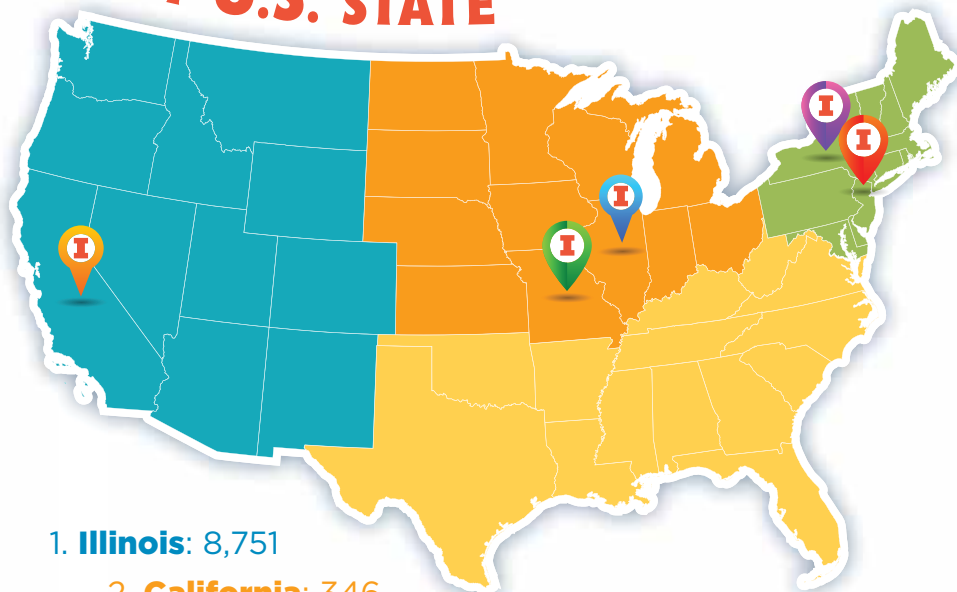
The roughly 11,500 undergraduates in the College of LAS come from almost 50 countries, 46 U.S. states, and all but four counties in Illinois. The graphic displays the most common origins of LAS students by region.

BY COUNTRY



- 1. **United States:** 9,770
- 2. **China:** 1,080
- 3. **South Korea:** 225
- 4. **India:** 114
- 5. **Malaysia:** 32

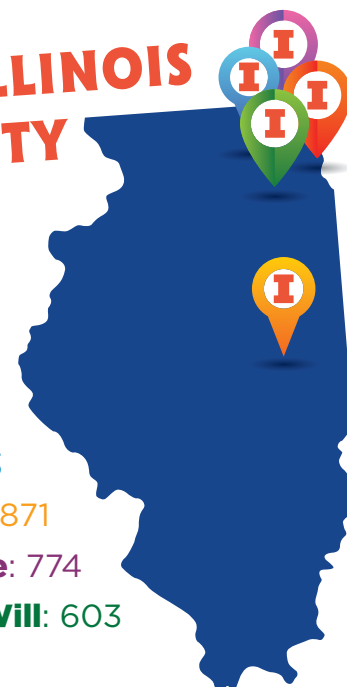
BY U.S. STATE



- 1. **Illinois:** 8,751
- 2. **California:** 346
- 3. **New Jersey:** 87
- 4. **New York:** 55
- 5. **Missouri:** 46

Source: Applied Technologies for Learning in the Arts & Sciences (ATLAS) Reporting Services. Numbers reflect enrollment in Spring 2018.

BY ILLINOIS COUNTY



- 1. **Cook:** 3,730
- 2. **DuPage:** 1,003
- 3. **Champaign:** 871
- 4. **Lake:** 774
- 5. **Will:** 603

## YOUR GIFT TRANSFORMS LIVES



The odds of going to college were stacked against Nicole Odulate, the second of five children in a single-parent home. That single parent, however, was her mother, who worked tirelessly to keep her daughter's future bright. In 2014, Nicole entered Illinois as a College of LAS Lincoln Scholar.

Now, Nicole is bound for law school with dreams of helping kids in poverty focus on their goals. She is grateful for all the support she's received—from her mother to the donors who made the Lincoln Scholarship Initiative possible.

"It's somebody's future that you're literally helping build," Nicole said. "Each dollar is somebody's step up to a better life."

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## FALL 2018 UPCOMING EVENTS

**REUNITE WITH FRIENDS AND CLASSMATES**, find out about new LAS programs and initiatives, and learn new things at these upcoming alumni events!

**LAS Alumni Awards dinner and ceremony**

**Friday, Oct. 12, 2018**  
Illinois campus

**Homecoming**

**Saturday, Oct. 13, 2018**  
Illinois campus

**Four Illinois presidents: Their journeys to the White House**

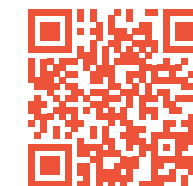
**Friday, Nov. 9, 2018**  
Abraham Lincoln Presidential Museum, Springfield

**Politics and the News**

**Saturday, Feb. 9, 2019**  
Walnut Room in Hotel Allegro, Chicago

**For more event information**

and registration, please visit [las.illinois.edu/alumni/events](http://las.illinois.edu/alumni/events), scan the QR code on the right, email us at [las-alum@illinois.edu](mailto:las-alum@illinois.edu), or call (217) 333-7108.



Also be sure to hear about future events in your area by updating your email address at [go.las.illinois.edu/alumnicontact-fall18](http://go.las.illinois.edu/alumnicontact-fall18).





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## THE POWER OF ADDING PERSPECTIVE.

In the College of Liberal Arts & Sciences, our students harness the power of “&.” They’re transformed inside our classrooms and through real-world learning experiences. Our students dive deep into their subject through one of our 70 majors, and then broaden their perspectives through internships, study abroad, and undergraduate research.

Employers love our graduates because they think critically, communicate well, and excel in teams. The numbers tell the story: 86 percent of 2016-17 graduates had full-time jobs, continuing education placements, or full-time service opportunities within six months of graduation. Their salaries averaged \$53,226.

**KNOW SOMEONE IN THE COLLEGE SEARCH?** Urge them to embrace “&” and apply to an LAS major at the University of Illinois.

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