



IQ - ISEE Quarterly

An update from the Institute for Sustainability, Energy, and Environment

What's new at the Institute ...

Levenicks Make Major Gift

Sustainability leadership, research, education, and practices will remain at the forefront of University of Illinois priorities, thanks in part to significant endowments from Stuart L. and Nancy J. Levenick of Naples, Fla.

Mr. Levenick, a U of I alumnus who captained the 1975 Illini football team and received a B.S. in forestry in 1976, and his wife have designated this major endowment in two parts:

- for the Stuart L. and Nancy J. Levenick Sustainability Chair Fund, which will establish an endowed chair in the College of Agricultural, Consumer and Environmental Sciences' Department of Natural Resources and Environmental Sciences (NRES); and
- for the Stuart L. and Nancy J. Levenick Resident Scholars in Sustainability Leadership Program Fund, to establish a resident scholars program at the Institute for Sustainability, Energy, and Environment (iSEE).

"As a forestry major on this campus, I learned the value of a strong, resilient environment and humanity's place in nurturing it," said Mr. Levenick, a former executive at Caterpillar Inc. and a longtime resident of Peoria. "As a growing world population must address its increasing food, clean water, energy, shelter, and basic health needs — without doing damage to the environment — we need leaders to emerge. New critical thinking is needed to address these challenges.

"Nancy and I hope that our funding can play a role by establishing a thought leadership program at Illinois that will benefit future generations."

NRES will select a faculty member to serve as the Levenick Chair in Sustainability. As an iSEE affiliate, this newly funded Chair will also recruit and manage the Resident Scholars Program at the Institute.



The Levenick Resident Scholars in Sustainability Leadership Program at iSEE will bring in experts from other universities, the private sector, and nonprofit organizations to share fresh perspectives and innovations with the Illinois community. With backgrounds from a variety of disciplines, the new Resident Scholars will enhance and accelerate the broader impact of sustainability research and innovation.

"This campus will become a destination for worldwide sustainability experts — offering them creative opportunities and exposing faculty, students, and staff on our campus to real-time sustainability solutions from across the globe," said Evan H. DeLucia, the Institute's Baum Family Director.

[Read the full news release on the iSEE website.](#)

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In the Spotlight: Ilsa Kantola

“From an early age, I was aware of farming going on around me, and the importance of land and soil to everything in our lives.”

Originally from Sacramento, a vibrant city nestled at the top of California's Central Valley, iSEE Postdoctoral Research Associate Ilsa Kantola grew up surrounded by agriculture both geographically and genetically — Kantola's grandfathers worked in the industry, and her father has a degree in Agricultural Economics. Living in a bustling metropolis did nothing to hinder Kantola's bond with nature; on the contrary, she fondly recalls driving down country roads playing a game called “Name that Crop.”

“Which,” Kantola jokes, “can be a very boring game in Illinois.”

In her work at the University of Illinois at Urbana-Champaign, Kantola contrib-

utes to the industry's most high-stakes conversation: the search for sustainable farming practices of global proportions. Kantola has long been passionate about her current field: her bachelor's degree from California Polytechnic State University is in Environmental Engineering with a Soil Science minor. Soil Science quickly developed into a central interest area.

“It's chemistry, it's biology, it's agriculture, it's food, and it's people,” Kantola says of her passion for the subject. “And it's all together.”

Kantola's current research at Illinois is in partnership with the Leverhulme Centre for Climate Change Mitigation (LC3M). The project, led by iSEE Director Evan H. DeLucia and the USDA's Carl Bernacchi, aims to combat rising atmospheric carbon dioxide (CO₂) levels by imbuing cropland soil with calcium- and magnesium-con-

taining silicate rocks.

The researchers' process for capturing atmospheric CO₂ involves two chemical reactions. First, atmospheric CO₂ dissolves in rainwater to create carbonic acid. Then, the acid reacts with calcium and magnesium in the soil to form calcium and magnesium bicarbonate, soluble compounds that leach with soil water, resulting in the relocation of CO₂ from the atmosphere to the water cycle.

To enhance this process, Kantola's team turns to basalt, an igneous rock containing both calcium and magnesium as well as phosphorus and minor nutrients that can benefit soil fertility. Large quantities of finely-ground basalt are spread over twin fields of corn and miscanthus at the Energy Farm and left to react with CO₂-laden rainwater.

[Full profile on the iSEE website.](#)

Geology/Geography Prof to Lead New Illinois Water Council

James Best, the Jack and Richard Threet Professor of Geology and a Professor of Geography and Geographic Information Science (GIS), was named Chairman of iSEE's Water Council, a steering committee that will help lead the Illinois Water Scholars as they work together on major interdisciplinary research opportunities at Illinois.

Other Council members: Entomology Associate Professor Brian Allan; Geography and GIS Associate Professor Trevor Birkenholtz; Civil and Environmental Engineering Professor Marcelo Garcia (who also directs the Ven Te Chow



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Hydrosystems Laboratory); Agricultural and Consumer Economics (ACE) Associate Professor Benjamin Gramig; Soil and Water Resources Engineering Professor Prasanta Kalita; Illinois State Hydrologist Laura Keefer of the Illinois State Water Survey; iSEE Associate Director and ACE Professor Madhu Khanna; Illinois Water Resources Center Director and Illinois State Geological Survey (ISGS) Hydrologist Yu-Feng Forrest Lin; ISGS Geologist Andrew Phillips; and U.S. Geological Survey Hydrologist Ryan Jackson.

[Read more at water.illinois.edu.](#)

What's new in research (continued) ...

CABBI Profile: Joe Zimmerman

When Joe Zimmerman takes his dogs, Millie and Ruby, out to play in the backyard, like many rural residents, he bumps into rows of wild prairie grasses. Unlike many rural residents, Zimmerman knows exactly what those grasses are.

"Miscanthus originates in southeast Asia," Zimmerman said. "This summer, one of the postdocs from China told me that it's considered a delicacy in his part of the country. They can cook the young shoots by boiling them briefly, and they're thought to be very nutritious."

Zimmerman is a Research Specialist on Erik Sacks' team for CABBI, the Center for Advanced Bioenergy and Bioproducts Innovation. A University of Illinois alum from Avon, Ill., he graduated and went directly into corn fields studying hybrids, genotypes, and crop breeding with AgReliant Genetics LLC.

"It was really rewarding to see the research, the hybrids we had studied, and the genotypes we had planted and started off with become commercial and become successful," Zimmerman said.

"A lot of breeding research is finding that needle in the haystack: It's one in 10,000 that's going to be good, and you have to be able to look past the other 9,999 that didn't work out. But to see that one product make it, get pushed through all the phases of testing, and become successful on a commercial level is very rewarding."

Though Zimmerman can now boast



that he knows just about every small town in the Midwest from his work in the corn industry, he was ready to stay in one place and put down roots with his wife, an architectural designer, and his two pups. When the opportunity to work for CABBI opened up at the U of I, Zimmerman was excited that he could continue to marry his love of the outdoors with research.

"A lot of my roots and specialties are in setting up field trials and being out in the field and collecting data and harvesting materials. That's what I'm passionate about," Zimmerman said.

Sacks' team, and Zimmerman, are a part of the Feedstocks Theme within CABBI. Research in this theme is focused

Quick CABBI updates

More from CABBI:

- Since late October, the Center has [published 11 papers](#) in scholarly journals.
- The U.S. Department of Energy's annual review of CABBI was Feb. 20-21 at Illinois.
- CABBI will host a Bioenergy Research Center Modeling Workshop May 2-3 at the University Club in Chicago.
- The annual retreat for CABBI scientists will be June 26-27 at the I Hotel and Conference Center in Champaign.



on using plants as factories — engineering crops that can produce high yields of biofuel. Feedstock researchers are trying to breed crops that will contain biofuels or other valuable chemicals within the stems of the plants, rather than in the fruits, as stems in these grasses are an enormous percentage of their biomass. One particular grass Zimmerman works with is *Miscanthus giganteus*, a large, hearty, perennial grass that has been established in many Midwestern prairies.

[Full profile on the CABBI website.](#)

Seed-funded Project Researchers Publish Papers

Researchers from iSEE seed-funded projects published four papers during the past few months:

- In December, members of the Brian Allan-led Stormwater and Mosquito Control project published a paper in the *Journal of Medical Entomology* with their findings that container size matters when mosquitoes carrying the Zika virus seek out human-made, artificial places to reside.

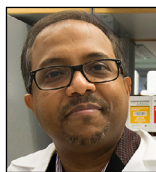
- In November, Allan's team and former team member Allison Gardner of the University of Maine published in *Proceedings of the Royal Society B* that manipulating leaf litter — particularly decomposing leaves from common blackberry plants — is effective in "attracting and killing" disease-carrying mosquitoes.

- In October, members of the Dipanjan Pan-led Crude Oil Pollution Treatment project published in *Journal of Materials Chemistry A* the results of their unique technology to remove harmful pharmaceuticals and personal care products (PPCPs) from water sources using a filter that features nanoparticles.

- In November, a Yuanhui Zhang-led team, seed-funded through iSEE's Campus as a Living Laboratory program, published a paper in *Nature Sustainability* on converting biological waste to diesel-compatible fuel. Zhang's team is building a pilot-scale reactor that can be mounted on a mobile trailer and "has the capacity to process one ton of biowaste and produce 30 gallons of biocrude oil per day."



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What's new in education ...



Collaboratory Opens for Business

iSEE's learning and meeting Collaboratory opened to classes Jan. 14. The space, outfitted with state-of-the-art presentation screens and teleconferencing capabilities, seats up to 36 students with the potential for larger meetings and events.

The first classes taught in the space include ENV5 301, the introductory course

for the SEE Fellows Program campuswide minor (photo above); two courses that are part of the undergraduate Certificate in Environmental Writing (CEW); and one Natural Resources and Environmental Sciences (NRES) course.

The iSEE Collaboratory is designed for discussion, creation, and communication,

and it is accompanied by a new media lab/studio that will allow users to create high-quality video and audio.

Generous funding from Stu and Nancy Levenick, Caterpillar Inc., the Student Sustainability Committee (SSC), and the Office of the Provost made this possible.

[Visit the Collaboratory calendar.](#)

New Program to Fund Instructors Adding Sustainability into Curriculum

On Dec. 3, iSEE Associate Director for Education and Outreach Gillen Wood announced that iSEE will offer Levenick iSEE Teaching Sustainability Fellowships for U of I instructors interested in adding sustainability elements

to existing courses (\$1,000) or creating a new course with a sustainability centerpiece (\$2,000). The first round of Fellows will be announced this spring.

[Read more about the program on the iSEE website.](#)

What's new in outreach ...

Save the Dates: Upcoming iSEE-related Events

Among the Institute-supported events in 2019:

- April — Earth Month will include several events planned by Students for Environmental Concerns; among iSEE events are Illini Lights Out on April 12 and 26, Plogging on April 14, an Arbor Day celebration, and two Earth Week lectures (the Charles David Keeling Lecture by MIT Meteorology Professor Kerry Eman-

uel at 5 p.m. April 22 in the Levis Faculty Center; and the CAS MillerComm Lecture by University of Michigan School for Environment and Sustainability Dean Jonathan Overpeck).

- May — The iSEE research project Crops *in silico* will host its Cis 2.0 Kickoff, Symposium, Workshop, and Hackathon on May 1-3 at the National Center for Supercomputing Applications (NCSA).

- July — iSEE's Next-Gen Feedstocks project hosts the Switchgrass V Conference on July 22-25 at Champaign Suites.

- September — iSEE Congress 2019 "Sustainable Justice" will be Sept. 24-25 at the Illini Union.

- October — Sustainability Week TBA.

[Stay up to date on events from the Institute and others on the iSEE website's Events tab.](#)

What's new in campus sustainability ...

U of I Campus Earns Coveted Climate Leadership Award from Second Nature

The University of Illinois at Urbana-Champaign is the recipient of Second Nature's 2018 Climate Leadership Award, the Boston-based nonprofit announced in partnership with the U.S. Green Building Council.

The 9th Climate Leadership Awards — announced in January 2019 — recognize innovation and leadership in climate action, including mitigation and resilience. One four-year and one two-year signatory campus of the Presidents' Climate Leadership Commitments are selected annually as overall winners; Illinois is the winning four-year institution, and Delta College is the two-year recipient.

"When the University of Illinois at Urbana-Champaign signed the American College and University Presidents Carbon Commitment in 2008, we began an intentional journey to make our campus one of the most sustainable in America," Chancellor Robert J. Jones said. "The Climate Leadership Award from Second Nature is welcome recognition of the progress we've made in the last decade."

Awards are based on demonstrated advances in innovation, cross-sectoral collaboration, and student preparedness. Key U of I efforts include:



- The depth and breadth of sustainability, energy, and environmental research on campus — including serving as a host institution for the Center for Advanced Bioenergy and Bioproducts Innovation (a U.S. Department of Energy Bioenergy Research Center).

- Measures to make facilities and the campus at large more sustainable, including the Solar Farm, renewable energy purchasing, comprehensive energy savings efforts from Facilities & Services, and the overarching framework developed in the Illinois Climate Action Plan (iCAP) to reach carbon neutrality by no later than 2050.

- Educational offerings in sustainability across the campus curriculum, with participation from almost every college and the majority of academic units integrating sustainability into their coursework.

- Behavior-change efforts and stu-

dent-facing opportunities such as the Certified Green Office and Laboratory Programs, zero-waste athletic events, and numerous student organizations and events (such as Illini Lights Out; see article below) dedicated to sustainability.

"Researchers on our campus are working hard to solve real-world grand challenges to ensure a growing population will have ample food, water, energy, shelter and health while also preserving our environment," said iSEE Baum Family Director Evan H. DeLucia, who accepted the award on behalf of the university at the Higher Education Climate Leadership Summit on Feb. 10-12 in Tempe, Ariz. "Right here on our campus, the staff at F&S is tirelessly working to continue reducing energy and resource use and costs, as well as greenhouse-gas emissions.

"And our campus community — leadership, faculty, staff and especially our students — is showing continued commitment to doing whatever it takes to make the University of Illinois a worldwide leader in sustainability. We can be proud of this achievement; it shows we are making a difference, and it should embolden us to continue doing so."

[Read the full news release.](#)

The Undergrad behind our Bee Campus USA Designation

In 2018, Illinois became the 53rd Bee Campus USA — and the first Big Ten Conference school with that designation.

The idea to pursue Bee Campus USA certification originated with Rachel Daughtridge, a junior in Natural Resources and Environmental Sciences (NRES).

One of the many ways that Daughtridge engages with on-campus sustainability is through her internship for Lincoln Avenue Residence Hall's

Sustainability LLC, a floor-designed for students interested in environmental issues.

Having lived there her freshman year, she jumped at the opportunity to help coordinate the program and support students with sustainability projects of their own.

"I knew that we could make this happen," she said, "because the university already met so many of the requirements."

[Read the full profile.](#)



Illini Lights Out a Flippin' Success in Fall

Hundreds of student volunteers dedicated their Friday nights in the Fall 2018 semester to making sure building lights were turned off for the weekend. The Illini Lights Out (ILO) semester totals: 27,434 bulbs turned off; \$4,115 saved in energy bills; and 35.2 tons of carbon dioxide equivalent saved.

Since the program started in 2016, turning off lights has saved the U of I 115 tons of carbon dioxide equivalent with more than \$13,000 in energy bill savings. ILO, run by iSEE interns, is generously funded by the Student Sustainability Committee.

[Updates — and Spring 2019 ILO dates — on our website.](#)



What's new with the Student Sustainability Committee (SSC) ...

More than \$800,000 Awarded

During the Fall 2018 semester, SSC allocated more than three-quarters of \$1 million to innovative student-, staff-, and faculty-led teams. Among the highlights:

- In the Department of Anthropology, undergraduate students in Jessica Brinkworth's lab will build a carbon garden outside Davenport Hall (above right). The students will use rain barrels to collect and to water the native plants. They will also turn lab members' food waste into compost for the garden.

- Students pursuing the Master of Engineering in Energy Systems are partnering with Facilities & Services to install occupancy sensors in the English Building. This project will improve energy conservation efforts by automatically turning off unused lights in 11 rooms.

- The Illini Union, iSEE, and Facilities & Services plan to expand their highly successful Zero Waste Quad Day event (far right). Quad Day is one of the largest events every year, with more than 10,000 students participating in a massive organization fair the day before classes start each fall. During the 2019 event, this team will offer multiple recycling stations throughout the Main Quad and will have a pledge



for student groups looking to go green.

These three project teams join the many individuals and groups from across campus who increase environmental stewardship in our community.

The next funding deadline for all faculty, staff, and student projects was Feb. 4; announcements for spring funding are coming soon.

[For more details, please visit the SSC website.](#)



What's new in the news ...

iSEE Directors Publish Opinion Piece on Climate Change

In December, Baum Family Director Evan H. DeLucia and Associate Directors Madhu Khanna, Gillen D'Arcy Wood, and Ximing Cai wrote an opinion piece that was published in *The News-Gazette* — our Institute's reaction to the National Climate Assessment and the U.N. Climate Summit. Excerpts:

While much of the world acknowledges the need to reduce greenhouse gas emissions to arrest the Earth's continued warming, the United States is sending a mixed signal after its latest assessment clearly illustrated the effects of global climate change in the U.S.

The assessment went far beyond the usual picture of wildfires in California or the rising seas and supersized hurricanes inundating the Florida coast. It showed that the effects of a deteriorating climate are beginning to be felt far inland — in the "flyover states" of the agricultural heartland.

Agriculture, the cornerstone of American food security, is a \$136 billion industry. Falling crop yields in the Midwest represent the

greatest threat to the U.S. economy, and to Americans' quality of life, in the coming decades. Even people on the coasts are taking note.

To guarantee that the U.S. can feed itself in the face of dramatically changing weather patterns, our nation requires a renewed investment in agricultural research, which has not kept pace with our growing economy. The investment in breeding more climate-resilient crops is in even worse shape.

Three vital, overlapping needs must be met: to build on increased crop yields achieved in the last decade; to increase yields under warmer, more extreme conditions; and to do this in a way that protects and renews the larger Midwestern ecosystem.

Funding for walls will not protect us from the onslaught of climate change — and walling ourselves off would be irresponsible as the rest of the world attempts to get its GHG emissions under control. Robust strategies for dealing with climate change are vital.

[Read the full opinion piece on *The N-G* website.](#)