

IQ: ISEE Quarterly

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

What's new at the Institute ...

Khanna Named Interim iSEE Director; CABBI Leadership Team Also Shuffled

On Aug. 31, Baum Family Director Evan H. DeLucia retired from the Institute for Sustainability, Energy, and Environment. DeLucia, the Founding Director who helped conceive the Institute and was with iSEE from its inception in December 2013, also stepped down as director of the Center for Advanced Bioenergy and Bioproducts Innovation (CABBI).

"Since its launch seven years ago, iSEE has grown into a nationally visible institute with vibrant research, education, and sustainability programs," he said. "We are unique in shepherding this three-part mission. Since iSEE's inception we have submitted over \$300 million in interdisciplinary research grants and have had a nearly 50% funding rate."

[Read his full letter of thanks to the iSEE community.](#)

The Arends Professor of Plant Biology, DeLucia has plans to retire from the University of Illinois but return in an Emeritus capacity to continue his research on iSEE projects — including the new Illinois Regenerative Agriculture Initiative (IRAI, [read more on pages 2-3](#)) and at CABBI.

Madhu Khanna, ACES Endowed Professor of Agricultural and Consumer Economics and a founding Associate Director at iSEE, has been named Interim Director.

"I am so grateful to the large community of researchers, educators, and students, faculty, and staff who have given their time in support of our three-fold mission. They truly make iSEE a community of innovative thinkers and doers," said Khanna, who in July also became the President of the Agricultural and Applied Economics Association. "And our gracious donors — Joel Friedman and Erika Cornelison of the Baum Family Fund, Stuart and Nancy Levenick,



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and Janelle Joseph — have directly influenced our past, current, and future success. iSEE has also been fortunate to have a dedicated team of staff and interns to implement its mission.

"I look forward to working with iSEE's many supporters to implement our shared vision for the Institute's future."

[Read her full introductory statement.](#)

By late 2020, iSEE intends to name a new Associate Director for Research to take Khanna's place in the organizational chart.

In the meantime, CABBI has named a new Director as well: Andrew Leakey, the Feedstock Production Theme Leader and Professor and Head of Plant Biology at Illinois, will step into DeLucia's role at the \$115 million U.S. Department of Energy-funded Bioenergy Research Center.

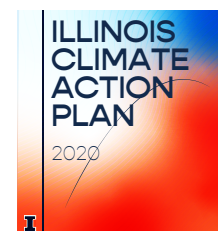
CABBI Sustainability Theme researcher Emily Heaton, who is moving from Iowa State University to the U of I Department of Crop Sciences in January 2021, replaces Leakey as the Feedstock Production Theme Leader and will work in both themes.

Heaton also will take the lead for iSEE and Crop Sciences on the rapidly developing IRAI ([read more on pages 2-3](#)) and will play a major part with iSEE's new Sustainable Agriculture scholars.

What's inside ...

**iSEE Offers 2021
Seed Funding for
Interdisciplinary,
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**New Grants
Total Nearly
\$7M for U of I
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iCAP is
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iSEE Offering Seed Funding Opportunities

- For the third straight fall, iSEE announced a call for proposals to support interdisciplinary research projects on topics related to sustainability, energy, and environment to promote new research collaborations or enhance existing collaborations among faculty and research scientists across campus that will improve their potential for attracting external support.

The proposal must involve at least two faculty-level researchers from different disciplines and departments and is limited to a maximum of \$30,000 for a year. Proposals must fit into at least one of iSEE's five research themes and will be judged on quality, innovation, interdisciplinarity, impact on the field, and the potential for attracting large external funding (grant proposals to run through iSEE's office), among other factors.

- iSEE also is continuing to seed-fund up to \$30,000 for proposals to its Campus as a Living Laboratory program, linking faculty-level researchers to sites or initiatives on campus that are relevant to objectives in the Illinois Climate Action Plan (iCAP).

[Read the full news release on both research calls.](#)

- The new Illinois Regenerative Agriculture Initiative (IRAI; [read more on page 3](#)) will offer funding opportunities to teams of researchers, farmers, and people in industry and/or nonprofits in the spring. Stay tuned!



In the Spotlight: Elena Blanc-Betes More than Grazes the Surface

One of the biggest struggles of forging a sustainable path to the future is making sense of the complexity of the problems we face. It's not enough to figure out how to produce enough food for 10 billion people — we must also rise to the challenge of producing that food in a changing and unstable climate. And the considerations don't end there. How can we produce this much food sustainably, taking into account carbon emissions and water conservation?

The intricacies of climate systems are enough to make anyone's head spin, but with a little computing power and patience, Elena Blanc-Betes, a Postdoctoral Researcher at the University of Illinois and Co-Investigator on iSEE's Multi-Paddock Grazing project, is using the predictive power of biogeochemical models to light the way.

For Blanc-Betes, it all started with curiosity. "Nature is like a big puzzle. Every piece of the puzzle exists in a very fine equilibrium with all the rest of the pieces. And when a piece goes out of place, the rest of the pieces need to rearrange to find that equilibrium again," she said.

That intrigue with the natural systems all around us led Blanc-Betes to the University of Barcelona, where she pursued a bachelor's degree in biological sciences and a master's degree in environmental engineering. While in Barcelona, she worked as a lab manager at the Institute of Marine Sciences and also as a research assistant in a forest ecology lab. Eager to dive deeper and answer her own research

questions, she traveled to the University of Illinois at Chicago, where she earned her Ph.D. in ecology and evolution.

Her Ph.D. research focused on how changes in precipitation will affect the vulnerability of this arctic carbon, and how the magnitude, timing, and form of carbon release may affect future climate trends.

Blanc-Betes researched these changes with a combination of empirical and *in silico* (computer modeling) approaches. Her biogeochemical models consist of countless algorithms that researchers fine-tune to approximate natural systems.

"Models are not magic — they're as accurate as the data you create them with, and as accurate as the algorithms that reproduce reality. So naturally, as we learn more about the system and gather more data, the models evolve alongside our understanding," she said.

With the satisfaction of completing her arctic climate study and her Ph.D., Blanc-Betes came to the University of Illinois Urbana-Champaign, where she now works in Evan H. DeLucia's laboratory and studies a variety of different natural and managed systems using biogeochemical models.

The Multi-Paddock Grazing project aims to investigate a new livestock grazing method's potential to reduce the emission of greenhouse gases, and improve soil carbon sequestration and water use efficiency, as opposed to business-as-usual continuous grazing.

[Read the full research profile.](#)

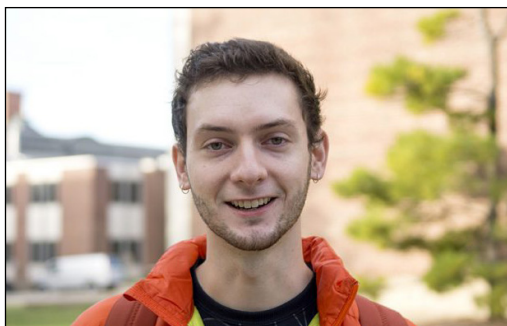
What's new in research (continued) ...

CABBI Researcher Profile: Dalton Stewart

On a small-town Pennsylvania farm, future CABBI scientist Dalton Stewart spent his Boy Scout days showing pigs at the county fair.

Well, not quite “Boy Scout” — Stewart’s formative years were devoted to an organization called 4-H. “Sort of like Boy Scouts, but with animals,” he said.

Now a CABBI Sustainability researcher, Stewart’s adolescent affinities for farms and fauna are a given. But his fascination with agricultural sustainability took on a new layer of nuance when he entered middle school and began learning about the pollution (e.g., chemical runoff, water contamination, and greenhouse gas emissions) associated



engineering. With a population nearly six times greater than his hometown, the Lewisburg campus is where his passion for sustainable policy-making really took off.

In Fall 2019, Stewart began his graduate studies at the University of Illinois Urbana-Champaign, where he is pursuing his M.S. in Environmental Engineering and working with Jeremy Guest, a fellow Bucknell alumnus. Currently, the Guest Lab is developing BioSTEAM (Biorefinery Simulation and Techno-Economic Analysis Modules), an open-source software to evaluate the environmental impact of biorefineries: facilities that convert agricultural feedstock into organic bioproducts like ethanol. Built in Python, the agile simulation tool helps scientists and other stakeholders analyze the economic and environmental impact of producing bioproducts.

Stewart’s contribution to the BioSTEAM team comes from the side of economic analysis. [Read the full research profile.](#)

with farming.

Stewart attended Bucknell University for his undergraduate studies in environmental

iSEE Critical Conversation Topic Leads to *The Conversation*

iSEE’s 2019 Critical Conversation on genetically modified mosquitoes resulted in a widely read op-ed piece in the online forum *The Conversation*.

“Genetically Modified Mosquitoes could be Released in Florida and Texas Beginning This Summer — Silver Bullet or Jumping the Gun?” reached more than 160,000 readers in the first week after publication.

The paper was written by Brian Allan, Associate Professor of Entomology at the University of Illinois at Urbana-Champaign; Chris Stone, Medical Entomologist and Director of

the Medical Entomology Lab at the Illinois Natural History Survey (INHS); Holly Tuten, Vector Ecologist at INHS; Jennifer Kuzma, Goodnight-NCGSK Foundation Distinguished Professor of Public and International Affairs and Co-Founder of the Genetic Engineering and Society Center at North Carolina State University; and Natalie Kofler, Levenick iSEE Resident Scholar in Sustainability Leadership at the University of Illinois and Founder of *Editing Nature*. Allan, Stone, and Tuten served as hosts of the 2019 iSEE Critical Conversation.

[Read more.](#)

New Grants!

Since spring, iSEE has helped bring several new grants to the University of Illinois campus. iSEE’s value add to the U of I campus in external research funding now totals more than \$149 million.

Some highlights include:

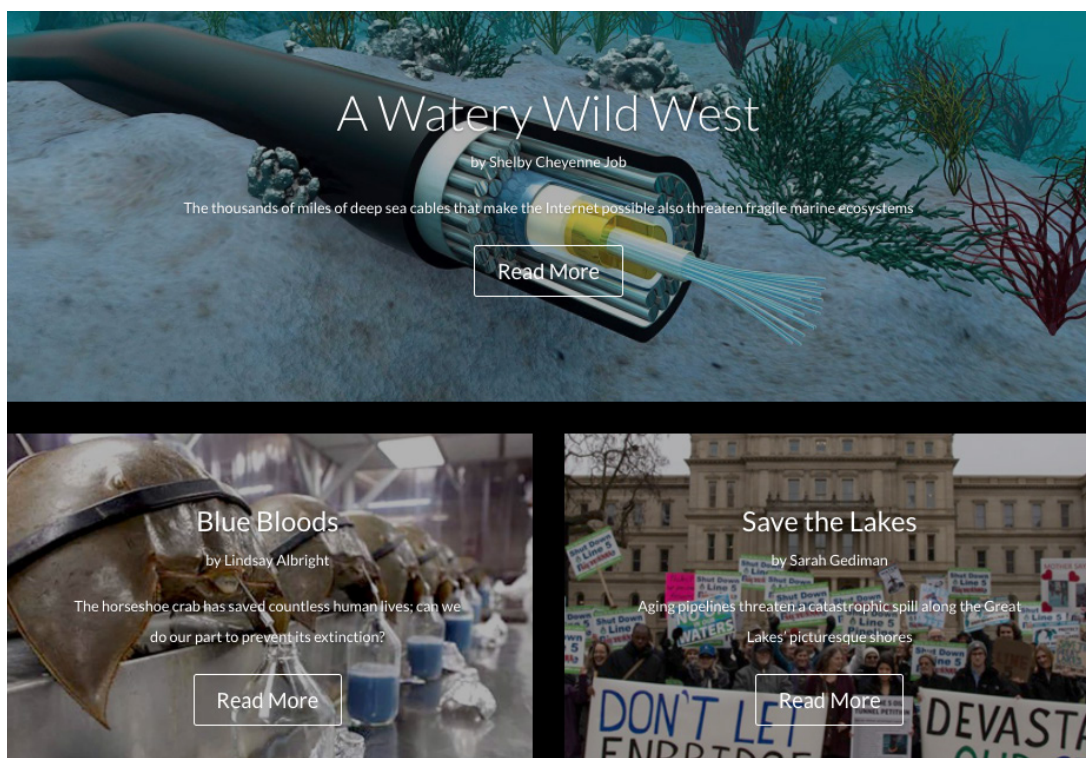
- A grant from Fresh Taste to launch the Illinois Regenerative Agriculture Initiative (IRAI), a partnership with the College of ACES, Department of Crop Sciences, the University of Illinois Extension, and iSEE. On Oct. 30, IRAI [hosted](#) a meeting to discuss priorities, future collaborations, and a forthcoming call for project proposals. [Read more.](#)

- A second grant totaling \$4.5 million for a U.S. Department of Energy ARPA-E SmartFarms project led by Kaiyu Guan to develop accurate and rapid field-level quantification of carbon intensity across the United States. Guan’s project was the only SmartFarms project to earn two rounds of funding. [Read more.](#)

- A \$1.4 million National Science Foundation subaward for U of I researchers to extract and produce plant-based compounds from feedstocks to be used to make inks. [Read more.](#)

- \$1.2 million from the U.S. Department of Agriculture for an iSEE team to create a dashboard for agricultural water and nutrient use. [Read more.](#)

What's new in education ...



Fall Lectures: 'Where Stuff Comes From'

To help further its educational mission in the midst of a global pandemic, iSEE has chosen to host a lecture series by Geology Professor Emeritus Stephen Marshak on society's use of an immense variety of materials — and their environmental implications.

Marshak's research in structural geology and tectonics, and his interest in geologic photography, have taken him to all seven continents. The former Director of the School of Earth, Society, and Environment discusses how these materials came into existence, how they are extracted and transformed for human use, and the sustainability issues involved.

A rundown of the noon Tuesday Zoom webinars, hosted by iSEE Associate Director for Education & Outreach Gillen Wood:

- Sept. 29: "Building Stuff — Materials from the Earth that Sustain our Built Environment: From Ancient Coral to City Sidewalks."

- Oct. 27: "Precious Stuff — The Discovery, Extraction, and Use of Valuable Minerals: From Gems to Smartphones."

- And upcoming on Nov. 17: "Burning Stuff — Fossil Fuels: Consuming the Life of the Past to Power Life of the Present."



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Q Magazine 3.1 Online; Volume 2 also in Print

Volume 3, Issue 1 of *Q Magazine* — a collection of diverse, investigative pieces written by current students and recent grads of iSEE's undergraduate Certificate in Environmental Writing (CEW) program — was officially published online in October.

In the newest issue, student authors explore hot-button issues — technology, medicine, energy — through the prism of water. In "What Lurks Beneath," you will learn about a 450-million-year-old horseshoe crab that is essential to human vaccines; fiberoptic cables that transmit big data under the sea, endangering sharks and other ocean life; and a decrepit oil pipeline in the Great Lakes that threatens the largest freshwater ecosystem on the planet.

This issue also features a pair of op-eds on nuclear fusion and graphene, two potential answers to our search for cleaner energy. You can read an essay on Italy's eco-friendly slow-food movement or a Q&A with climate expert Katharine Hayhoe, who wants all of us to talk about climate change.

In September, the second print volume of *Q*

16 Entries for Writing Contest

Q editors received an impressive 16 manuscripts in fall 2020 as entries for the Janelle Joseph Award for Environmental Writing.

Sponsored by another generous donation from Joseph, iSEE will award the grand prize winner \$1,000; other students will receive \$500 apiece for the best op-ed, Q&A, memoir, feature, and graduate student article.

The top undergraduate entries — including some that were not awarded prizes — are expected to appear in the spring and fall issues of *Q* in 2021; the announcement of prize winners is coming in November.

was published — on 100% recycled content paper. That volume highlights student works from the fall 2019 and spring 2020 online issues.

[Visit the magazine website.](#)



What's new in campus sustainability ...

iCAP 2020: It's Here!!

On Oct. 20, as part of Campus Sustainability Month, more than 150 campus community members gathered to celebrate the University of Illinois Urbana-Champaign's achievements during the past year — and to move ahead toward greater achievements with the official signing of the Illinois Climate Action Plan (iCAP) 2020. [Read about iCAP 2020.](#)

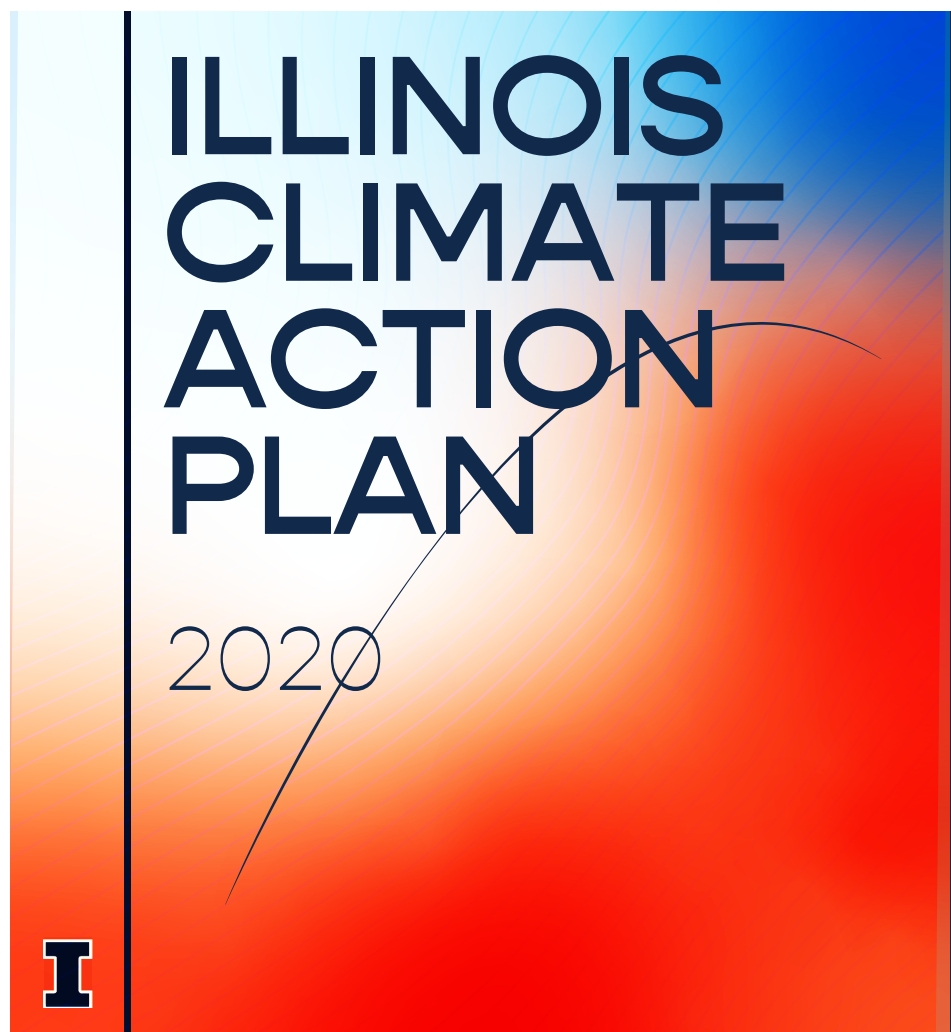
Chancellor Robert J. Jones highlighted the event by officially approving the document, written through teamwork between Facilities & Services (F&S) and the Institute for Sustainability, Energy, and Environment (iSEE) with input from countless students, faculty, staff, and community members.

The Chancellor called iCAP 2020 “bold and ambitious. ... not just a map for a more environmental and sustainable university, I believe that it is a guide to make sure we are more resilient, adaptable, and more sustainable in every single phase of our mission for decades to come.”

iCAP 2020 commits the campus to divest from fossil fuels, switch to clean energy sources, cut landfill waste, and pursue environmental justice. Campus and community members spent more than a year developing 56 objectives in eight key themes — Energy, Transportation, Land & Water, Zero Waste, Education, Engagement, Resilience, and Implementation.

Hosted by iSEE's Interim Director Madhu Khanna and Associate Director for Campus Sustainability Ximing Cai, the event also included:

- discussion of campus sustainability progress and goals by leaders from the Illinois Student Government and Student Sustainability Committee;
- presentation of new Certified Green



Offices by iSEE's Meredith Moore;

- an overview of the energy savings partnerships and the International Laboratory Freezer Challenge winners by F&S Executive Director Mohamed Attalla;
- presentation of the Energy Conserva-

tion Incentive Program winners by F&S's Rob Roman; and

- Sustainability Working Advisory Team (SWATeam) overviews of some iCAP 2020 objectives from student SWATeam members.

Other Sustainability Month News ...

- iSEE helped produce a new interactive sustainability training video to accompany the annual fall ethics training on campus. All campus members were encouraged to interact with “[Sustainability at Illinois: Your Actions Matter.](#)” More than 900 did so!
- The iSEE [Sustainability Month Waste Challenge](#)



encouraged waste production curbing and better purchasing decisions. About 100 people participated.

- The Department of Chemistry Administrative Office and the Department of Communication were named new [Certified Green Offices](#).
- iSEE kicked off the [Certified Green Chapter Program](#).

Campus Earns New Accolades

In addition to recertification during the past year as a Bee Campus USA and Tree Campus USA as well as a Silver Bike Friendly Campus ...

- The U of I won a new designation as a “hat trick” award winner of the International Laboratory Freezer Challenge for repeating as the top school in the Academia category for the third straight year. Kudos to all — especially Carl R. Woese Institute for Genomic Biology and Center for Advanced Bioenergy and Bioproducts Innovation Lab Manager Lucienne Burrus for her role in helping to earn the award.

- Illinois was No. 48 — and second in the Big Ten Conference — out of 312 institutions in Sierra Club Magazine’s “Cool Schools” contest.

[Read more about campus recognitions.](#)



Rooted in Campus History

A row of Austrian pines borders the construction site for the new Siebel Center for Design, their weathered branches softening the modern lines of the stone and glass building.

These century-old trees have been carefully preserved through the 18-month construction project that is set to wrap up this fall. They are remnants of a wind break that protected a vast experimental orchard planted there in the late 19th century by botanist Thomas Jonathan Bur-

rill, a pioneer in plant pathology and the third University of Illinois president (1891-1894).

“As the protector of campus open space, I did not want to see them take down historic trees,” University Landscape Architect Brent Lewis said. “Just as the coronavirus is actively reminding us, our open spaces are just as valuable as our building spaces.”

[Read the full article on the preservation efforts.](#)

Clean Energy Applications — and Research — Major Topics for Fall 2020

In Fall 2020, four solutions — or possible solutions — for Illinois Climate Action Plan clean energy goals were in the news:

- **SOLAR:** In August, Solar Farm 2.0 construction began. This second farm will give the Illinois campus 75 acres of solar production. Additionally, at the urging of iSEE and the Sustainability Council chaired by Chancellor Robert J. Jones, Facilities & Services (F&S) is exploring a purchase from a nearby solar farm that would help campus reach 33% of its total power demand from clean sources.

- **NUCLEAR:** On Sept. 10, iSEE and Interim Director Madhu Khanna hosted a public webinar to discuss campus needs for low-carbon energy sources — and how a proposed micro-reactor could fit into campus carbon neutrality goals. Experts from the Department of Nuclear, Plasma, and Radiological Engineering outlined some of the first steps taken in a multi-partner U.S. Department of Energy proposal to bring a research reactor to campus and

the technology, materials, fuel, and safety measures that it would involve. F&S Executive Director Mohamed Attalla outlined campus energy needs and emission reduction targets. Faculty and students discussed the research, educational, and sustainability aspects of a micro-reactor. The second half was devoted to audience questions.

- **GEOTHERMAL:** On Nov. 5, iSEE co-hosted an event with the Illinois Geothermal Coalition, F&S, and the Illinois Water Resources Center on low-temperature geothermal exploration as a source for heating and cooling systems. The event explored new partnerships and potential funding opportunities for research and application on the U of I campus and beyond.

- **HYDROGEN:** On Nov. 12, iSEE will participate in The Midwestern Hydrogen Partnership Virtual Workshop to explore the possibilities of hydrogen as a clean energy source. The partnership is between the Grainger College of Engineering, Argonne National Laboratory, and regional industrial partners.