



IQ - ISEE Quarterly

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

What's new at the Institute ...

New Hires Bolster iSEE's Mission

iSEE is pleased to announce three additions this past summer:

Natalie Kofler

Kofler, Founder and Director of *Editing Nature*, joined the University of Illinois at Urbana-Champaign's Institute for Sustainability, Energy, and Environment (iSEE) as its first Stuart L. and Nancy J. Levenick Resident Scholar in Sustainability Leadership.

Kofler, a molecular biologist and bioethicist, has authored numerous scientific research articles, reviews, and commentary

pieces, and chaired international seminars and summits.

Lecture on Nov. 7

Kofler will deliver a Center for Advanced Studies (CAS) MillerComm Lecture titled "Editing Nature: Governance Hurdles and Ethical Holes in Genetic Engineering" at 5 p.m. Nov. 7 in Spurlock Museum's Knight Auditorium.

[Read more.](#)



KOFLER

She is passionate about ensuring diverse voices and viewpoints steer science and technology.

"At *Editing Nature*, we think a lot about how to tap into collective wisdom to steer responsible technological development," Kofler said. "I am so excited to learn from and collaborate with the faculty and students at U of I. Together, I think we can come up with some really innovative ways to integrate cross-disciplinary and cross-cultural perspectives and address some of our most pressing environmental challenges."

[Read the full announcement.](#)



MOORE

Meredith Moore

Moore is iSEE's Sustainability Programs Coordinator. She will oversee many different projects on campus.

"I will be overseeing and helping to coordinate the Working Advisory Teams, and helping to craft the 2020 Illinois Climate Action Plan (iCAP)," Moore said. "I am also excited to expand the Greener Campus programs and certifications while developing new ways that Illinois can become more sustainable."

Whether the changes are large or small, short-term or long-term, Moore hopes to do what it takes to make people more environmentally conscious.

[Read her profile.](#)



KURTZWEIL

Jenna Kurtzweil

As iSEE's new Communications Specialist, Kurtzweil works with the Communications team to reach campus about iSEE through written content, social media campaigns and the weekly newsletter.

"After a year as a Writing Intern here, I felt drawn to keep pursuing science writing and communication. I was excited for the opportunity to continue working for iSEE, and to sharpen that focus specifically into environmental communication," she said.

[Read her profile.](#)

What's inside ...

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Solar Farm 2.0 Approved; 75 Acres of PV! — Page 6



In the Spotlight: A4F's Ian Goller

"I'm kind of like an accountant, except instead of accounting for money, I'm accounting for carbon emissions."

That's how Ian Goller explains his work with the Agroforestry for Food (A4F) team at the University of Illinois at Urbana-Champaign.

Before coming to the U of I, Goller completed his B.S. in Anthropology at the University of Chicago with a minor in Physics. He still hadn't figured out exactly what he wanted to do with his career. But he was ready to try just about anything — working as a tutor, creating his own nonprofit, and practicing as a better-than-average hand-stander with experience in aerial silks.

While testing out a variety of different fields, Goller ended up at The Plant, a collaborative community of food businesses based in Chicago. His main gig was to test if the company could reuse waste products from their coffee roaster and brewery to create energy to run the bakery.

"You have to use so much energy to get the water out of it, it becomes obsolete," he said.

But this entry into Life Cycle Assessment

(LCA) is what eventually brought Goller to the U of I campus to pursue his M.S. in Environmental Engineering. LCA is not typically used for agriculture.

"It is most typically used for consumer products," he said. "The most quintessential LCA problem is, is it better to make soda bottles out of glass or plastic?"

The cycle starts at the production chain. First, break the object or situation down to the raw materials being used and how those materials are processed. Eventually, track what material is actually being introduced into the market.

Goller is taking this process and applying it to agricultural systems within the A4F project, which is investigating alternative options for agriculture in the Midwest. The work is conducted on 30 acres at the Illinois Energy Farm.

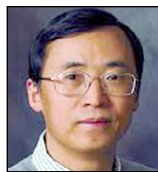
"I separated (the seven crop mixtures, called treatments) a little further, into 10 different scenarios, which I'm now analyzing," Goller said. "I'm basically taking the agricultural scenarios that they have going on down there at the farm, and modeling all of them in Python."

[Read the full research profile.](#)

Institute's Associate Director Earns Recognition

In August, Ximing Cai, iSEE's Associate Director for Campus Sustainability, was named a 2019 Fellow of the American Geophysical Union (AGU). Cai will be honored along with 61 other 2019 AGU Fellows at its Fall Meeting on Dec. 11 in San Francisco.

Cai's prolific research profile as a Professor of Civil & Environmental Engineer-



CAI

ing includes coupled human-natural system analysis with an emphasis on human interferences in hydrological processes, water-energy-food system modeling especially in dry areas, and sustainable water resources management particularly in developing countries.

[View the full story.](#)

iSEE Announces Seed Funding Call for Proposals

In mid-October, iSEE requested 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 goal of this funding is to enable the development of exploratory research ideas that involve multiple disciplines and departments in any of the five thematic areas of interest to iSEE; collect preliminary data or other information to develop a research project; and prepare and submit research proposals for external funding.

The proposal must involve at least two applicants from different disciplines and different departments and is limited to a maximum of \$30,000 for a year.

Successful applicants will be expected to submit at least one proposal through iSEE to a competitive external source for funding in 2020 and to work with iSEE to communicate the findings of their research through the Institute's website in addition to submitting an annual report to iSEE.

Proposals are invited from tenured/tenure-track faculty and research scientists. Post-docs are not eligible to apply.

[Get further information and specific requirements in the full news release.](#)

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

iSEE Researchers Earn Grant, Get Published

In August, an iSEE seed-funded team at the University of Illinois at Urbana-Champaign was awarded a \$1 million grant from the Bill & Melinda Gates Foundation to evaluate the economic and environmental impact of sanitation systems under development and to prioritize research to increase global access to sanitation.

Led by Civil & Environmental Engineering Assistant Professors Jeremy Guest and Roland Cusick, both Illinois Water Scholars, the grant will allow researchers to model and assess several different designs of novel, "reinvented" toilets as well as modular treatment systems called Omni-Processors (OPs).

[Full news release.](#)

One month earlier, Guest's original seed-funded team including Natural Resources & Environmental Sciences Assistant Professor Daniel Miller published a paper titled "Resource Recovery from Sanitation to Enhance Ecosystem Services" in *Nature Sus-*



tainability. [Read more about the original seed-funded project.](#)

Other Recent Papers

- On Sept. 23, iSEE Directors and Affiliates led by Associate Director Madhu Khanna published a commentary piece titled "Harnessing Emerging Technologies to Mitigate the Hypoxia Challenge" in *Nature Sustainability*. The paper was produced as a result of the iSEE Critical

Conversation 2018: The Nitrogen Reduction Challenge, a collaborative forum that united scientists and scholars to generate innovative solutions. [Full news release.](#)

- In June, a team led by iSEE Director Evan H. DeLucia published "Are We Approaching a Water Ceiling to Maize Yields in the United States?" in *Ecosphere*. [Full news release.](#)

- In August, iSEE Associate Director Gillen D'Arcy Wood published "Climate Delusion: Hurricane Sandy, Sea Level Rise, and 1840s Catastrophism" in *Humanities*. [Full article.](#)

CABBI Researcher Profile: Ming-Hsun Cheng

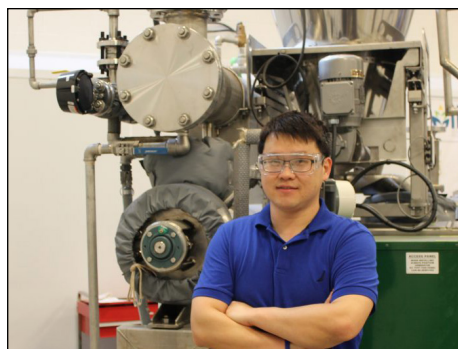
It's not often that volleyball, paper-making, and pilot-scale biomass plants are mentioned in the same sentence. But for CABBI Conversion Postdoc Ming-Hsun Cheng, all of the above are integral to his identity as a researcher, risk-taker, athlete, and scientist.

When Cheng began his undergrad in Forest Products Science at Taiwan's National Chiayi University, he was faced with a decision that set the scene for his career: Did he prefer forestry's craft-based component or the discipline's science-centric side?

Based on Cheng's current station in the Department of Agricultural and Biological Engineering at the University of Illinois, it's no surprise that the latter won out.

Despite opting for chemistry over craft, Cheng did take courses in paper-making and wood-pulping throughout his time as an undergrad, completing several internships to refine his craftsmanship capabilities.

In Fall 2017, Cheng began his current position in the Department of Agricultural and Biological Engineering at Illinois, where he works with CABBI's Conversion team to optimize bioenergy sorghum for valuable chemical production. Cheng describes his role in CABBI Deputy Director Vijay Singh's lab as "intermediate."



His team acts as the catalyst that converts fresh-from-the-field biomass into intermediate products — sugars — which are transformed into end products farther down the line.

After sorghum is harvested, dried, and ground, Cheng facilitates a process called "hydrothermal pretreatment." This entails loading raw biomass into a reactor and "treating" it with hot steam, opening up the sorghum's structure and separating useful components from the not-so-useful. Interestingly, the biomass deconstruction process closely resembles the paper-making methods Cheng picked up during his time as an undergrad.

"After that, we collect the pretreated biomass and do the mechanical refining process," he said. "My role is to produce

Quick CABBI updates

More from CABBI:

- Since spring, the Center has [published 20 papers](#) in scholarly journals.



- More than 230 CABBI scientists met in June in Champaign for the CABBI Annual Science Retreat. A highlight was the "Bioenergy 101" series of talks; videos are available on the CABBI website.

- CABBI and the Integrated Bioprocessing Research Laboratory (IBRL) at Illinois hosted a Technology Showcase and Open House in early October, featuring researchers, industry representatives, and government officials. DSM officially became the first industrial affiliate for CABBI and IBRL, presenting a \$10,000 check.

the hydrolysate and provide it for other CABBI groups to use, for the further production of chemical products like fatty acids and biofuels."

[Full research profile.](#)

What's new in education ...



Q Mag Published in Print, Online

In September, the third issue of *Q Magazine* went live online.

Q is the nation's only entirely student-written, professionally curated environmental publication, and is a product of the Certificate in Environmental Writing (CEW) offered jointly through iSEE, the School for Earth, Society & Environment (SESE), and the English Department.

Volume 2, Issue 1 — “Born to be Wild” — features the research and writing talents of students Amber Volmer, April Wendling, Haley Ware, Zack Fishman, Nidhi Shastri, and Fall 2019 *Q* Student Editor Jenna Kurtzweil, and it explores the impacts of human-caused climate conditions and environmental tragedies in nature.

Each original essay tackles in its own way the tough-to-answer question: What does it mean for us to “win,” ecologically?

Volume 2, Issue 2 promises to be river-centric, and plans are well underway with new Student Editor April Wendling.

[Read the latest issue of *Q* — and brace yourself for a jarring journey into the wild.](#)

Before the fall publication, in Summer 2019, *Q*'s first two issues were combined for the Volume 1 print edition.

Fifteen articles, written by 13 different student authors enrolled in ENGL/ESE 360, 477, and 498 (the capstone course for the CEW) were chosen for publication, and 2018 graduate Katie Watson, a former iSEE Communications Intern, served as the Student Editor.

The CEW now features a dozen graduates.

Donor's Gift Lets *Q* Commission Research Trips for New Articles

A generous \$5,000 gift this year from Janelle Joseph allowed *Q Magazine* staff writers to go on assignment for articles that will appear in the Spring 2020 issue:

- Taylor Jennings and Jenna Kurtzweil's eight-day journey this summer began at the Gila River's headwaters in New Mexico's Gila National Forest and wrapped up in western Arizona. The duo visited historic sites and conducted interviews with experts, advocates, and scientists to learn more about water management in the region.

- In October, April Wendling adventured along the Columbia River in Washington. On her travels, she toured the Hanford Site, a decommissioned nuclear production complex. The site's nine reactors produced plutonium during World War II and the Cold War. Wendling also explored the Hanford Reach, a nearby wildlife preserve. This area is a haven for many species, featuring a variety of habitat types, including the Columbia River itself and the surrounding arid shrub-steppe grasslands and mountains.



2019 iSEE Events Draw Crowds

Wrapping up several public events during the past six months:

- In May at the University Club in Chicago, iSEE hosted its second Critical Conversation, discussing the scientific, ethical, and legal challenges associated with genetically modified mosquitoes used for disease control. May Berenbaum, noted Professor of Entomology, kicked off the discussion with a keynote (photo above). Organizers are developing a scientific policy paper as well as an opinion piece. [More on the event.](#)

- CABBI hosted its annual scientific retreat in June and co-hosted a Technology Showcase and Open House at the Integrated Bioprocessing Research Laboratory in October (*read more on Page 3*).

- In September, more than 400 people attended iSEE's sixth annual Congress titled "Sustainability Justice." The event featured researchers, educators, journalists, and activists on panels and roundtable discussions as well as keynotes from Kimberly Wasserman, Executive Director of the Little Village Environmental Justice Organization in Chicago (photo above right), and John Knox, former Special Rapporteur to the United Nations on Human Rights and the Environment.

- In October, iSEE spearheaded Sustainability Week on campus, with several events daily. The week was highlighted by the annual Campus Sustainability Celebration, at which individual and campus accomplishments were recognized (photo below right) — and iSEE began soliciting recommendations from the community for 2020 Illinois Climate Action Plan (iCAP) objectives.



What's new in campus sustainability ...

Campus Earns More Accolades

The University of Illinois at Urbana-Champaign has been recognized with the following achievements in recent months, in addition to recertification as a Tree Campus USA and as a Bee Campus USA:

- Illinois was No. 20 out of 282 four-year higher education institutions in Sierra Club Magazine's "Cool Schools" contest in 2019.



The U of I ranked tops in the Big Ten Conference (Michigan State University had the second-best ranking at 66th).

- The University of Illinois at Urbana-Champaign won first place in the 2019 International Laboratory Freezer Challenge, repeating as the top school in the Academia category for the second straight year. In 2019, 70 labs from 15 buildings participated in the program.

- In October 2019, the University of Illinois at Urbana-Champaign earned its first Silver designation as a Bicycle Friendly University (BFU) from the League of American Bicyclists. The U of I, which has maintained bronze-level BFU certification since 2011 and is one of 208 colleges and universities recognized nationally, is now one of 94 with Silver level or better status.

[Stay up to date on campus sustainability recognitions.](#)

Solar Farm 2.0 a Major Renewable Boost

In Fall 2019, the University of Illinois Board of Trustees approved construction of Solar Farm 2.0 — an expansion of more than 50 acres of solar panels.

Facilities & Services (F&S) and Prairie-land Energy Inc. intend to increase campus on-site renewable energy generation to 25,000 megawatt-hours — meeting an objective in the Illinois Climate Action Plan (iCAP).

Construction is expected to begin soon. When added to the 21-acre original Solar

Farm that began operations in December 2015, the completed array will give the University about 75 acres devoted to solar — making the campus “the third-largest user of on-site renewables for higher education facilities in the United States,” F&S Executive Director Mohamed Attalla said.

Solar Farm 2.0 will include habitat for pollinators under the solar panels, and iSEE researchers intend to use the farm as a “living laboratory” for agrivoltaics (in which crop production and energy generation coexist).



Geothermal Exploration: What's New on our Campus

During the Fall 2019 semester, iSEE Communications Specialist Jenna Kurtzweil is publishing a three-part series on geothermal energy and its potential as a renewable energy source at the University of Illinois at Urbana-Champaign.

In Part 1, iSEE explores the science of geothermal and its relationship with the University. Part 2 takes a deeper dive into the geothermal research conducted at Illinois, and Part 3 will focus on areas of campus using or planning to use the renewable energy.

Kurtzweil's introduction:

"Innovative research at the University of Illinois is exploring a clean energy source hidden

right under our noses — and feet.

"Geothermal energy, the subterranean space heater responsible for hot springs, geysers, and volcanoes, has been a subject of public fascination, recreation, and research for thousands of years. Now, as society begins to depart from its dependence on fossil fuels, geothermal emerges as an important renewable energy resource."

"Whether you're an accomplished researcher, aspiring scientist, or renewable energy advocate, acquiring a working knowledge of geothermal energy begins with a single question: What exactly is going on underground?"

[Read the first installment.](#)



Newly Realigned SWATeams Begin 2020 iCAP Writing Process

In preparation for writing the 2020 Illinois Climate Action Plan (iCAP), iSEE along with Facilities & Services and other campus entities have made some slight changes to the teams of students, faculty, and staff working toward iCAP goals.

Campus sustainability leadership will remain the same with the Sustainability Council (the Chancellor and upper-level campus leaders) and the iCAP Working Group (midlevel campus managers). But to better incorporate climate resilience and educational components, iSEE transformed its Sustainability Working Advisory Teams (SWATeams) of 2014-19 into six new, and larger, teams.

The new groups, which will include three to four faculty, three to four staff members, and three to four students, are:

- Energy (incorporating generation, purchasing, distribution, conservation, and more);
- Land & Water (incorporating agriculture, land use, sequestration, water, stormwater, and more);
- Zero Waste (incorporating purchasing, waste, recycling, food, and more);
- Transportation (largely unchanged — seeking sustainable, healthy, low-emissions options on and off campus);
- *NEW* — Education (seeking to complement the disciplinary educational goals of campus with opportunities for interdisciplinary learning, research, and independent study on sustainability, energy, and the environment); and
- *NEW* — Resilience (bringing campus and the greater community together to address what must be done to prepare for vulnerabilities to extreme weather and other results of climate change).



Public input solicited

In Fall 2019, iSEE and the SWATeams started the 2020 iCAP writing process, in which each team will put together five-year and longer-term goals and objectives for campus to reach as it pursues carbon neutrality by 2050 or sooner. Teams will also suggest potential strategies on how campus might reach these new targets.

The official iCAP kickoff was in October at the Campus Sustainability Celebration, during which students, faculty, staff, and the community were invited to offer suggestions for objectives and strategies.

iSEE will continue to offer regular public forums to invite more input from campus and beyond, and it also has made available an online form for easy submissions.

[Find out more and fill out the form on our website.](#)



What's new with the Student Sustainability Committee ...

SSC Funds 4 Student-Led Small Grants

The Student Sustainability Committee received 46 grant proposals totaling \$2.3 million during its fall funding request cycle. Members are working toward decisions on those applications.

In the meantime, four small (\$10,000 or less) student-led grants were already approved:

• **Fermentation Club:** This group focuses on making fermented products such as kombucha, cheese, hot sauce and sauerkraut at home, helping minimize waste from packaging and shipping, as well as creating a sustainable source of these products. Students will develop and teach new members how to make these products in the Food Science & Human Nutrition (FSHN) Pilot Plant. By getting members excited about sustainability and home cooking, the Fermentation Club will reduce emissions from food transportation and help make a better planet.

• **Illini Box:** This project aims to solve the issue of the unsustainable process of using single-use bowls, lids, and to-go containers. This is needed, as many students want to eat their food in a different location than the dining hall. Dining halls such as Orange on Green use single-use containers for to-go meals, generating unneeded waste that eventually ends up in a landfill since it cannot be recycled as it



contains food waste.

• **Restoration of the Low-Mow Area at Orchard Downs Housing Facility:** The goal of this project is to successfully restore the low-mow site at Orchard Downs to prairie garden that has more function and biodiversity. This project will incorporate at least 25 native plant species, create habitat for wildlife and pollinators, and increase biodiversity overall. Other goals of this project are to give students

hands-on experience and restoration skills. Additionally, it will be important to educate students and the community about Native American Culture through the land acknowledgement.

• **Illinois Space Society Hybrid Rocket Engine:** This project focuses on designing, building, and testing an environmentally friendly, reusable rocket on a hybrid engine. Advancements in green technology are being made in the aerospace industry, including new materials and different propulsion methods critical to the growing rocket industry. Commercial companies have begun to develop greener processes by designing reusable vehicles as well as implementing environmentally friendly materials and fuels. New propulsion technologies have been introduced that lower the environmental impact while retaining the technology's key capabilities. Hybrid engines are one of these technologies that are starting to be utilized in the industry as a greater amount of research is being done on them. With the uptick in companies developing new rockets and new space exploration technologies, making these kinds of engines known can help ensure that rocket technology is cleaner and more sustainable in the future.

[Stay tuned for SSC's funding decisions on the web.](#)

New Coordinator to Support Student Groups, Initiatives

In Summer 2019, the Student Sustainability Committee (SSC) hired Eric Green as its new Coordinator.

Green will identify and support sustainability projects around campus. Once the student Committee members make decisions about funding projects from the nearly \$1.2 million annual budget collected through student fees, Green is responsible for administering those funds. He also will do marketing on the projects and engage students in these new initiatives. Working closely with iSEE, he will support other student-led groups and campus sustainability programs as well.

He hopes to see unique and experimental projects come from the applications sent to SSC.



"Before iSEE was even founded, I had a friend who was the chair of the SSC," Green said. "I loved that students had a say in how their campus was shaped with regards to sustainable changes. Through my experience as a project manager and as an educator, I knew that I wanted to continue to support the students in their efforts. The opportunity to work with students and support sustainable efforts is a blessing."

Green obtained degrees from the University of Illinois at Urbana-Champaign, with his B.S. in Electrical Engineering and his M.S. in Natural Resources and Environmental Sciences. He wrote his thesis on energy economics and how carbon dioxide policy could influence demand for electricity.

[Read the full profile.](#)