

iSEE Quarterly (iQ)

AN UPDATE FROM THE INSTITUTE FOR SUSTAINABILITY, ENERGY, AND ENVIRONMENT (iSEE)

Spring 2021

What's new at the Institute ...

iSEE Brings in Activist, Energy Expert for 2021 Levenick Scholar Residencies

In February iSEE announced that it would bring two renowned scholars to the University of Illinois Urbana-Champaign campus in Spring 2021.

Environmental activist and MacArthur "genius" grant recipient Catherine Coleman Flowers and nuclear engineering and nuclear policy expert Denia Djokić were named Stuart L. and Nancy J. Levenick Resident Scholars in Sustainability Leadership for 2021.



FLOWERS

"Catherine and Denia are speaking to issues that range from environmental justice for rural and disadvantaged communities to global nuclear energy policy," said Jeffrey Brawn, the Levenick Professor of Sustainability who runs the program through iSEE and the Department of Natural Resources and Environmental Sciences (NRES). "These issues align seamlessly with the mission of our land grant university, and both scholars will engage a wide spectrum of disciplines within our campus. Despite the necessity of virtual residencies, I am con-

fident that Catherine and Denia will have significant impact on our community."

Flowers is the founder of the Center for Rural Enterprise and Environmental Justice (CREEJ) and a Senior Fellow for Environmental Justice & Civic Engagement at the Center for Earth Ethics at Union Theological Seminary. A researcher, activist, and writer who brings attention to the largely invisible problem of inadequate waste and water sanitation infrastructure in U.S. rural communities, she was selected as a MacArthur Fellow in 2020. Her first book, *Waste: One Woman's Fight Against America's Dirty Secret*, explores the environmental justice movement in rural America and highlights her journey as an activist.

Among her iSEE responsibilities, Flowers hosted a Book Talk in April as one of four events at iSEE's reimagined virtual Congress, "The Future of Water" (*read more, page 5*).

Djokić is a Researcher in Energy, Equity, and Society at the Nuclear Engineering and Radiological Sciences Department at the University of Michigan, as well as an Associate at the Project on Managing the

Atom at the Harvard Kennedy School's Belfer Center for Science and International Affairs. Her research interests lie broadly in social and environmental justice aspects of the governance of nuclear energy technology.

As a Resident Scholar, Djokić helped organize the iSEE Critical Conversation in May involving key stakeholders in examining the role of nuclear technology in a clean energy future, and she will collaborate on publications based on



DJOKIĆ

the discussion.

The Levenick Resident Scholars in Sustainability Leadership Program was funded by a generous endowment to iSEE and NRES in early 2019 from U of I Alumnus Stuart Levenick and wife Nancy Levenick of Naples, Fla. It was created to bring in experts in a variety of fields and disciplines from other universities, the private sector, and nonprofit organizations to share fresh perspectives and innovations with the Illinois community.

[Full announcement on our website.](#)

What's inside ...

**Get to know
iSEE Researcher
Shion Watabe**

— Page 2



**Award
Winners
Highlight Q**

— Page 4

**Greener Campus
Certifications
on the Rise**

— Page 6

Climate/Energy, Plant Modeling Experts Offer Virtual Keynotes

In addition to several events during Earth Month, including iSEE Congress (*read more about both on page 5*), the Institute planned two research-related events with public keynotes in the first half of 2021:

- **On May 5-7**, iSEE hosted its third Critical Conversation, sponsored by the Baum Family Fund. This event, a facilitated and unattributed discussion of the role of nuclear power in a clean energy future, was kicked off with a May 5 public keynote from James Hansen, Director of Columbia University's Climate Science, Awareness, and Solutions Program, titled "Global Climate Change: Implications for National and Global Energy Policies." Hansen is best known for his testimony on climate change to congressional committees in the 1980s that helped raise broad awareness of the global warming issue.



HANSEN

[Read more about Hansen and the Critical Conversation.](#)

- **Coming June 8-10**: The Crops *in silico* Project team is hosting its fifth symposium online, highlighted by a public keynote from Michael Pound, Nottingham Research Fellow in Computer



POUND

Vision, University of Nottingham, UK. The title of Pound's talk: "Data-Hungry Models: Deep Learning of Phenotypes in Crop Plants." [Read more.](#)

In the Spotlight: Clear Waters Ahead with Shion Watabe

Reliable drinking water, grid electricity, and sewer connections are not a given; more than 4 billion people across the globe lack safely managed sanitation. Increasing access to sustainable sanitation systems in both resource-limited and technologically advanced communities is daunting, but it's a challenge that the Guest Lab Group at the University of Illinois has risen to meet. Among them, Shion Watabe, a master's student in environmental engineering, is committed to making a positive impact.

Watabe grew up in rural Australia. She came to America to pursue education and athletics, earning her bachelor's in civil engineering and competing as a Division I tennis player at the University of Idaho. In her junior and senior years, she took an interest in environmental engineering classes, and her senior thesis focused on making different aspects of civil engineering, like buildings and infrastructure, more sustainable.

During her undergraduate studies, Watabe joined a civil engineering lab to study the kinetics of wastewater treatment, going on to complete an internship in consulting for environmental engineering. This job had her working out in the field with local municipalities near the University of Idaho, many of whom possessed outdated and over-capacitated wastewater treatment systems in need of innovative updates and redesign.

"It was really fascinating, but I discovered through my internship that (wastewater treatment) wasn't what I was most passionate about. I was motivated to explore opportunities that looked beyond meeting what is required today, and pursue novel and innovative approaches to sanitation issues we will face into the future. This pushed me to go into studying for my master's and going into research," Watabe said.

In 2020, she came to work for Jeremy Guest, Associate Professor of Civil and Environmental Engineering at the University of Illinois Urbana-Champaign while pursuing a master's in environmental engineering.

The overall goal of the Guest Research Group is to contribute to sustainable sanitation infrastructure and its ease of access, particularly in low-income communities. Most of these underserved populations are



limited in their access to safe drinking water, grid electricity, and sewer connections. Worldwide, the lack of proper sanitation costs an estimated \$223 billion per year.

"There is a strong need for appropriate sanitation technologies to improve environmental and human health, especially in resource-limited settings where low sanitation access is coupled with economic poverty and scarce employment opportunities," said Guest, the Lead of iSEE's seed-funded [Sanitation Technology Project](#) — and who also serves as iSEE's Acting Associate Director for Research.

[Read the full profile.](#)

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

CABBI Research Profile: Nam Kyu Kang

Bridges the Feedstock-Conversion Gap

The overarching goal of the Center for Advanced Bioenergy and Bioproducts Innovation (CABBI) is to reduce the nation's dependence on fossil fuels by increasing the value of energy crops. CABBI uses a "plants as factories" approach to grow fuels in plant stems, derive valuable chemicals from plant matter, and ensure economic and environmental sustainability throughout the operations cycle.

Typically, researchers from CABBI's themes collaborate in sequence to achieve this goal. For example, Feedstock Production researchers engineer plants to synthesize high-value molecules; Conversion Theme researchers then use engineered yeasts to develop those molecules into diverse, marketable end products like lubricants and organic acids.

More from CABBI

- The Center's Communications team has compiled a new webpage titled "CABBI ABCs: A Guide to Our Scientific Terms." This page defines for the non-scientist some of our most commonly used terminology, broken into four categories: Bioenergy Basics, On the Farm, In the Lab, and The Tools. [View our public page!](#)

- Since January 2020, CABBI has published 21 scholarly papers, bringing its total number in four years to 154. [View the publications page.](#)

- The Center has also raised its total of publicly available, published datasets to 57. [View the data page.](#)

performance of C4 grasses like sorghum. Yong-Su Jin is a Professor of Food Microbiology in Food Science and Human Nutrition, and a lead scientist in CABBI's Conversion Theme. He studies yeast strain engineering, facilitating biochemical production from cellulosic sugars.

The idea for this revolutionary project came about while the Ort and Jin Labs were collaborating on the RIPE (Realizing Increased Photosynthetic Efficiency) Project.

"One day we thought, 'If we can produce oil in the plant, why not produce organic acid in the plant as well?' Instead of using

In a novel collaboration between two University of Illinois Urbana-Champaign labs, researchers from the two themes are pooling their skills to engineer *plants* that produce organic acids directly from carbon dioxide (CO₂) and sunlight, cutting out the extra step of conversion via microbes.

The two principal investigators leading this project come from different themes in CABBI. Donald Ort is the Robert Emerson Professor of Plant Biology, Interim Director of Carl R. Woese Institute for Genomic Biology, and a lead scientist in CABBI's Feedstock Production Theme. His work focuses on developing strategies to increase the photosynthetic



plant engineering plus yeast engineering, we engineer the plant to produce organic acid from CO₂ and sunlight directly," Jin said.

It's not as simple as editing a few genes in a crop. Enabling the accumulation of organic acids in energy crops is a long-term goal. The team's short-term focus is investigating the implementation of organic acid production pathways in microalgae, which are much more simplistic organisms than plants — making them a perfect testbed for this project.

Jin and Ort have vastly different research backgrounds, providing complementary skills but also adding a layer of challenge to the collaboration. Enter Nam Kyu Kang, a Postdoctoral Researcher recruited by Jin and Ort to help spearhead this project. Kang earned his B.S. in Chemical Engineering from Sunkyunkwan University and went on to earn his Ph.D. in Chemical and Biomolecular Engineering at the Korea Advanced Institute of Science and Technology. His doctoral and postdoctoral work has focused on microalgae engineering, making him the ideal candidate to bridge the gap.

[Read the full research profile.](#)



Q Mag 3.2 Highlights ‘Burn Zone,’ Energy Fallout

A wealth of spirited writing from all genres awaits you in “The Big Clean-Up,” Q Magazine’s most thematically diverse issue yet. In our headline piece “Burn Zone,” Janelle Joseph Environmental Writing Contest Grand Prize Winner Andy Sima shares his moving encounter with a New Mexico landscape charred by wildfires.

Two stories — “Silent Killer” by Gwen-na Heidkamp and “Coal’s Dirty Secret” by Peter Davis — focus on the public health and environmental toll of the toxic byproduct coal ash. Maria Maring’s “Solastalgia” vocalizes the emotional toll of reflecting on the expiring natural world — and our role in its demise.

On the corporate front, Jennifer Coronel shows that making consumers feel good about their impact on the Earth can be profitable in “An End to Greenwash-

Joseph Writing Contest Renewed for 2021

Thanks to another generous donation from Janelle Joseph, the Environmental Writing Contest for Q Magazine enters its second year.

The contest is open to Illinois undergrads and includes a \$1,000 grand prize as well as \$500 prizes in five categories: feature; memoir; op-ed; Q&A; or “At Illinois” (the latter category involves highlighting environmental research, innovation, or activism at the U of I).

Entries must be 1,000 to 2,000 words and will be accepted through Sept. 30, 2021. [Full details.](#)

ing.” Brandon Hausser’s “Plant-Based Fun” scrutinizes efforts by one company, LEGO, to swap petroleum-based products with plants.

In his op-ed “Blame Game,” Jonah Messinger explores the California blackouts of August 2020. And don’t miss “Protecting

Our Water,” Anneli Cers’ Q&A with iSEE Congress speaker Joan Rose, a Stockholm Water Prize winner and renowned microbiologist who developed new ways to track pathogens in water systems — including COVID-19.

[Read the articles.](#)

Advisors, Panelists, Partners Contribute to ELP Workshop Success

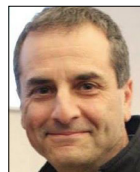
After registration filled out in a less than three days, iSEE’s inaugural foray into Environmental Leadership Program (ELP) workshops wrapped up successfully in spring.

The Institute wants to thank the ELP advisory board as well as the panelists and partners who shared their expertise with our students!

On March 24, the environmental policy workshop featured keynotes by ELP advisory board members Eban Goodstein, Professor and Director of the Center for Environmental Policy at Bard College, and Tami Craig Schilling, Agronomy Knowledge Transfer Lead at Bayer Crop Science.

On April 13, the corporate sustainability workshop featured an opening keynote from ELP advisory board member Harriet Hentges, President and CEO of Hentges Associates and an expert

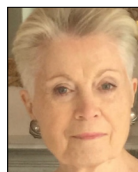
in sustainability in the food industry. A panel discussion on private-sector views of sustainability included Holly Emerson, Global



GOODSTEIN



SCHILLING



HENTGES

Senior Director of the Global Sustainability team Johnson Controls; Pedro Leon de la Barra, Project Manager at Sol Customer Solutions; Stu Levenick, Retired Group President of Caterpillar Inc. and a generous iSEE benefactor; and Chris O’Brien, Director of Business Development for CustomerFirst Renewables. And a mini-career fair featured

professional participants Brunswick i-Jet Lab, Dayempur Herbals and Dayempur Farm, Para La Tierra, Resource Environmental Solutions, Sol Systems, Sun Tribe, The Nature Conservancy, Waterborne Environmental, Worldwide Opportunities on Organic Farms USA (WWOOF-USA), and the Illinois Professional Science Master’s Program.

[Read more and watch videos of the keynote addresses.](#)



12 Levenick Teaching Sustainability Fellows to Expand Curricular Options

In March, the Institute for Sustainability, Energy, and Environment (iSEE) named its largest and most diverse group of faculty and instructors to be 2021-22 Levenick iSEE Teaching Sustainability Fellows.

Funded by a generous endowment from Illinois Alumnus Stuart L. Levenick and his wife Nancy J. Levenick, this third cohort of faculty and teachers — a record 12 of them — from across the University of Illinois Urbana-Champaign campus will incorporate sustainability into existing classes or create entirely new courses built around sustainability elements.

Associate Director for Education & Outreach Gillen D'Arcy Wood said applications continue to increase each year for the Levenick Teaching Sustainability program — and academic units from across campus continue to show interest in adding sustainability thinking into the curriculum.

"The courses to be developed by this cohort range in focus from sustainability in the Arab world, to carbon capture technology, to green tourism," Wood said. "Levenick Fellows will meet throughout the year to trade ideas on sustainability education and to benefit from the educational resources and expertise at iSEE."

"Our Institute's goal is to incorporate sustainability into as many classes as possible, and we are grateful that we can make progress each year through this program."

The 2021-22 cohort and their projects:

- Bryan Endres, Professor of Agricultural and Consumer Economics (ACE), adding to the existing "Food Law" course;
- Renata Endres, Instructor in ACE, developing a new course titled "Recreation and

Tourism Economics";

- Ali Freter, Interim Director of the College of Agricultural, Consumer, and Environmental Sciences Study Abroad Program, adding to the existing "First-Year Experience Program" course;

- Ramez Hajj, Assistant Professor of Civil and Environmental Engineering (CEE), adding to the existing "Asphalt Materials" course;

- Jiajun He, Teaching Assistant Professor of Mechanical Science and Engineering, developing a new course titled "Carbon Capture and Storage";

- Samantha Lindgren, Assistant Professor of Education, developing a new course titled "Education for Global Sustainability";

- Roman Makhnenko, Assistant Professor of CEE, adding to the existing "GeoEnergy Systems" course;

- Ripan Malhi, Professor of Anthropology, developing a new course titled "Transforming Science from Colonial to Sustainable Practice";

- Eman Saadah, Teaching Associate Professor of Linguistics in the Arabic Language Program, adding to the existing "Language and Culture of the Arab World" course;

- Chadly Stern, Assistant Professor of Psychology, adding to the existing "Stereotypes, Prejudice, and Discrimination" course;

- Ann Sychterz, Assistant Professor of CEE, adding to the existing "Design of Structural Systems" course; and

- Roderick Wilson, Assistant Professor of History and East Asian Languages and Cultures, adding to the existing "Intro to Japanese Culture" course.

[Read more about the Teaching Fellows Program.](#)

iSEE Congress Events Draw 250 Participants

iSEE Congress, "The Future of Water," was rescheduled from Fall 2020 to April 2021 — as four noontime events throughout Earth Month — due to the ongoing pandemic. A total of 250 people attended the four Zoom talks:

• Tuesday, April 6 —

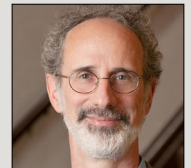
"The Weaponization of Water in the Middle East and Africa," Marcus King, Associate Professor of International Affairs, George Washington University.

• Wednesday, April 14

— Book Talk about "Waste: One Woman's Fight against America's Dirty Secret," by Catherine Coleman Flowers, iSEE Levenick Resident Scholar, author, researcher, and environmental activist.

• Tuesday, April 20 —

"The Past, Present, and Future of Water," Peter Gleick, Co-Founder, Pacific Institute.



• Friday,

April 23

— "From Polio to Covid: Environmental Virology at its Best," Joan Rose, Stockholm Water Prize winner and Nowlin Chair in Water Research, Michigan State University.

iSEE wishes to thank the Joint Area Centers (JACS) and the Illinois Global Institute for co-hosting, and the Center for Advanced Studies for co-sponsoring the Gleick and Rose lectures.

[Read more and watch videos of Congress events.](#)

What's new in campus sustainability ...

An Earth Month to Remember

From an in-person trash pickup event to online conferences and lectures to Arbor Day tree plantings, iSEE and its partners offered a packed Earth Month menu for the University of Illinois campus community.

Things kicked off with the [community trash pickup](#) April 7, sponsored by the Institute and Facilities & Services, at which dozens of participants cleaned up the area around the Boneyard Creek.

A day later, iSEE hosted a “[Sustainability Rocks](#)” celebration on the Main Quad, where participants painted rocks with environmental messages. The results will adorn future iSEE sustainability features on campus.

In addition to four Congress lectures (see page 5 for a recap), iSEE also co-sponsored the annual Charles David Keeling Lecture on April 19, hosted by the Department of Atmospheric Sciences. More than 120 people attended the [online lecture by Alice Hill](#), the David M. Rubenstein Senior Fellow for Energy and the Environment at the Council on Foreign Relations (CFR) in Washington, D.C.

Ahead of Arbor Day, iSEE planted its own tree outside the National Soybean Research Center — which will offset carbon impact of transporting Illinois Climate



Action Plan (iCAP) 2020 books from the printer to campus. (The books were printed on 100% recycled content paper, but iSEE went further to make the iCAP completely carbon neutral.) [Video of this tree planting on April 26](#) helped preview the annual Arbor Day planting on campus that was part of the April 30 Champaign County Sustainability Network (CCNet) virtual celebration.

And iSEE Communications Intern Maria Maring hosted the April 29 “TED Talk: Eco Edition” on environmental activism. The first three of these virtual talks, an ongoing monthly series, have drawn 115 attendees.

[Read more about Earth Month.](#)



ADAPTHAUS Opens

The Illinois Solar Decathlon student organization has finished work on ADAPTHAUS, a net-zero-energy home designed for adaptability.

Built in Champaign for the Department of Energy's Solar Decathlon Competition and supported by funding from the Student Sustainability Committee and a grant procured through iSEE from the Illinois Clean Energy Community Foundation, the house features climate-conscious construction, advanced solar arrays, and a cost-effective, modular layout allowing it to grow with a family.

The group hosted a private grand opening this spring — another iSEE Certified Green Event — and public tours followed. [Learn more.](#)

Greener Campus Programs Grow

iSEE's Greener Campus Certification Program has been quite active during the Spring 2021 semester.

During the past year, iSEE has certified:

- 28 events, including iSEE Congress and the “TED Talk: Eco Edition” series;
- seven Greek chapters, including gold-level awards for Delta Delta



Delta, Pi Beta Phi, Delta Gamma, Kappa Delta, and Zeta Beta Tau; and

- three offices, International Student & Scholar Services, Department of Communication, and Department of Chemistry Administrative Office.

[Learn more about all of iSEE's Certified Greener Campus programs.](#)

Solar Farm 2.0 Up and Running — Increasing Campus Green Energy

In early 2021, Solar Farm 2.0 — an objective pushed by iSEE and accomplished by Facilities & Services — went online, increasing campus solar capabilities to 75 total acres and 25,000 megawatt-hours per year.

The achievement completes the 2015 Illinois Climate Action Plan (iCAP) objec-

tive for producing 25,000 MWh per year by FY 2025.

With an ongoing wind power purchase agreement, the U of I campus currently features 50,000 MWh per year of clean energy. The iCAP calls for 140,000 MWh per year by FY2030, and the work has begun toward achieving this next goal.