

# IQ: ISEE Quarterly

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

What's new in research ...

## iSEE's New 'Water at Illinois' Scholars Website Up, Running

In July, the Institute for Sustainability, Energy, and Environment (iSEE) launched a new website to coalesce the dozens of water scholars on the University of Illinois' Urbana-Champaign campus.

Illinois is home to a rich, interactive community of world-renowned scholars, who are willing to work across disciplines to solve the issues the world faces with its water supply — and "Water at Illinois" ([water.illinois.edu](http://water.illinois.edu)) is the new access point for water-related research conducted across campus.

The website showcases Illinois scholars' research, education, and engagement programs integrated across four main categories of water-related "needs":

1. Adaptation to a changing climate and extreme weather events;
2. Sustainable water, food, and energy resources;
3. Safe drinking water and public health; and
4. Resilient watersheds and ecosystems.

In addition, Water at Illinois has a page that lists more than



100 campus scholars — plus a page describing who the scholars are and the Water Council that steers them. Each individual scholar has a page as well, where areas of water expertise, research interests, courses, affiliations and general information are available.

The site serves as a "front porch" to various water centers at Illinois — including the state surveys, academic units, and grant-based centers — as well as to laboratories, facilities and field stations that specialize in water research.

Finally, Water at Illinois will be a repository for opportunities in the water field, including grants, educational areas, and jobs. The Water Council already has shed light on potential funding opportunities for Illinois researchers and has identified potential teams for proposals. iSEE intends to continue convening the water scholars regularly — and to start similar processes with energy and other scholar groups.

[More details on the Water at Illinois website.](http://water.illinois.edu)

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

# Researcher in the Spotlight: Aimee Gall

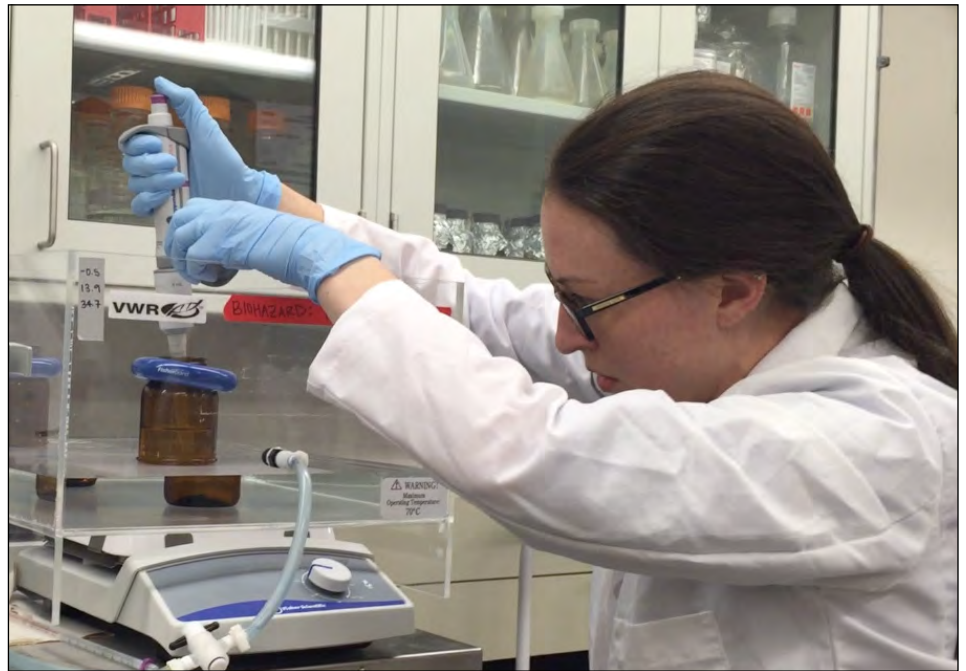
Aimee Gall, a member of iSEE's Smart Water Disinfection Project team, is an Illinois Ph.D. student in Environmental Engineering specializing in viruses: how they infect; how they multiply; and how they can be stopped from doing so.

During her graduate studies, Gall has worked most closely with adenovirus, a pathogen present worldwide in drinking water supplies that causes diarrheal disease, respiratory problems, and conjunctivitis (pinkeye). Adenovirus is of particular interest to the Smart Water Disinfection team because it is one of the trickiest to inactivate — render harmless — as it isn't affected by several popular kinds of water treatments.

So, she said, if you can find a treatment that will inactivate adenovirus, you can inactivate a lot of other viruses with the same treatment.

In the lab, Gall exposes viruses to a chlorine-based disinfectant and then takes samples of the treated water to combine with cultures of human carcinoma lung cells. After several days' incubation, she can determine (based on visible symptoms of infection) how many virus cells were inactivated by the treatment, and how many were left infectious.

In addition to discovering the ways adenovirus is inactivated, she is also helping to develop a sensor for active viruses in water. Bacteria in water are relatively easy to detect — just take a sample and let it grow colorful patches in an incubator for 24 to 48 hours. Viruses, however, must infect host cells and be allowed to multiply for a week or more to get a visual result. Using DNA strands as a red-flag system, she hopes to create a dipstick that could be inserted into a water sample and change color to indicate the presence of active viruses.



## Let's Go to the Video!

► [iSEE's YouTube channel](#) features a short film with Aimee Gall talking about the Smart Water Disinfection Project. [View it!](#)

"This tool would be invaluable in the field," she said, because people could collect water, treat it, and dip in the sensor stick to be sure that the treatment was successful.

The change in sensor color could be a simple yes or no to viruses, or it could display a color along a gradient for a more detailed reading of the water composition. This sensor technology would be the first of its kind, and it all starts with learning how viruses are inactivated by different treatments.

International collaborations have re-

sulted in some of Gall's greatest memories as a researcher.

One of her favorites is of a student named Vincent from the University of Nairobi, Kenya. He visited Illinois one summer to learn from her how to run disinfection experiments. When he returned to Kenya, he was able to get equipment to start research of his own. Gall called this spread of scientific knowledge a "victory."

"I like the 'people-applied' area of research," she said. "My long-term goal for this is working in developing regions and working with people who have water they're not applying disinfectants to. I see the impact it could have on people globally, so I think the part that keeps me going is the fact that there are so many people that don't have treated water."

[Read more about the Smart Water Disinfection Project.](#)

[Read more about Gall and her research.](#)



## Woody Polyculture Project Leader Promoted

iSEE extends its congratulations to Sarah Taylor Lovell on her promotion to Associate Professor of Crop Sciences. Lovell is the Primary Investigator on iSEE's

Multifunctional Woody Polyculture project.

[Read more about Lovell.](#)

[Read more about the iSEE seed-funded WPP.](#)

What's new in education ...

# SEE Minor to Start Enrolling in Spring

Six academic units have come together to offer the new Sustainability, Energy and Environment Fellows Program (SEE FP), a campuswide undergraduate minor through iSEE to promote systems-level thinking about energy and sustainability and foster the development of an integrated view of the economy, society and the environment.

The minor is expected to be finalized by the U of I Board of Trustees at its November 2015 meeting and to be available for enrollment in Spring 2016.

The minor provides selected students an opportunity to develop an integrated perspective on sustainability and understand the feedbacks, trade-offs and barriers to achieving it and their implications for decision-making.

The SEE FP will prepare students for pursuing careers in the corporate sector, nonprofit organizations, government agencies and environmental advocacy groups. It is being offered in partnership with Agricultural and Consumer Economics (ACE), Civil and Environmental Engineering (CEE), Integrative Biology (IB), Natural Resources and Environmental Sciences (NRES), School of Earth, Society and Environment (SESE), and Urban & Regional Planning — who are also contributing teaching faculty.

Students are encouraged to enroll in the minor in their sophomore year; it requires a minimum GPA of 3.0. Students will need to complete the minor by obtaining 16-18 credits from a specified list of approved courses, in consultation with their adviser.

One of the new mainstay courses in the SEE FP is being

offered for the first time in the spring semester. ENVS 301: Tools for Sustainability will teach systems-level thinking skills to enable better understanding of the different dimensions of sustainability — and the problems and trade-offs involved in achieving that sustainability.

Students will learn about metrics for measuring sustainability. They will also gain competence in tools such as cost-benefit and life-cycle analyses needed to compare the sustainability of different technologies and development options.

Team-taught by Madhu Khanna, Professor of Agricultural and Consumer Economics; Jody Endres, Assistant Professor of Law in the Department of Natural Resources and Environmental Sciences; Jeremy Guest, Assistant Professor of Civil and Environmental Engineering; and Lulu Rodriguez, Associate Professor of Agricultural Communications, this course will also emphasize communications skills, enabling students to articulate about the integrated dimensions of sustainability in an interdisciplinary setting.

The course will meet 10:30 a.m. to noon Mondays and Wednesdays in 209 Huff Hall. No prerequisites are needed; enrollment is open to all sophomores — and sophomores interested in enrolling in the minor in 2016 are particularly encouraged to take ENVS 301.

For more details about the SEE FP, the ENVS 301 course, and/or enrollment, contact Khanna, iSEE Associate Director for Education and Outreach, at [khanna1@illinois.edu](mailto:khanna1@illinois.edu).

[More about the minor and related courses on the iSEE website.](#)

## Three Earn Lavey Rosencranz Research Awards

In July, the Department of Natural Resources and Environmental Sciences (NRES) and iSEE announced funding awards for three Illinois graduate students researching the impacts of climate change on public health.

The 2014-15 Warren Lavey and Dr. Holly Rosencranz Research Awards in Climate Change and Public Health — \$3,000 apiece — were allotted to:

- Surendra Karki, Pathobiology;
- Nora Sadik, Civil and Environmental Engineering; and
- Erin Welsh, Integrative Biology.

“We hope that our grant program will raise awareness of, and promote solutions to, the threats of climate change to public health,” Lavey and Rosencranz said in a joint statement. “This year’s winners will research the impacts of climate change on insect-borne diseases and water quality in the United States, Uganda, and Panama.”

Karki’s research will explore the impact



**KARKI**

**SADIK**

**WELSH**

of extreme weather events on the risk from the West Nile virus in South Cook County, Illinois. Specifically, he will examine and model the relationship between mosquito abundance and temperature and rainfall by comparing averages, then by the effects of extreme rainfall events and increased temperatures.

Sadik is researching climate change, water ecology, and public health in urban Kampala, Uganda. In particular, the research will examine extreme weather effects on clean drinking water supplies as well as water for agriculture.

Welsh is investigating tick-borne dis-

ease transmission with expected continued climate change in Central Panama. The research will integrate field surveys, tick survival enclosures, and genomic analyses to address how climate conditions shape the ecology of ticks and their accompanying bacteria.

Lavey, an Adjunct Professor of Law and an Adjunct Assistant Professor in Natural Resources and Environmental Sciences at Illinois, and Rosencranz, an Assistant Professor of Clinical Medicine at the University of Illinois at Chicago College of Medicine, have long been concerned with public health issues.

“Importantly, the grantees will disseminate their findings through publications and presentations on this campus, to professionals in their fields, and to the public,” they said. “We are happy to support these impressive Illinois students.”

[More about Karki, Sadik, and Welsh on the iSEE website.](#)

What's new in campus sustainability ...

# Illinois Climate Action Plan Released

In October, iSEE published the 2015 Illinois Climate Action Plan (iCAP), an updated roadmap for campus sustainability initiatives as the Illinois campus seeks its ultimate goal of carbon neutrality by the earliest possible date.

The new iCAP, which was crafted after consultations with — and help from — students, faculty, staff, and campus administrators, was more than a year in the making. It was signed in October by Acting Chancellor Barbara Wilson.

“This new plan is ambitious, and it positions Illinois at the forefront of tackling the profound sustainability challenges that face humanity, including climate change and clean energy,” Wilson wrote in the introduction of the book. “We intend to serve as a model for campuses and communities across the world, while we also educate the next generation of sustainability leaders who can build on our campus’s efforts. Our campus will move toward carbon neutrality and will also be a showcase for sustainability in terms of water use, recycling, transportation, and agricultural practices.

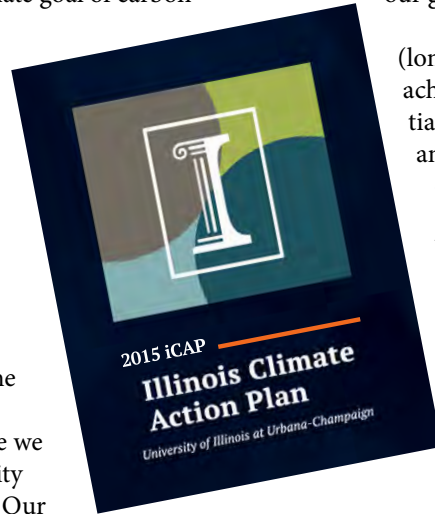
“We are proud of the progress we have already made, but

we are also both humbled and excited by the challenges that lie ahead. I am pleased to endorse this plan and I am confident that our great campus is ready to rise to these challenges.”

Included in the 88-page document are goals (long-term), objectives (specific, measurable, achievable, relevant, and time-bound), and potential strategies (methods to consider to reach goals and objectives). They are listed in 11 major areas:

- Energy Conservation and Building Standards;
- Energy Generation, Purchasing, and Distribution;
- Transportation;
- Water and Stormwater;
- Purchasing, Waste, and Recycling;
- Agriculture, Land Use, Food, and Sequestration;
- Carbon Offsets;
- Financing;
- Curricular Education;
- Outreach; and
- Research.

[More info, including a pdf of the document and the eight-page “iCAP in a Nutshell,” can be found on the iSEE website.](#)



## Campus Earns STARS Gold Recognition, More Honors from AASHE

The University of Illinois at Urbana-Champaign continues to display sustainability excellence by earning its second consecutive Gold ranking from the Association for the Advancement of Sustainability in Higher Education (AASHE).

Through the Sustainability Tracking, Assessment, and Rating System (STARS) tracking system, AASHE encourages higher-ed institutions of all sizes to report and be recognized for the steps they’ve taken to reduce greenhouse gas emissions and waste, as well as to increase campus participation in sustainability efforts. Based on a detailed set of criteria in 18 categories, schools earn points to improve their ranking. STARS offers four levels of ranking: bronze, silver, gold, and platinum.

Illinois is one of 51 schools — and one of three in the Big Ten Conference — to achieve Gold in latest, more stringent version 2.0 of the STARS tool. The program has ranked 143 schools total with its STARS 2.0 program.

The Illinois campus achieved its first Gold rank in 2013. Recognition is conferred every few years. Becoming a Gold-ranked institution is no small feat. Hundreds of pieces of data on campus water and energy use, administrative policies, student efforts, waste handling procedures, transportation, and dining services were entered into the STARS report.

Big point-earners in Illinois’ second Gold-winning report included the iSEE Certified Green Office Program outreach campaign, the Campus Bike Center community partnership, the 2015 Illinois Climate Action Plan (see story above), and the offering of more than 30 courses in continuing education programs (certificates outside of a degree-granting program like a Baccalaureate or Masters).

“I’m delighted that the excellence of our campus sustainability efforts has been recognized with a Gold ranking from STARS, even with the more stringent requirements of STARS 2.0. This is clear evidence of our campus’s leadership in the academic community,” said Ben McCall, iSEE Associate Director for Campus Sustainability.

Further honors were announced in October 2015 in the Association for the Advancement for Sustainability in Higher Education (AASHE) Sustainable Campus Index, which put Illinois No. 1 among all schools in the buildings category and No. 2 for water, among the Top 10 sustainable campuses overall, and with perfect scores on campus engagement and coordination and planning highlights.

[You can check out the 2015 reporting on AASHE’s website.](#)  
[To read more about recent campus sustainability honors, visit the iSEE webpage.](#)



## What's new in campus sustainability (continued) ...



# iSEE Strengthens Ties with SSC

iSEE is proud to become even more closely tied with the Student Sustainability Committee (SSC) moving forward. Expanding on its role as a signatory for SSC funding allocations, iSEE now is home to the SSC Coordinator's office and offers support to the Committee as needed.



SSC funds more than \$1.1 million each year in innovative, sustainable projects. Its mission is to make the University of Illinois at Urbana-Champaign a leader in campus sustainability. SSC does this through reviewing, recommending, and funding projects that increase environmental stewardship, inspire change, and impact students.

The Committee reviews and recommends projects to be funded from two student fees: the \$12 Sustainable Campus Environment fee and the \$2 Cleaner Energy Technologies fee.

At more than \$1 million awarded in 2013, one major SSC-backed project is coming to fruition: With SSC's funding support,

### SSC Spring Funding Cycle Open

The Student Sustainability Committee (SSC) funds more than \$1 million in sustainable projects annually, with past projects ranging from the Solar Farm to the Sustainable Student Farm. SSC is now accepting grant applications for its Spring 2016 Funding Cycle. For more information, or to apply, please visit <http://ssc.sustainability.illinois.edu> or email [sustainability-committee@illinois.edu](mailto:sustainability-committee@illinois.edu). Applications are due Jan. 24, 2016.

Facilities & Services is constructing a 20.8-acre, 5.87 megawatt solar farm on south campus (above). The last panels were put in place Oct. 22. When fully operational (the ribbon-cutting is scheduled for Nov. 19), the farm will produce 7.86 million kilowatt-hours, or about 2 percent of the campus electrical demand.

[Visit SSC's website for more information about the Committee and its recent activities, including its calls for proposals.](#)



## What's new in funding ...

### Proceeds from Carbon Credits Sale to Fund Future GHG Reductions

This summer, the campus announced it has received more than \$830,000 from Chevrolet through the Bonneville Environmental Fund for a sale of campus Verified Carbon Units.

In the deal negotiated in Spring 2014 by iSEE, Chevrolet will retire the carbon units it purchased — earned through the good work Illinois did in the past several years to reduce its greenhouse gas (GHG) emissions — on behalf of the environment. Campus agreed to match 50 percent of the Chevy sale, bringing the total to nearly \$1.25 million.



iSEE and Facilities & Services have agreed to add \$750,000 of that total to the campus Revolving Loan Fund (RLF), which was set up as a funding source for utility conservation projects with less than 10-year payback periods. As of 2015, the fund had grown to \$3,190,213; adding the Chevrolet money will take the total past \$3.94 million.

The remaining amount from the carbon credit sale, nearly \$500,000, will be used to support further reductions of campus GHG emissions.

[Read more about the carbon credit sale on the iSEE website.](#)

## What's new in outreach ...

### iSEE Congress 2015 Explores World Water Crises

In September, the Institute hosted iSEE Congress 2015, “Water Planet, Water Crises? Solving the World’s Water-Food-Energy Needs Sustainably.” This second Congress saw a large increase in registrants, from about 230 in 2014 to more than 370 in 2015, including more than 200 students.

The Congress brought together scholars, researchers, policy experts, and industry representatives from Illinois, the nation and the world to discuss that most basic human need of clean, fresh water.

Student rapporteurs summed up the experience at the end. Here are a few take-aways:

- Water is a place-based science; vulnerabilities of water sources are based both on region and climate — as well as on extreme weather events. And solutions will come only when models take into consideration that we have limited prediction skills.
- Agriculture and power production impact our national water supply’s quantity and quality — and it’s not just the overuse of water. Nutrient runoffs and other pollutants are damaging the environment, too.
- There is not a single solution to optimize the balance between water, food, and energy: sociopolitical dynamics are also in play.
- Water, human health, and ecosystem services are inextricably linked to climate change, and we need large-scale, long-term, interdisciplinary studies to under-



stand these connections and to advance scientific and societal goals.

- Culture, values, and preferences must be considered when making decisions about water use, and governments must find a way to lead policy change so that technology can solve the issues.

• Water quantity and quality issues are on several scales, from individual to global, but more holistic and integrated strategies — and technical innovations — are needed to solve the issues.

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

