



Idaho Water Resources Research Institute

THE CURRENT

VOLUME 3, ISSUE 1

WINTER 2020

FEATURING
STORIES
BY STUDENT
WRITERS

LETTER FROM THE DIRECTOR

Dear Readers,

Walking in this morning, robins were found on the hillside adjacent to the University of Idaho water tower searching for breakfast. Spring is almost here, and we at the Idaho Water Institute, like those little birds, are getting prepared for it. The Water Institute is dedicated to collaboration and we are willing to put our money behind it! While you can peruse our numerous opportunities on our Facebook page, I wanted to talk specifically about one of them, our Graduate Student Affiliate Program, and our current affiliate, Maddie Goebel. Maddie is doing an outstanding job with us and we are excited to announce that the program is expanding!

The Fall 2020 application for the Graduate Student Affiliate Program will be available on our Facebook Page (facebook.com/IWRRIMoscow) on **April 1**. Applications are due no later than **May 1** and selected affiliates will be announced on **May 15**. This program will fully fund the costs of tuition, fees and a semester stipend for two Ph.D. students during Fall 2020. It is an exciting program that we anticipate will be a triple win, for the Water Institute, two Ph.D. students and their faculty advisors.

In this issue of The Current we also feature four University of Idaho faculty and their respective water resource research. Special thanks to Dr. Jodie Nicotra for providing us access to her class, and to the students that organized the interviews and wrote the stories. Each faculty member brings their own expertise to water resource research and these stories reflect that. While this quartet of researchers are impressive, they are just four members of an active faculty conducting water resource research at University of Idaho. We, at the Water Institute, are delighted to be affiliated with them.

Spring is almost here, and we are excited to get things rolling.

Best,
Alan

GRADUATE AFFILIATE PROGRAM

SPRING 2020



Madeline Goebel

The Water Institute kicked off the Spring 2020 semester with a bang! We collected applications from highly qualified applicants for the inaugural the Water Institute Graduate Student Affiliate Program. The program seeks to provide University of Idaho graduate students with an opportunity to explore and collaborate on water-related research issues. After careful review of the candidates, The Water Institute was honored to be able to offer the position to Madeline Goebel. She graciously accepted and is the Water Institute's first Graduate Affiliate.

Maddie is a first-year Master's student in the College of Natural Resources (CNR). Her research explores risk and behavior in Idaho's Coeur d'Alene Basin, a popular region for outdoor recreation that is impacted by heavy metal contamination. Here at the Water Institute, Maddie has been helping with several projects and is providing a fresh insight that we are excited to have. She is truly an asset to our team this semester. Stay connected with us to see the great collaboration with Maddie unfold.

FALL 2020

CALL FOR APPLICATIONS

The Water Institute is thrilled to announce that **TWO** Ph.D student affiliate positions will be offered for the Fall 2020 semester! The positions will have tuition and fees covered as well as compensation for 20 hours of work per week at the Water Institute.

To apply, students should email their completed application and supplementary materials to IWRRRI@uidaho.edu or physically hand them in at our office in Morrill Hall (Room 216). Applications will be available on or before **April 1, 2020**. Please see the Water Institute Facebook page (facebook.com/IWRRIMoscow) for application materials, additional information, and any updates regarding the position.

Applications for the Fall 2020 affiliate positions are due no later than **May 1, 2020 at 5 PM PST**. The selected students will be notified of their acceptance into the program on or before May 15, 2020. The affiliate position awardees will also be announced on our Facebook page. If you have any questions regarding the affiliate program, please reach out to us at IWRRRI@uidaho.edu.

THE 30TH ANNUAL IDAHO WATER QUALITY WORKSHOP



Melissa Topping & her poster at IWQW



Maddie Goebel at IWQW

Melissa (Mel) Topping and Maddie Goebel visited Boise, ID for the 30th Annual Idaho Water Quality Workshop (IWQW) at Boise State University, hosted by the Idaho Department of Environmental Quality. The Water Institute is proud to have been able to provide coffee on the final morning of the conference. Maddie and Mel also attended a Software Carpentry workshop where they used water quality data in the R programming language. Mel also presented a poster on her thesis research project on tool accuracy in citizen science, and collected the last few data points she needed to complete her data analysis (Go Mel!)

GRADUATE STUDENT TRAVEL VOUCHER

To support other University of Idaho students in their endeavors to present at events like the Idaho Water Quality Workshop, the Water Institute offers a \$500 travel voucher for eligible graduate students. For a student to be eligible, they must be presenting research at a formally recognized regional or national conference. The voucher can be used for transportation and accommodations.

Requirements for a successful application include that the student must:

- Have been accepted to present their own research (poster or presentation) at a regional or national academic conference
- Be first author of the presentation or poster
- Present their research or project at the next Water Institute Annual Water Symposium and
- Acknowledge the Water Institute in the presentation or on the poster.

To apply for the voucher, please visit our Facebook page or email us to obtain a copy of the application. Contact info can be found on page 9. Physical copies of the application may also be obtained from our office in Morrill Hall (Room 216).

WRITING FOR THE WATER INSTITUTE

An intra-university service-learning project



*Dr. Jodie Nicotra, Dpt. of English
University of Idaho*

When Dr. Jodie Nicotra of the University of Idaho's English Department reached out to The Water Institute's director, Dr. Alan Kolok, she was simply looking for an internship opportunity for one student in the English-Professional Writing major. This quest unexpectedly evolved into a unique occasion for all 18 students in her English 202 course to gain real-world experience writing research profiles of faculty for the Water Institute's newsletter.

ENGL 202, Intro to Professional Writing, helps students learn to write for a variety of professional audiences and purposes. Students write formal pieces like white papers and reports, do an in-depth public policy analysis, and craft materials for internship applications.

For the Water Institute assignment, called "Writing for a Client," four student groups contacted potential interviewees from a list provided by Dr. Kolok. This list included researchers across the university who are affiliated with or funded by the Water Institute. Students then interviewed their chosen researcher and co-drafted a journalistic style article. They collectively reviewed the articles as a class, and revised according to feedback. Each student was graded on the overall quality of their group's article, in addition to their individual performance as a team member.

Dr. Nicotra noted that students found the real-world nature of the project refreshing. In turn, Dr. Kolok said, the researchers told him how much they enjoyed the chance to talk to students. The student-written articles are included in the following pages.

The Water Institute would like to formally thank Dr. Nicotra for her interest in collaborating and the students in her class for their dedication and impressive work. Dr. Nicotra encourages University of Idaho students in any major to consider a minor in Professional Writing as a means to diversify and refine their writing skills.

A WORLD CONNECTED BY WATER

A human-environment geographer uncovers the truth about hydropower in rural China



*Dr. Tom Ptak, Dpt. of Geography
University of Idaho*

In an interconnected world, environmental issues create rippling effects from small rural communities to international spheres. "Nothing stays local," says Dr. Tom Ptak, a human-environment geographer at the University of Idaho.

Ptak's research examines the interdependent relationships of water and human society. "It's not just about how water affects social circumstances. It's not just how water impacts economic circumstances. It's about the interdependencies around all of those relationships. If you take one of those pieces out, you tell an incomplete story," says Ptak.

He focuses on hydropower, its relationship to humans, and how those affect people on a holistic, global scale. Ptak's research can take him all over the world, and he's worked recently in China, Tibet, and Chile. "That's my laboratory," Ptak says, pointing to a world map.

In one of his research trips to China, Ptak studied how hydropower operations impact small, rural communities. For five months Ptak conducted observations, household surveys, and interviews in the Nu River valley of Yunnan Province where his research discovered something unexpected. In some cases, hydropower development had further marginalized ethnic and rural communities which were already some of the poorest in China, and instead had benefitted others already who were comparatively better off.

In his research investigating energy development and inequality, Ptak argues for the value of using social science approaches to illustrate unforeseen consequences of hydropower development. Although China's affairs seem distance from Idaho, Ptak says that understanding China is "absolutely critical" if we are to understand and improve global environmental challenges both now and into the future. China is the largest energy user and carbon emitter on the planet, which makes it a key player in any discussion about solving global environmental concerns.

Moreover, in an increasingly interlinked world, China's actions - even the seemingly small ones - are more relevant than ever. Ptak is also working to help solve environmental issues directly in Idaho. He is currently set to receive grant funds administered through the Water Institute to conduct similar research on the human dimensions of irrigation modernization. If the proposal is funded, Ptak plans to work with collaborators at the Idaho National Laboratory and use a social science based analytical tool to analyze and understand social barriers to irrigation modernization across the Western United States.

EXPANDING KNOWLEDGE, ONE DROP AT A TIME

How the McClure Center and the Water Institute are changing the way undergraduates research in Idaho



Dr. Katherine Himes

*McClure Center for Public Policy
Research, University of Idaho*

Water. This element allows life to flourish. Without it, Idaho would be a barren wasteland rather than the beautiful state we live in. Although we all rely on water to live, few are active in creating policies that protect this valuable resource.

One undergraduate student seeks to change that. This intern spent eight weeks of her summer speaking with stakeholders who care about the Spokane River, including local cattle ranchers, tribal leaders, and business moguls. Ultimately, she aimed to inform these different stakeholders and involve them in decisions about water policy.

Her idea was nurtured under a cooperative internship program for undergraduate students, led by Dr. Katherine Himes, director of the James A. and Louise McClure Center for Public Policy Research and the Water Institute.

The internship program allows undergraduate students to spend their summers researching a topic in the field of water policy. The program is catered to each individual intern. “We’re going to slot them into something we’re doing in a way that makes sense for us and aligns with their interests,” Himes said.

The intern worked with the Water Institute to first collect data on the Spokane River’s water quality. They compiled this research in order to help create a coalition of educated citizens who were all invested in water policy. The intern then joined Himes at various water policy meetings in Boise and even traveled to Tuscon, AZ to attend an international conference. At the end of the program, the intern compiled her summer’s work into a presentation that was voted best presentation among a group consisting of both undergraduate and graduate students.

This opportunity for one undergraduate intern is only the beginning. Himes hopes to expand the program to give undergraduates the chance to learn skills normally reserved for graduate students. “I would love it if we had a cohort of students who are doing water policy internships, because they could then learn from each other,” Himes said.

With additional funding, the program will be able to provide opportunities for undergraduates to impact Idaho water policy, from the shores of Lake Pend Oreille to the tumbling waters of Idaho Falls.

FOOD-ENERGY-WATER NEXUS

How a geographer views the relationships between our resources



Dr. Karen Humes, Dpt. of Geography
University of Idaho

Most Western scientists are trained to focus on one object with laser precision. But geographers focus on systems and relationships, a way of thinking that is better suited for solving “wicked problems” like climate change or food insecurity.

University of Idaho geography professor Dr. Karen Humes is a typical geographer in that she looks at systems - in this case, one she calls the “food-energy-water nexus.” The food-energy-water nexus sees these things not as individual resources, but as one unified system.

Humes believes that water, energy and food security are three sectors central to sustainable development. As the world population continues to increase, demands for these three basic services follow. Agriculture is by far the largest water consumer of annual water withdrawals globally. In Idaho itself, “97% of the water we withdraw from streams and aquifers goes to irrigated agriculture,” says Humes.

Humes, along with her team of graduate students, works with companies and agencies in Idaho to gather information on their water, food, and energy footprints. Humes and her team then analyze the data to find the relationships between their footprints. Then they put them into a model that can help companies make better decisions. “What if we change crops or buy more cows? These are ‘what if’ scenario models,” says Humes.

Humes wants to create these working models for companies seeking to become more energy efficient and environmentally friendly. One of Humes’ goals is to help companies realize that when they’re using water, they’re using energy, and vice versa. “The positive advantage is that it creates synergies. Say that you help a food processing plant conserve water, you’re probably going to conserve energy as well,” says Humes.

Humes received a seed grant from the Water Institute for her research on how the food-water-energy connections in the nexus affect Idaho. The grant helped pay graduate students that Humes keeps deeply involved in her research. “I do almost no research without my graduate students,” says Humes.

Humes hopes to find long-term and environmentally friendly solutions for some complex and interrelated issues that are challenging a potential shortage of resources. “Our mission is to help producers and processors figure out how to be as sustainable as possible,” says Humes. “We need to make thoughtful decisions considering water use as well as greenhouse gas emissions. That is the gist of nexus thinking.”

ROBOT FISH OF THE FUTURE

How a geographer views the relationships between our resources

1,200 feet below the surface of Lake Coeur d'Alene in Coeur d'Alene, Idaho lurks an autonomous submersible robot - armed to the teeth with scientific equipment designed to sample the lakebed.



Dr. John Shovic, College of Engineering
University of Idaho

Its name is Catfish, and it's one of three submarines that Dr. John Shovic and his team of student researchers are outfitting with software systems that will allow them to drive themselves, map underwater topography, and collect samples autonomously for IWRRI, as well as other scientific organizations in the future.

"We're working with Dr. Alan Kolok and the Water Institute to produce an autonomous submarine vehicle to do science," Shovic said. "The whole idea is, you take our submarine, you throw it off the side, it goes and does its science - it maps out a 1,000 by 1,000-foot grid, takes a whole bunch of samples, and then comes back to the boat." This is intended to be a "set it and forget it" system - which will save scientific research teams time and resources collecting underwater data in the future.

The submarines are not yet self-reliant; Shovic controls them with an Xbox controller while his team refines the software used to control the robots. A flight control system recycled from a drone allows the submarine to automatically adjust for currents and pressure differences in the water - making the submarines easy to control, and even easier to code for.

Shovic says the main problem now is giving the subs a means of locating themselves underwater without surfacing to collect a GPS signal. "Because guess what? You go under the water, you can't get GPS," Shovic said. The team is currently working on a doppler sonar system that will generate data about the sub's speed and direction to modify its mapped position between surfacing. "What we need to do, basically, is build an inertial navigation system," Shovic said.

The system isn't finished yet, but Shovic imagines it someday being implemented by water research teams the world over. "This is an open-source project," Shovic said. "We'll publish all our hardware and software, and we'll help people do what we did. That's part of the whole science thing. We're already talking to people in Montana about running these devices in Butte, in the Berkeley Pit."

The team is currently looking for graduate and undergraduate students in computer science and engineering. John Shovic can be reached at jshovic@uidaho.edu for more information on internship opportunities and availability.

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