THE UNIVERSITY OF ALABAMA® | Alabama Water Institute

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ALABAMA WATER INSTITUTE INTERDISCIPLINARY INNOVATION PROGRAM OFFERS FUNDING SUPPORT FOR NEW RESEARCH

The Alabama Water Institute's Interdisciplinary Innovation, or I², Program is designed to increase the rate of competitive federal and foundation grant submissions for affiliated faculty members at The University of Alabama. The program supports new and ground-breaking research proposed by interdisciplinary research teams, and projects should address societal needs of vital water resources.

By Brock Parker

Amanda Koh, Lead PI

Since its inception in 2019, several projects have been funded by the I² Program. The first project was submitted by lead principle investigator Amanda Koh, assistant professor of chemical and biological engineering, and co-PI Tyler Hodges, assistant professor of biological sciences. The goal of their project is to develop new types of foam to reduce contamination by metals, hormone mimics and pesticides and herbicides, which will promote global access to clean water.

Tyler Hodges, co-PI

The foams will be embedded with small molecules or biological macromolecules, such as antibodies and enzymes. If successful, they could create a large-scale material, which could not only easily handle and allow polluted water to flow through, but detect, trap and remove specific contaminants at low concentrations. Koh and Hodges believe these foams can be used anywhere in the world and will be simple, effective and inexpensive.

Milad Esfahani, Lead PI

The second project was submitted by lead PI Milad Esfahani, assistant professor of chemical and biological engineering, and co-PI Geoffrey Tick, professor of geological sciences.

Geoffrey Tick, co-PI

Their project examines poly-fluoroalkyl substances and the effects on human and environmental health, as well as the risk to the safety of ground, surface and drinking water.

Their goal is to provide a platform for a membrane functionalization process using metal organic frameworks, or MOFs. This will allow them to design and fabricate multifunctional membranes for the selective removal of different contaminants from water with reduced fouling. They believe unique properties of MOF compounds can be incorporated into a membrane structure to enhance the selective rejection capability of nano-composite membranes towards specific contaminants such as polyfluoroalkyl substances, dyes and bacteria.

The institute's I² program is just one method of assisting affiliated faculty members. The AWI Pilot Bridge Program was created in 2018 to help faculty who have already submitted competitive grants to federal agencies and are in need of bridge funding to be able to resubmit those proposals for water-related projects.

Information about guidelines, how to apply for either of these programs and deadlines are available on the AWI website.

UA TO LEAD STUDY ON IRRIGATION-FED FARMING IMPACTS IN DEEP SOUTH

By Adam Jones

Unique research led by The University of Alabama will study whether more irrigation-fed farms in the Deep South could lead to a more robust agriculture industry, possibly becoming an even greater economic engine.

Irrigation-fed farming is not as commonplace in the humid and wet Deep South, particularly Alabama, as the rest of the country. The 17 states in the Western United States, for instance, make up three-quarters of all irrigated farmed acres, and, in California, nearly half of all farmland is irrigated, according to the latest federal data.

In contrast, only about 4% of farmland is irrigated in Alabama, but it is also the fourth wettest state in the nation.

With a four-year, $1.75 million grant, UA researchers will examine how a transition from rain-fed farming to irrigation-fed farming in the Deep South could impact harvests and water use, providing crucial data to policymakers considering initiatives to encourage irrigation.

Although it may be an expensive transition for an existing farm, irrigation can ease farms through droughts and yield greater harvests, even in normal years, with great economic benefits.

"As agriculture plays a significant role in the economies of the Deep South, one potential option for their economic resurgence is through a drastic increase in agricultural productivity," said lead principal investigatorDr. Hamid Moradkhani, the Alton N. Scott Endowed Professor of Engineering and director of UA's Center for Complex Hydrosystems Research.

The study will look at the Mobile River Basin, the 44,600 square miles that drain into Mobile Bay that includes central Alabama and portions of eastern Mississippi and northwest Georgia. The research team will examine how the linked resources of food, water and energy within the basin would be impacted through a transition to irrigation farming.

Through computer modeling, the team will study how various levels of irrigation, from continuing the current course to a significant shift to irrigation, will affect agriculture productivity, energy production, water supply and waterway navigation. Researchers will also work with 60 farmers within the basin to evaluate the openness to transitioning.

It will also evaluate the influence of climatological, sociological and economic factors on farmer's receptiveness to transitioning to irrigation.

"This project will help identify the barriers and incentives needed to spur transition to irrigation-fed farming in the Deep South, enabling informed decision-making by lawmakers," Moradkhani said.

Along with Moradkhani, civil, construction and environmental engineering researchers from UA includeDr. Mukesh Kumar, associate professor; Dr. Hamed Moftakhari, assistant professor; and Dr. Glenn Tootle, associate professor. Also, Dr. Nicholas R. Magliocca, UA assistant professor of geography, is involved with the project.

Dr. Denis Nadolnyak, an Auburn University professor of agricultural economics and rural sociology, is also a part of the research team.

If you have not been trained to use the Watershed Game, or would like assistance with facilitating the game, please contact Dr. Nikaela Flournoy (nyflournoy@crimson.ua.edu) for more information.

THE WATERSHED GAME IS AVAILABLE FOR CHECK OUT

The Watershed Game is an interactive tool that helps individuals understand the connections between land use and water quality.

Participants learn how a variety of land uses impact water and natural resources, increase their knowledge of best-management practices, and learn how their choices can prevent adverse impacts. Participants apply plans, practices, and policies that help them achieve a water quality goal for a stream, lake, or river.

Trained Watershed Game Facilitators can now check out any of the four game versions:

- Local Leaders Stream
- Local Leaders River
- Local Leaders Lake
- Classroom

Game versions will be reserved and checked out on a first reserve, first served basis.

ANDREEN BRINGING ATTENTION TO LEGAL AREAS OF WATER LAW

Bill Andreen is the Edgar L. Clarkson Professor of Law at The University of Alabama. He received his law degree from Columbia University School of Law and has an interest not only in climate change and water management, but also in numerous aspects of law such as administrative, environmental (both domestic and international), environmental federalism and all aspects of water pollution law.

By Brock Parker

Dr. William Andreen

"I was somewhat interested in environmental protection back in law school because of the state of our nation's water and air," said Andreen. "I really got interested in it after law school when the law firm I was working for assigned me to an environmental assessment case dealing with the construction of MARTA in Atlanta. After two years of private practice, I joined the U.S. Environmental Protection Agency. I was soon assigned to all kinds of defensive cases and ended up doing a lot of water pollution work, as well as some air pollution and hazardous waste work. When I left EPA in 1983, I came to the University where I have taught environmental law and administrative law ever since."

Andreen's current projects involve writing articles and updates on various water topics, such as the long-running legal battle between Alabama, Georgia and Florida over the Apalachicola-Chattahoochee-Flint River Basin and the struggle between Alabama and Georgia over the waters of the Alabama-Coosa-Tallapoosa River Basin. He is also working to complete a comprehensive history of water pollution control in the United States. He has already published two articles in that series, which cover developments up to 1972 and the passage of the Clean Water Act. Once the series has been completed up to the present day, he hopes to revise and expand upon this work in book form.

"I also do work on nonpoint source pollution, environmental flows and the effect that climate change will have on both. The ultimate goal is to encourage people to support strong and vigorous environmental protection and enforcement of our standards," he said.

To assist with his projects, he is a member of the Center for Progressive Reform, a virtual think tank of approximately 60 law professors. They collaborate and develop white papers and other publications on a wide variety of environmental and safety issues. Currently, he is part of a group that is working on the contours of new climate change legislation. For future projects, Andreen plans to focus more on administrative law.

"I suppose that's not water per se, but it does have a lot to do with how the courts view agency action," he said. "I do plan to write more about judicial deference to agency interpretations of statutes and also address environmental federalism, which deals with the relationship between the EPA and state agencies."

Andreen's expertise also reaches across the world. He serves as the director of the Joint Summer School Project with the Australian National University, a program he founded in 2001. ANU sends 10 law students to UA during the spring semester, and 10 students from UA are sent to Australia in the summer. Both institutions host the students for five weeks, as well as a professor from the visiting university. "One thing that is really unique about the program is that students from both schools are present in the classroom when the comparative law class is taught – both here and in Australia," he said. "This allows for more interaction, more interchange and more learning about the culture of each nation. It's a very well-rounded program."

Andreen would like to see more interdisciplinary work take place on this campus – more of a fusion of science with law and policy.

"One would hope that what we learn and understand from the natural and social sciences actually gets applied in law and policy," he said. "Today, we are seeing an example of the EPA turning its back on science in its new rule making on the extent of waters of the United States. The new rule actually ignores hundreds of peer-reviewed pieces of literature indicating that intermittent and ephemeral streams are connected to perennial streams. If you pollute an ephemeral or intermittent stream, you are causing damage to the biological, physical and chemical integrity of downstream navigable waters. The current administration is trying to write intermittent streams and ephemeral streams out of the definition, which is really pretty awful.

"It's a sad day, but there is hope. I was recently looking at a Gallup poll that reports that 62 percent of Americans believe the government is currently doing too little to protect the environment. It's the highest in 12 years and likely reflects the current administration's attacks on strong environmental protection. The only time that figure was higher was in 1992."

WITH LEADER IN PLACE, UA READY TO STRENGTHEN TIES WITH MOBILE AREA

With a new business engagement and research operations manager in place, The University of Alabama's office in the GulfQuest facility is fortifying existing relationships and pursuing opportunities to help the Mobile area thrive.

By Adam Jones

Dana George

Opened earlier this year, UA's office at GulfQuest on the Mobile waterfront provides a centrally located physical space to expand research capacity and collaborations in the area. It serves as a nexus for research and programmatic initiatives that will benefit the region and UA.

"We want to further develop existing and create new sustainable partnerships within Mobile and south Alabama that are beneficial to external stakeholders, especially industry, in order to increase the number of collaborative projects and, at the same time, create career opportunities for UA students through these partnerships," said Dr. Russell J. Mumper, UA vice president for research and economic development.

UA has an historical and ongoing presence in the area including research into issues in, around and offshore from Mobile Bay and the Gulf Coast that includes an established program at the Dauphin Island Sea Lab. Other UA efforts in the area have involved adolescent health and transportation, among others, as well as partnerships with the University of South Alabama.

"There is a tremendous amount of potential in partnerships between the University and the community around the Mobile Bay area," said Dana George, UA's new business engagement and research operations manager at GulfQuest. "Likewise, there is a lot of expertise at the University that can be used to take full advantage of the opportunities for the region and expand economic development."

George is originally from Mobile, and began as the manager of UA's GulfQuest office in June. She is an experienced customer service manager with a demonstrated history of working in the oil and energy industry. She has extensive experience in business engagement, operations, research, sales and customer experience management.

"We are excited Dana has joined our team as the point of contact and UA research leader at GulfQuest," Mumper said. "She is well positioned to help establish UA as the 'go to' university for collaborative problem-solving and helping to strengthening ties with Mobile and South Alabama."

HOW TO GET AFFILIATED WITH THE ALABAMA WATER INSTITUTE

If you have expertise that could contribute to addressing complex water issues, please register yourself on our website. All registered members are considered affiliated with AWI and have access to all AWI resources. To register, visit the AWI website: ***awi.ua.edu.***

Affiliated Member Information:

http://ovpred.ua.edu/alabama-water-institute/awi-affiliated-members/

Eligibility Criteria:

- A faculty/staff/student appointment at the University of Alabama.
- Research expertise in a water-related field.
- Completion of registration form.

Questions? Please contact Stefanie O'Neill at soneill2@ua.edu or 205-348-9128.

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