

DEPARTMENT OF DEFENSE WATER RESILIENCE FELLOW JOINS GWSC AS ASSOCIATE DIRECTOR

By Misty Mathews



Dr. Kate Brauman

Dr. Kate Brauman joined the Global Water Security Center (GWSC) on Monday, Nov. 1, as its associate director for analysis and commu-

nications. Brauman is a 2020-22 Water and Climate Resilience Fellow at the US Department of Defense through a Science Technology Policy Fellowship with the American Academy for the Advancement of Science.

Brauman's research quantifies and communicates how changes in nature

affect human wellbeing, with a particular focus on water resources. She was a coordinating lead author for the Global Assessment of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), a Section Lead for the 2021 United Nations Environmental Programme Global Synthesis Report "Making Peace with Nature," and a 2018 AAAS Leshner Leadership Fellow for Public Engagement.

Brauman most recently served as the Lead Scientist for the University of Minnesota's Institute on the Environment Global Water Initiative, where she was a member of the Natural Capital Project science team. Her projects include payments for watershed services, global variation

in "crop per drop," and worldwide trends in water consumption and availability. She received her doctorate from Stanford University and her undergraduate degree from Columbia University.

"Dr. Brauman is an incredible addition to the GWSC team and the UA research community," said GWSC Director Mike Gremillion. "She is on the leading edge of research on how water relates to human behavior and risk. Her background and expertise provides a tremendous push toward our mission to operationalize water security research to transform decision-making processes at the national and international levels."

AWI FELLOW, UA ENGINEERING FACULTY RECEIVES FULBRIGHT AWARD

By Bryant Welbourne



Dr. Leigh Terry

Dr. Leigh Terry, assistant professor with The University of Alabama's College of Engineering, and Alabama Water Institute Faculty Fellow,

recently received a Fulbright Specialist Award to exchange knowledge and establish partnerships through a variety of educational and training activities within environmental science.

Terry will travel to Barranquilla, Colombia, in November to collabo-

rate and work with the faculty at the Universidad del Norte on research and teaching projects related to water quality. The award will be used to address critical water quality issues facing the U.S. and Colombia and provide the opportunity to conduct research, exchange ideas and contribute to finding solutions to shared international concerns.

"I'm honored to receive a Fulbright Specialist Award to Universidad del Norte in Barranquilla, Colombia," said Terry. "I look forward to the knowledge exchange and partnership that will take place to advance science and develop lasting connections for our institutions."

Terry is one of more than 400 U.S. citizens who will share their expertise with host institutions abroad through the Fulbright Specialist Program. Recipients are selected based on their academic and professional achievement, demonstrated leadership in their field and their potential to foster long-term cooperation between institutions in the U.S. and abroad.

"The award provides support to accelerate research on global water quality issues and build relationships, knowledge and leadership in support of the long-term interests of the United States and Colombia," said Terry.

Since its establishment in 1946, the

(continued on next page)

UA RESEARCHER AWARDED GRANT FOR IMAGING ALGAE IN COASTAL WATERS

A new equipment grant will allow University of Alabama researchers at the Dauphin Island Sea Lab to improve their ability to forecast harmful algal blooms in Mobile Bay.

By Brock Parker



Dr. Kenneth Hoadley

Imaging FlowCytobots, or IFCBs, and for personnel.

“The funding will improve our ability to monitor and predict harmful algal blooms, which are a problem for fisheries, aquaculture and tourism activities along our coastline,” said Hoadley, an assistant professor in UA’s Department of Biological Sciences.

The IFCBs are cylindrical submersibles that sip up small volumes of water and take thousands of images per hour of microscopic algae and zooplankton in the water column. Using image recognition software, different species can be identified, sorted and logged into a database for tracking changes in microbial community composition. Hoadley said this is a great advantage over using traditional lab microscopes and allows higher-throughput monitoring in real-time.

The two IFCBs will rotate between Mobile Bay and Hoadley’s lab. While out in the water, the IFCB will be

The Gulf Coast Ocean Observing System has awarded \$457,000 to Dr. Kenneth Hoadley for the purchase and maintenance of two

anchored to buoys in conjunction with other instruments, which are part of Alabama’s Real-Time Coastal Observing System, or ARCOS. Currently, ARCOS does not have the capability to instantaneously analyze algal communities as they change.

“We can take advantage of the network of sensors that already exists in order to better understand what we are seeing at the biological level with the IFCB,” said Hoadley. “Along with the ARCOS network, these new instruments represent a huge opportunity to link biogeochemical signals with biological response.”

Harmful algal blooms can kill marine life and create respiratory problems for humans. The data collected by the IFCBs can ultimately be used to create an alert system for stakeholders around Mobile Bay.

“We can make that information available to oyster aquaculture facilities, and they can know to raise their platforms out of the water temporarily during HAB events,” Hoadley said. “That same sort of information can potentially be utilized for the tourism industry, for certain beach closures and for safety.”

Moving the IFCBs around the bay could also be useful in identifying areas where researchers are seeing unique phytoplankton compositions that might be indicative of upcoming



ing problems.

“Dr. Hoadley is trying to enhance our observing capabilities on the coast of Alabama and focus on an issue that has great societal impact,” said Dr. Behzad Mortazavi, professor and chair of UA’s Department of Biological Sciences. “The goal is to develop an understanding of what leads to the development of harmful algal blooms and if there are potential mitigation options down the road.”

The grant from GCOOS will provide support for a graduate student for three years, and both the instruments and funding will help train students in this field of research.

“It’s certainly a great opportunity to make Mobile Bay a sort of test bed for looking at harmful algal blooms,” Hoadley said. “This is a huge opportunity, and I feel like a lottery winner for this particular grant.”

AWI FELLOW RECEIVES FULBRIGHT AWARD

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research, exchange ideas and contribute to finding solutions to shared international concerns.

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NOAA AWARDS CLIMATE SCIENCE FUNDING FOR UA, SEA GRANT PROJECTS

The National Oceanic and Atmospheric Administration has awarded funding for climate science and community resilience projects involving researchers from The University of Alabama, Sea Grant programs and universities around the Southeast.

By Brock Parker



Dr. Hamed Moftakhari (left), and Dr. Wanyun Shao

NOAA's Climate Program Office recently announced more than \$171 million to support projects aimed at improving U.S. climate challenges. The agency's newly launched Adaptation Sciences Program will use more than \$4.8 million to fund 20 new 2-year projects centered on future flooding impacts in coastal areas.

One of those projects will focus on Weeks Bay, Alabama, and southeastern Texas where investigators will use elaborate flood and vulnerability models to help local governments address resilience and communication efforts in response to perceived flood risks. Dr. Hamed Moftakhari, UA assistant professor of civil, construction and environmental engineering, is one of the lead investigators on that team.

"The primary goal of our project is to understand how coastal communities perceive current and future compound flood hazards," said Moftakhari. "This understanding helps better characterize the way local governance networks emerge and are shaped by climate and flood factors."

Dr. Wanyun Shao, assistant professor in UA's Department of Geography, is part of another team that is working with the Sewerage and Water Board of New Orleans, Louisiana, to better understand the geographical and temporal vari-

ability in rainfall and flooding. The project will help the city to create a master plan to prioritize water infrastructure investments over the next five decades by coupling climate data with demographic and behavioral data.

NOAA's CPO also awarded \$400,000 for four new 1-year projects through its Regional Integrated Sciences and Assessments Program. One of those projects will allow Sea Grant programs and universities in the Southeast U.S. and Caribbean regions to study climate inequities in coastal communities.

"The Southeast and Caribbean Climate Alliance will work with communities in these regions to identify the root causes of health disparities and inequities and understand ways in which these are worsened by climate change," said Mark Risse, director of UGA Marine Extension and Georgia Sea Grant.

Coastal communities are experiencing increased flooding that can cut off access to healthcare facilities. Rising seas lead to saltwater intrusion, impacting water supply and wastewater infrastructure. Floodwaters that cover roads or encroach on residential homes carry pollutants and bacteria. All these threats pose a risk to public health.

"Populations that are typically most vulnerable to these risks are low-income communities, communities of color, rural communities, tribal and indigenous communities," said project lead Mona Behl, associate director of Georgia Sea Grant at UGA Marine Extension and Georgia Sea Grant.

The alliance includes experts at Marine Extension and Georgia Sea Grant, Florida Sea Grant, Mississippi-Alabama Sea Grant, Puerto Rico

Sea Grant, the University of Virgin Islands and the Centers for Disease Control and Prevention.

"Regional collaboration on the impact of climate on populations is key to understanding best practices and how to leverage them at the local level in terms of community health," said Scott Rayder, executive director of the Alabama Water Institute. "By teaming together, we will be able to identify problems and solutions faster in service of these at-risk populations and provide better health outcomes for these communities."

Over the next year, the team will work to identify the most vulnerable communities in the Southeast and Caribbean regions and cultivate partnerships with local leaders, businesses and public health professionals to improve communication, share existing tools, and identify information and resource needs. They will also host workshops to gather input that will inform policies, programs, and trainings needed to design community-led solutions to reduce health disparities and inequities in these regions.

"Local solutions to climate change are most effective when they are developed holistically, taking into consideration racial, socioeconomic and structural barriers," Behl said. "By working with communities in these regions, we will develop a shared vision and research framework to improve community health, promote economic development and build climate resilience."

Information from an article at University of Georgia Marine Extension and Georgia Sea Grant was used with permission in this report.

COLLABORATIVE UA-ALABAMA A&M AQUATIC PROJECT AWARDED NATIONAL SCIENCE FOUNDATION FUNDING

The National Science Foundation has awarded Alabama A&M University \$399,000 in supplemental funding for a collaborative aquatic project with The University of Alabama and other institutions.

By Dr. Carla Atkinson and Brock Parker

The supplemental support will be used for the Aquatic Intermittency effects on Microbiomes in Streams, or AIMS, an EPSCoR RII Track-2 project that is partially based at UA. With the additional funding from the NSF, the AIMS team will build a strategic partnership with Alabama A&M University (AAMU), a Historically Black College and University. Dr. Dawn Lemke, assistant professor of environmental sciences at AAMU, will join the AIMS project with Drs. Carla Atkinson, Jon Benstead and Nate Jones, as well as new AIMS affiliate Dr. Ariel Shogren from UA's Department of Biological Sciences.

The overall goal of the AIMS project is to quantify and predict how drying in stream networks impacts downstream water quality in order to better inform policy and management in the Mountain West, Great Plains and Southeastern Forest ecosystems.

AIMS is a multi-institutional effort among UA, University of Kansas, University of Mississippi, University of Southern Mississippi, University of Oklahoma, Kansas State University, Idaho State University and now AAMU. The requested support will expand the impact of the AIMS institutional network to formally include a minority-serving institution that will enhance research and education opportunities among AAMU and all AIMS institutions. As a result, this partnership will add a diversified perspective as well as specific scientific expertise and talent to the multi-university, multistate endeavor.

The AIMS project has many initiatives to broaden participation, primarily through student training

and mentoring. The greater collaborative connections between UA and AAMU that would be fostered by this supplement would enhance nearby research infrastructure, provide direct mentored research experience for AAMU students and several additional workshop opportunities. Greater preparation, skill development and exposure to concepts through workshops and hands-on field experience will ideally interest more AAMU students in research careers and opportunities, which can affect long-term engagement for a key underrepresented group in STEM, particularly the natural sciences.

The requested support will enable a postdoctoral research associate to be based at AAMU that will work

collaboratively with personnel from the AIMS project, Lemke and graduate and undergraduate students at AAMU. The two-way connection between these institutions will lead to benefits for both AAMU and UA students, faculty and early career researchers. As a result, AAMU will gain access to a network of researchers at a larger institution, while UA will benefit from the unique perspectives and experiences of MSI students.



Dr. Carla Atkinson, left, along with members of UA's AIMS team. **Photo credit: Dr. Carla Atkinson**

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AWI SPOTLIGHT: DR. RYAN JOHNSON



Dr. Ryan Johnson

The Alabama Water Institute recently welcomed Dr. Ryan Johnson as a postdoctoral researcher.

Johnson earned his

Ph.D. in civil and environmental engineering from the University of Utah. His dissertation research took advantage of artificial intelligence and machine learning to improve snowpack-dependent urban water systems' resilience, reliability and vulnerability in a changing climate.

"This ongoing work characterizes urban water system demands as a function of external drivers, such as precipitation, air temperature and irrigated area, to improve the understanding of a water system response to surface water availability, particularly during supply-limiting drought conditions," Johnson said.

Raised in Southern California, Johnson took a strong interest in water and the role it plays in shaping an area known for its dry and water-scarce characteristics. Summers spent camping and fishing in the Sierra Nevada mountains ignited his interest in the engineering side of water resources management, most notably the extensive land grab and interbasin development of the Los Angeles Aqueduct.

"The benefits and impacts of this project indicate that we as a nation need to advance the technology and

management of our water resources to better benefit society, underrepresented groups and environmental resources," he said.

Johnson joined AWI because he sees The University of Alabama establishing itself as a national leader in water research. The University is strengthening its ties to federal partners, such as the National Oceanic and Atmospheric Association and the U.S. Geological Survey, in order to advance national water security, forecasting, quality and management.

Within the first week of arriving at AWI, Johnson's poster presentation won second place at the Alabama Water Resources Conference and Symposium in Orange Beach. His topic was on how interdisciplinary collaboration provides an unrivaled research product, and it was based on a climate vulnerability project he is working on with Salt Lake City, Utah.

"My team of engineers, climate scientists and hydrologists presented how

the characterization of supply and demand, driven by this year's megadrought, is critical to quantifying water system performance," Johnson said. "This methodology departs from the overarching concept that demand is embedded in stationarity, establishing a new standard in urban water system vulnerability assessments."

Johnson's future research projects will expand the operations of national-scale streamflow forecasting tools. He will continue working on the Salt Lake City project and will utilize AWI's relationships with federal and state partners to further his water management research at UA.

"The University's close ties to NOAA, the USGS and others offers the opportunity to propose impactful research concepts that can take my niche regional work and expand to the national scale," he said. "These projects also demonstrate the potential to give back to the community and advance forecasting tools to help prepare for climate and weather extremes."

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To register, visit the AWI website: awi.ua.edu

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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