THE UNIVERSITY OF ALABAMA® | Alabama Water Institute

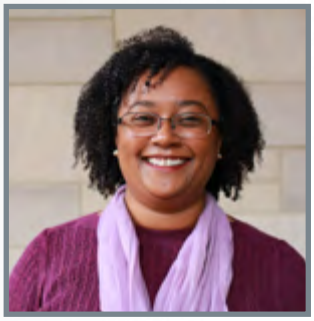
NEWSLETTER

Volume 3 No. 1

UA INSTITUTES WORKING TOGETHER FOR HEALTHIER LIVES IN RURAL ALABAMA

The new director of the Alabama Life Research Institute wants to enhance healthcare and life in rural areas, and that includes improving access to and quality of water.

By Brock Parker



Dr. Sharlene Newman

Dr. Sharlene Newman began her tenure as the executive director of the ALRI in October 2019. A cognitive neuroscientist, Newman grew up in Abbeville, Alabama, a small community located in the southeastern corner of the state. With degrees in engineering and a career background in psychology, she believes her expertise, along with that of the ALRI researchers, can accomplish that objective.

"Our goal is to bring together faculty from different disciplines to address large problems related to life, and our focus will be life in rural America, specifically life in rural Alabama," Newman said. "I know that well with being from a rural area of our state."

Among the many issues Newman wants to tackle are easier access to hospitals and clinics, using technology to make sure senior citizens are eating well and taking their medicine and helping younger people avoid addictions, such as with opioids.

Finding solutions requires collaboration across The University of Alabama campus, and when it comes to water, Newman is eager to work with researchers from the Alabama Water Institute.

"As we know, water is important for life. We have to have clean water in order to live, let alone have a healthy life," she said.

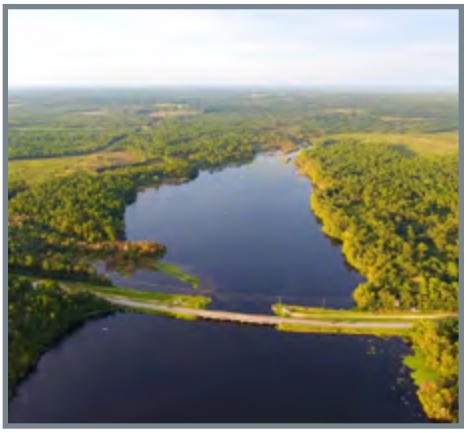
"I think rural Alabamians care about making sure they have clean water, and if they're doing something that may be impacting it, I think they're more than willing to make changes in order to have healthier lives for themselves and their children and grandchildren."

According to AWI-affiliated faculty members, approximately 25 percent of residents in rural areas do not have access to city water systems. They rely on wells for drinking water, and they are required to treat their own wastewater by way of permitted on-site septic systems.

"Understanding the issues around sewage systems is crucial because they may feed into the groundwater in some way," Newman said. "That can impact our streams and waterways where people are fishing, pulling things out and eating them, so all of that very much ties into the health of our citizens."

Newman said she envisions the ALRI and AWI developing joint studies and public education programs as a way to strengthen collaborative efforts. Research will not only be done on campus, but she and other faculty members will visit rural areas around Alabama to learn more about the needs of those communities. In turn, they'll offer advice on how the institutes can help provide solutions.

"I think rural Alabamians care about making sure they have clean water, and if they're doing something that may be impacting it, I think they're more than willing to make changes in order to have healthier lives for themselves and their children and grandchildren," she said. "I think they're happy to get that information and use it to do what they need to do."



AWI'S FLOURNOY NAMED 2020 MIRZAYAN FELLOW

Dr. Nikaela Flournoy has been selected for the 2020 Christine Mirzayan Science & Technology Policy Graduate Fellowship Program with The National Academies of Sciences, Engineering & Medicine.

By Brock Parker

Dr. Nikaela Flournoy

The fellowship is a 12-week training and educational program that hosts early career individuals at The National Academies in Washington, D.C. They spend their time learning about science and technology policy and the role that scientists and engineers play in advising the nation. According to The National Academies, the Mirzayan Fellowship "offers a unique opportunity to obtain the essential skills and knowledge needed to work in science policy at the federal, state or local levels."

Flournoy, a postdoctoral fellow in the Alabama Water Institute, has spent the past three years focusing her research on interdisciplinary coastal biogeochemical studies. She has been investigating the impact of the 2010 Gulf of Mexico oil spill disaster on the biodiversity and ecosystem services in marshes and nearby habitats. She has combined bench, field and computational approaches to profile microbial communities in coastal areas affected by the spill.

As a Mirzayan fellow, Flournoy intends to learn how to apply her interests in coastal resource sustainability and science policy with her dedication to broadening participation in STEM for workforce development in areas of national need.

Flournoy was named as a Gulf of Mexico Research Initiative scholar with the Alabama Center for Ecological Resilience in 2018. She is also an advocate for the importance of early engagement in science, resource accessibility and retention of underrepresented minority students in STEM fields.

In 2016, Flournoy earned her Ph.D. in biological sciences from The University of Alabama.

She also holds a Master of Science in microbiology from the University of Iowa and Bachelor of Science in biology from Alabama A&M University.

H.U.B.

AWI Presents: ***Water H.U.B. Talks* series**

An opportunity for researchers to come together.

H—Hear broadening perspectives on current and emerging water issues to,
U—Uncover through shared understandings of complex water issues to,
B—Build bridges to foster interdisciplinary research and education opportunities.

Wednesday, March 11

Speaker: Mukesh Kumar, Ph.D.
Associate Professor, Civil Construction and Environmental Engineering, The University of Alabama

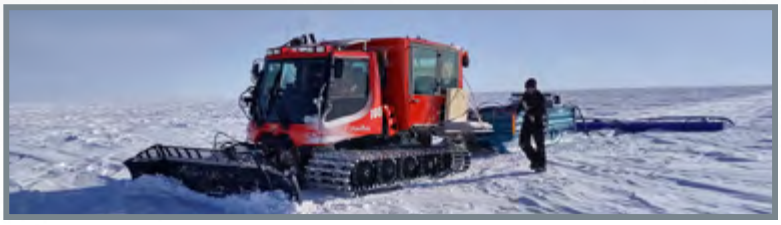
For the full list of spring semester speakers visit: *awi.ua.edu*

Time: 12 p.m. - 1 p.m. • Location: Bevill Building, Rm.1000
Boxed lunches will be provided if R.S.V.P. is received: *awi@ua.edu*

Alabama Water Institute Hosting World Water Day Event

The Alabama Water Institute will host an event honoring World Water Day March 26 from 11 a.m.-1:30 p.m. in the Ferguson Center ballroom. Faculty and students can learn more about water quality and resources by experiencing The Watershed Game and its four versions: streams, lakes, rivers and the newest, coastal. Tim Leopard, UA's senior associate vice president for campus development, will provide updates on the campus stormwater project. The AWI, Alabama Life Research Institute and Graduate School will also have informational tables and supplies. Food and drinks will be available.

UA ENGINEERS HELP FIND SITE TO DRILL FOR ANTARCTICA'S ANCIENT ICE



By Adam Jones

A unique radar developed by engineering researchers at The University of Alabama helped find the location to recover some of the oldest ice buried in Antarctica as part of an international effort to better understand the Earth's climate history.

Using information collected by the radar, scientists leading the project confirmed the site where they intend to drill a core of ice in East Antarctica, located at Little Dome C, an area of about six square miles nearly 620 miles inland. It is possible the drilling will recover ice nearly 1.5 million years old, which may reveal why the climate cycle for the Earth's ice ages lengthened roughly 1 million years ago.

"With active participation of UA students, our team developed very complex, high-sensitivity remote sensing radars in less than a year and successfully mapped deep layers no other group has been able to accomplish," said Dr. Siva Prasad Gogineni, Cudworth Professor of Engineering, director of the UA Remote Sensing Center, and an internationally recognized expert in the field of remote sensing.

Dr. Stephen Yan, assistant professor of electrical and computer engineering, led the project for UA.

The work is part of Beyond EPICA, a more than $12 million project supported by the European Union involving 12 institutions in 10 European countries and with UA selected to perform precise radar imaging. It follows a previous effort, dubbed EPICA, which recovered an 800,000-year-old ice core.

Scientists, led by Dr. Carlo Barbante from Ca' Foscari University of Venice and the Institute of Polar Sciences of the National Research Council of Italy, hope ice layered 1.5 million years ago can reveal Antarctica's climate and the greenhouse gasses present during the Middle Pleistocene Transition, which happened between 900,000 and 1.2 million years ago.

During this time, the periods between glacial climates transitioned, lengthening from about 41,000 years to 100,000 years between ice ages. This change is the mystery Beyond EPICA seeks to resolve.

Little Dome C, nearly 25 miles from the nearest research station in an area administered by the French and Italian polar agencies, was selected as the potential site to recover the ancient ice after an initial two-year Radar Echo Sounding survey that covered more than nearly 2,500 miles of airborne and ground-based measurements as part of the previous EU project.

In November, UA's radar was deployed to the site to scan nearly 2 miles below the ice to precisely select the exact drilling site. The work was conducted by Dr. Drew Taylor, UA assistant professor of electrical and computer engineering, with international collaborators Dr. Daniel Steinhage from the Alfred Wegener Institute in Germany and Dr. David Lilien from the University of Copenhagen in Denmark.

The ultra-wideband radar and antenna capable of penetrating deep into ice was able to image, with high definition, the ice layering in the deepest part of the ice sheet. The radar was designed and fabricated by UA researchers, including seven graduate and eight undergraduate students in the UA College of Engineering, and led by Dr. Charles O'Neill from the UA Remote Sensing Center.

Radar development was supported by the University of Copenhagen, the Alfred Wegener Institute, the National Science Foundation and UA.

"We're proving we have the expertise in remote sensing with our radar systems and design to provide unique solutions to answer the questions the scientists have about the ice and our climate," Taylor said.

Taylor and the team at Little Dome C drove a tightly spaced grid over two areas about 2.5 square miles in size. The radar collected a tremendous amount of data initially analyzed on-site using software developed by students and faculty from UA.

"It became apparent to everyone these data were much improved from anything seen before in this area," Taylor said. "It is a testament to the effort put forth by the leadership, faculty, staff and students of the Remote Sensing Center over the past weeks and months."

The data was further analyzed and modelled in European laboratories, allowing scientist to confirm with a meter-scale resolution the exact future drilling site. The radar imaging showed there should not be any ice melting at the base, despite the tremendous pressure of the mass of ice above it. The characteristics of the deeper layers, with ice at least 1.5 million years old, should be preserved with a good temporal resolution, the scientist believe.

"It is the first time that a site for deep drilling has been selected with such a high precision and effort," said Dr. Olaf Eisen with the Alfred Wegener Institute and one of the leaders of the Beyond EPICA project. "The new radar measurement showed more clearly than before, that the ice there is well stratified and most probably very old."

If the project proceeds according to plan, it will take six years to drill, collect and analyze the ice from what will be a deep hole.

ABBASZADEH FINDS WATER RESEARCH OPPORTUNITIES FAR FROM HOME

Peyman Abbaszadeh is a Ph.D. candidate in The University of Alabama's Department of Civil, Construction and Environmental Engineering. He is also a research assistant in the Center for Complex Hydrosystems Research (CCHR), a research center of the Alabama Water Institute.

By Brock Parker

Peyman Abbaszadeh

Originally from Iran, Abbaszadeh came to UA to pursue his Ph.D. in hydrology and water resources. His research focuses on hydrologic modeling, data assimilation and remote sensing to more accurately predict extreme hydroclimate events.

"Let's assume that next week we are expecting a thunderstorm," said Abbaszadeh. "We know we'll have heavy rainfall, so we want to know how much flood to anticipate from this extreme storm."

Using advanced statistical and dynamical modeling and abundant state-of-the-art satellite observations, Abbaszadeh said they can also predict drought conditions and how long they will last.

"This information is crucial for water managers, farmers and stakeholders as how to consume water to avoid the deficit," he said.

Abbaszadeh earned his bachelor's and master's degrees in his home country, and he came to UA to pursue his Ph.D. and to conduct research in hydrologic science and engineering for societal benefits. He is working on his Ph.D. under the supervision of Dr. Hamid Moradkhani, the director of CCHR and Alton N. Scott Endowed Professor in the Department of Civil, Construction and Environmental Engineering. Abbaszadeh said being an international student at UA opens the door to a wide variety of opportunities because many students come from countries that might not have the facilities that the University offers.

"One important thing we have here at UA is the hope for future," he said. "We are studying, learning and conducting research, and at the same time we're building our future."

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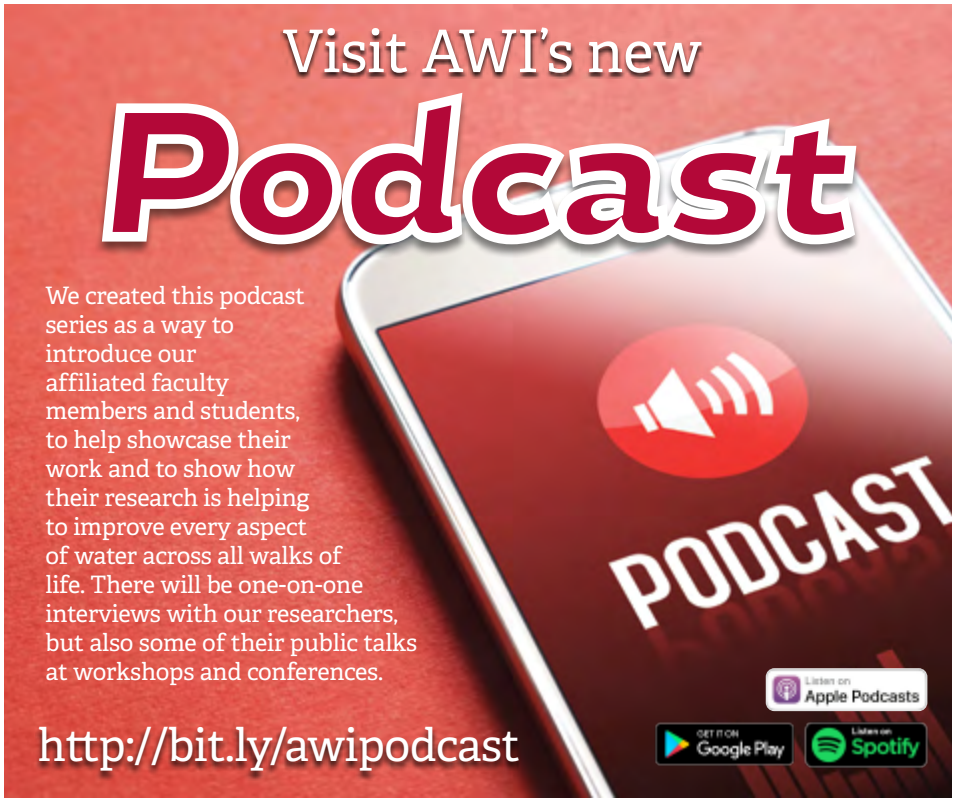

Contact Brock Parker at brockparker@ua.edu or 205-348-5328 for more details or to schedule a recording.

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