

ASU students learn about science, sailing and self-discovery

Monthlong expedition gives students firsthand research experience while providing weather scientists with important data

By Dolores Tropiano, ASU News
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Story highlights

Through the Aerosols and Ocean Science Expeditions program offered at ASU's New College of Interdisciplinary Arts and Sciences, students go on a 28-day cruise to study one of the world's most abundant — and often minimized — environmental hazards: dust.

Students get a firsthand look at how interdisciplinary scientific field research is conducted, as well as lessons of self-discovery, while providing weather scientists with important data.

Keon Davis gripped the side of the 208-foot research vessel as 30-foot waves battered the boat.

The roar of the 20 mph winds was so loud that anyone trying to speak to him would be impossible to hear.

It was one of those experiences that tethers the mind to the moment — demanding absolute focus on the task at hand.

As the ship continued toward the African coast, Davis considered retreating to the cabin.

But he had a job to do.

Davis, a fourth-year astrophysics student at Arizona State University, was a member of a six-person team that spent nearly a month aboard the NOAA ship [Pisces](#) this summer as part of a trans-Atlantic field research campaign studying one of the world's most abundant — and often minimized — environmental hazards: dust.

[Vernon Morris](#), senior associate dean for knowledge enterprise and strategic outcomes in ASU's [New College of Interdisciplinary Arts and Sciences](#), supervised the 28-day [Aerosols and Ocean Science Expedition](#), part of the internationally recognized series of trans-Atlantic field research campaigns known as the [AEROSE \(Saharan Dust AERosols and Ocean Science Expeditions\) program](#).

For more than two decades, AEROSE scientists, students and government agencies have taken their research out of the laboratory and onto the Atlantic Ocean to study how airborne particles change as they travel across the ocean.

The AEROSE project gives students real-world, firsthand research experience, and it gives weather scientists two important tools. First, it collects rare weather data from remote parts of the open ocean, where information is usually limited. Scientists use this data to test and improve satellites before they launch. Second, it provides a highly reliable dataset that plays a role in the accuracy of satellite observations and climate models.

NOAA, NASA and international researchers are already using this dataset to strengthen weather forecasting and global climate models.

More to dust than meets the eye

At first glance, atmospheric dust may not seem like a subject worthy of an ocean expedition.

But Morris says there is much more to dust than meets the eye.

“All AEROSE cruises are focused on the multiplicity of environmental impacts of airborne mineral dust from the Saharan desert,” said Morris, an ASU Foundation Professor who has participated in the expedition more than 15 times. “These range from atmospheric to marine to terrestrial and public health impacts.”

Those impacts can occur over vastly different periods of time, he said — from immediate air pollution and weather events to seasonal changes and long-term effects on the climate.

Dust particles can influence weather and ocean conditions, and they can affect air quality and human health.

“These little particles are so small that if you breathe enough of them into your lungs, they can cause breathing issues and affect the entire respiratory system,” Davis said.

Why this research matters

Research is the invisible hand that powers America's progress. It unlocks discoveries and creates opportunity. It develops new technologies and new ways of doing things.

Learn more about ASU discoveries that are contributing to changing the world and making America the world's leading economic power at researchmatters.asu.edu.

Learning science at sea

The summer AEROSE expeditions give students firsthand experience in how interdisciplinary scientific field research is conducted.

Instead of learning only from textbooks, lectures or lab experiments, students are part of a working research team. They learn how to operate instruments, collect samples, record observations, troubleshoot equipment and make decisions in an environment where the classroom is in constant motion.

Each day, student researchers work five-hour shifts collecting hundreds of measurements of the atmosphere and ocean, recording everything from wind speed and cloud coverage to the characteristics and concentrations of small particles that often hang in a haze between the boat and the sun.

Those particles travel thousands of miles from the Sahara Desert across the Atlantic Ocean and into the Americas — even as far as the Southwestern U.S.

Several times each week, students report their findings back to Morris. The measurements will help researchers track what was happening to airborne particles as they moved across the Atlantic, and they will also improve modeling and space-based observational capabilities.

Sailing, science and self-discovery

For Davis, simply being at sea for nearly a month was an experience unlike anything he had encountered before.

“I think that trip is unique,” he said. “I don't think there's a lot of things or opportunities like that.”

The experience made Davis think about something far beyond ocean research: His goal is to eventually be part of a space mission, and he has often wondered what it might be like to spend extended periods of time in a confined environment with the same people. The AEROSE expedition gave him a small glimpse of that.

Ultimately, for Davis, the experience became about more than learning how to collect scientific data.

“I feel like it made me more confident and aware of myself,” he said.

Postdoctoral scholar [Saira Hamid](#), who had participated in an earlier AEROSE research cruise, took on a leadership role, helping guide students through the science. But some of her biggest lessons had less to do with instruments or measurements and more to do with how science gets done.

As an early-career researcher, Hamid said she once thought being a capable scientist meant demonstrating that she could do the work independently.

“There was a lot of personal growth for me, because it really taught me how, for great scientific endeavors like what we’re trying to do here, you can’t do it alone,” she said.

“This taught me that that is completely impossible, and it’s OK to ask for help. And that’s actually what makes teams stronger.”

This story originally appeared on [ASU News](#).

Main image



ASU student researchers spent nearly a month aboard the NOAA ship Pisces this summer as part of the Aerosols and Ocean Science Expeditions program offered at ASU's New College of Interdisciplinary Arts and Sciences. Students on the expedition got a firsthand look at how interdisciplinary scientific field research is conducted. Photo courtesy of Vernon Morris

Text image(s)



Fourth-year ASU astrophysics student Keon Davis aboard the NOAA ship Pisces as part of the Aerosols and Ocean Science Expeditions program this summer. Photo courtesy of Vernon Morris



Postdoctoral scholar Saira Hamid said some of the biggest lessons she learned had less to do with instruments or measurements and more to do with how science gets done. Photo courtesy of Vernon Morris

Gallery



ASU student researchers spent nearly a month aboard the NOAA ship Pisces this summer as part of the Aerosols and Ocean Science Expeditions program offered through ASU's New College of Interdisciplinary Arts and Sciences.



Fourth-year astrophysics student Keon Davis (far left) and other ASU students sometimes passed the time aboard Pisces by playing cards with crew members.



Dust particles can influence weather and ocean conditions, and they can affect air quality and human health.

SCIENTISTS



Denise Keeler (Chief Sci.)



Korry Martin



Saina Hariri



Kacen Davis



Anaya Green



Lauryn Fox



Sarah Marmolejos



Jack Hughes

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ASU students aboard the NOAA ship Pisces were part of a working research team.