AOML Keynotes

NOAA'S ATLANTIC OCEANOGRAPHIC AND METEOROLOGICAL LABORATORY

January-March 2020

AOML is an environmental laboratory of NOAA's Office of Oceanic and Atmospheric Research located on Virginia Key in Miami, Florida

Three Possibilities, One Choice

In January 1971, employees of the fledgling National Oceanic and Atmospheric Administration were asked to choose "the symbol that will serve as the trademark of our programs in future years." Choice 2 was selected as the hands-down favorite and became NOAA's official emblem. The emblem symbolizes the interconnections between the Earth, ocean, atmosphere, and ecosystems.

A Teleworking Workforce

To help contain the spread of COVID-19, Department of Commerce staff were placed on mandatory telework status on March 23, with only mission-critical employees able to enter their normal worksite and only when necessary, as a precaution to protect their health and safety. AOML employees are adapting to their new virtual work environment, connecting with one another through online video conferencing and other communication tools. The lab continues its support of NOAA's mission through this time of "Safety at Home" guidance from the State of Florida.

NOAA Celebrates 50 Years of Science, Service, and Environmental Stewardship

"The oceans and the atmosphere are interacting parts of the total environmental system upon which we depend not only for the quality of our lives, but for life itself."

President Richard Nixon
July 9, 1970

On July 9, 1970, President Richard Nixon addressed Congress regarding efforts to establish the National Oceanic and Atmospheric Administration. Three months later, NOAA was officially founded on October 3, 1970 from an assortment of departments and agencies scattered throughout the federal government, including the US Coast and Geodetic Survey, Weather Bureau, and Bureau of Commercial Fisheries. Since then, NOAA has emerged as a world-class forecasting and resource management agency with a reach that extends from the surface of the sun to the depths of the ocean floor.

NOAA's unique science mission benefits every American life every day in positive ways, including keeping Americans safer and contributing to greater US economic growth than ever before. In the next 50 years, NOAA will advance innovative research and technology, answer tough scientific questions, explore the unexplored, inspire new approaches to conservation, and continue its proud legacy of science, service, and stewardship.

Here are some of the ways NOAA serves the nation today:

NOAA is a global leader in environmental science and technology, helping the world adapt to our changing planet: NOAA uses cutting-edge research and technologies to help better understand planet Earth.

NOAA is building a Weather-Ready nation: NOAA remains at the forefront of weather science, making earlier and more accurate forecasts that save lives, protect property, boost the US economy, and strengthen national security.

NOAA is a leading steward of a cleaner, healthier, more sustainable ocean: NOAA helps ensure long-term sustainability of the nation's fisheries, protecting vulnerable marine species and their habitat and supporting aquaculture.

NOAA powers the blue economy: NOAA explores, maps, and observes the nation's waters, preserving underwater parks and coastal reserves and supporting resilient coasts, working waterfronts, marine commerce, and sustainable seafood for a thriving economy.

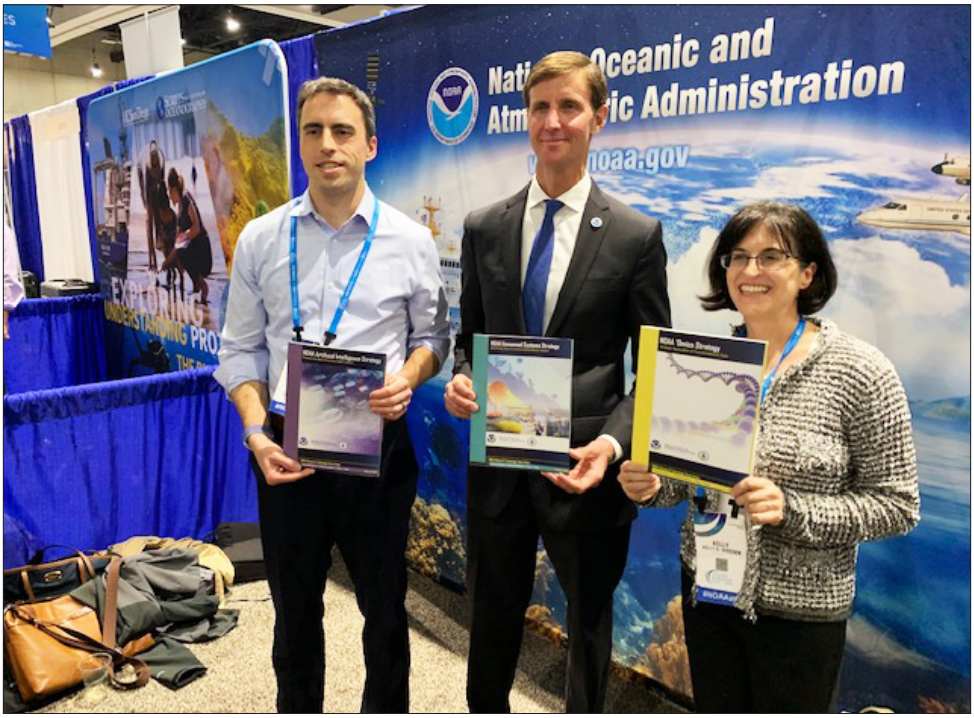
NOAA harnesses big data: NOAA collects data from satellites, ships, aircraft, and a vast network of environmental monitoring systems, keeping the public safe, promoting the nation's economic security, protecting and managing resources, and enhancing our understanding of planet Earth.

Join NOAA in celebrating its 50th anniversary by visiting www.noaa.gov/50-years to find features, multimedia, milestones, and events.

NOAA Premieres Strategies Focused on Emerging Science and Technology

"These strategies will accelerate the implementation of the most effective science and technology applications to advance NOAA's mission to protect life and property and grow the American Blue Economy."

Rear Admiral Tim Gallaudet, PhD
Assistant Secretary of Commerce for Oceans and Atmosphere and Deputy NOAA Administrator



Greg Dusek of NOAA's Center for Operational Oceanographic Products and Services, NOAA Deputy Administrator Tim Gallaudet, and Kelly Goodwin of AOML premiere three of NOAA's four new science and technology strategy documents.

At the international Ocean Sciences meeting this past February, AOML microbiologist Kelly Goodwin, PhD, helped NOAA unveil a new strategy for how the agency will dramatically expand its use of 'omics in the coming years. The 'Omics strategy is one of four blueprints NOAA premiered that will guide transformative advancements in the quality and timeliness of its science, products, and services. The three other emerging science and technology focus areas include unmanned systems, artificial intelligence, and cloud services.

Goodwin played a pivotal role in developing NOAA's 'Omics strategy document by serving as the co-chair of the 'Omics Strategy task force. In this role, she worked closely with colleagues at the National Marine Fisheries Service to become familiar with the many ways 'omics is being used across the agency. She helped write both the strategy and implementation plan for how 'omics research will help NOAA better monitor and understand the biological communities of the oceans and Great Lakes.

"It has been gratifying to learn about the amazing work NOAA is doing across the agency in terms of 'omics," she said. "It's a privilege to share stories about how we are working to harness these tools to help meet mission objectives."

'Omics refers to a suite of advanced methods to analyze material such as DNA, RNA, proteins, and metabolites. 'Omics methods are faster, cheaper, and less invasive than traditional methods, providing more timely access to information.

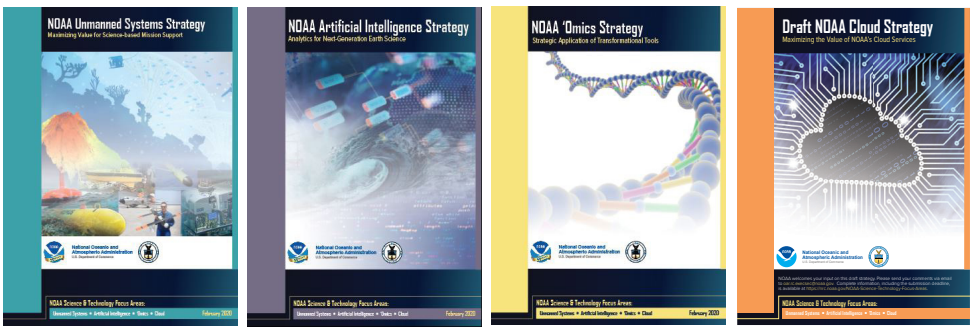
The technology enables NOAA to "understand the who, what, and how of biological organisms," according to Goodwin. "That is, who is there, what are they doing, and how might they be adapting to changing ocean conditions."

NOAA's 'Omics strategy will improve ecosystem assessments and forecasts, advance stewardship, and promote the Blue Economy. National priorities for its use include fisheries management, aquaculture development, food and water safety, species and habitat conservation, seafood consumer protection, and natural products discovery.

Like 'omics, the three other emerging science and technology focus areas also support a broad range of pre-existing programs across the agency. For example, AOML uses a variety of unmanned systems to collect highly accurate, time-sensitive data in support of climate and weather studies, while an example of its use of artificial intelligence includes ecoforecasts that alert marine managers to environmental conditions that foreshadow coral bleaching. Additionally, cloud computing partnerships with commercial cloud service providers enable AOML scientists to store and crunch massive quantities of data.

Implementing the four new strategies will enable NOAA to more fully address complex challenges that exist across multiple missions, accelerate research advances, solve tough problems, and set a course to strengthen its leadership role as a science and technology innovator in the coming decades. As efforts proceed, NOAA is poised to more efficiently and effectively coordinate their development and use, enabling the agency to remain at the forefront of environmental knowledge.

The strategy documents for NOAA's emerging science and technology focus areas were developed with guidance provided by Congress and the Administration.



NOAA's strategy documents are available at https://nrc.noaa.gov/NOAA-Science-Technology-Focus-Areas.

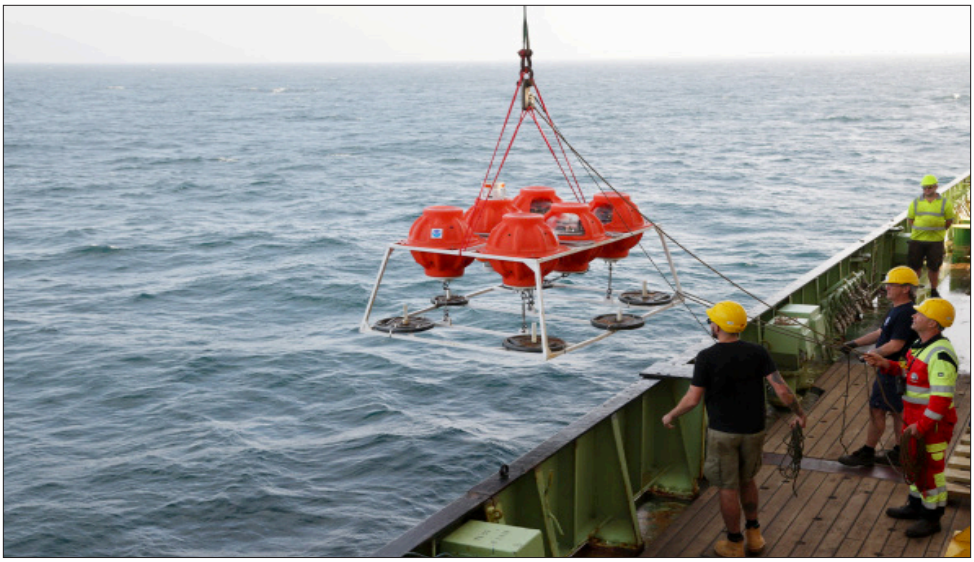
Autonomous Data Pods to Provide Low-Cost, Reliable Data Retrieval

In March, AOML oceanographers collaborated with colleagues from the National Oceanographic Centre in the UK to deploy two autonomous data pod systems near the eastern boundary of the North Atlantic Ocean. The cruise aboard the British research vessel RSS *James Cook* is the first full scale operational deployment of the data pod systems, which will rest on the ocean floor coupled with pressure inverted echo sounders. The goal is to provide a low-cost solution for sustained monitoring of the Atlantic meridional overturning circulation.

Ships have traditionally collected data using acoustic telemetry when passing by an instrument's location on the ocean floor. However, as ship time becomes increasingly expensive and difficult to schedule, autonomous data pod systems offer a viable solution for economically retrieving data from bottom-moored instruments.

AOML engineers designed and manufactured the data pods to address the challenge of limited access to ship time for data retrieval. The pods record data from instruments moored on the ocean floor. At pre-programmed intervals, they self-release, rise to the sea surface, and transmit their stored data via satellite.

Pressure inverted echo sounders are acoustic instruments placed on the seafloor that measure bottom pressure and the time it takes for a sound pulse emitted by the instrument to travel to the ocean surface and back. The travel time measurements are then transformed into full-depth profiles of temperature and salinity.



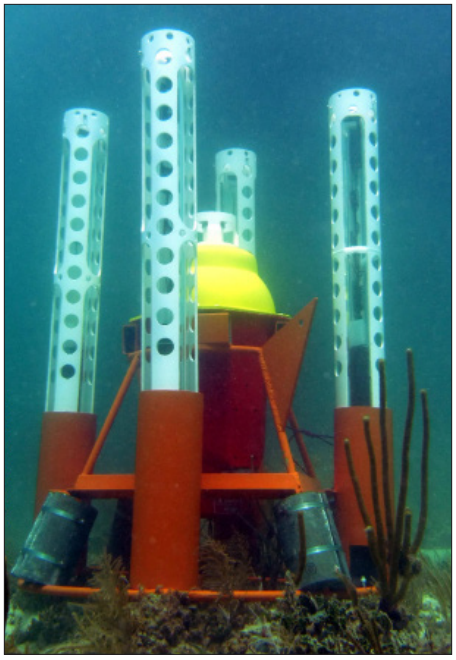
The first of two pressure-inverted echo sounder-data pod packages is deployed from the deck of the British oceanographic research vessel RSS *James Cook* to rest on the ocean floor at a depth of about 1000 meters.

The two data pod systems were deployed in the vicinity of the Canary Islands next to the UK's tall moorings at depths of approximately 1000 and 5000 meters. Each system is programmed to release a data pod about once a year, with the last pair of pods programmed for release in 2024.

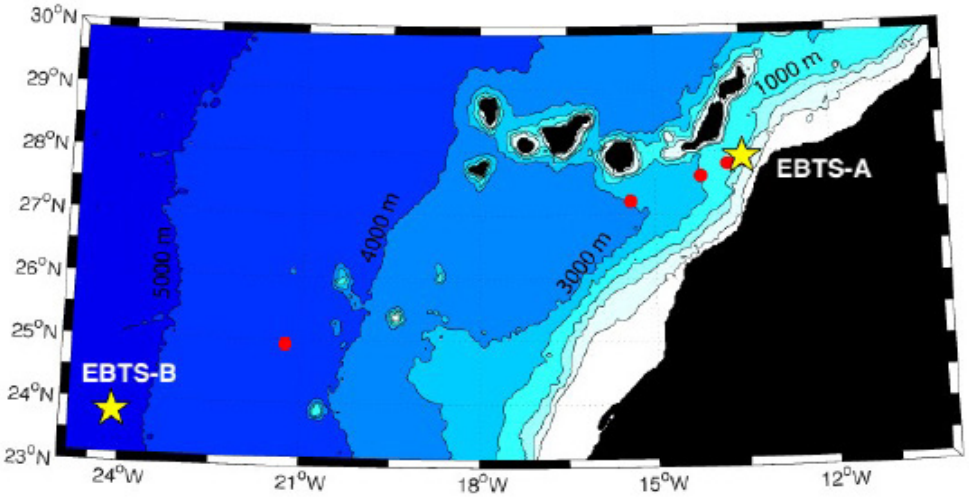
Data from the deployed instruments will complement measurements from other NOAA-led Western Boundary Time Series observing projects in the western North Atlantic. The data will also aid studies on the Atlantic meridional overturning circulation's volume and heat transports in the subtropical North Atlantic Ocean.

AOML researchers have been gathering data from the western boundary of the North Atlantic for 30+ years, providing a nearly-continuous time series of ocean transport. If the current field experiment is successful, data from both the western and eastern boundaries of the Atlantic can be combined to aid researchers in detecting short- and long-term changes in this ocean basin.

The data pod system enables researchers to reliably and continuously gather critical ocean data at a fraction of the cost required by the use of research vessels, resulting in significant savings to both NOAA and the nation. The project is funded by a NASA grant and by AOML, and led by Denis Volkov, a University of Miami-Cooperative Institute scientist at AOML.



Prototype of the data pod system developed at AOML that was used to test the viability of expendable pods shuttling data to the surface from instruments moored on the ocean floor.

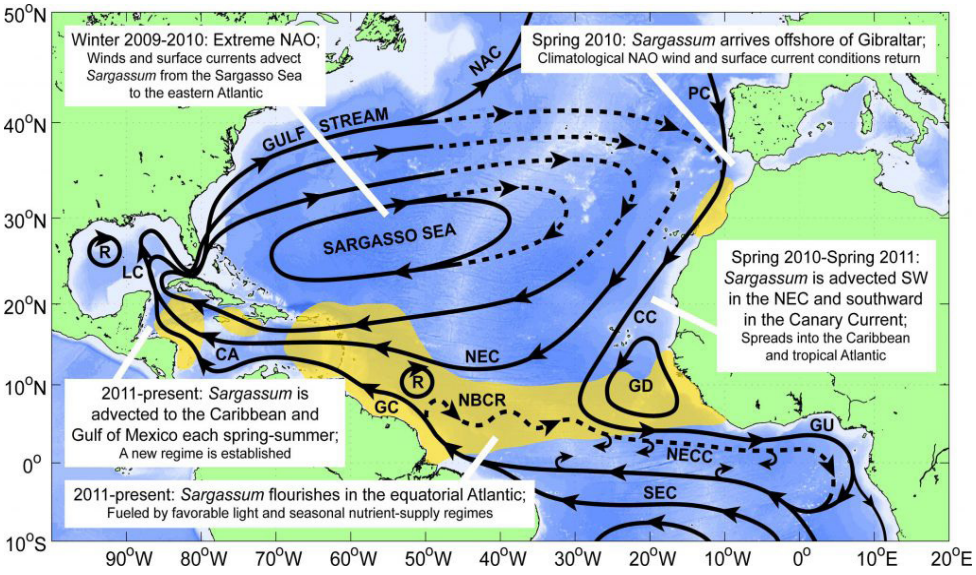


Yellow stars denote the location of moorings on the ocean floor where an autonomous data pod system was deployed.

Chasing Sargassum: New Insights on Coastal Sargassum Invasions

Since 2011, the coastlines of the tropical Atlantic Ocean and Caribbean Sea have been plagued by extraordinary accumulations of a type of floating brown alga, commonly called "seaweed" and known as Sargassum. These alga float at the sea surface, where they can aggregate to form large mats in the open ocean.

Off the US eastern seaboard in the Sargasso Sea and Gulf of Mexico, free-floating Sargassum has always been common. These alga provide an essential habitat, with food sources, nursery areas, and breeding grounds for fish, sea turtles, and birds. However, the increased abundance of Sargassum in the tropics, stretching from Africa to the Caribbean Sea and Gulf of Mexico, has had adverse effects on these regions' coastal ecosystems and local human communities.



Map of the Atlantic basin that shows the pathway by which Sargassum exits the Sargasso Sea and makes its way to the tropical Atlantic Ocean and Caribbean Sea.

The ways in which Sargassum has invaded the tropical Atlantic have been a mystery, but we may now have an answer. A new study in *Progress in Oceanography** led by AOML researchers identifies possible mechanisms and pathways by which Sargassum has entered and flourished in the tropical Atlantic and Caribbean.

"We were particularly interested in understanding the origins of the tropical Atlantic's Sargassum population and how it's being sustained. Its presence has caused severe socioeconomic impacts on local communities," said Libby Johns, PhD, AOML oceanographer and lead author of the study.

The study team discovered that during the winter of 2009-2010, winds that typically blow to the east—from the Americas to Europe—strengthened and shifted to the south. This shift was unusual and triggered a long-distance eastward dispersal of Sargassum from the Sargasso Sea toward the Iberian Peninsula in Europe and West Africa. After exiting the Sargasso Sea, the Sargassum drifted southward in the Canary Current and then entered the tropics. Once in this new and favorable tropical Atlantic habitat, with ample sunlight, warm waters, and nutrient availability, the Sargassum flourished and has continued to grow.

Having established a new population, the Sargassum now aggregates almost every year in April-May in a massive windrow or "belt" north of the Equator, along the region where the trade winds converge. During the spring, the Sargassum follows this convergent region's northward seasonal excursion. By June, the belt stretches across the entire central tropical Atlantic. Large portions of the algae are then transported to the Caribbean and Gulf of Mexico via the North Equatorial and Caribbean current systems.

"Predicting the occurrence of Sargassum blooms will help us better understand their impacts on our ecosystems and thereby improve our scientific advice in the management of our fisheries and protected species," said Cisco Werner, Chief Science Advisor, NOAA-National Marine Fisheries Service.

Out at sea, Sargassum is an important habitat, but as it accumulates close to the coastlines it can smother valuable corals, seagrass beds, and beaches. As it washes ashore the seaweed begins to decay, attracting flies and other insects. During its breakdown, Sargassum produces hydrogen sulfide gas which smells of rotten eggs, repelling beachgoers and affecting the tourist industry that depends on pristine ocean conditions.

This study offers new insight into the recent Sargassum events. Further studies in collaboration with AOML's international partners across the North Atlantic Ocean, Caribbean Sea, and Gulf of Mexico are needed to fully understand and improve predictions of the distribution and impacts of Sargassum outbreaks, as well as develop strategies to effectively mitigate the invasions.

Small air-filled pockets allow Sargassum to float at the surface of the water where it aggregates in large mats on the open ocean.

*Johns, E.M., R. Lumpkin, N.F. Putman, R.H. Smith, F.E. Muller-Karger, D. Rueda, C. Hu, M. Wang, M.T. Brooks, L.J. Gramer, and F. E. Werner, 2020: The establishment of a pelagic Sargassum population in the tropical Atlantic: Biological consequences of a basin-scale long distance dispersal event. *Progress in Oceanography,* 183: 102269.

NOAA Research Highlights AOML Scientists for Women's History Month

In honor of March being Women's History Month, NOAA Research has been featuring women scientists from across the agency, taking readers inside a typical day in their work life. Here are excerpted versions of two AOML scientists—Kelly Goodwin and Leticia Barbero—recently highlighted.

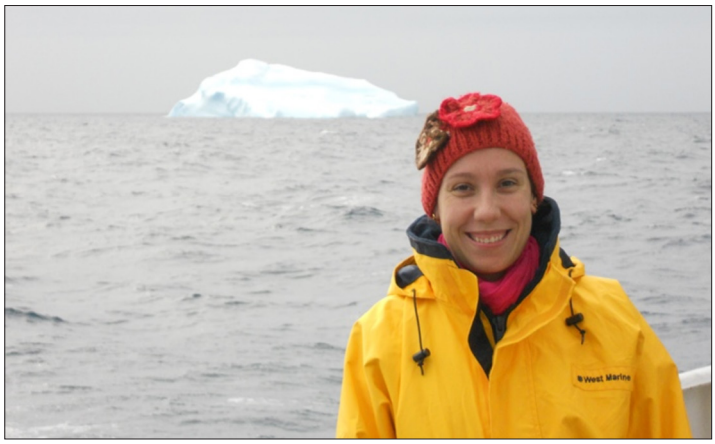
Dr. Kelly Goodwin is a microbiologist who currently co-chairs the task force that's laying out the plan to implement NOAA's 'Omics Strategy. The 'Omics Strategy is one of four science and technology strategies that aim to guide transformative advancements in the quality and timeliness of NOAA's science, products and services.

I'm a microbiologist, so what has always drawn me to the oceans is biology of all kinds—even the kind that you can't see. Because even though microbes are too tiny to see by eye, you feel their impact every day. They regulate all the fundamental biogeochemical cycles, like oxygen, carbon, nutrients, and metals. Life depends on microbes. They're these tiny things that affect the whole world, and I've always found that fascinating.

As the co-chair of the 'Omics Strategy task force, my role was to help write the strategy and the (pending) implementation plan for new 'omics research. The plan represents NOAA as a whole, so I had to become familiar with how scientists across NOAA are working within 'omics, including people who are working on harmful algal blooms, environmental DNA (eDNA) of fish and protected species, and more. This involves learning what other scientists are doing and then figuring out how to tell their stories to government leaders and the public so that we can better explain why working with 'omics will help NOAA meet its mission objectives.

Microbes are hard to study—under a microscope, you just see dots or squiggles. It wasn't until 'omics technologies came along that we could look at DNA, RNA and proteins, and really start to unlock mysteries of the microbial world. And as we've done so, we've realized that the world is more complex and diverse and interconnected than we ever thought before. Working in 'omics is like being an explorer. I can sit at my desk and look at A, T, G, and C's (the DNA code letters) and explore the depths of the oceans by looking at DNA sequences.

And to be able to do that at NOAA—to be able to blend that basic scientific curiosity with something that can benefit the average person—that's the perfect combination.



Dr. Leticia Barbero is a chemical oceanographer at NOAA's Cooperative Institute for Marine and Atmospheric Studies at the University of Miami. In her role, she studies the carbon dioxide system in the ocean, specifically ocean acidification in the coastal waters along the eastern seaboard of the US and Gulf of Mexico.

I come from an inland city about 3-4 hours from the nearest beach, but I guess I always liked the sea and all the secrets it seemed to hold. I also liked the idea of a multidisciplinary degree where I had the chance to study chemistry, biology, physics, and geology. As I completed my undergrad, climate change and how it affects the oceans was appealing to me, and that's how I ended up doing my PhD studying the carbon dioxide system.

My work is mostly focused on ocean acidification studies. Ocean acidification is the decrease in pH that occurs as a result of increased carbon concentrations in the ocean. The increased acidity can have significant impacts on ecosystems and organisms. My group collects carbon chemistry data along the east and Gulf of Mexico coasts of the US through a variety of approaches that include ships of opportunity, discrete samples, and specific research cruises.

I lead our group's ocean acidification cruises in the Gulf of Mexico. These cruises take place every 4 years and incorporate a multidisciplinary team of scientists that collect data on the physics, chemistry, and biology of our coastal waters, all with the purpose of monitoring trends of ocean acidification and how they could impact local communities.

I like that my work isn't monotonous. Sometimes I sit in my office all day, but other times I work in the lab with samples, or I travel to meet with colleagues to present our results. And then every other year I get to go on research cruises, where I feel really seasick at first (and think I'll never do this again) but after that really enjoy the opportunity to work with a diverse group of people.

The full profiles for Kelly Goodwin and Leticia Barbero, as well as other women scientists highlighted by NOAA Research are available at https://research.noaa.gov/News/Scientist-Profile

In January, more than 20 AOML scientists braved the chilly winter weather of Boston, Massachusetts to attend the American Meteorological Society's 100th annual meeting. The centennial event, hosted at the Boston Convention and Exhibition Center, brought together scientists, educators, students, media reps, and vendors from across the globe for the largest conference dedicated to weather, water, and climate. Over the 5-day conference, AOML attendees made 33 oral and poster presentations on tropical meteorology, as well as on advances with new technology and collaborative efforts with research partners to improve tropical cyclone forecasts.

Some of AOML's attendees at the AMS annual meeting in Boston, Massachusetts included (left to right): Laura Ko, Andrew Kren, Joe Cione, Karina Apodaca, Michael Mueller (NOAA'S Earth System Research Laboratory), Sarah Ditchek, Kelly Ryan, Steve Diaz, Jon Zawislak, Andy Hazelton, Lisa Bucci, Frank Marks, Shirley Murillo, Xuejin Zhang, John Cortinas, Eric Uhlhorn (former AOML scientist), and Jun Zhang.

Ocean Sciences Meeting Rallies Marine Science Community

In February, more than 20 AOML scientists attended the 2020 Ocean Sciences Meeting in San Diego, California to present their research through oral and poster presentations. The biennial event, co-sponsored by the American Geophysical Union, Association for the Sciences of Limnology and Oceanography, and The Oceanography Society, brought together the diverse international marine science community to share and explore the latest oceanographic research and emerging technologies for studying the global ocean.

Some of AOML's attendees at the 2020 Ocean Sciences meeting included (left to right): Molly Baringer, Claudia Schmid, John Cortinas, Chris Kelble, Kelly Montenero, Rik Wanninkhof, Kelly Goodwin, Kirsten Harper, Leticia Barbero, Jon Christophersen, Michael Rudko, Rafael Goncalves, Dongmin Kim, and Denis Volkov.

AORA Launches Marine Microbiome Roadmap

In February, AOML microbiologist Kelly Goodwin attended a Marine Microbiome Working Group meeting of the Atlantic Ocean Research Forum (AORA) in Brussels, Belgium to launch the Marine Microbiome Roadmap. The roadmap is an international effort between Canada, the European Union, and United States "to advance a shared vision of the Atlantic Ocean that is healthy, resilient, safe, productive, understood, and treasured." It is expected the roadmap will yield new insights on the significance of the microscopic scale of ocean life, as this level affects almost every aspect of life on Earth.

Members of the Marine Microbiome Working Group hold copies of the new Marine Microbiome Roadmap. Photo credit: AORA.

AOML Staff Tour Historic Virginia Key Beach Park

In honor of February being Black History Month, groups of AOML staff toured the Historic Virginia Key Beach Park located a short walking distance from the AOML facility. Virginia Beach was designated as the "only Dade County Park for the exclusive use of Negroes" in August 1945, an era when Miami's segregated African American community was banned from beaches and public swimming facilities. The 82.5 acre park was a favorite, cherished gathering place for friends and families until it closed in 1982. It reopened in 2008 due to the diligent, dedicated efforts of local activists.

AOML staff meet with a tour guide (right) to learn more about the Virginia Key Beach Park's history and the African American community's struggle to gain access to the beach.

TACOS Program Hits 25,000th Profile Milestone

On January 12, NOAA's Tropical Atlantic Current Observations Study (TACOS) reached a milestone: the 25,000th hourly upper-ocean velocity profile collected in the tropical North Atlantic Ocean at the PIRATA (Prediction and Research Moored Array in the Tropical Atlantic) buoy moored at 4˚N, 23˚W. Prior to the start of TACOS on March 6, 2017, the only velocity profiles collected at this location were from shipboard measurements. TACOS added 10 acoustic current meters to the buoy, with profile measurements taken at depths of between 7 and 87 m every 1-10 minutes, depending on the depth. These measurements are vital because upper ocean currents influence temperature, salinity, and air-sea fluxes in the tropical North Atlantic which, in turn, affect the weather, climate, and fisheries of the surrounding continents. TACOS is led by AOML scientists in collaboration with partners at NOAA's Pacific Marine Environmental Laboratory, the Ocean Observing and Monitoring Division of NOAA's Climate Program Office, and the multinational PIRATA program.

Buoys on deck and ready for deployment in support of the multi-national Prediction and Research Moored Array in the Tropical Atlantic observation network.

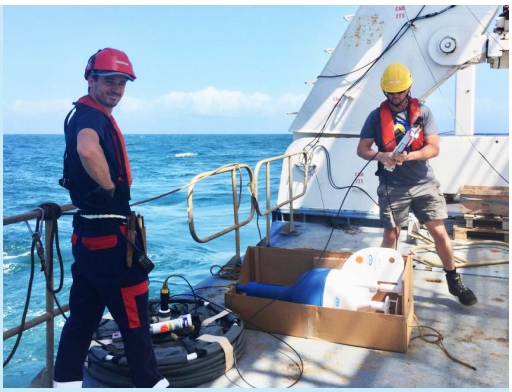
NOAA's Acting Chief Scientist Visits AOML

Craig McLean, NOAA's Acting Chief Scientist and the Assistant Administrator for the Office of Oceanic and Atmospheric Research, visited AOML on January 21. Craig met with AOML managers and hosted an all-hands meeting with staff to answer questions and concerns, as well as discuss the science conducted at AOML. He also toured several of the laboratories at AOML, including the lab's newly renovated, state-of-the-art engineering space. While in Miami, Craig also presented a seminar at the University of Miami's Rosenstiel School entitled *If you like your weather forecast, thank...an oceanographer!*

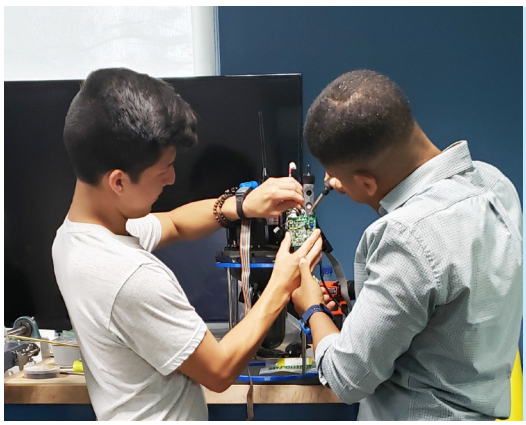
While touring AOML's new engineering space, Zach Barton explains the workings of an AOML-designed automated launcher for expendable bathythermographs to Craig McLean.

Out at Sea with our Heads in the Clouds

AOML scientists collaborated with French colleagues in February to deploy 10 surface drifting buoys from aboard the research vessel *Atalante* in the northwest tropical Atlantic Ocean. The deployments were undertaken in support of the Atlantic Tradewind Ocean-Atmosphere Mesoscale Interaction Campaign, a large, multinational project to improve understanding of the complicated interactions between the ocean and atmosphere that create shallow convective clouds. NOAA scientists are interested in studying shallow clouds and air-sea interactions due to their influence on global conditions, from temperatures and precipitation to more extreme weather events. Most of the drifters were deployed in regions of fresh water northwest of the mouth of the Amazon River. As the drifters float northward with this layer of fresh water, they will provide information on sea-surface temperatures and salinity, including the time it takes for these "fresh lenses" to erode. These specially-designed buoys, each equipped with near-surface temperature, salinity, atmospheric pressure, and wind sensors, will also measure how low-salinity water alters upper-ocean temperatures and interacts with near-surface winds. Data from the drifters will be combined with measurements from other research vessels and autonomous floats and gliders to gain a broader understanding of ocean-atmosphere interactions.



French scientists prepare to deploy a surface drifting buoy from aboard the RV *Atalante*.



Glider School in Session

In February, AOML scientists traveled to Puerto Rico and the Dominican Republic to train glider team members with the Caribbean Regional Association for Coastal Ocean Observing and the Autoridad Nacional de Asuntos Maritimos. The hands-on training focused on the removal and installation of science sensors on AOML's fleet of underwater gliders. The training also included how to install new batteries, ballast the gliders for a mission, and test the gliders' functionality for future missions. These gliders will be deployed during the upcoming 2020 Atlantic hurricane to collect oceanographic data in support of hurricane intensity forecasting studies.

Diego Ugaz, a University of Miami-Cooperative Institute electronics technician at AOML (left), trains a glider team member from the Autoridad Nacional de Asuntos Maritimos in the Dominican Republic.

Congratulations

Congratulations to the following AOML staff members who were recognized during the American Meteorological Society's 100th Annual Meeting in January:

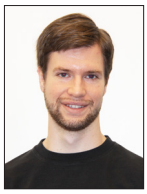
- AOML Director Dr. John Cortinas was officially made a Fellow for his long-term contributions to the atmospheric sciences.
- Laura Ko, a University of Miami-Cooperative Institute research associate with the Hurricane Research Division, received an honorable mention award at the 19th Conference on Artificial Intelligence for Environmental Science Student Presentation Contest.
- Jun Zhang and Robert Rogers were awarded the 2020 Banner I. Miller award for their paper *Evaluating the impact of improvements in the boundary layer parameterization on hurricane intensity and structure forecasts in HWRF*.

Jun Zhang, Robert Rogers, and coauthor Vijay Tallapragada with AOML President Jenni Evans.

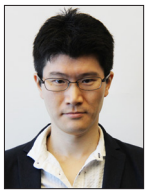
Welcome Aboard

Dr. Kyle Ahern joined the staff of AOML's Hurricane Research Division in February as a University of Miami-Cooperative Institute senior research associate. Kyle will work with the Modeling Group in support of hurricane modeling studies, particularly in regard to NOAA's Hurricane Analysis and Forecast System. He recently earned a PhD in meteorology from Florida State University.

Sabine Belanger joined the staff of AOML's Office of the Director in February as an administrative contract employee. Sabine will tend to an assortment of duties in support of AOML as the new receptionist. She will also function as a full member of the Admin Group, with fiscal duties related to budgeting and fund tracking. Sabine holds an MS degree in education from Walden University.

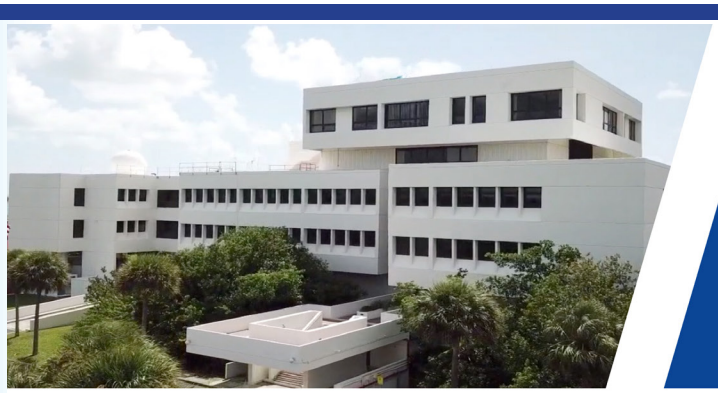


Dr. Levi Cowan joined the staff of AOML's Hurricane Research Division in January as a University of Miami-Cooperative Institute post-doctoral scientist. Levi will work with the Modeling Group on the development and analysis of NOAA's Hurricane Analysis and Forecast System, as well as the Advanced Weather Interactive Processing System. He recently earned a PhD in meteorology from Florida State University.



Dr. Udai Shimada of the Japan Meteorological Agency's Meteorological Research Institute began a 1-year visit to AOML in February. Dr. Shimada will work with Hurricane Research Division scientists to extract structural properties of tropical cyclones from NOAA airborne observations that are not accessible with current satellite platforms. These data will be used to study the relationship between tropical cyclone size and rapid intensification.

Dr. Lakemariam Worku joined the staff of AOML's Hurricane Research Division in January as a University of Miami-Cooperative Institute post-doctoral scientist. Lakemariam will work to develop a prototype Hazardous Weather Testbed experiment focused on products and services associated with a landfalling tropical cyclone using the FACETS, i.e., Forecasting a Continuum of Environmental Threats, concepts. He holds a PhD in atmospheric science from A&T University.



NOAA

OPEN HOUSE

POSTPONED

In light of updates from local and state authorities related to Coronavirus/COVID-19 we have decided to postpone the NOAA Open House planned for Saturday April 25th, 2020 on Virginia Key.

We are taking this step out of an abundance of caution to ensure the safety of our volunteers and visitors.

Please visit our website aoml.noaa.gov for up-to-date information as we continue to celebrate NOAA's 50 years of science, service, and stewardship.

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Keynotes is published bimonthly to highlight AOML's recent research activities and staff accomplishments.

Keynotes editor: Gail Derr

Recent Publications *(AOML authors are denoted by bolded capital letters)*

Bhalachandran, S., P.S.C. Rao, and **F.D. MARKS**, 2019: A conceptual framework for the scale-specific stochastic modeling of transitions in tropical cyclone intensities. *Earth and Space Science,* 6(6):972-981.

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